

Final Report of the LIEEP Power Savers Program (PSP)

April 2016

Prepared for the Department of Industry, Innovation and Science on
behalf of the PSP Consortium



NATURE CONSERVATION COUNCIL OF NSW
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ABOUT THIS REPORT

This report provides a final analysis and summation of the Power Savers Program (PSP) under the Commonwealth Government Low Income Energy Efficiency Program (LIEEP). It includes:

- a detailed description of the PSP trial
- a summation of findings from the PSP Data Evaluation Report which was independently assessed and reported by ISF on the evaluation of a) overall implementation of the PSP and b) impact of the PSP on participants and their electricity use, and
- policy and program recommendations for future implementations of similar programs.

Aside from the general public, the main audience for this report is the PSP consortium and the Australian Department of Industry, Innovation and Science (the Department) in order to inform future policies and programmes for assisting low income households in Australia to become more energy efficient.

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NCC was established in 1955 to provide a shared voice for community environmental organisations from across New South Wales (NSW). Representing 150 community organisations with a combined membership of over 60,000 individuals, NCC is a force for positive change, facilitating a powerful voice for nature, to protect and restore the unique natural environment of the state of NSW.

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The Institute for Sustainable Futures (ISF) is a university research institute that creates change towards sustainable futures by conducting independent project based research for Australian and international clients.

DISCLAIMER

The authors have used all due care and skill to ensure the material is accurate as at the date of this report. NCC and the authors do not accept any responsibility for any loss that may arise by anyone relying upon its contents.

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POWER SAVERS CONSORTIUM

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DEPARTMENT OF INDUSTRY, INNOVATION AND SCIENCE

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Australian Government
**Department of Industry,
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ACRONYMS AND ABBREVIATIONS

AAR	At-Assessment Retrofit
ACOSS	Australian Council of Social Services
assessor	home energy assessor
BDC / BDC form	Billing Data Consent form
CALD	Culturally and Linguistically Diverse
EWON	Energy and Water Ombudsman, NSW
LIEEP	Low Income Energy Efficiency Program
HEA	Home Energy Assessment (home assessment)
HWS	Hot Water System
ISF	Institute for Sustainable Futures, University of Technology Sydney
NESB	Non-English Speaking Background
NCC	Nature Conservation Council of NSW
OCC	Outbound Call Centre (United Voice)
OEH	Office of Environment and Heritage, NSW
PAR	Post-Assessment Retrofit
PIPS	Pre-Intervention Phone Survey
POPS	Post-Intervention Phone Survey
PSAP	Power Savers Action Plan
PSP	Power Savers Project
QR1/2/3	Quarterly follow up phone calls
SHWS	Solar Hot Water System
the Department	Department of Industry, Innovation and Science
TUNSW	Tenants NSW (NSW Tenants Union)
UV	United Voice

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EXECUTIVE SUMMARY

This document represents the Final Report of the Power Savers Project under the Commonwealth Government Low Income Energy Efficiency Program (LIEEP).

The Executive Summary provides a synopsis and review of PSP objectives, implementation, evaluation, and key outcomes to inform future energy efficiency policy and program approaches.

Introduction

LIEEP was announced in July 2011 as a competitive merit-based grant program to provide grants to consortia of government, business and community organisations to trial approaches to improve the energy efficiency of low income households.

The LIEEP objectives and intended benefits are as follows:

- Trial and evaluate a number of different approaches in various locations to assist low-income households to become more energy efficient.
- Capture and analyse data and information for future energy efficiency policy and program approaches.
- Assist low-income households to implement sustainable energy efficiency practices to help manage the impacts of increasing energy prices and improve the health, social welfare and livelihood of low-income households.
- Build the knowledge and capacity of consortium members to encourage long-term energy efficiency among their customers or clients.
- Build capacity of Australia's energy efficiency technology and equipment companies by maximising the opportunities for Australian industries to participate in the projects.

In early 2013, under LIEEP Round 1, the Nature Conservation Council of NSW was successful in its application for grant funding to conduct the Power Savers Project (PSP). The project was a three-year, three-million dollar initiative which trialled an innovative approach to residential energy efficiency in 1,010 low-income households in the Sydney, Central Coast, Hunter and Illawarra regions of New South Wales.

The PSP was delivered by a Consortium including lead organisation Nature Conservation Council (NCC), United Voice NSW (UV), Solahart and the Institute for Sustainable Futures (ISF) at the University of Technology Sydney. It included a further focus on assisting tenants and people from non-English speaking backgrounds.

United Voice (a union) was a consortium partner due to strong engagement with their membership, who predominantly work in low-income industries. This demographic had not specifically been engaged previously for energy efficiency benefits i.e. low-income working households who do not access welfare or Centrelink services or have a health care card.

The PSP focused on 5 objectives:

- Increase energy literacy among participants and therefore contribute to participants having a sense of control over their electricity use and electricity bills
- Reduce electricity use in participants' homes through the provision of one-to-one guidance (Energy Assessment and ongoing engagement with project staff), combined with the installation of energy-efficient technology in participants' homes
- Generate persistent electricity use reductions through the provision of ongoing support and communication through participants' peer network(s)
- Develop and test methods to overcome split-incentive barriers in a select number of participant households by developing a method for upgrades to solar hot water systems (with degrees of subsidy) in rented properties

- Develop, implement, evaluate and disseminate effective, replicable models for reducing energy use by low-income households.

PSP Design and Implementation

The project had a target of 990 participants (in addition to the 20 PSP Pilots) and successfully reached this target within the scheduled timeframe. The key to recruitment was the pre-existing relationship between United Voice and its members. There have been a number of energy efficiency programs over recent years offering free home energy assessments, including some LIEEP projects, some of whom have struggled to effectively recruit households.

The majority of the 990 households that participated in the PSP were in the Sydney region (81%) with the remainder from the Hunter (10%), Illawarra (5%) and Central Coast (4%).

PSP recruitment began with a pilot of the program with 20 participants from July 2013 and the Pilot Evaluation Report was submitted in June 2014. The PSP continued into the main implementation with 990 participants recruited from December 2013 to March 2015.

The recruitment process included an eligibility check, booking of an in-home energy assessment ideally within 2 weeks of recruitment, and a pre-intervention survey (PIPS) to allow for comparisons with the post-intervention survey (POPS) at the end of 12 months. This was the beginning of the ‘participant journey’ of the PSP.

Table 1 outlines the participant journey for the PSP. Following successful recruitment, the 12 month participant journey for the PSP sought to ensure a meaningful and enduring interaction with participants, provide real and tangible, tailored assistance, encourage persistent behaviour change, and meet the practical evaluation requirements of the project.

TABLE 1: PSP PARTICIPANT JOURNEY

Timing	Elements of journey	Key responsibility
Start	Eligibility and Recruitment; Pre-intervention phone survey (PIPS); Scheduling of in-home energy assessment.	United Voice
2 weeks	2-hour home energy assessment with assessor. Support to household to install small-scale tailored energy efficiency equipment (At-Assessment Retrofits, e.g. hot water insulation; Eco-switch); education about electricity use in the home and the electricity bill.	NCC / Assessor
1 month	Tailor-made Power Savers Action Plan (PSAP), based on home energy assessment, posted to household.	NCC
2 months	Phone call to household to review assessor recommendations; provision of post-assessment retrofit(s) (PARs)	NCC
3 months	First quarterly phone call (QR1) to household.	United Voice
6 months	Second quarterly phone call (QR2) to household. Fact sheets distributed via post as required / requested.	United Voice
9 months	Third quarterly phone call (QR3) to household.	United Voice
12 months	Post-intervention phone survey (POPS) conducted with household. Conclusion of journey. “Champions” invited to final Conclusion Event.	United Voice

Integrated into this participant journey were other communications and educational materials such as seasonal newsletters (winter and summer), which were posted to all participating households, as well as SMS reminders relating to their scheduled energy assessment and rebate expiries.

Other aspects of the 12 month journey for some of the 990 households included a subset of:

- households who received installation of a fully-funded solar hot water system (home owners).
- 'Energy Champions' recruited and trained to promote energy efficiency, network with peers and share successful energy performance improvement stories. A subset of Champions helped to form Power Savers Teams in their communities. This included additional United Voice members who were not involved in the PSP.

A participant was defined as someone who had completed a home energy assessment. While 24% of appointments were cancelled by households, attempts to rebook those households resulted in just under half of the 24% going on to rebook and successfully complete an assessment. A total of 84% of the 990 participants went on to complete their entire 12 month journey, which is likely the result of the ongoing communications and support provided by the PSP.

The Power Savers Action Plan (PSAP) was a brief summation of the assessment. It reinforced the new energy actions suggested by the assessor, both short and long-term, as well as encouraged households to continue with current actions that were saving them energy, money, and providing them with a more comfortable home.

During each assessment, assessors provided and/or installed a suite of 'At-Assessment Retrofits' (AARs). AARs included items to assist with basic draught-proofing, hot water system insulation, lighting, and reduction of standby power. Approximately 90% of households received 5 or more AAR items.

Following their assessment, the majority of participants (94%) received at least one type of energy efficiency retrofit post-assessment. Over half received energy efficiency equipment (up to the value of \$250), just under a third received a rebate for energy efficient appliances/items/services (up to a value of \$250), and about one-eighth of households received an in-home energy monitor device (IHD).

In addition to the above benefits, some of the 1,010 participants also received a solar hot water system (SHWS) based on a points criteria/ranking developed by the PSP. The initial target was to install 100 solar hot water systems:

- 50 for participants who owned their homes (by offering a free solar hot water system), and
- 50 for participants that rented (by offering a discounted solar hot water system to landlords under a cost-sharing or 'split-incentive' arrangement with tenants).

Due to system cost reductions and STC price increases, the PSP exceeded its target for installation of 50 fully funded solar hot water systems in owner households. In total, 79 installations (including 1 Pilot) were successfully completed from the available SHWS funding pool.

Despite significant efforts, the PSP did not reach its target for the installation of any solar hot water systems in renter households. While attempts were made to engage eligible renters, and subsequently their landlords or real estate agents, the target of engaging 50 combined was only partially achieved with 63 renters being engaged, but only 22 landlords or real estate agents continuing with engagement.

The key barriers were seen to be related to:

- regulations that provide little incentive for landlords to make their homes more energy efficient
- upfront cost to the landlord, and
- risk, perceived or otherwise, from tenants in approaching their landlord, either related to security of tenancy, or potential risk of rent increases as a result of improved home facilities (eg. reduced energy costs for the tenant from having a SHWS installed).

The PSP sought to maintain contact and support households throughout a 12-month period in order to encourage sustained behaviour change. Quarterly phone calls at 3, 6, and 9 months included check-ins on billing data consent progress, their general feedback on the PSP, whether they had received posted items and if they were saving money, interest in becoming a Champion, and offers of further support.

Additional communications included a selection of 6 Fact Sheets developed by the PSP, a summer and winter newsletter, phone assistance with progressing PAR rebates, and any other support required such as further advice on understanding energy bills. Peer-to-peer networks also offered support.

The PSP developed 'Champions' and 'Power Savers Teams' that some participants engaged in to take their learnings from the PSP outside the group of participants. A total of 224 Champions were identified, well above the target of 60, and they took a range of actions from recruiting others to the project, sharing their knowledge, and sharing their story through promotional videos or testimonials used in PSP communications.

Additionally a range of Teams were formed, who took these Champion steps to the next level and engaged the broader community around energy efficiency. Of the 224 champions, 11 went on to form 5 'power savers teams' who spread knowledge of energy efficiency across their peer networks through workplace and other peer-to-peer interactions. This was most prominent in the Early Childhood Educators team, in which 38 educators across 27 centres, who hold the position of 'sustainability officer' in their centres undertook training to develop their capacities in the role and to deliver lessons based on energy efficiency and sustainability.

Despite the evaluation of the peer-to-peer network having few metrics, the evidence provided demonstrates that the use of individuals as 'champions' and workplace/industry networks to share and disseminate knowledge of household energy efficiency was highly successful.

Tailored support for tenants and NESB / CALD communities

The PSP attempted to deliver very tailored assistance for households, not only in the form of retrofit options for households, but also in aligning with the needs of tenants, as well as people from non-English speaking and/or culturally/linguistically diverse backgrounds.

Reaching out to tenants, who are traditionally excluded from programs such as this, was a core aim of the PSP. The demographics of tenancy has changed dramatically over the past few decades, seeing increasing rates of long-term tenancy and increasing rates of families in rental households. Rates of renting for low-income households is also substantially higher than other demographics. In Australia there are significant barriers for tenants in regards to engaging in energy efficiency, predominantly around legal restrictions on changes that can be made to their homes, insecurity of tenancy, and lacking legislation and tax concessions to require and encourage landlords to improve the energy efficiency of their properties.

The PSP took a range of actions to try to both increase rates of tenants in the program, and to tailor the experience of tenants within the program, specifically through tailoring PARs and communications. The program was successful in recruiting a good proportion of renters, almost half. However the program also identified that substantive structural barriers remain which prevent renters from fully engaging or benefiting from the energy efficiency gains being made, which has substantive impact on quality of life.

The PSP's trial of cost-sharing arrangements regarding solar hot water systems has given evidence to structural barriers both in terms of tenancy rights, as well as a lack of regulations/incentives for home owners, which effectively prevent tenants from implementing more significant energy efficiency initiatives in rental homes.

Additionally, the PSP aimed to provide equal access for participants or potential participants from NESB/CALD backgrounds. To do so the PSP engaged two bodies to assist in translating and interpreting for the program – TIS (Translating and Interpreting Service) for over-the-phone interpretations and on-site interpretations for assessments, and Straker translations for written translations.

In total, 78 different nationalities were represented in the PSP. Besides Australians, the biggest demographic were from Nepal, with 135 participants of Nepalese background. A total of 69 other nationalities made up the group labelled as “Rest of the world”.

Despite the challenges of the different languages spoken, the PSP was successful at enabling participants to access the PSP through the comprehensive provision of written translation and verbal interpreter services.

Data management requirements

During the PSP, a large pool of data was gathered from various sources including the pre- and post-intervention surveys, home energy assessments, and ongoing interactions throughout householders’ 12-month journey.

Data management requirements were highly underestimated in the original PSP LIEEP application, both in terms of needs and budget. However, through the re-allocation of budget across line items, the two main software applications, FluidSurveys (assessment tool) and Salesforce (CRM for participant interactions), were able to be purchased at not-for-profit rates.

Cost-Benefit and Cost-Effectiveness of the PSP

LIEEP set out to “assist low-income households to implement sustainable energy efficiency practices to help manage the impacts of increasing energy prices and improve the health, social welfare and livelihood of low-income households” and “build capacity of Australia’s energy efficiency technology and equipment companies by maximising the opportunities for Australian industries to participate in the projects.”

For the PSP, where accurate data is available, a **quantitative cost analysis** was undertaken for both cost-effectiveness (consumption savings for the householder, in kWh) and cost-benefit (in financial savings for the householder, in \$). Where other positive outcomes of benefits and co-benefits of the PSP could not be quantified as a ratio, such as improvement in thermal comfort and improvements in health and wellbeing, NCC has conducted a **qualitative cost analysis** of these benefits.

The total cost of implementing the PSP was just under \$2 million, less costs associated with the operation of the ‘Research Trial’ element of the PSP (i.e. removing the substantive research and development, reporting costs, evaluation costs).

Two PSP ‘Treatment Groups’ were identified, which received substantially different treatments (and therefore achieved different levels of savings). These Treatments were ‘Group 1’ (standard treatment – including home energy assessment, at assessment retrofits, post-assessment retrofits and ongoing communications) and ‘Group 2’ (standard treatment + solar hot water system installation).

Per household costs were then calculated for the different cost levels as determined by the Department, and applied against each Treatment Group. Results of this cost level analysis are outlined in

Table 39, below.

Table 2: PSP per household costs invested for the two Treatment Groups by Analysis Level

Cost Level	Group 1 – Standard Treatment	Group 2 (Standard + SHWS)
Level 1 - Direct trial approach	\$977	\$4,969
Level 2 - Trial Component	\$1,458	\$5,449

Level 3 – Total Business		
	\$1,746	\$6,508
Level 4 - Total Trial	\$3,014	\$9,522

Financial (\$) and consumption (kWh) savings were also calculated for the different treatment groups (per household per year), based on ISF's analysis of consumption data obtained from the energy distributors, and on estimates from modelling provided by Solahart. Per household savings are provided in Table 40.

TABLE 3: DATA UTILISED IN COST-EFFECTIVENESS AND COST-BENEFIT RATIOS

Treatment Type	Average kWh saved / household / year	Average \$ saved / household / year
Group 1 (Standard)	259*	\$70.64*
Group 2 (Standard + SHWS)	2081^	\$562^

*Compared to control group (as per 'matched pairs' method outlined in Section xx of this report)

^Calculated for the average PSP household, based on 200 litres (4 person household, 302L system) replacing an electric 250 litre hot water system.

Cost-effectiveness ratios and Cost-Benefit ratios were then calculated for both Group 1 and Group 2 treatments, to yield the following results:

TABLE 4: COST-EFFECTIVENESS RATIOS FOR THE TWO TREATMENT GROUPS

Cost Level	Cost Effectiveness Ratio	
	Group 1 (Standard Treatment)	Group 2 (Standard + SHWS Treatment)
Level 1 - Direct trial approach	4	2
Level 2 - Trial Component	6	3
Level 3 – Total Business	7	3
Level 4 - Total Trial	12	5

TABLE 5: COST-BENEFIT RATIOS FOR THE TWO TREATMENT GROUPS

Cost Level	Group 1 (Standard Treatment)	Group 2 (Standard + SHWS Treatment)
Level 1 - Direct trial approach	14	9
Level 2 - Trial Component	21	10
Level 3 – Total Business	25	12
Level 4 - Total Trial	43	17

In the context of LIEEP, and for this unique demographic and geographic area (Sydney, Illawarra, Hunter and Central Coast regions), the most cost effective option was the Group 2 treatment, which includes the installation of SHWS for a household. However, it is noteworthy to remember that not all households are eligible for SHWS installation, and that these would be limited to home owners.

The direct trial approach yields a 14 year payback period for the Group 1 standard treatment at Level 1 (Direct Trial approach, i.e. assessments and retrofits alone), for the PSP participants, compared to a 9 year payback period for the installation of SHWS.

Where other positive outcomes (co-benefits) of the PSP could not be quantified as a ratio, such as improvement in thermal comfort and improvements in health and wellbeing, NCC has conducted a qualitative cost analysis of these co-benefits. Co-benefits have been defined by Grayson and Nina as “the additional direct and indirect benefits of energy-efficiency policies and measures other than energy savings”¹.

Measurable Qualitative Benefits included:

Direct Benefits to participants

The following indicators were measured in the PSP program design as a before and after self-reported value quantified in the PSP program design as a before and after self-reported value, and evaluation has found these translate to benefits for participants, which could have positive flow-on effects for local economies. These benefits are discussed in detail elsewhere in this Executive Summary, and include:

- Marked improvement in thermal comfort rating
- Significant improvements in energy literacy
- Significant improvements in reported sense of control (relative ‘empowerment’ over energy use)
- Very positive community development / capacity building outcomes through the PSP Champions and Teams program.

Further, to the benefit of local economies and the energy efficiency industry, **the PSP contributed a total of \$765,392 to local economies**, through procurement of products or services from at least 15 different locally based companies.

Finally, further and important co-benefit beyond the LIEEP scope was the large number of relationships and connections forged between PSP staff and various stakeholders including the members of the Advisory Committee, other NGOs, universities and others. Key findings of the PSP were communicated as the PSP evolved, through LIEEP forums, active participation in GEEAR and most recently, PSP participation in OEH *Co-design* workshops for their *Home Energy Action* program.

Independent Evaluation, and ultimate findings

Associated with this Final Report is the PSP Data Evaluation Report produced by ISF, which is an independent analysis of the evaluation findings of a) overall administrative implementation of the PSP, and b) impact of the PSP on participants and their electricity use. The Data Evaluation Report analysis found that the project achieved a range of positive outcomes for low income household energy efficiency, despite several barriers faced during program implementation.

As indicated in the Data Evaluation Report, and summarised in Table 6 overleaf, ISF’s evaluation of the PSP found that:

- 16% of the metrics exceeded targets (3 metrics)
- 44% of the metrics fully achieved the targets (9 metrics)
- 22% of the metrics partially achieved the targets (4 metrics)
- 6% of the metrics did not achieved the target (1 metric)
- 11% of the metrics were unable to be evaluated (2 metrics)

¹ Grayson and Nina, 2011, *Evaluating the co-benefits of low-income energy efficiency programmes*, OECD / IEA

TABLE 6: OVERVIEW OF PSP PERFORMANCE INDICATORS AND RESULTS (EVALUATION OUTCOMES)

Category	Performance Measure	Metric	Target	Result	Rating
Program Evaluation					
Participation	Recruitment targets are reached	No. of households successfully recruited	990* households successfully recruited	990 households participated	Fully Achieved
	Energy efficiency retrofits and assessments delivered	No. of home energy assessments delivered to households	Assessments delivered to 990* households	990 Home Energy Assessments delivered	Fully Achieved
		No. of tailored energy solutions delivered to households	Tailored energy solutions delivered to 990* households	837 Post-Assessment Retrofits (PARs) delivered	Partially Achieved
	Solar hot water systems are negotiated and installed	No. of fully funded solar hot water systems (SHWS) installed in owner households	50 solar hot water systems installed in owner households - funded through grant funding	79 funded solar hot water systems installed	Exceeded
		No. of SHWS installed under landlord/tenant cost sharing agreements	50 solar hot water systems installed - funded under landlord/ tenant cost sharing agreements	0 solar hot water systems installed under cost sharing agreement	Not Achieved
		No. of landlords and tenants engaged to develop cost sharing arrangements for SHWS	50 landlords and their tenants engaged to develop up to 50 cost sharing arrangements for installation of solar hot water systems	63 renters and 22 landlords (or their real estate agents) engaged around cost sharing arrangements	Partially Achieved
Project Management	Project rolled out on schedule	% of milestones reached by due date	(No specific target set)	100% of milestones completed by agreed due dates	Fully Achieved
	Sufficient project staff recruited	No. of FTE staff dedicated to recruitment	100% recruitment of required UV and NCC project staff and volunteers	Recruitment was sufficient	Fully Achieved
	EOI completed for home assessors	No. of EOI's completed for home assessors	2-3 competitive EOIs completed for home assessors	2 EOIs completed (one direct and one competitive)	Fully Achieved
	Project systems created/implemented	No. of required systems, project documents and communications implemented	(No specific target set)	All required systems, project documents and communication materials implemented as per Funding Agreement	Fully Achieved
Impact Evaluation					
Impacts on Electricity Use					
Reduced Electricity Use	Decreased electricity consumption	% change in electricity use across all participating households during project	Electricity use reductions of 5-10% in participant households due to installation of retrofits	Overall average reductions of 3% with highest reductions in Illawarra region (9%)	Partially Achieved
	Increased capacity of participants	% of Livelihoods workshop indicators improved	30-50% of indicators identified in Livelihoods workshop demonstrate improvement and hence increased capacity to use energy more efficiently	Post-livelihood workshop not conducted	Unable to evaluate
	Perceived reduced electricity use	% improvement on measures of self-reported energy efficiency	Improvement on some measures of self-reported energy efficiency as measured on Likert scale in questionnaire**	Modest improvements (1%-4%) in self-reported measures of energy efficiency (due to high baseline)	Fully Achieved
Persistent Energy Reductions			NB: persistence of electricity reductions beyond the life of the PSP not able to be measured as part of this evaluation		Unable to evaluate
Impacts on Participants					
Electricity Literacy	Self-assessment via pre/post survey	% improvement on measures of self-reported energy efficiency	Improvement on some measures of self-reported energy efficiency as measured on Likert scale in questionnaire**	Awareness of relative electricity use and ability to understand bill improved by 24-32%	Fully Achieved
Sense of Control	Self-assessment via pre/post survey	% improvement on measures of self-reported energy efficiency	Improvement on some measures of self-reported energy efficiency as measured on Likert scale in questionnaire**	Proportion who strongly agreed they had control over their electricity use increased by 6 times and electricity bill increased by 5 times	Fully Achieved
Peer-to-peer networks	Champion outreach	No. of champion participants engaged	60 peer-to-peer champions recruited	224 champion participants recruited	Exceeded
		No. of Power Savers Teams formed	3 Power Savers Teams formed	5 Power Savers Teams formed	Exceeded

*Excludes Pilot participants

**This target was revised from the initial project logic as 100% improvement on some measures in Likert scale would not be realistic, rather statistically significant *improvement* on some measures would be a more realistic target. The target was set prior to the development of the survey questions, and Likert scale responses and therefore it was necessary to revise this target. A Wilcoxon Signed-rank test was run on the survey results to determine statistical significance, more details are contained in Section 0

Many of the overall findings of the Data Evaluation Report are incorporated in this Final Report, including:

- the projects' impact on participants' electricity use, and
- the projects' impact on participants' energy literacy and sense of control.

In order to evaluate whether PSP participants electricity use had decreased due to the PSP interventions, a rigorous analysis was conducted by ISF on 'participants' electricity billing data records when compared to a matched control group – those who had not received any treatments, or 'non-participants'.

Overall the PSP was successful in achieving average electricity use reductions (when compared to a matched control group) of 3% across all participants, and in the Illawarra region reductions were as high as 9%. Mean electricity consumption was lower in all four PSP regions compared to non-participants.

Of note, within this analysis, mean daily consumption by participants was markedly lower than non-participants in winter 2015, showing that participants saved the most energy when compared to non-participants during the coldest winter of the PSP period (2013-2014). This may indicate that retrofits and rebates which aimed to increase efficiency of electricity use during winter may have contributed to this reduction in consumption.

ISF's analysis of the pre (PIPS) and post (POPS) intervention qualitative surveys found that the PSP was highly successful in increasing participant's self-perception of their energy literacy, as well as their sense of control over both their electricity use and their energy bills. Such results included:

- The proportion of participants who stated their bill was very or somewhat clear and easy to understand increased from 47% to 79%.
- The proportion of participants who agreed or strongly agreed they were aware of how their electricity use compared to others increased from 45% to 69%.
- The proportion of participants who reported they were prevented from reducing their electricity use due to a lack of knowledge decreased from 48% to 0.4%.
- The proportion of participants who agreed or strongly agreed they had control over their electricity use increased from 60% to 89%. The proportion of participants who strongly agreed increased by more than 6 times, from 7% to 44%.
- The proportion of participants who agreed or strongly agreed they had control over their electricity bill increased from 53% to 87%. The proportion of participants who strongly agreed increased by more than 5 times, from 8% to 41%.

This is likely due to some key aspects of the home energy assessment, such as clearly explaining to participants how to read their energy bill, as well as education about their use of electricity in the home.

Performance against objectives and benefits

In line with the intended objectives and benefits of LIEEP, the PSP has trialled an innovative and very tailored, individual approach which has improved the energy efficiency of low income households across the greater Sydney region and enabled them to better manage and control their energy use.

Innovative aspects of the PSP, besides the targeted audience, have been:

- recruitment through a trusted member-based organisation
- very detailed home energy assessments, including a focus on energy literacy and empowerment
- highly tailored retrofits, including suitable options for tenants
- testing of a cost-sharing arrangement between landlords and tenants for retrofit installations
- ongoing assistance for participants, including information and resources to cater for multiple languages
- participants acting as energy efficiency Champions in their community or workplace

Participating households have implemented actions to help manage the impacts of increasing energy prices. Along with that, it is expected that a range of associated health, social welfare and livelihood measures have improved in such households.

The knowledge and capacity of consortium members to deliver and evaluate such projects has been increased substantially, as attested by the number of lessons learnt and recommendations contained throughout this report. United Voice is also in a much better position to encourage long-term energy efficiency actions and advocacy among its membership.

The capacity and prospects of various Australian energy efficiency technology and equipment companies has been greatly enhanced, with a significant volume of retrofit purchases being made by the PSP.

Reviewing the five planned objectives, outcomes and outputs of the PSP:

- energy literacy of participants and their sense of control over electricity use and electricity bills improved dramatically
- electricity use in participants' homes was reduced after rigorous analysis against a matched control group
- persistence of electricity use reductions was unable to be measured within the LIEEP timeframe, however, participants have reported a greater sense of control and literacy, a number of Champions, Teams and other peer networks have been established, and the capacity of United Voice to continue on from the PSP has been greatly enhanced
- the 'split-incentive' cost-sharing approach was unsuccessful, however, a number of lessons have been learnt for future program approaches in order to address some significant barriers, and
- a number of key factors have been identified to provide a template for effective, replicable models for reducing energy use by low-income households.

A large pool of data has been captured by the PSP for analysis, and the evaluation of the PSP presented in this Final Report and ISF's Data Evaluation Report has demonstrated a wide range of key factors and recommendations in order to help inform future energy efficiency policy and program approaches.

Key recommendations of the PSP

- 1: That split-incentive barriers to greater rental household energy efficiency are significant and persistent and that policy designed to overcome split incentives should be reviewed.**
- 2: Government, at state and federal levels, should work to amend legislation and policy to ensure that energy efficiency of tenancy properties is brought up to a standard and opportunities to improve efficiency are open to tenants as well as home owners, such as hot water systems.**
- 3: That future low income energy efficiency programs engage a member-based organisation which has pre-existing relationships and established trust to engage potential participants. By doing this, substantive barriers to engaging with this demographic can be reduced, and people not reached by other programs can be reached.**
- 4: Budget for the key aspects of data management, including a customisable CRM system, must be compulsory for future projects, and should be set up prior to program starting.**
- 5: That program efficiency is achieved by a trusted organisation utilising a call centre to allow for the scale of recruitment, assessment bookings, case-management of retrofits and ongoing engagement.**

6: That communications are tailored to the demographic to ensure equal access to the program. The program must be accessible to the participant pool's availability, and tailor communications to times that suit participants as they go about their busy lives.

7: Factor the lack of structured work and stability of low-income workers, specifically shift workers, into planning around cancellations rates, assessor availability and project planning in future low income energy efficiency programs.

8: Future programs should continue to engage participants in tailored 1:1 energy assessments with qualified energy assessors. Participants of Power Savers greatly appreciated the time given to them and the tips from their individual assessments.

9: That assistance to households should be tailored to each household's individual needs, both in terms of financial assistance and coordination of installation. Future programs using rebates should allow a substantive amount of time for participants to save the necessary additional funding for purchase.

10: Champions programs should target existing community structures such as workplaces or community groups, and target sectors with mutual self-interest in improving education of the workforce on energy efficiency, such as Home Care and Early Childhood Education.

11: That adequate budget and resources be allocated to ensure all target audiences can engage in the program, irrespective of language, culture or physical ability.

12: For future programs, a research organisation should develop a research project to guide and support research efforts, including a comprehensive data schema, data management guidance, and evaluation manual to inform both quantitative and qualitative evaluation and research outcomes specifically for low-income households.

13. That more low income energy efficiency programs be funded by Government, in particular to target working people and communities with non-English-speaking background.

INTRODUCTION

Low Income Energy Efficiency Program

The Low Income Energy Efficiency Program (LIEEP) was part of a suite of Commonwealth Government measures announced in July 2011. LIEEP was a competitive merit-based grant program established by the Commonwealth Government to provide grants to consortia of government, business and community organisations to trial approaches to improve the energy efficiency of low income households and enable them to better manage their energy use (Australian Government Department of Industry, Innovation and Science, 2015). The LIEEP objectives and intended benefits are as follows:

Objectives

- Trial and evaluate a number of different approaches in various locations to assist low-income households to become more energy efficient.
- Capture and analyse data and information for future energy efficiency policy and program approaches.

Benefits

- Assist low-income households to implement sustainable energy efficiency practices to help manage the impacts of increasing energy prices and improve the health, social welfare and livelihood of low-income households.
- Build the knowledge and capacity of consortium members to encourage long-term energy efficiency among their customers or clients.
- Build capacity of Australia's energy efficiency technology and equipment companies by maximising the opportunities for Australian industries to participate in the projects.

Power Savers Project

In early 2013, the Nature Conservation Council of NSW (NCC) was successful in its application for grant funding to conduct the Power Savers Project (PSP) under Round 1 of the Federal Government's Low Income Energy Efficiency Program (LIEEP). This was one of 20 LIEEP trial projects throughout Australia, funded by the Department of Industry, Innovation and Science (the Department).

The PSP was a three-year, three-million dollar initiative which trialled an innovative approach to residential energy efficiency in 1,010 low-income households in the Sydney, Central Coast, Hunter and Illawarra Regions of New South Wales.

The PSP was delivered by a Consortium including lead organisation (LIEEP Grant Recipient) Nature Conservation Council (NCC), United Voice NSW (UV), Solahart and the Institute for Sustainable Futures (ISF) at the University of Technology Sydney.

For the purposes of the PSP, low-income households were defined as households in the lower two household income quintiles². The PSP included a focus on assisting low-income tenants and low-income people from non-English speaking and/or culturally/linguistically diverse backgrounds.

²as indicated in ABS 6530 Household Expenditure Survey 2009-10, specifically Table 6: Equivalised Disposable Income Quintile, Household Characteristics

Key Features

The key features of the project were:

- Providing detailed home energy assessments, tailored energy solutions, and ongoing contact and assistance for participants;
- Producing energy efficiency information and resources to cater for multiple languages;
- Recruiting and training interested participants to act as energy efficiency Champions in their community or workplace;
- Using peer-to-peer networks and storytelling to inspire and sustain energy-efficient behaviours;
- Including tenants (as well as owner occupiers) in the participant base, and identifying retrofit activities that could be undertaken in rented properties; and
- Undertaking robust evaluation and data analysis to inform future energy efficiency policy and programs.

Key Innovations

The approach of Power Savers to assist low-income households was new and innovative in terms of the recruitment and engagement methodology and also in relation to the specific subset of low-income households being targeted. Innovative aspects included:

- Recruiting and engaging the target audience through a trusted organisation, i.e. their Union, United Voice, which represents a range of low-income industries and workers in Australia;
- Reaching a new demographic of households who have not been directly targeted or eligible in energy efficiency programs previously, i.e. low-income working households who do not access welfare, Centrelink services or have a health care card;
- A large percentage of the targeted demographic were expected to be living in a rental property, and the PSP made specific attempts in eligibility and program implementation to include participants from rental properties and make their engagement meaningful;
- Engaging tenants and landlords to develop cost-sharing arrangements for energy efficiency measures, i.e. installation of solar hot water systems; and
- Testing whether engagement of households through the use of Champions, storytelling and peer-to-peer support networks leads to persistence of energy-efficient behaviours.

The PSP represented an important opportunity to:

- reach and assist a new target demographic;
- highlight and attempt to address barriers to energy efficiency in the target audience; and
- demonstrate an effective, replicable model for inspiring sustained energy savings for low-income households.

Power Savers Project objectives

The aim of the PSP was to reduce energy use and household energy costs in the target low-income households through a combination of trusted engagement, ongoing support and regular communication, as well as tailored education, advice, and energy solutions (retrofit items and rebates).

Broadly speaking, there were two core objectives of the PSP, which were consistent with the objectives of LIEEP:

- Trial and evaluate innovative approaches to improving energy efficiency for low-income households; and
- Capture and analyse data and information to inform future energy efficiency policies and programs.

The five planned objectives, outcomes and outputs of the PSP are outlined in Table 7 below. This is an update from the original Table outlined in the PSP Evaluation Framework, in order to reflect project variations agreed to by the Department.

TABLE 7: PSP OBJECTIVES AND PLANNED OUTCOMES

#	Project Objectives	Planned Outcomes
1	Increase energy literacy among participants and therefore contribute to participants having a sense of control over their electricity use and electricity bills.	Participants have an increased understanding of the benefits of energy efficiency and increased energy literacy.
2	Reduce electricity use in participants' homes through the provision of one-to-one guidance (Energy Assessment and ongoing engagement with project staff), combined with the installation of energy-efficient technology in participants' homes (energy efficiency solutions will be tailored to the needs of each individual home).	Participating low-income households reduce energy use by a median value of 10% with a comparable reduction in household energy costs. Further reductions are expected for households that receive solar hot water systems.
3	Generate persistent electricity use reductions through the provision of ongoing support and communication through participants' peer network(s).	Effective peer-to-peer engagement leads to increased persistence of energy-efficient behaviours amongst participating households.
4	Develop and test methods to overcome split-incentive barriers in a select number of participant households by developing a method for upgrades to solar hot water systems (with degrees of subsidy) in rented properties.	Suggested approaches for overcoming split-incentive barriers that could be replicated in future projects.
5	Develop, implement, evaluate and disseminate effective, replicable models for reducing energy use by low-income households.	Effective, replicable models for reducing energy use by low-income households are implemented, evaluated and disseminated.

PROJECT DELIVERY

Consortium partners and governance

The PSP was delivered by a Consortium including lead organisation NCC, United Voice NSW (UV), Solahart, and the Institute for Sustainable Futures (ISF) at the University of Technology Sydney. All parties were bound by a Consortium Agreement which detailed the project deliverables, timeline, and payment scheduling.

Nature Conservation Council of NSW (NCC)



The Nature Conservation Council of NSW (NCC) is the peak environment organisation for New South Wales, representing more than 150 member groups from across the state. NCC has a strong track record of inspiring and assisting thousands of people to reduce waste, save power and take action to protect the environment.

NCC was primarily responsible for overseeing the coordination and administration of the PSP, including the requisite reporting and financial requirements, as well as management of subcontractors.

The NCC team for the PSP is described below:

- Chief Executive Officer – oversees the strategic and financial success of the program;
- Program Director – financial management; drives the ongoing strategic development of the project in collaboration with NCC staff, Consortium Members and the Advisory Committee and drafts/approves legal documents;
- Program Coordinator – Responsible for program administration, coordination and delivery of program schedule, documentation and reporting;
- Program Officer – Coordinating a variety of project tasks, such as creation and delivery of the communications strategy, education materials, data management and integrity, and deployment of post-assessment retrofits (PARs).
- Program Officer – Coordinating various aspects of data management and integrity, inventory and procurement, and deployment of PSAPs and PARs (including IHDs);
- Program Assistant – assisting with various project roll out tasks, such as the development of communication materials and deployment of PARs.

The CEO met bi-weekly with the Program Director to discuss project progress, in particular financial figures and how we were tracking against milestone targets. The Program Director met weekly with the Program Coordinator to discuss the project as a whole and allow the program coordinator to seek advice on any part of the program they considered to be not going as well as what it should be, or falling behind. The Program Coordinator met daily with the Program Officers, and all the team (apart from the CEO) held a weekly internal meeting.

United Voice



United Voice is one of Australia's largest unions and represents over 100,000 of Australia's lowest paid workers in industries such as home care, early childhood education and care, cleaning, manufacturing, hospitality, tourism, manufacturing and security. United Voice NSW (UV) has around 17,000 members, and it was expected that around 11,500 members would be eligible (in terms of subsets targeted and geographical location) to participate in the PSP.

UV enjoys an excellent, well-established connection with its participants and also has appropriate infrastructure (eg. outbound call centre, OCC) to support continuous engagement with their members. Additionally, members are connected to each other through workplace membership and delegate structures, enabling peer recruitment.

Hence, UV primarily played a critical role, as a trusted partner of participants, in engaging and recruiting households, and in developing the Champions and Teams aspects of the project. Eligibility for the PSP was not restricted to UV members, but members made up the vast majority of participants.

For the majority of the PSP, one full-time Project Coordinator was employed with United Voice and, along with a number of casual and part-time staff in the Outbound Call Centre (OCC), was responsible for recruitment of participants to the program, ongoing engagement and associated activities. The activities of UV staff were overseen by two more senior members of staff, who both also participated in project management meetings. The coordinator participated in project meetings and reported weekly to UV's Special Projects Officer. UV's Political Coordinator oversaw the overall management of the project and reported to the Branch Secretary. The core project team for UV met formally each week.

Institute for Sustainable Futures, University of Technology Sydney



The Institute for Sustainable Futures (ISF) is a research and consulting organisation. ISF works with industry, government and the community to help create sustainable futures through independent, project based research.

ISF provided the Background Research Report (BRR) and Evaluation Framework, as well as formal evaluation reports for the Pilot phase and the final Data Evaluation Report.

The BRR helped to further guide development of the design and delivery of the PSP. Research included theories of behaviour change and social practice in relation to energy efficiency, barriers and opportunities to energy efficiency uptake, and an analysis of energy efficiency policy. The Evaluation Framework established the model for PSP data collection and analysis. Findings from the Data Evaluation Report have been incorporated into this Final Report.

Solahart



Solahart conducted home site inspections and installation of all solar hot water systems (SHWSs). Through their experience and established site assessment process, Solahart were responsible for confirming the site suitability of households and providing an estimate of the expected energy savings for the household. Solahart are also responsible for the ongoing warranty of the systems, and the relevant Solahart authorised installer / dealer is responsible for the warranty of works carried out. In addition, Solahart assisted in the PSPs attempts to install SHWSs under a split-incentive, or cost-sharing, arrangement between tenants and landlords.

Consortium Meetings

Consortium meetings were held more frequently at the infancy of the project, at least monthly from January 2013. As the project developed (and as in-kind budget was over-extended early in the project), from September 2013 each of the Consortium partners have met together on an as-needed basis.

The majority of meetings have been held between UV and NCC as the key project partners. These meetings have been both formal and informal. Both partners are in contact on a daily/weekly basis.

Meetings with ISF have occurred as-needed, for example, discussions in relation to data management and evaluation, meeting CSIRO requirements, and delivery of the Livelihoods Workshops. Solahart have been represented at all major Consortium meetings, and have been involved in project discussions as relevant.

Reporting arrangements that have been established require each Consortium partner to be accountable and report to the lead partner regularly on progress on their deliverables (as set out in the Consortium Agreement), and also to formally report on Milestones.

Advisory Committee

A project Advisory Committee was established to provide additional project oversight and experience. The Advisory Committee held quarterly meetings throughout 2014 and consisted of a Consortium representative(s) as well as members from a range of relevant sectors:

- The Office of Environment and Heritage, NSW (OEH)
- Australian Council of Social Services (ACOSS)
- Tenants Union, NSW (TUNSW)
- Energy and Water Ombudsman, NSW (EWON)
- University of Sydney, Faculty of Social Sciences
- Ausgrid
- Granville Multicultural Community Centre

Due to some difficulties with attendance at meetings throughout 2014, the Advisory Committee were consulted and it was agreed by this Committee that we would only meet with them as necessary, following the October 2014 quarterly meeting. Since this approach was taken, we consulted by email and phone with individual members on various project matters. We also kept them informed of Milestone Reports as they were submitted, and invited their feedback. Advisory Committee members were invited to all formal events and celebrations.

Subcontractors

A number of Subcontractors were directly employed by NCC at various stages of the PSP, including communications specialists (Republic of Everyone and Curious Works), five home energy assessors (assessors), and an electrician for the installation of in-home displays (IHDs). Other tradespersons were indirectly employed by the PSP, such as by householders during the procurement and installation of post-assessment retrofits (PARs). In addition, a significant proportion of the budget was allocated to procurement of retrofit items (AARs and PARs), benefiting local suppliers.

Energy Assessors

A key part of the PSP design was the delivery of home energy assessments to participants. Advertisements (Expressions of Interest or EOIs) were released to recruit home energy assessors to deliver the home assessments.

Initial EOI: Pilot Phase

The initial EOI selected a qualified and experienced energy assessor for the delivery of the Pilot in Sydney. Existing connections between NCC staff and other organisations that had run previous energy efficiency projects in the Sydney region were explored.

One potential candidate was recommended by a known and trusted organisation, and was subsequently asked to submit his CV and make a formal application for the role. Having fulfilled the criteria, this

candidate was recruited as Pilot assessor to assist with the development and roll-out of the Pilot. The Pilot assessor was given an induction to the program at NCC's offices and then conducted the home assessments with the 20 Pilot participants.

Second EOI: Rounds 1-3

As the project developed and the frequency of home energy assessments increased, the need for an additional 4 home assessors to work alongside the original pilot home assessor was identified.

This time, a more formal EOI was submitted on the ABSA (Association of Building Sustainability Assessors) website as well as through known networks that energy assessors would frequent such as the Alternative Technology Association (ATA).

Ten (10) responses to the advertisements (EOI) were received which was not considered a large response. The 10 responses were reviewed and suitable candidates contacted to discuss more particulars of the role.

Each of the additional four home assessors was identified via their registration and membership of ABSA. Assessors responded to the ABSA advertisement by submitting their Resume and a covering letter.

Each home assessor was recruited on the basis of meeting certain selection criteria, namely:

- Certificate IV in Home Assessment
- Extensive practical experience in energy assessment of (low-income) households.

The EOI process resulted in a total of 5 home assessors recruited for the program. As with the Pilot assessor, the four new energy assessors were given an induction to the program at NCC's offices. The Pilot assessor was involved in delivering this induction.

After this, each new Assessor attended a minimum of one practical home assessment with an existing assessor, to ensure that the information conveyed to participants was consistent. Additionally, the training program ensured that assessments complied with the program objectives and data collection requirements while remaining responsive to the diverse requirements of the target participants (e.g. NESB/CALD).

Each of the assessors signed a detailed contract outlining their involvement and obligations. In order to provide stability of employment, we decided to include in the standard contract that assessors would be paid for a minimum of six (6) home assessments per week. An example contract is provided in Appendix 1.

Project overview

The Gantt Chart *Project Schedule* in Appendix 2 provides a broad scale overview of the Power Savers Project (PSP).

It is worth noting that the entire PSP, as with all LIEEP projects, was a 'Pilot' or trial, as we were developing new and innovative ways of engaging a new target audience of low-income workers. The PSP was split into four distinct stages or phases:

1. Inception, planning and development phase

This period involved ongoing negotiations between NCC and the Department around the Funding Agreement, which resulted in a delay to the start of the project of some 5-6 months. Subsequently, changes to the original Project Schedule (GANTT chart) were needed and were proposed by NCC in order to fit the new timeframe.

Also during this time, the following occurred:

- Consortium Agreement developed
- PSP project staff recruited by each of the Consortium partners
- Project Plan and other key PSP documentation developed
- Background Research Report produced by ISF
- Communications Strategist engaged and Pilot materials developed
- Energy Assessor for Pilot Phase engaged and scoping of further candidates
- Pilot Recruitment Strategy developed
- Data management plans initiated and scoped
- Home Energy Assessment tool developed
- Advisory Committee identified

A number of the above activities required updating as the PSP progressed.

2. Pilot project

The core objective of the Pilot Phase was to test a number of approaches that might be incorporated into the future roll-out of the PSP. The Pilot Evaluation Report details the approach and outcomes from the Pilot Phase of the PSP (Appendix 3).

In summary, 27 people were recruited by phone from United Voice members, and 20 participated as Pilots who had indicated, via previous UV surveys, a strong impact, interest or concern with the environment and/or energy costs. Pilot participants received a somewhat different experience to the households in the main project roll-out and hence their data and feedback has been evaluated as a separate cohort. The primary objective was for Pilots to help develop the main PSP, whilst still providing similar benefits to Pilot participants.

The Pilot Phase helped to test and refine a number of PSP elements, including:

- The requirements and inherent logistics of the Data Collection and Reporting Plan (i.e. what data is being collected, what data is necessary for evaluation).
- Pre-intervention surveys
- Energy Assessor
- Energy assessment tool (for usability – capacity to engage and educate, integration and stability);
- Retrofit items and tailoring of a suite of energy solutions
- Action plans for a post-assessment report
- Solar hot water system site assessment and installation processes
- Communications, recruitment and educational materials - to define messaging, 'look and feel'
- Professional films by CuriousWorks.
- Post-intervention surveys

3. Main project

The roll-out of the key aspects of the main project were primarily based around the participants or households. All 990 households experienced the same engagement or 'journey' throughout their 12 month involvement in the project. This included an energy assessment, action plan, retrofit items or rebates, and regular check-ins and support. Further detail of the specific roll-out of the project and the participant journey are outlined in the Gantt Chart and in the next section of this report.

Data management was critical in delivering the project and is addressed in later sections of this report, namely the use of Salesforce's Customer Relationship Management (CRM) software and the FluidSurveys tool to collect and manage home energy assessment data.

The main project roll-out stage saw development, implementation and refining of a number of other PSP elements, including:

- Data Collection and Management
- Energy assessment booking and assessment processes (for time, cost and effectiveness);
- Recruitment strategies;
- Retention strategies;
- Ongoing Communications materials and scripts;
- Post-intervention surveys.

4. Final events and reporting period

As identified in the Gantt Chart, the final phase of the project enabled a much-needed period of reflection, celebration with participants (Conclusion Event), data cleaning and analysis, evaluation, reporting, auditing and a general dissemination of lessons learnt from the PSP. More details on the Conclusion Event and other reporting requirements are identified later in this report.

Participant Journey

Each household participating in the PSP received an energy efficiency intervention or ‘treatment’ to help them save energy and money in their home. The treatment mainly consisted of an in-home energy assessment (HEA), At Assessment Retrofit items (AARs) followed by a Post Assessment Retrofit(s) (PARs), a Power Savers Action Plan (PSAP), and ongoing communication and support as part of their 12 month PSP ‘journey’. In addition, 79 households received a Solar Hot Water System (SHWS) retrofit, including one Pilot household.

The participant journey for the PSP sought to ensure a meaningful and enduring interaction with participants, encourage persistent behaviour change and meet the practical evaluation requirements of the project. Table 8 outlines the participant journey for the PSP.

TABLE 8: PSP PARTICIPANT JOURNEY

Timing	Elements of journey	Key responsibility
Start	Recruitment Pre-intervention phone survey (PIPS) Scheduling of in-home energy assessment (HEA) Welcome letter sent out after recruitment	United Voice
2 weeks	2-hour home energy assessment; Request for billing data consent. Support to household to install small scale tailored energy efficiency equipment e.g. hot water pipe insulation, ecoswitch (At Assessment Retrofits or AARs)	NCC / Energy Assessor
1 month	Tailor made Power Savers Action Plan (PSAP), based on home energy assessment, posted to household.	NCC
2 months	Phone call to household to review assessor recommendations and provision of post-assessment retrofit(s) (PARs)	NCC
3 months	First quarterly phone call (QR1) to household.	United Voice
6 months	Second quarterly phone call (QR2) to household. Fact sheets distributed via post as required / requested.	United Voice
9 months	Third quarterly phone call (QR3) to household.	United Voice
12 months	Post-intervention(evaluation) phone survey (POPS) conducted with	United Voice

Timing	Elements of journey	Key responsibility
	household to address project impact against baseline. Conclusion of journey. “Champions” invited to final Conclusion Event.	

Integrated into this participant journey were other educational materials such as seasonal newsletters (winter and summer), which were posted to all participating households, as well as SMS reminders relating to their scheduled energy assessment and rebate expiries.

Other aspects of the journey for some households included a subset of:

- 79 households who received installation of a free solar hot water system (home owners).
- ‘Energy Champions’ recruited and trained to promote energy efficiency, network with peers and share successful energy performance improvement stories. A subset of Champions helped to form Power Savers Teams in their communities. This included additional United Voice members who were not involved in PSP

Due to ISF’s Background Research Report and United Voice’s own knowledge of their member base the PSP focused on phone conversations, SMS and mail-outs, as it was known that the participants were less likely to read e-newsletters or to access electronic communications. This was positively received by participants. Alongside targeted times of contact in line with various industry working times, participants were largely able to stay engaged in the program.

Recruitment

The participant engagement piece, from leads to program completion, was undertaken by United Voice.

A potential PSP participant travelled through various stages in the initial recruitment efforts:

- **Lead:** Nominated as a potential recruit and contacted to join the program
- **Recruit:** Eligible to participate and agreed to join the program
- **Participant:** Completed a home energy assessment.

Leads

A key part of the partnership with United Voice was the ability to involve their members as the participants of the PSP program. It was anticipated that the majority of participants of the PSP would be sourced from UV’s membership in the 4 regions targeted by the program.

Engagement with UV provided a large amount of leads for the PSP, however, it was understood that not all of these leads would be eligible for the program, and that the targeted group have limited available time which would serve as a barrier to converting leads to recruits, which is why such a large group of leads was required.

Each UV member (or associate) who met the eligibility criteria had an equal chance of participating in the program.

Rolling mail-outs were targeted to members of UV according to federal government electorate. A target was set to recruit 10% of the total membership in each electorate.

Some electorates in each of the 4 main regions (Sydney, Hunter, Central Coast and Illawarra) were held back for the intended control group, so that we could try to establish a balance of controls and non-controls in each region and different climate zones wherever possible.

Eligibility

United Voice was engaged as a consortium partner in the PSP due to their strong engagement with their membership, who predominantly work in low-income industries. This was a demographic who has not

generally been engaged previously for energy efficiency benefits, i.e. low-income working households who do not access welfare or Centrelink services nor have a health care card (many of which fall into the second lowest income quintile). A large percentage of households in the target demographic were also expected to be living in a rental property, another subset rarely targeted.

Eligibility criteria set by the Department was quite generalised, loosely based on the definition of 'low income' being the 2nd quintile of income, as per ABS 6530 Household Expenditure Survey 2009-10.

PSP Eligibility Criteria was developed collaboratively between NCC and UV. The criteria included householders who were slightly higher wage earners than the 2nd income quintile but were eligible due to financial vulnerability created through relative proportion of income spent on housing, as well as energy stress indicators. International students and renters were also intentionally included in the criteria.

The Eligibility Criteria is outlined in Appendix 4.

Eligibility criteria were utilised at the 'leads' stage of recruitment. Once a lead was confirmed eligible for the program and agreed to join the PSP, they were converted to a 'recruit'.

Recruitment method

Through negotiations with UV, NCC and the Commonwealth Government, the PSP decided to target the Regional Development Areas (RDAs) of Sydney, Hunter, Central Coast and the Illawarra (henceforth referred to as 'Regions'). UV did not have RDA information readily available against their membership data, so categorised leads for the PSP based on federal electorates that fitted roughly within those boundaries.

Federal electorates were used for the recruitment roll-out as these were manageable areas both in terms of size and distance for assessors to travel, and the boundaries would remain the same for the period of the program. These electorates were split between the planned control and non-control groups based on expected recruitment figures from each to have an equal proportion of each RDA in the control and non-control group.

Recruitment was also broken into rounds based on the original project plan, as per below. During these different rounds recruitment was undertaken through a range of different strategies. These included

- Phone Contact by the PSP UV Coordinator and Member Service Centre (which shifted to the Outbound Call Centre)
- On-the-Ground Organisers
- Use of existing member structures and leaders
- Mail out
- Champions
- Conference and Events
- Social Media
- Retired United Voice members.

Additionally, a contingency strategy was developed in case UV was unable to fill the project targets for recruitment through these measures, where the PSP would work with partner organisations to expand recruitment.

Given available resources and the preferred recruitment process (through United Voice membership), recruitment strategies and numbers needed regular monitoring. Recruitment and the rate of attrition needed to be managed carefully, as well as any over-recruitment, in that we needed to provide some certainty for all project partners, as well as the dates a participant could expect to be involved (eg. home assessment date).

Due to time limits and targets the use of a call centre proved to be the most practical and manageable form of recruitment. For this method, an electorate was mailed a recruitment package, and within two

weeks leads would receive a call from the call centre. It was expected that not all leads would be eligible for the program, and that other factors (interest, time availability) would also play a role in recruitment success.

This was documented in two recruitment strategy documents, first in September 2013 prior to recruitment of participants, and secondly in December 2014 which outlines the developments in method and changes in balance of various methods.

Champion and Organiser recruitment also played a crucial role in recruitment, however they were much less manageable and unpredictable methods when specific targets and timelines are required to be met.

It was also expected that some recruits would withdraw from the program before receiving an energy assessment, as receiving an energy assessment is a time commitment that some may not have been willing to make. Therefore, an attrition rate of 30 – 50% was factored in to ensure that recruitment targets would be met. An attrition rate of 37% was experienced by the program, which was determined to be towards the low end of the scale. Over time, United Voice finessed methods for recruitment to reduce drop-off rates which were very effective.

Recruitment Phone Script

In the recruitment phone call, the OCC ran through the basics of the program, how it was being funded, and why UV was involved in the program. The script also asked the potential recruit some questions about their experience with energy use, before asking them to join the program. From then, the OCC ran through the eligibility requirements to determine eligibility status.

The recruitment script is attached in full in Appendix 5.

Trifecta Script

When the recruitment method was adapted a new script was used which covered the recruitment, pre-intervention phone survey and booking of the in-home energy assessment, as well as the core parts of the recruitment phone script and home assessment Booking Script. The trifecta script is attached in full in Appendix 6.

Barriers to Engagement and Mitigating Strategies

The PSP deliberately targeted a demographic which had not been represented in programs like this before, and traditionally does not opt in to programs like this. Using UV's experience in engaging this demographic the PSP identified and developed strategies to overcome a range of barriers which would prevent this demographic from engaging in the program.

A range of expected barriers to recruitment were identified in the original recruitment strategy:

- Behaviour, attitude and habits around energy use in the home;
- Low levels of energy literacy;
- Low literacy or cultural barriers due to Non-English Speaking Background and /or Culturally and Linguistically Diverse communities;
- Renters may have a belief that they cannot do anything to reduce their energy use;
- Renters may lack information and skills to advocate effectively to landlords and influence tenant practices;
- Low income households may lack the resources to install energy efficient retrofit solutions; and
- Busy people's lack of time due to long working hours, shift work and study.

Recruitment Rounds

The total participant sample size of 1,010 was broken into a number of groups in order to:

- Run a pilot of the PSP with a small sample of participants to test:
 - the recruitment process for registering households in the project

- the energy efficiency treatments provided to the households.
- Recruit participants in a way that:
 - reflected availability and interest in the project over the course of the PSP
 - was able to be conducted in an efficient manner with the resources provided to the PSP consortium by the LIEEP grant
 - was equitable to United Voice's membership base.
- Allow for the treatments to be delivered in an efficient and effective manner, including consideration of availability of participants and energy assessors.
- Attempt to create a control group for evaluation purposes, both in Round1b and Round 3.
- Maximise the data being collected in order to complete evaluation purposes at the conclusion of the PSP.

Pre-Intervention Phone Survey (PIPS)

A pre-intervention phone survey (PIPS) was developed at the beginning of the project as an opportunity to gather information about participants' demographics and current knowledge, attitudes and behaviours. This would then be compared to answers in the Post-intervention phone survey to test changes as a result of the program.

Knowledge, attitude and behaviours were mostly explored through a series of questions using Likert-type response scales (e.g. strongly agree to strongly disagree, very clear to understand to very difficult to understand) to enable a baseline for determining how these factors would change for participants over the course of the project.

The PIPS was administered to participants from all rounds. Based on simple logistics and also feedback from the evaluation of the Pilot, the full list of pre-intervention questions were partly asked by the OCC (phone), and partly asked in the early sections of the home assessment (in home).

It would have proven too onerous to ask all PIPS questions over the phone, and it also made more sense and was more contextual for some of the PIPS questions to be asked by the assessor while in the home.

The PIPS is contained in Appendix 7.

Booking of assessments

Home assessments were booked primarily by the OCC, with an aim of booking within 2-3 weeks of recruitment. A list of recruits awaiting a home assessment was called through and the OCC arranged a time that suited both the participant and the assessor, as soon as possible, for the home assessment to be completed.

At one point, the Hunter assessor elected to book their own assessments in order to manage their calendar alongside other (non-PSP) commitments. Additionally the Illawarra assessor booked the majority of the assessments in that area. However, the vast majority of the home assessments were booked by the OCC.

The call consisted of a reminder of the program, an overview of what is required in a home assessment, in particular the specifics around the amount of time it will take, and the Billing Data Consent form (BDC). Where possible, the PIPS was also completed on this call.

The home assessment Booking Script is attached in full in Appendix 8.

As above, as strategies developed to increase efficiencies the recruitment style shifted to the 'trifecta' method. The trifecta script is attached in full in Appendix 6.

Home Energy Assessments (HEA)

The Home Energy Assessments (home assessments or HEAs) were the source of a number of key tasks and data points, including:

1. completion of the Billing Data Consent (BDC) form, necessary in order to access billing data.
2. demographic data, e.g. number of residents, tenure type and length
3. energy bill information, energy sources, billing data/tariff information, lighting, appliance use
4. heating and cooling, including perceived levels of comfort
5. dwelling data e.g. number of bedrooms, living rooms, dwelling material
6. Recommended actions, to be utilised to develop each household's PSAP
7. Willingness to be a PSP 'Champion'
8. Inventory of energy efficiency measures (AARs) installed during assessment (e.g. valve cosy)
9. Recommended PARs

The full version of the Power Savers Assessment Tool (via FluidSurveys) is outline in Appendix 9.

Home assessments started in September and October 2013 with the PSP Pilot group (20 households). For the main roll-out of the project (990 households), home assessments commenced at the beginning of February 2014 and finished on 11 May 2015.

Each of the 1,010 participant households received a detailed home assessment with an experienced energy assessor, lasting from 1 to 2 hours, depending on the size of the home and the level of engagement and interest from the occupant(s) of the household.

Following completion of a home assessment, the household was considered a participant and counted towards the 1,010 target. The budget allocated for the home assessment and associated retrofits dictated that we could not complete a home assessment, pay our energy assessor, implement retrofits, and then not count that household as a participant, even if they withdrew or were not contactable soon after.

Energy assessors guided the householder through the PSP energy assessment tool which was created and custom-made by PSP staff using the FluidSurveys application.

The Home Energy Assessment process was designed to engage and educate households, while still meeting data collection requirements defined by the Commonwealth Government and CSIRO. Qualified, certified and experienced energy assessors guided the household through:

- A number of documentation requirements
- Detail and visual aids relating to a number of energy efficiency themes:
 - hot water, including if solar hot water is feasible / recommended by energy assessors
 - swimming pool and spa use, if applicable
 - heating, including levels of comfort
 - cooling, including levels of comfort
 - lighting in and around the home
 - appliances, including age and efficiency, as well as standby power use
- Action pages for each of the above themes, prompting discussion between the energy assessors and householders, leading to the eventual formation of the Power Savers Action Plan (PSAP)
- Provision and/or installation of a suite of 'At-Assessment Retrofit' (AAR) items, as applicable to each household
- Recommendations for 'Post-Assessment Retrofits' (PARs), tailored to each household
- Questions regarding the household's willingness to participate in any future media/case studies, as well as any interest in the 'Energy Champions' aspect of the PSP
- From October 2014, questions to tenants regarding willingness and approval for the PSP team to approach their Landlord/Real Estate Agent directly, subject to the energy assessor recommending a SHWS (solar hot water system) as an option for the rental home.

The basic expenditure model applied to the home assessments was based on the PSP receiving approximately \$500 of direct funding for each household which was applied as:

- \$200 for the assessor
- \$50 for AARs
- \$250 for PARs.

Due to the main holiday periods each year, there were minimal home assessments in December and January. The PSP completed all Round 1 and 2 assessments by the 31st January 2015, with the remaining Round 3 group home assessments starting from February 2015.

Billing Data and consent forms

It was agreed at the inception of the project, that in order to measure electricity consumption reductions and cost savings over the life of the project, the PSP should collect electricity consumption data from each of the 990 participants (the Pilot phase, covering 20 participants, did not measure electricity savings – see Pilot Evaluation Report in Appendix 3).

It was identified the electricity consumption (or billing) data would need to be obtained from the electricity distribution companies, responsible for reading the household's electricity meters.

PSP households were generally in areas serviced by the energy distributors Endeavour Energy and Ausgrid. Both organisations were approached by ISF with a data request to supply billing data for PSP participants in order to conduct an evaluation of electricity savings. It was identified that consent would be required from each household, as well as the National Meter Identifier (NMI), address and customer name in order for the energy distributors to validate the participants and release the data.

During the Project Design stage, ISF worked in consultation with the energy distributors and NCC to develop a 'Billing Data Consent Form' (BDC) (Appendix 10) which the electricity account holder for each household assessed would be asked to sign. The form contained a number of fields relevant to the data export request that would be made at the end of the project to the distributors in order to obtain the consumption data for evaluation. NCC was responsible for obtaining and recording these BDCs.

It was known that the sample size of 990 was a small sample for evaluation purposes, so the PSP aimed to collect as many billing data consent forms as possible. It was also expected that there might be some attrition from those declining to sign consent forms or moving home. So as the project evolved, and the best approaches to maximising return on the BDCs started to emerge, the method for approaching participants and making the request changed.

An e-signature was initially preferred for the BDC in an attempt to make the process easy for the assessors to manage (e.g. avoid posting signed forms) and give an instant electronic record with the added benefit of saving paper. The e-signature plan was abandoned due to:

- technical issues with e-signatures via the FluidSurveys tool
- the electricity account holder not being home at the time of the home assessment
- household undecided about signing the form (after the assessor had left)
- translated versions being needed

The BDC was also translated into the top 5 languages for assessors to carry with them in case they encountered ESL difficulties. The BDC was translated whenever requested by households, but there were only a few requirements for this.

Some Households did refuse to sign the BDC at the time of the home assessment, or wanted more time to consider signing. The reasoning provided to households was that it would be a key part of evaluating the PSP and that the data would be de-identified with no link to them personally.

The BDC was not forced upon households. If a household refused to sign the BDC at the time of the home assessment, assessors were instructed to continue with the home assessment as normal, provided the household allowed it.

At times the electricity account holder was not home during the home assessment (HEA). In such cases, assessors were instructed to continue with the HEA as normal, provided the household allowed it. For the first 50 – 100 assessments, it became apparent that a further incentive would be required to increase the rate of return of BDCs.

A strategy was put in place to obtain as many BDCs as possible:

Plan A: the BDC form was signed by the account holder and received by the assessor at the home assessment. assessors noted this as 'Yes' in Fluidsurveys and then mailed a batch of BDCs to NCC every fortnight.

Plan B: if the BDC was unable to be signed at the assessment or the account holder was not present, the assessor left a form and a reply-paid envelope at the home for the household to return. The assessor would inform the household that they would not be eligible to receive a PAR unless they signed and returned the BDC.

Plan C: if no form was received at 2 weeks post-HEA, a cover letter (Appendix 11), form and reply-paid envelope was mailed to the household. This was often integrated with the PAR phone call made to participants following their assessments. NCC staff would discuss and confirm PARs with the household, but clarify that these would only be provided once project staff were satisfied the household either returned a satisfactory copy of their form signed by the electricity account holder, or that they could not sign the form because it was out of their control (e.g. difficulties obtaining consent from the account holder; account holder was their landlord). This plan was implemented mid-program in response to a higher than desirable rate of missing BDCs.

Plan D: if still no form was received at 4 weeks post-HEA, an SMS was sent to the participant

Plan E: if still no form was received at 6 weeks post-HEA, the household was given a reminder call

Additionally, incorporated into the above plan, the OCC also took opportunities at QR1, QR2 and QR3 to utilise these phone calls as a reminder of the BDC requirement.

Although the above strategy did result in an increased rate of return of BDCs, there were still some households who were not comfortable with the process, and refused to sign the BDC.

Table 9 shows a final breakdown of the BDC status of the 990 participant households (excluding 20 pilot households).

TABLE 9: ATTRITION OF BILLING DATA CONSENT FORMS FROM PSP PARTICIPANTS

Status of BDC	Description of Status	Numbers
BDCs Not Received		
Withdrew and no BDC	Participants who dropped out and did not provide a signed BDC	46
Unable to provide BDC	Participants who wanted to provide a signed BDC,	7

Status of BDC	Description of Status	Numbers
	but did not have the power/rights/ability to do so	
Refused to sign BDC	Participants who either said they are not willing to sign the BDC, or Power Savers was unable to get in touch with them	31
TOTAL		84
BDCs Received		
Received signed hard copy BDC	Signed by the participant at the HEA	846
BDC signed in FluidSurveys	For HEAs completed at start of project	60
TOTAL		906

Therefore, consent to access billing data was obtained from 906 participant households in total.

Power Savers Action Plan (PSAP)

As part of the home assessment conducted by energy assessors (assessors), a number of energy efficiency themes were discussed with households including:

- the actions they are currently taking to save energy and/or increase comfort within their home (“is doing”)
- the actions they should consider undertaking to save further energy and/or increase comfort in their home (“to do”)
- the longer-term actions they should try to work towards (“do later”).

The data collected on these ‘action’ pages informed the development of a tailored PSAP for each individual household. The tailored PSAP was designed to be a very brief, easy-to-read, summary report based on the households’ home assessment, to encourage households to check each ‘Action’ off their list.

The PSAP, as with all other project communications with households, was translated as required.

The Power Savers Action Plans (PSAPs) were posted to participants, with a separate cover letter, ideally between 2 weeks and 1 month post-assessment. Alternatively, if the timing of the Households PAR deployment was in alignment, the PSAP was posted with the PAR letter and any PAR items, as required.

The Pilot Phase of the PSP identified that the Pilot PSAP was too lengthy and wordy. Additionally, the target audience have been identified as time-poor and for a significant number, English is a second language.

After approximately 500 PSAPs had been compiled and sent, changes were made to simplify the process of compiling each Plan. Previously, it had been quite time consuming for NCC project staff to compile each PSAP. The new process involved a very small cost for the services of an Excel Macro coder, but dramatically improved the efficiency of PSAP compilation.

The PSAP also underwent a major facelift in November 2014, as it was noted in the feedback from participants (at Quarterly Check-Ins) that some were finding it difficult to identify the PSAP.

An example PSAP is provided in Appendix 12.

As a result of feedback from the PAR and QR1 calls to participants, the Department approved NCC's adjustment to the timing of the PSAPs and PARs. PSAPs and PARs were deployed anytime between 2 weeks and 2 months post-assessment.

The reasoning for this was mainly based on feedback from the PAR and QR1 calls that:

- participant recall of the Assessment and the PAR recommendation was lower the longer we left it.
- it was deemed more effective to deploy PSAPs and PARs while it was fresh in the participants mind and their motivation was likely higher to make changes.
- doing PARs earlier allowed for the inevitable lag time between deploying PARs/letters and any installs/appliance purchases, meaning better feedback was gained at the QR1,
- the earlier we retrofit, the more likely we were to see household level reductions in energy use and costs and increased comfort.
- getting the PARs together in the same envelope/package with their PSAP may increase recognition of PSAP.
- sending PSAPs with PARs (where possible) improved efficiencies / costs and saved doubling up.

Overall, the improvements in the design of the PSAP were important in terms of communicating a positive image for the program. The PSAP was an important communication channel to provide an overview to the participant of the actions recommended to them by their assessor, and to assist participants in continuing on a journey of becoming more energy efficient.

Not all households are expected to have used the PSAP, however, some definitely did. For example, since receiving her PSAP, Miranda from West Hoxton diligently adheres to the energy tips she received. She now uses her dishwasher and washing machine only during off-peak electricity periods, and also opted to take up a Solar Hot Water system from Solahart. As a result, Miranda has seen some substantive savings.

Retrofits

As above, during the home energy assessment, assessors noted (in the Fluidsurveys assessment tool) the AARs they installed, based on the needs of each participant. Additionally, they noted the recommended PAR proposed for deployment to each household.

Assessors also made an initial site assessment and a basic needs analysis of the potential for a SHWS to be installed at each home.

At-Assessment Retrofits (AARs)

During each home assessment, assessors had at their disposal a suite of 'At-Assessment Retrofit' (AAR) items that they had the option of providing and/or installing based on the home assessment and the needs of each household. The AAR items (approximate value of \$50) were:

- *Ecoswitch*
- LED globe (Osram 9W, 650lm, warm white, screw or bayonet)
- *ValveCosy*
- Lagging (insulation) for hot water pipes
- thermometer (showing recommended temperatures for freezer/ fridge/heating/cooling/hot water)
- shower timer (4 minute)
- tap aerators
- door snake
- door seal (Raven - RP17)
- window and door seal (Raven - RP14)

- *Renshade* (cost was \$16/m, so this was generally included as part of the \$250 PARs allowance per household)

As the energy solutions for each household were tailored, the AARs provided by the assessor were chosen based on what would potentially make a difference for the particular household, and only in agreement with the householder. assessors provided households with any of the above items that the household did not already have, and that would also be of likely benefit in the household saving energy and money on their bills and/or improving the comfort of the home. On most occasions, all or most AARs were provided.

Aspects relating to storage of AARs are outlined in Appendix 13 - **Aspects of retrofit delivery**.

Cost efficiencies and discounts on AARs and PARs from suppliers are addressed in the Budget section.

Post-Assessment Retrofits (PARs)

PARs were the additional tailored retrofits provided to a householder following on from the home energy assessment and mail out of the PSAP. The objective of the PAR is to empower participants to make further changes to their home, following on from their energy assessment experience. PARs are an opportunity to provide participants with additional tailored assistance, based on the expert recommendation of energy assessors, and in agreement with participants at the point of assessment.

PARs included energy efficiency items or rebates up to the value of \$250. Options for PARs were open to natural expansion throughout the PSP in order to provide all-important tailored solutions to participants.

The PARs can be categorised into three main options:

1. Products – a combination of one or more energy-saving products; or
2. An energy display monitor ('Efergy E2' in-home display) and installation by an electrician (available to home-owners only); or
3. A rebate towards an energy efficient appliance or fixture upgrades.

The list of PARs grew throughout the PSP to include those listed in Table 10.

TABLE 10: TYPES OF POST ASSESSMENT RETROFITS

Energy Efficiency Equipment (including IHD)	Rebate
An in-home display (IHD) for home owners OR A combination of the following items up to the value of \$250: • LED light-globes, LED downlights and PAR30 spotlight-globes • pedestal fan • ceramic fan heater • draught-proofing products (caulking tubes, door and window seals, draft-stoppers) • water-efficient showerheads • other extra AAR items	A rebate of up to \$250 to contribute to one or more of the following: • Fridge • Freezer • Fridge/freezer • Fridge seals • Washing machine • Dishwasher • Outdoor shutters • Whirlybird installation • Curtains/pelmets • Draughtproofing works • Insulation (ceiling or floor) • LED downlights • electric to gas HWS upgrade • storage to instant HWS • HWS temperature check • HWS size reduction • SHWS inspection/repair • Solar panels (photovoltaic) • Reverse-cycle air-conditioning

Energy Efficiency Equipment (including IHD)	Rebate
	• Air conditioner service • Ceiling fan / window fan / pedestal fan • Dyson Hot & Cool fan • Microwave • Rice cooker • Pressure cooker • Oven seals or hinges/stove repair • Clothes horse • Flyscreen • LED TV (to replace CRT or Plasma) • Skylight • Blankets (including electric)

An initial 3-month expiry was placed on all rebates in order to encourage participants to replace old inefficient appliances as soon as possible and for the PSP to evaluate the benefits within the LIEEP program period. In certain circumstances, an extension up to 6, 9 and/or 12 months or more was allowed to enable participants to save up the extra monetary contribution.

Gregory from Ryde always had keen interest in energy efficiency, and he did not hesitate to join the PSP when approached. The advice, knowledge and support he has gained from the PSP have spurred Gregory to renovate his house. Gregory intends to make his house more comfortable to live in, whilst reducing his energy cost. Gregory was also provided with an energy display monitor as part of the PSP, and he absolutely loves using it.

"I now have the ability to continuously monitor my energy usage. This device has made me more aware of the running cost of various appliances. The best part, it has indirectly altered my energy behaviour. These days, I have developed a positive habit of turning off most appliances before going out."

Gregory from Ryde

Certain conditions were placed on some PARs. For example:

- whitegoods needed to be new (or as new) and meet minimum energy star ratings (eg. 3-star fridge)
- qualified and licensed tradespeople were required to be used whenever relevant (eg. insulation)

Retrofit items utilised in the PSP were chosen for a variety of reasons. This included considerations of cost, energy-savings, ease of use/installation, storage, where manufactured, tenancy issues (such as possible relocation of participants and Landlord approval requirements), and value-for-money/items that will have the most impact.

Aspects relating to deployment of PARs, rebates, and also more detail about PAR items is outlined in Appendix 14 - **Aspects of retrofit delivery**.

Solar Hot Water Systems

The initial design of the PSP identified a target of providing 100 Solar Hot Water Systems to participants, which included:

- 50 fully funded SHWSs for home owners,
- 50 subsidised 'split-incentive' (cost-sharing) SHWSs for landlords and their tenants.

However as the project evolved, it was evident that the cost-sharing arrangement was not progressing to the point of *installing* systems, therefore in 2014 an additional target was included for evaluation:

- *Engage* 50 landlords and their tenants to develop up to 50 cost-sharing arrangements for installation of solar hot water systems.

Homeowners

The PSP had a funding pool of \$250,000 available for the installation of 50 fully-funded SHWSs for home owners.

During the home energy assessment, if a new SHWS was deemed beneficial, the energy assessor would conduct and record (in FluidSurveys) a basic site assessment to determine if the household was physically suitable for an installation, which included shading issues, roof type, pitch and orientation. The assessor also collected information about the following:

- Type of current hot water system
- Location of existing hot water system (i.e. plumbing configuration)
- Age of existing system
- Tank condition (if corrosion visible, needs replacement)
- Tank size
- Location of driveway (i.e. access).

A certain number of homeowners were then selected each month that ranked with the highest points based on the selection criteria in Table 11.

TABLE 11: SELECTION CRITERIA FOR SOLAR HOT WATER SYSTEM INSTALLATION IN OWNED PROPERTIES

Selection Criteria	Points / weighting
1. Number of occupants (1-2, 3-4, 5+)	25%(5%; 15%; 25%)
2. Age of HWS (1-5, 6-10, 11+)	50%(5%; 15%; 50%)
3. Electric Storage HWS	15%
4. Champions potential*	10%

*The PSP team decided to allocate a small weighting to participants who were likely Champions

David, from Casula was one of the lucky 79 participants to receive a solar hot water system through the PSP. Since the installation, David has seen savings of close to \$400 per quarter.

“Through the installation of the solar hot water system, I’ve saved money and also reduced my carbon footprint. It feels good helping the environment.”

Solahart contacted the selected home owners each month to arrange for a more detailed site inspection (than the first inspection at home assessment) to check for SHWS suitability. If this inspection was successful, an installation date was organised.

Tenants

No funding was allocated to the installation of SHWSs for tenants and landlords.

The project aimed to fund the cost of a solar hot water system by offering a significant discount, with the remaining cost paid for by the participant’s landlord and / or the tenant under a cost-sharing or ‘split-incentive’ arrangement.

Administratively, a similar process to homeowners was initially undertaken by assessors in order to determine site suitability for a SHWS installation in a tenanted property. Slightly different criteria were used to rank priority for tenanted homes, as set out in Table 12.

TABLE 12: SELECTION CRITERIA FOR SOLAR HOT WATER SYSTEM INSTALLATION IN RENTED PROPERTIES

Selection Criteria	Points / weighting
1. Age of HWS (<1, 1-2, 3-5, 6-10, 11+)	50% (0%; 5%; 15%, 35%, 50%)
2. Length of tenure (< 6 mts, 12 mts, 18mts, 24 >mts)	20% (0%; 10%, 15%; 20%)
3. Number of occupants (1-2, 3-4, 5+)	20% (5%; 10%; 20%)
4. Relationship with landlords (OK, Good, Excellent)	10% (0%; 5%; 10%)

A key aspect was both the age and condition of the current HWS. In late 2014, a slight adjustment was made to the criteria to give a higher weighting to older HWSs, as per the above. The PSP team decided it was highly unlikely for a landlord to change over a system that was not older (11 years or more) or in need of repair.

Critically important was obtaining permission from the tenant for the PSP team to contact their landlord or real estate agent. Without tenant consent, the PSP did not proceed. If permission was granted, NCC obtained contact details for the landlord.

In a later iteration of the FluidSurveys tool, and in order to streamline the process, assessors would ask for tenant permission at the home assessment, as well as obtain contact details for the landlord or real estate agent.

NCC or Solahart would then contact the landlord or real estate agent to attempt gain their agreement for a no-obligation Solahart site inspection to confirm site suitability.

A successful inspection would be followed by negotiation with the landlord and/or tenant regarding a cost-sharing arrangement.

A number of documents were produced in order to assist in informing both the landlord and tenant about the arrangement and the potential benefit including:

- Letter to Landlord/Real Estate Agent (including the PSP discount on offer)
- Fact Sheet for Landlords (including SHWS benefits and potential tax benefits)
- Landlord Agreement (between NCC and the Landlord)

If there was interest from the landlord or real estate agent, the letter and fact sheet were posted, and Solahart or NCC placed a phone call to follow up 1-2 weeks later.

Quarterly Check-ins (QR1, QR2 and QR3)

Throughout the PSP, we aimed to contact each participant every quarter of their involvement or 'journey'.

Quarterly follow ups (QRs) were a phone conversation to check on their progress, to determine what further education material might help, and what further voluntary involvement participants might be interested in through the Champions program.

Quarterly follow-ups were a valuable opportunity to gauge the changes participants were making in their electricity use, what effects they were seeing and what else the project could do to help them save energy and money, and be more comfortable in their home.

The QRs program rolled out on a sliding basis following the dates of each participant's assessment. Three progress phone calls were scheduled – QR1, QR2 and QR3.

Quarterly check-in 1 (QR1)

QR1 calls started in June 2014 and ideally were made 3 months after the home assessment was complete, and at a minimum of 1 month after the completion of the PAR deployment. The objectives were to:

- confirm participants received their PAR and PSAP
- evaluate the immediate value, as perceived by the participant, of:
 - o the home assessment
 - o the PSAP
 - o the PAR process
- source new participants and potential champions

The phone script for QR1 is provided in Appendix 15.

Quarterly check-in 2 (QR2)

QR2 calls started in October 2014 and ideally occurred 6 months after the home assessment, and at a minimum 1 month after the QR1.

The second quarterly phone call check-in was an opportunity to obtain feedback from participants at a mid-point after their home assessment. QR2 acted as a catalyst to provide participants with further tailored information in the form of a library of 6 or more PSP fact sheets. The objectives were to:

- Check in on participant experience half-way through the program
- Identification of any stories and champions
- Check in on bill changes
- Identification of any areas where we could help participants make further reductions in their energy use/bills
- Distribute fact sheets

The phone script for QR2 is provided in Appendix 16.

Quarterly check-in 3 (QR3)

QR3 calls started in December 2014 and ideally occurred 9 months after the home assessment and at a minimum 1 month after the QR2.

The third quarterly phone call check-in was an opportunity to scope potential stories of the PSP and ask participants to be part of local Power Savers teams. The objectives were to:

- Have an open conversation about the participants experience in the program
- Gauge changes made by the participant to reduce their energy use – both through the PAR and outside of the PAR
- Invite participants to join a local Power Savers team.

The phone script for QR3 is provided in Appendix 17.

Amended QRs

participants who had their assessment later in the project had a truncated participant journey due to shortened project timelines. Thus, such households ended their journey after approximately between 7-9 months post-home assessment.

For these participants, QR1 was slightly amended to refer to discussions around sharing knowledge gained, rather than recruiting others to the program. Both the QR2 and the QR3 were also altered to reflect the different journey for these participants (see Appendix 16 and Appendix 17).

Champions and Teams

The Champions and Teams aspects of the PSP had not been developed in detail during the initial project planning periods. A Project Proposal was prepared by UV in 2014, in discussions with NCC, and submitted to the Department, as outlined in Appendix 18.

The use of peer-to-peer networks and storytelling to inspire and sustain energy-efficient behaviours was targeted through the development of individual leaders, or 'Energy Champions', who would empower households to tell their stories to their peer networks and / or encourage others to get involved.

A Champion was defined as someone who took activities beyond the core or the program, or who took action to spread the learning of the 'Power Savers' project beyond themselves – be that within their family, workplace or community.

Examples of potential 'actions' which would define someone as a 'Champion' included:

- Encouraging others to join the 'Power Savers' project;
- Speaking to family, friends, workplace or community about ways to save energy;
- Engage in media, or agrees to be part of other initiatives e.g. videos;
- Consulting with the Power Savers Project team on the program roll-out;
- Skilling up around energy efficiency;
- Set up a Power Savers team.

A 'Power Savers team' would be a group of champions who acted together to take action in the same way an individual champion does, though on a greater scale.

Examples of potential 'actions' which would define a 'power savers team' included:

- Supporting one another in energy saving efforts, sharing ideas and tips;
- Act as a collective, or a consultative group, around the shape and the development of the 'Champions' program;
- Running a workshop in their community; or
- Acting in their workplace to reduce energy use.

Objectives

In the PSP Champions / Teams Project Plan, UV set out a range of objectives, as listed in

Table 13 below:

TABLE 13: PSP CHAMPIONS & TEAMS OBJECTIVES

Objective	Strategy
Select and train 60 champions to the program	Throughout various interactions with participants of the program – from recruitment, PAR and quarterly follow ups.
Form a minimum of 3 power savers teams in one or more of the Sydney, Hunter and Illawarra regions	By both encouraging champions to build their own teams within their networks and developing teams through asking participants to be part of 'local power savers teams'.
Increase recruitment to the program	By encouraging champions to tell their story to others who would be eligible for the program
Spread knowledge gained through the PSP to the broader community and increase energy literacy of the broader community.	By encouraging champions and participants to share their knowledge in their personal circles, and to engage in broader sharing through other mediums such as media or videos.
Increase skill set of participants	By inviting champions to engage in a range of new opportunities such as creating a video to promote the program or share their story for media. Through 1:1 training with champions for all parts of the champion program, and encouraging champions to take initiative.
Build peer-to-peer interaction	By encouraging champions to share the PSP and its learnings with their communities, and engage in specific communities created within the PSP. Encouraging participants to recruit others to the PSP
Build a peer-to-peer network	By inviting participants and champions to be part of 'local Power Savers teams'
Identify opportunities for the program to grow and develop.	Consult with champions about the roll-out of the program and ideas for the champions program.

There was little detail on the specifics of how the Champions program would be analysed, so UV developed this plan, in consultation with NCC, at Milestone 7.

At this point some interactions had already begun, and not all information was recorded. Due to the trial nature of the PSP, reporting and evaluation requests developed over time, meaning that at some stages information was not recorded as extensively as would have been liked in retrospect.

Additionally, due to the organic nature in which participants were expected to engage in sharing the knowledge of the PSP with their friends, family and colleagues, we could not expect to have extensive knowledge of all interactions.

Methods of identification and recruitment

Due to the intensity of the program timeline, it was understood that the main development of champions would occur through direct points of engagement with the PSP Project Staff and the OCC. This would be backed up with UV organisers across the various industries.

Through all points of the PSP project staff were looking for potential champions and engaging with participants about potential ways they could step up and engage on a level higher than the core of the PSP. This was highest in the QR2 and QR3 calls, where the OCC were specifically looking for leadership qualities and putting the 'hard ask' on participants to take further actions.

The OCC had training around leadership, identification and development. Following this training the OCC had a 'Champions Script' that they used when phone interactions identified a potential champion (Appendix 19).

Below, in Table 14, the various stages of engagement are outlined.

TABLE 14: STAGES OF ENGAGEMENT FOR PSP CHAMPIONS PROJECT

Stage	Engagement Strategy
Recruitment	At recruitment OCC staff look out for potential leaders and put an 'ask' to recruits if there are other people they would like to recruit to the program. If identified, OCC encourages participants to either take some brochures and talk to these people directly, or pass on their details to the PSP.
Assessment	Assessors ask participants if they would be willing to engage in the Champions program, and whether they would be interested in sharing their story on film or in the media.
Post-Assessment Retrofit (PAR)	PSP project staff listen for potential champions, and where suitable discuss the program with participants and record any relevant information for further interactions.
QR1	In the first quarterly follow up the OCC do an initial analysis from the conversation as to whether the participant is a likely champion. They ask the participant if they would recommend the program to others, and if the participant answers yes, ask them whether they would be interested to engage with the champions program.
QR2	In the second quarterly follow up the OCC actively scopes whether the participant could be a potential leader. If identified as a potential leader, or interested in doing more, the OCC put a strong ask on them as to whether they would like to be a Champion, and task them to encourage someone else to join the program. Throughout this process the OCC provides over-the-phone training as to strategies for running this conversation, inoculate them against potential ways the conversations might go, and develop strategies for dealing with objections (as required).
QR3	In the third quarterly follow up the OCC engages in a wide conversation with participants in attempt to develop the participants 'story'. From this, if the participant is deemed as engaged in the program and motivated by it, the OCC ask if they would like to be part of a local Power Savers team, or if they have other ideas as to how they would like to be engaged.
1:1 with Project Staff	PSP Project Staff conduct 1:1s with strong champions, either over the phone or face-to-face, for a range of reasons. Particularly these 1:1s occur for 3 main reasons: 1. Training to step up 2. Scoping of where the champion would be willing to take their engagement, and developing a plan to do so 3. Consultation about the broader program roll-out
Local Teams	The PSP will work with champions to put together local team meetings across the geographical area of Power Savers. The first meeting will be formed as a 'table talk' (where a group of people get together to discuss an issue and what to do with it) where different participants can get to know each other and put forward a plan for working together in the future.
Other	Through all communications (particularly written communications such as welcome letters, PAR letters and newsletters) participants are encouraged to talk to their personal circle about getting engaged in the program, and encouraged to get more involved.

Through UVs experience with their members, it was anticipated that industry teams were likely to be the most effective way to organise Power Savers teams – specifically because it is where United Voice members are most engaged in their community, and it is the most effective way to bring a group of PSP participants together. This was anticipated to take place either through a group acting within their workplace, or using their workplace/industry to create a team outside the workplace.

Additionally the PSP looked to engage with external organisations to engage teams – either participant led or sourced as a potential area of further recruitment/benefit.

Champions Communications

Through the Champions and Teams projects, participants received additional communications to discuss further involvement as Champions. For the most part, the initial sourcing discussions with Champions were had through the quarterly follow-ups, although at this stage they were not identified explicitly as Champions.

Once champions were selected for Power Savers teams ongoing conversations were conducted with UV project staff and a specific project staff member from NCC (dedicated to the ECEC team), which were conducted both in-person and over-the phone.

Additionally identified champions received a phone call and physical invitation to be a Power Savers ambassador at the 2015 Delegate's conference, and a phone call and invitation to the PSP 'Conclusion event'.

Additional communications

A wide range of communication mechanisms and materials were created to engage and support participating households throughout the PSP. In addition to the communications previously outlined, mail outs of Fact Sheets and seasonal newsletters occurred, in order to supplement the phone calls and provide additional information.

The order of the key PSP communications is indicated in **Figure 1**.

As per the recommendation of the Pilot Evaluation Report, to place importance on “*follow-up communications (variety of communications mediums to achieve persistence in energy efficient behaviours)*”, the schedule was designed to ensure that participants received regular communication throughout their 12 months in the PSP.

Fact Sheets

Following the QR2 which occurred at around 6 months post-assessment, the PSP sent out a pack of fact sheets designed to assist participants in continuing to become more energy efficient, and targeted at the next steps in the journey.

The Fact Sheets (Appendix 20) included information for households on:

- Draughtproofing
- Windows
- LEDs
- Cooling
- Heating
- Efficient appliances

The development of the PSP Fact Sheets identified an apparent gap in the availability of simple, easy to read, quality information, suitable to our diverse and time-poor audience. The main information readily available on the market was too technically heavy, and not particularly digestible. It was decided that new fact sheets would be developed which would provide quick and easy information to assist participants in

taking next steps around energy efficiency, and filling knowledge gaps around energy efficient products and actions. PSP staff undertook extensive research and peer review on a number of energy efficiency topics. The ultimate output was a series of fact sheets, tailored to the target which were circulated to participants, as well as two newsletters.

Newsletters

Seasonal newsletters were prepared and posted to all participants who had completed a home assessment, to correspond with the change in season to support households in ensuring their homes were adequately prepared for the expected temperature changes.

The newsletters complemented the ongoing energy efficiency education with, and to create a sense of community by sharing stories of PSP participants. Newsletters also included calls to get involved in the Champions program, and encouragements to share the program and learnings to others.

A summer newsletter was posted in December 2014 to all participants who had completed a home assessment. The final version is provided in Appendix 21.

A winter newsletter was posted in July 2015 to all participants who had completed a home assessment. The final version is provided in Appendix 22.

Website

A PSP website, and possible Facebook page, was initially forecast to play a key role in aiding communications with and between participants. However, upon further investigation, UV's membership and the PSP target audience were unlikely to utilise or benefit during the project from this form of communication.

A website was developed throughout 2016 in order to provide a source of ongoing reference for interested participants, for energy efficiency resources and information such as PSP Fact Sheets and other website links, and to highlight household successes via some case studies.

Below is a screenshot of the PSP website, www.powersavers.org.au, to be launched in April 2016.



The website link will be referenced in the 'final communication' to participants.

Final communication

A 'final communication' is planned for April 2016 and is to be mailed to all 1,010 PSP participants (minus withdrawals). This will comprise of a thank you covering letter and a one-page infographic summarising the key outcomes of the project, as well as reference to the above website.

Post-Intervention Phone Survey (POPS)

The post-intervention phone survey (POPS) was largely based on the PIPS. Following the recommendation in the Pilot Evaluation Report (Appendix 3), the length of the questionnaire was shortened to reduce the amount of time required. In addition, some questions were adjusted as questions were asked in the home assessment instead.

All POPS questions were conducted over the phone by the OCC. It was administered to the Round 1 and 2 treatment groups from February 2015 onwards, which was 12 months after the first PSP participants completed their home assessment.

The full POPS was not administered to the Round 3 group (the original control group) due to time and budget constraints, and the realisation that this group could not be used as a control group. Instead a reduced version was developed, which gathered essential information about participants' view of the program and focusing on participants reflecting on their PSP experience. It did not include the 'after'

questions on elements such as perceptions of efficiency, literacy and control for the before and after analysis of the impact of the project on participants.

The data from these surveys is used to evaluate the behaviour and attitudes of PSP participants throughout the life of the PSP, and in particular, conduct before and after comparisons with responses from the PIPS.

The POPS is contained in Appendix 23.

Conclusion event

The PSP identified a conclusion event was an important final step in the PSP journey for participants. NCC and UV identified that the goal was collective engagement, including that at the dinner:

- participants engaged with each other
- participants felt that their contribution to the project was valued and celebrated
- the conclusion of the project was recognised
- light activities for people to engage in as a collective were provided e.g. photographing participants achievements during PSP, prizes of energy efficient products.

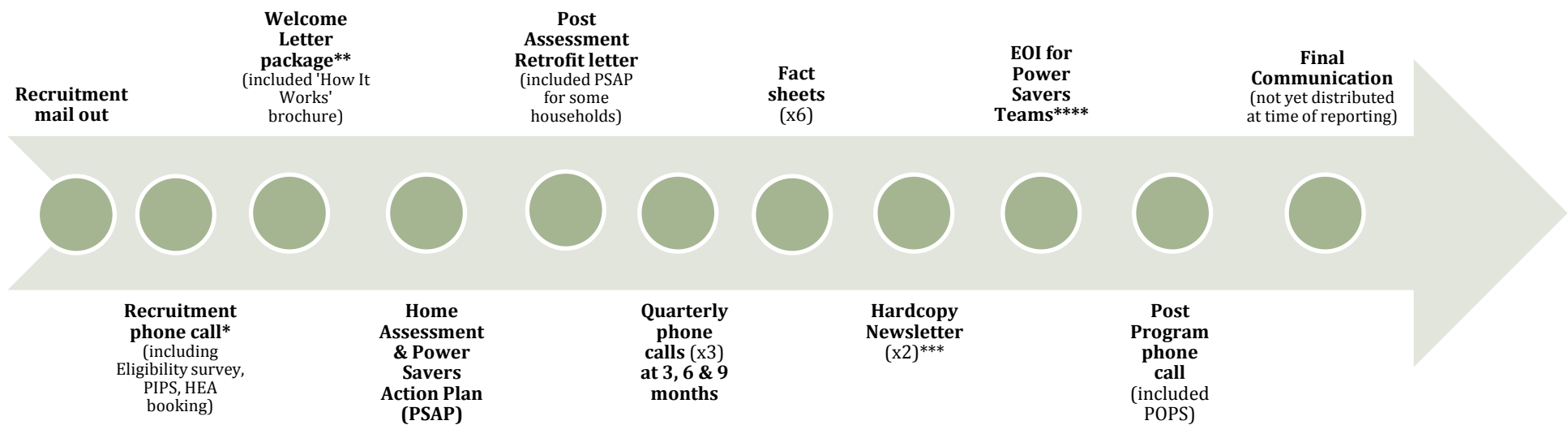
The dinner was held on Monday the 16th November at Diethnes Restaurant in Sydney. Forty two (42) project participants and guests attended from an anticipated fifty two (52). The three (3) principal PSP assessors and their partners and project staff from NCC and United Voice also attended. Overnight accommodation was provided for four (4) regional participants and workplace release organised for two (2) participants from the Sydney metro area.

The following activities were implemented to achieve the goal of collective engagement:

- take a photograph with your guest, or others, and hold an energy saving themed message
- a lucky door prize draw where 1st prize was a highly sought after Dyson Hot and Cool fan heater kindly donated by Appliances Online
- subsequent prizes were smaller energy saving devices such as eco switches, shower timers etc.

Feedback from the dinner was very positive with participants enjoying the opportunity to connect with other members of the project and to meet project staff who they'd had numerous phone contacts with.

FIGURE 1: KEY COMMUNICATIONS RECEIVED BY PSP PARTICIPANTS



*Also termed initial 'trifecta' call – commenced from Round 2
**Commenced mid-2014
***The Summer Newsletter was posted in December 2014 and the Winter Newsletter was posted in July 2015.
****EOI for Power Savers Teams was sent September 2015.

Rental households

Across NSW around 30% of people report renting their homes. UV does not explicitly record the tenure status of its members, however it is expected that there is a higher proportion of UV members in rental homes than the state average, and that in general there would be a higher proportion of tenancy in this targeted demographic.

During the scoping of the LIEEP programs, the PSP identified an interest in attempting to target participants in rental tenancies, as an attempt to overcome the structural barriers these people tend to face, specifically around energy efficiency. Specific groups were included in the PSP eligibility criteria to make it easier for renters to take part in the program, knowing they are often in a more insecure position than home owners.

The composition of the tenancy market has changed dramatically over the past decade and the UV membership reflects those changes. Once dominated by singles and young people, whom would transition to homeownership, the private rental market is now increasingly populated by older people and families with children³ seeking long term rentals and ongoing stability. Rental affordability is increasingly out of the reach of many low paid workers. Median rent as a percentage of income rose from 19% in 1981 to 26.9% in 2011⁴.

It was understood at the program onset that there were a great number of barriers facing low income renter households in improving their EE. Studies show that low income tenants are twice as likely to live in uninsulated homes compared to owner occupiers⁵, they are more likely to have older inefficient appliances⁶ and have higher risk of living in homes with inefficient electric hot water systems and poor draught proofing⁷.

Most poignantly low income households are recognised as self-limiting their energy use, compared to higher income households, in an effort to reduce energy costs⁸. There would be obvious limits on the capacity of an individual, who was likely to be already moderating their behaviour, to improve EE if the dwelling they were renting was inefficient and there was low likelihood that the landlord would make improvements.

The PSP also went to significant efforts to tailor the home assessment and PARs for renters, so that they would be able to take their energy efficient knowledge and items if they moved home.

Engaging and tailoring to Tenants

One of the key features of the PSP was its tailored approach in terms of providing advice and retrofitting items specific to participants' homes and lives, in particular identifying retrofits that were specifically suitable for tenants.

According to the NSW tenancy laws, tenants are required to obtain consent from their landlords to make any changes to rental property fixtures. Although the laws stipulate that landlords could approve minor changes, many renters still face a lot of difficulties because the laws are vague, as they do not define what minor changes are, alongside a widely acknowledge power imbalance where many renters fear being evicted or facing a rent increase in response to asking for changes to the property.

³Stone, Burke. Hulse and Ralston, "How has the private rental sector changed in recent decades, particularly for long-term private renters? AHURI, Research and Policy Bulletin, February 2015

⁴ Ibid

⁵ ACOSS, *Energy Efficiency and People on Low Incomes*, 2013

⁶ Ibid

⁷ Ibid

⁸ Ibid

Therefore, any retrofits that required landlord approval would add a layer of complexity and a risk to security of tenancy, therefore presenting a substantive barrier to deep engagement of tenants in the program. Therefore the PSP decided to restrict retrofits for tenants to those that did not require landlord approval and could be easily removed or taken with the tenant if they were to move home.

During the home assessment, logic was built into the energy assessment tool to ensure that only tenant-related questions and information was discussed. This was then used to create a tailored energy action plan that only recommended appropriate actions that a renter could undertake.

The PSP took a risk-averse approach to retrofit installations, to ensure that the program was not putting tenants in any situation which could affect their relationship with their landlord or security of tenancy. For example, IHDs were not an option for tenants, as it may have required drilling a hole into the electricity meter box.

The vast majority of AARs, and many PARs, were suitable for tenants. Some of the retrofits that were recommended for renters included:

AARs

- shower timer
- door snake
- thermometer
- ValveCosy
- LED globe
- Ecoswitch
- Renshade

PARs

- Major whitegoods, eg washing machine, fridge
- Cooking appliances such as Microwave, Rice cooker, Pressure cooker
- Small portable appliances such as pedestal fans and ceramic fan heaters
- Clothes horse
- Flyscreen
- LED TV (to replace CRT or Plasma)
- Blankets (including electric)

These retrofits allow renters to continue making savings in their energy bills even though they may have moved to a new property.

Tirtha was unable to use his lighting rebate from the PSP as he was experiencing some issues with his landlord. He did not want to press the lighting rebate with his landlord out of fear of being evicted. Tirtha eventually agreed to accept a pedestal fan as part of his PAR as he did not require any installation or approval from his landlord. He can also take his pedestal fan with him if he moves in the future.

Linguistic and cultural diversity

To ensure equal access for participants or potential participants from NESB/CALD backgrounds, UV engaged two bodies to assist in translating and interpreting for the program – TIS (Translating and Interpreting Service) for over-the-phone interpretations and on-site interpretations for assessments, and Straker translations for written translations.

Translation and Interpreting Service (TIS)

TIS, run by the Department of Immigration and Border Protection, provided both over the phone interpretation and interpreters for the home assessments. Because of the not-for-profit status of the PSP, we were able to access most of these services for free.

Miranda comes from a non-English speaking background; a Serbian interpreter was engaged during her home energy assessment, together with her energy assessor. She appreciated the extra effort the Power Savers Program took to ensure she understood the program.

Originally TIS provided free translating and interpreting services for not-for-profits. Before the implementation phase TIS changed its policy to no longer provide free translating services. Additionally in late 2014 TIS changed its policy, meaning that free on-site interpretation services would only be provided between the hours of 8am -6pm Monday to Friday and outside of that we were required to pay.

An additional account was required to be set up to provide weekend and after-hours interpreters to home assessments, again to ensure equal access to those unavailable during normal working hours. As providing equal access for participants from NESB/CALD backgrounds was a priority to the PSP we decided to continue to book assessments outside of these hours, where required, for participants in need of a translator. A 2 hour assessment usually cost around \$380, however there was some discretion from TIS around the cost, and some higher cost assessments held on public holidays. It was decided that this was a priority for the PSP, and coupled with the free interpreting services we were able to gain through the service, well worth it.

Straker Translations

We used a separate organisation for written translations called Straker Translations.

Straker Translations is a cloud-enabled translation services provider. We chose Straker initially based on price, and continued engagement with them as they provided a quality service. The service allows for an online submission and a quote within minutes.

Initially, a case manager was assigned by Straker to engage directly with UV, however it appears this model was ended mid-way through PSP implementation. Generally this was not a problem as the online system was very user-friendly and the service highly professional.

Data management and collection

Data management was a core piece of delivering the PSP and was overseen by NCC and UV staff. In addition to the billing data sourced by ISF, three main types of project data were captured:

- project delivery information and tasks
- participant information and interactions, and
- home energy assessment data.

A number of data management and collection systems were considered and trialled during the project, as shown below in Table 15. In the end, two systems were chosen to primarily manage project data:

1. FluidSurveys to administer the assessment survey, 'Power Savers Assessment Tool'
2. Salesforce as a Client Relationship Management system (CRM).

These are described in more detail below.

TABLE 15: PROJECT SYSTEMS CONSIDERED AND UTILISED

NAME OF SOFTWARE	USE FOR PSP
Project / task management software	
Wrike <i>Initially piloted, discontinued</i>	- project management tool to assist in the completion of cross-organisational tasks - mainly used by NCC internally as a back-up reminder for tasks - discontinued after one year as little time available to spend training key personnel in how to use
Asana <i>Initially piloted, continued</i>	- free task-management tool - enabled the UV project coordinator to create interactive lists of tasks, to be shared with the OCC (operated out of hours)
Participant relationship management software	
Google docs <i>Initially piloted, discontinued</i>	- tracked interactions with participants during the pilot phase - free and relatively quick and easy to set up - not sufficient to handle detailed and complex interactions required over the life of the project
Unison <i>initially piloted, discontinued</i>	- database system used by United Voice to manage membership database - used by UV during Round 1 and 2a recruitment - decided that including the recruitment piece within Salesforce would allow for cleaner management of data
Salesforce <i>Identified post-pilot, continued</i>	- selected following exploration of potential Customer Relationship Management (CRM) software - eligible not-for-profit discount applied but funding for other non-core areas still required to purchase - worked with locally-based companies Arxxus and, later, Clouding Around to develop the Salesforce platform which was used to: - maintain contact details - track 'journey' of each household through the PSP - schedule and manage home assessment bookings via an integrated calendar application shared with assessors - collect data for the PIPS, QR1, QR2, QR3 and POPs - deploy PARs and maintain an inventory of PARs - manage status of BDCs, PARs and SHWS installations - track potential Champions - track calls made and provide a history of interactions - attach files, communications and PAR receipts - note translation requirements - SMS participants (via the "SMS Magic" App) - produce quick and simple data reports and graphs
Survey tool for collecting home assessment data in the field	
Survey monkey <i>Initially considered, not utilised</i>	- free well-known tool - did not contain the necessary functionality (in particular, offline capability) for PSP needs

NAME OF SOFTWARE	USE FOR PSP
FluidSurveys <i>Initially piloted, continued</i>	• superior functionality, particularly sophisticated survey logic and offline capabilities • used by home assessors in the field regardless • fully customisable by Project Staff • very affordable alternative to developing Application for the same purpose

Data management requirements for the PSP were initially very much underestimated and the budget was, in fact, non-existent. Fortunately, budget for the website and other communications had been overestimated so, in agreement with the Department, funding was transferred across line items.

FluidSurveys

For the purposes of this document, FluidSurveys is used interchangeably with mention of the Power Savers Assessment Tool (Assessment Tool).

FluidSurveys software, or access to it, was purchased and utilised by NCC to develop an efficient assessment tool for assessors to collect the specific data required for LIEEP and the PSP. These requirements related back to the Data Schema developed by CSIRO, as well as PSP-specific information that we have required assessors to gather at the point of home assessments.

A range of home assessment tools were considered, but all of them required extensive costs for usage and/or adaptation for LIEEP purposes. Fluidsurveys offered the most cost-effective option, where minimal to no budget had been initially allocated.

Fluidsurveys' advantage over a tool such as Survey Monkey was that it offered more capabilities for in-built-logic in the survey. Fluidsurveys is cloud-based, but an additional advantage was that it offered an offline mode. Some locations in the PSP region had an unreliable internet connection, so Fluidsurveys allowed assessors to maintain data integrity and prevent data loss. As soon as assessors returned to a stable internet connection location and uploaded the final data set and file photos for each household record, the PSP team had immediate access to the data.

Salesforce

The Salesforce web/cloud-based platform was the key PSP participant database / CRM.

A range of databases were considered but Salesforce offered a number of features required for the specific needs of the PSP. Fortunately, NCC was able to successfully apply and gain access to a considerable discount to purchase Salesforce under their "not-for-profit" initiatives.

NCC and UV worked collaboratively with two locally-based companies to develop the Salesforce platform which was utilised and shared by the majority of the program team to do the tasks listed in Table 15. Salesforce proved to be a very effective and highly adaptable platform, with very little programming knowledge required beyond the initial development phase. The scope of Salesforce continued to grow with the project's needs and it was absolutely essential as a database for the PSP to track the interactions and journey of each household record.

EVALUATION METHOD

This section covers aspects of the evaluation of the project from the PSP Data Evaluation Report which was independently assessed and reported by ISF on the evaluation of a) overall implementation of the PSP and b) impact of the PSP on participants and their electricity use.

Evaluation to date

ISF conducted a number of evaluation activities during the implementation of the PSP. These include:

- Background Research report to inform project design in July 2013
- Evaluation Framework at the commencement of the PSP in May 2013
- Livelihoods Workshop with PSP participants in February 2014 and Summary report in May 2014
- Evaluation Report of the Pilot phase of the PSP in June 2014.

A summary of these evaluations is detailed below. These reports were submitted to NCC (and subsequently the Department) as part of the Milestone Reporting for the LIEEP.

Background Research

The Background Research Report provided background evidence to inform and support design and delivery of the PSP. The report introduced theories of behaviour change and social practice, perceptions of energy efficiency and highlighted useful approaches to project design. The report also examined barriers to project implementation in engaging with low income and renter households. It also provided an analysis of, and conclusions from, past energy efficiency projects (via interviews with past project staff).

A summary of the key findings and recommendations of the Background Research Report include:

- No single behaviour change theory available can be described as ‘perfect’ or ‘right’ – what is consistent across theories is that behaviour is influenced by:
 - an individual’s perception of themselves within their environment
 - signals they receive about their behaviour from this environment.
- Social practice theory provides an alternative view of how individuals and structures participate in everyday practices.
- A deep understanding of biases and limitations of the end user needs to be identified as precursor to successful changes in behaviour.
- The 2013 United Voice Real Voices member survey provides a key reference point from which to draw narratives for the PSP, e.g. members are already primed for narratives that articulate ‘cost of living’ pressures, especially electricity prices, as a class issue.
- It will be important to identify how PSP participants are empowered (through appeals to intrinsic values) and hence how well the project is achieving persistence of energy-efficient practices.
- A range of engagement materials and mechanisms will be required to satisfactorily engage participants.
- Segmentation technique based on either attitudes and actions or audience values may be more appropriate than segmenting by demographic characteristics.
- Use of a values approach may be most appropriate for broad communications whereas segmenting by actions could be useful when targeting a specific behaviour.
- Communicating across multiple mediums and tailoring messaging to value groups that are likely to be accessing that medium is recommended.

- While price barriers prevent low-income households accessing energy-efficient household appliances, other factors also play a significant role including:
 - reduced rates of financial or other literacy
 - language barriers and recent migrant or refugee status
 - reluctance to trust or engage with government agencies
 - illness or other health related concerns
 - transient employment
 - uncertain length of tenancy in buildings
 - behaviour of others
 - habit
 - comfort
 - health and hygiene.
- Installation of a broad range of energy efficiency technologies alongside wider education and communications projects presents an opportunity to assist low-income and disadvantaged households to embed technology within behaviours.
- Improving household energy efficiency may not always result in decreasing electricity bills because households could elect to realise non-energy or lifestyle benefits e.g. increased comfort during cold or hot weather events.
- Targeting of incentives to influence the behaviour of the landlord can help to overcome the split incentive barrier.
- Rebates can reduce the disincentive for owners/landlords to implement energy efficiency changes but are more likely to be effective when connected to regulatory obligations.

Analysis of other energy efficiency projects highlighted that:

- tailoring interventions to needs and wants of households is key to project success – there is no single project offering suitable for all households
- primary objectives of many energy efficiency projects are to improve electricity efficiency, lower electricity bills and provide more thermal comfort and energy literacy (compared to reducing greenhouse gas emissions)
- low-income energy efficiency projects have typically used government concession cards as an eligibility requirement, often an inadequate mechanism for identifying the most vulnerable and in need households
- owner-occupiers or public and social housing has been the focus of low income energy efficiency projects in the past
- the predominant model has been educational materials, combined with an in-home energy assessment and installation of basic energy efficiency items
- when solar hot water systems are installed in rented properties:
 - clear parameters about maintenance requirements are set and warranties are investigated on both parts and labour costs associated with replacing parts
 - the selection process considers the size of the household, how they use hot water, gas availability and connections and climate zones
 - the likely outcomes of the installation need to be clear to the participant
 - installation needs to be coupled with advice on tariffs to ensure households are not placed on a tariff that could result in higher electricity costs.

The Background Research Report is contained in Appendix 24.

Evaluation Framework

The Evaluation Framework established the model for PSP data collection and analysis by:

- providing context across activities that determine the efficiency, effectiveness and/or appropriateness of the PSP by identifying;
 - external drivers to the PSP such as the Commonwealth Government and requirements of NCC to meet the obligations of the Funding Agreement
 - internal drivers such as the ability for the project to learn and improve from the Pilot, within the framework of the overall PSP
- documenting the project stakeholders, their needs, and how their skills and attributes affect the management of the project;
- defining the outcomes the PSP was seeking to achieve
- identifying inputs into the PSP that would translate into outputs and ultimately contribute to project outcomes
- identifying data sources for evaluation including:
 - Registration and participant group questionnaires (pre and post)
 - Home assessments
 - Livelihood workshops, and
 - Billing data.

The PSP was, where possible, delivered in accordance with the Evaluation Framework. The Evaluation Framework is contained in Appendix 25.

Livelihoods Workshop

The sustainable livelihoods analysis (Ellis 2000) provides a framework for understanding capacity. Assessing household capacity provides an understanding of the values, interests and priorities of key stakeholders with respect to home energy efficiency. It also reveals the capacity of these stakeholders to adopt more energy efficient practices in the home and to understand capacity-building priorities.

This approach was used by the PSP in a workshop in February 2014 to identify the capacity of a small sample of participants. The participants were recruited through United Voice's membership base and had signed up to the project as Champions. A goal of 12 workshop attendees was set.

United Voice made intensive efforts to recruit participants to the livelihoods workshops using financial incentives (\$50 Coles Voucher) and placing direct phone calls. Prior to the day of the workshop 20 people within a pool of 100 invitees said they would attend the workshop. However, primarily due to last minute shift changes and other shifting priorities, only 5 PSP participants attended the livelihoods workshop. All 5 participants were homeowners from Western Sydney.

The workshop was conducted and the five participants completed a 'self-assessment' process using the livelihoods method. The intention was to repeat the workshop 12 months later to determine how the capacity of participants to adopt more energy efficient practices in the home had changed. This was by comparing a range of indicators and self-assessment ratings to measure their capacity to save energy before and after participation in the PSP.

However, the relative success of the second workshop would hinge on all five members of the first workshop attending, to collect the post-participation data and eventually provide results during the final evaluation. One attendee from the first workshop had withdrawn from the program due to lack of time, which also reduced the pool to 4 attendees. It was also clear that there was bias in the demographic profile of participants (all home owners from Western Sydney) and this sample, and their capacity data, was not representative of overall participation in the PSP.

Therefore, upon much reflection between Consortium staff, the second Livelihoods workshop was not conducted. Further, these findings suggested that workshops would not be an effective avenue for appropriately engaging participants in Champion style activities, and plans for workshops with Champions were also abandoned.

The Livelihoods Workshop Summary Report and key outcomes as well as result of the 'self-assessment' process is contained in Appendix 26.

Pilot Evaluation

The PSP Pilot Phase was initiated to test a number of approaches that might be incorporated into the future roll-out of the PSP. Thirty (30) Pilot participants were recruited as United Voice members who had indicated concerns with energy costs and/or the environment or energy efficiency in previous UV member surveys.

The Pilot project brochure with a registration form was mailed out to these 30 members followed by a phone call within two weeks. A total of 18 registration forms were received and 5 verbal confirmations that registration forms were returned. Of the remaining 7 members recruited to the Pilot, 2 dropped out and 5 opted to be included in later rounds of the PSP. One more dropped out at the point of booking the assessment. Thus, the pilot included a total of 20 participants from the 27 recruited, giving a drop-out rate of 26%.

Each participant received a home assessment during September to October 2013, pre -assessment surveys and, after a 4-month period, post-assessment surveys. Pilot participants received in-home energy displays only. The pilot did not test specific targeting of renters for the installation of solar hot water systems, billing data collection and analysis of actual energy consumption. Overall, early results from the pilot stage were positive.

The key findings and recommendations of the Pilot Evaluation Report were that the pilot:

- provided a good test of PSP objectives, data collection mechanisms and impacts on participants at an early stage of the PSP
- provided a snapshot of household characteristics likely to be represented in the wider PSP sample including:
 - single, couple and family households;
 - detached, and older dwellings;
 - large proportion of households using electricity for hot water, heating and cooling;
 - mix of owner occupied and rented homes;
 - mix of low-income employment industries; and
 - upwards of eight to ten consumer electronic appliances in the household.
- showed significant success in increasing energy literacy and feelings of control over electricity use at no cost to comfort within the home
- has contributed to a significant reduction in self-reported barriers to energy efficiency, in some cases halving the proportion of participants that cite these barriers
- identified four items that could be considered during the main PSP rollout:
 - revisions to the post-intervention survey and participant contact protocols (dedicating more resources to gather the post-intervention data);
 - importance of the right person as the home assessor (tighter scheduling of home assessments and ensuring consistency of participant experience);
 - importance of follow-up communications (variety of communications mediums to achieve persistence in energy efficient behaviours);
 - continued inclusion of the in-home display as an option in the menu of energy solutions (participants energy literacy increased); and

- Adequately addressing the needs of renters (who were not included in the pilot).
- The Pilot Evaluation Report is contained in Appendix 3.

Project outcomes logic

In order to evaluate the PSP, a Project Outcomes Logic table was developed (part of the Evaluation Framework contained in Appendix 25). The logic table defines the:

- outcomes the project was seeking to achieve (i.e. the thing we want to change)
- inputs into the project which will translate into project outputs, and ultimately contribute to project outcomes
- success criteria which provide linkages between inputs, outputs and outcomes
- performance measures and targets against which success criteria are assessed.

Initial Logic

The Project Outcomes Logic table developed at the beginning of the PSP project for evaluation purposes is presented in the Data Evaluation Report.

Final Logic

While the initial logic table formed the benchmark for evaluation now the PSP is complete, a more detailed logic including additional performance measures and outcomes was required. This was to ensure the final evaluation of such a large multi-year project was as comprehensive and complete as possible (and time permits).

The final logic, as presented in the Data Evaluation Report, reflects evolution of the PSP including:

- implementation from 2012-2015
- evaluation as more data was collected across this period
- governance of LIEEP across several Commonwealth government transitions.

The final evaluation by ISF focused on two parts:

- Program Evaluation of the overall implementation of the project by the PSP consortium, specifically:
 - Participation
 - Project Management
- Impact Evaluation of the impact of the project on household energy efficiency, specifically:
 - Impact on Electricity Use
 - a. Reduced electricity use
 - b. Persistent electricity use reductions
 - Impact on Participants
 - c. Electricity Literacy
 - d. Sense of Control
 - e. Peer-to-peer networks (introduced as a new outcome)

Data sources

This section outlines the management and the sources of data that were used by ISF to complete the Program Evaluation and Impact Evaluation.

Project Delivery Data

ISF requested data from the NCC/UV core project team for each of the identified Participant and Program Management metrics. Data for the Participation metrics was included in a single, large export from Salesforce of all project data relevant to this evaluation. This information was analysed and summarised according to the agreed metrics and then compared with NCC/UV's own analysis for verification.

Data for the Project Management metrics was exported from the PSP project delivery systems, and supplemented and contextualised through personal communications from the PSP core project team out of their own knowledge and experience of the project.

Home Energy Assessment data

The complete set of data collected during the Home energy assessments was exported from FluidSurveys and provided as a separate source of data.

Three pieces of information were extracted from the home assessment data and merged with the Salesforce data export:

1. home tenure type for demographic analysis
2. the number of At-Assessment Retrofits delivered
3. Participants' self-reporting of their energy efficiency

Participant survey data

Participant responses to the Pre- and Post-Intervention Surveys were recorded in Salesforce, and provided as part of the single Salesforce data export. The key data utilised for evaluation was responses to the survey by participants on:

- sense of control over energy use and bills
- energy literacy
- barriers to reducing electricity (lack of control and knowledge only)
- attitudes to electricity reductions (importance of reducing electricity use and motivations to reduce electricity use)
- participant perceptions of their energy efficiency⁹.

Only participants who completed both the pre- and post-surveys were included in the sample, a total of 526 (though not all participants completed all questions).

Billing Data

Participant Data

Electricity consumption data (or billing data) was requested for 776 households from electricity distribution companies Ausgrid and Endeavour Energy.

⁹ Only the 'Post' data was recorded in Salesforce. As mentioned earlier, some 'Pre' data was collected during the Home energy assessment and recorded in FluidSurveys and some was collected via the PIPS and recorded in Salesforce

Consumption data was exported from Ausgrid and Endeavour Energy's databases and provided to ISF in a csv file. This was then used to conduct the evaluation of electricity, cost and emissions savings from the PSP.

Useable Data for Evaluating Savings

Beyond the attrition experienced through the Billing Data Consent form process, there was further attrition of 'usable' data as described in Table 16, and the final number of households that were eligible to be used in the final savings analysis equated to 776.

TABLE 16 : ATTRITION OF 'USEABLE' DATA FOR EVALUATION

Timeline / Activity	Overview	Description
Feb 2014 - Oct 2015: Implementation	906 households provided consent.	Over the life of the project, a total of 906 participants were known to have provided consent for the Project to access their billing data.
Oct 2015: NCC Export to ISF Dec 2015: Data request to distributors	Upon investigation, only 776 of the 906 consent forms were found to be compliant due to: - incorrect NMI's (number incomplete/incorrect, or gas NMI provided instead of electricity) - participants outside the Ausgrid or Endeavour operating area - signatures lost through IT error - household that moved home - household that withdrew	Initially, in an effort to streamline the record keeping process for BDCs, consent from households was captured as an e-signature using the Fluidsurveys 'Power Savers Assessment Tool' using a tablet. However, after the first 60 energy assessments were already completed, NCC discovered that some of the web links to the e-signatures had broken. In order to prevent further losses of e-signatures, NCC changed the e-signature process to a hard copy signature process. Some NMIs were written down incorrectly, some households did not write their NMI, some households wrote down the wrong number (i.e. could not correctly identify the NMI on their bill and noted another unrelated number).

Upon conclusion of the implementation phase of the PSP, NCC exported relevant data from the 776 BDCs to ISF to request the data export from Endeavour Energy and Ausgrid.

Despite the 776 valid BDCs provided, validation of the participant records by Endeavour Energy and Ausgrid reduced the data used for evaluation further to 553 households and the method applied for the savings evaluation reduced this further to 396 households.

Non-Participant Billing Data

As described in the next section, using a sub-set of the participant group as a control group was not possible due to bias and size. Therefore, in addition to the participant billing data, ISF also requested a sample of de-identified billing data records from Ausgrid and Endeavour (30,000 household billing data records from each) in order to provide a control group for comparison against the participant group.

This data was provided to ISF as a csv file, which was then utilised (as a control group to compare against the participant group) to evaluate electricity, cost and emissions savings for the PSP.

Control group

The use of a control group was identified at the commencement of the PSP as important in order to "provide an untreated research sample against which all other groups or samples in the research is compared" (Better Evaluation, 2015).

This was achieved, but not in the fashion originally intended. The evolution of the PSP control group was as follows:

- **August 2012:** LIEEP Expression of Interest (EOI) from the PSP Consortium proposed that: “500 low-income rental households will be expected to participate as champions out of an eligible 5,000 United Voice households approached.”
- **October 2012:** LIEEP Grant Application / Project Plan from the PSP proposed a Pilot with 10-30 people, and a further 1,000 households participating overall, including 500 ‘non-control’ participants, and 500 ‘control group’ participants.

A randomised or stratification process was to be employed to assign participants to the control or non-control groups in order to ensure the independence of the control group.

- **January-June 2013:** Program was delayed for 5-6 months from the intended start date as changes to the Funding Agreement were negotiated, resulting in the need to look at alternative program designs.
- **Late 2013-early 2014:** In light of these early delays, as well as findings from the Pilot phase regarding the most appropriate methods for recruitment and procurement, it was agreed:
 - randomised selection of a control group was not able to be applied to the PSP considering the realities of the ‘real-life’ roll out of the project, including:
 - that the PSP required equity of access for all UV members i.e. all PSP participants
 - randomised selection of a non-control group was not able to be applied to the PSP considering the realities of the ‘real-life’ roll out of the project, including:
 - Home assessment booking processes and assessor availability
 - Participants needed some certainty as to when they could expect their home assessment
 - Given the available budget, over-recruitment and attrition rates needed to be regularly monitored. The PSP could not risk doing more than 1,010 home assessments.

As mentioned in the Project Plan:

Random selection and assignment of participants into control vs non-control groups is ideal, however the PSP has had to consider the organisational capacity of UV to recruit in such a way. Additionally, project design and the realities of project roll out lent itself strongly toward the first recruits being non-control participants and the later recruits (a subsample of 310) being ‘controls’. Analysis provided from this control/non-control participant comparison will seek to minimise systemic bias by matching as close as possible the characteristics of the control group with those of the non-control group.

To assist evaluation, the PSP is attempting, as much as feasible, to recruit an equal ratio of control and non-control household records from each of the 4 geographic locations, as well as an equal ratio of household records from the two ABCB climate zones that cover the PSP region. However, the PSP can only do what is feasible in ‘real life’.

- A selection of early recruits would be offered an incentive voucher (\$50) to re-join the project in 6 months’ time (Round 1b) in order to act as a ‘control’ group. Retrospective billing data would be obtained for such households (via consent provided in the Billing Data Consent form) to compare against non-control households. Following a 6 month hiatus, control households would then receive the same experience and offers as non-control households in order to ensure equity for all participant households.

- **Early 2014:** At this stage, it was realised that informing the control group about the program introduced bias. At this point there had been large efforts to create a control group, and further efforts were made to recreate a control group through Round 3, as follows:
 - After approximately 100 Round 1b participants were recruited as ‘controls’ and informed that their home assessment would be delayed in return for a \$50 incentive voucher, it was clear that a new design would be required. This new design meant that all of the first recruits to the PSP would be classed as non-controls (approximately 680, including 41 Round 1b participants who re-joined), with their assessments to be complete between February 2014 and January 2015.

The later recruits (approximately 310) would act as ‘controls’ by only beginning their journey 12 months after the first non-control households (i.e. February 2015) – Round 3. In order to eliminate bias of the control group which had occurred with Round 1b:

- The control group would not be exposed to the PSP or any PSP interventions, and when recruited would provide consent for release of retrospective billing data (via the Billing Data Consent form) to compare against non-control group
 - 9 electorates (7 in Sydney, 1 in Hunter and 1 in Illawarra) of the entire recruitment pool (36 electorates – 26 in Sydney, 4 in Hunter, 2 in Illawarra and 2 in Central Coast) were quarantined amongst the different regions to be the recruitment pool for the control group to assist as much as possible in having similar geographical characteristics amongst non-control and control households.
 - The group would only receive home assessments 12 months after the first non-control households.
- **August 2015:** Despite best efforts with program design and rollout, it was highlighted that a combination of potential recruitment bias, the reduction in the project time period and, importantly, the reduction in the number of participants for the potential control group may lead to less statistical significance for evaluation. It was proposed that recruitment bias be tested and if found to exist, de-identified data from non-participating households in the regions would be requested from the electricity distributors that could act as a different form of control group.
 - **January 2016:** Once data was obtained for evaluation, the proposed control households (approx. 310) with available data fell to around 100 households due to a combination of BDC forms not being signed, missing NMIs and validation of customer details by the electricity distribution businesses. The need for testing recruitment bias was moot as the final number of control participants was too small to be considered a statistically valid control group.

Therefore, for the quantification of savings, ISF grouped the approx. 310 (former control) participant households (Round 3) with the approx. 680 non-control participant households (Rounds 1-2).

Instead, a sample of de-identified electricity consumption data from non-participating households was obtained by ISF from the electricity distribution companies to act as the control group for the purposes of PSP evaluation.

Evaluation of project

Program evaluation method

The overall implementation of the project by the PSP consortium was evaluated through analysis of:

- Project delivery data exported from Salesforce
- Home Energy Assessment data exported from FluidSurveys and combined with Salesforce data
- Personal communications from the PSP core project team

The information provided from Salesforce was summarised in tabular and graphical format before being assessed against the performance targets. This was supplemented by data from the Assessment data to present findings for home tenure and the At-Assessment Retrofits.

The information provided on project delivery by the project team was verified against the evaluators' own knowledge of the project, before being summarised and assessed against the performance targets.

Impact evaluation method – electricity

The impact of the PSP on electricity savings was evaluated through analysis of:

- billing data in order to quantitatively estimate electricity savings
- participant self-reported workshop and survey data in order to understand participant perceptions of their ability to make savings
- persistence of electricity reductions

Electricity and cost savings evaluation method

Although the PSP had procured 846 billing data consent forms, less than 50% of households - only 396 – could be utilised in the billing data analysis. Attrition of data was due to a number of reasons as indicated earlier:

- households from the original pool of 990 refusing to sign the BDC
- households entering incorrect NMI's on BDC forms,
- or being outside the Ausgrid and Endeavour Energy networks
- Non-validation of NMI's, due to out of date customer records held by Ausgrid and Endeavour
- Incomplete billing cycles
- households who withdrew from the project

The original intention of the quantitative estimation of PSP savings was to use a regression based model to estimate project level electricity savings, using billing data and household demographic data. However due to a smaller than expected data sample and no characteristics other than consumption (e.g. no socio-economic or dwelling information) being available for the non-participant data set, the matched pairs mean comparison (MPMC) method was chosen for evaluation as it relies on electricity consumption data only. The matched pairs mean comparison (MPMC) is a conceptually simple but computationally intensive method where each participant household is matched with a non-participant household that has a similar consumption pattern before the intervention period. Once what each household would have consumed without intervention is estimated, the observed differences from what the participants actually consumed can be taken, and can be attributed to savings from participation in the project.

Therefore the 396 households with relevant billing data were matched to 396 households from the de-identified billing data to run the matched pairs method to identify electricity savings.

To calculate cost savings associated with electricity saved by PSP households, published 2015 projected average c/kWh residential electricity prices for 2015/16 were obtained and applied directly to the electricity savings over the quarter to give the cost saved per kilowatt hour per household per quarter (\$/kWh/hh/quarter). In addition an emissions factor was applied to the electricity savings to calculate the greenhouse gas emissions avoided per household per quarter.

Self-reported data evaluation method (for perceptions of energy efficiency)

The Pre-intervention and Post-intervention surveys conducted with participants before and after their participation in the project included three questions related to electricity use reductions. Data from each survey was recoded numerically and then compared to determine if households reported increased motivation and energy efficiency at the end of the project, and by extension, reduced electricity use.

Defined metrics and performance targets were unable to be developed to effectively and appropriately measure persistence within the timeframe of the evaluation.

Impact evaluation method – participants

Evaluation of the impact of the project on participants was determined primarily through analysis of the Pre-intervention and Post-intervention surveys. The surveys contained three specific questions on each of the two key elements under consideration, energy literacy and sense of control. As with the analysis of participant perceptions of savings, data was recoded numerically and then compared to determine if households reported increased literacy and control at the end of the project. No control group was utilised to evaluate the changes in sense of control and energy literacy of participants.

RESULTS

The following section sets out the results from the PSP, including a summation of the key findings from ISF's Data Evaluation Report.

Impact on electricity savings

The impact of the PSP on electricity savings was evaluated through analysis of:

1. billing data in order to quantitatively estimate electricity savings
2. participant self-reported workshop and survey data in order to understand participant perceptions of their ability to make savings
3. persistence of electricity reductions

1. Electricity and cost savings

From the available data set, ISF worked to calculate:

- electricity saved by PSP households (kWh and percentage/hh/day and kWh/hh/quarter)
- cost savings associated with electricity saved by PSP households (\$/kWh/hh/quarter)
- greenhouse gas emissions savings, i.e. kilograms of carbon dioxide equivalent avoided per household per day (CO₂-e/hh/day).

In order to evaluate whether PSP participants electricity consumption had decreased due to the PSP treatments, an analysis was conducted on their electricity consumption pre and post intervention and against a control group.

Both pre and post intervention billing data was collected and utilised in the analysis. Pre-intervention data was collected and utilised up to 24 months prior to the intervention. With the final round of participants receiving their treatments in 2015, the post intervention data was limited for some participants. The final evaluation results were derived from comparison against a control group, which was drawn from de-identified non-participant data provided by the electricity distributors.

Miranda was astonished at her savings. Ever since she installed solar panels and disconnected her gas, her quarterly bills for electricity and gas have reduced from \$800 to \$300 despite continuing the same lifestyle. "I was shocked when I received my electricity bill last week. It was only \$79.62 for 23 days! This is so much lesser than my bill from 2 years ago!"

Demographic and tenure profile

In comparison to the total participants, the 396 households used in the savings analysis had a similar demographic and tenure profile.

Mean daily consumption

Firstly the evaluation analysed the data across non-matched pairs, using the validated billing data for 485 of the total 990 households. This data was from January 2012 to January 2016.

Figure 2 and

Figure 3 contain a histogram of raw (i.e., non-matched) mean participant and non-participant consumption, and a time series graph comparing mean daily participant and non-participant consumption in kilowatt hours per household per day (kWh/hh/day). Together, these figures show the

differences in participant and non-participant household consumption over the period of analysis (January 1st 2013 to November 30th 2015).

Figure 2 shows a clear discrepancy in mean participant and mean non-participant data over time, with non-participant households (blue) generally consuming electricity at a higher rate than participant households (pink). This highlights the importance to control for determinants of electricity consumption such as climate, household structure and socio-economic factors.

FIGURE 2: MEAN DAILY CONSUMPTION DENSITY HISTOGRAM

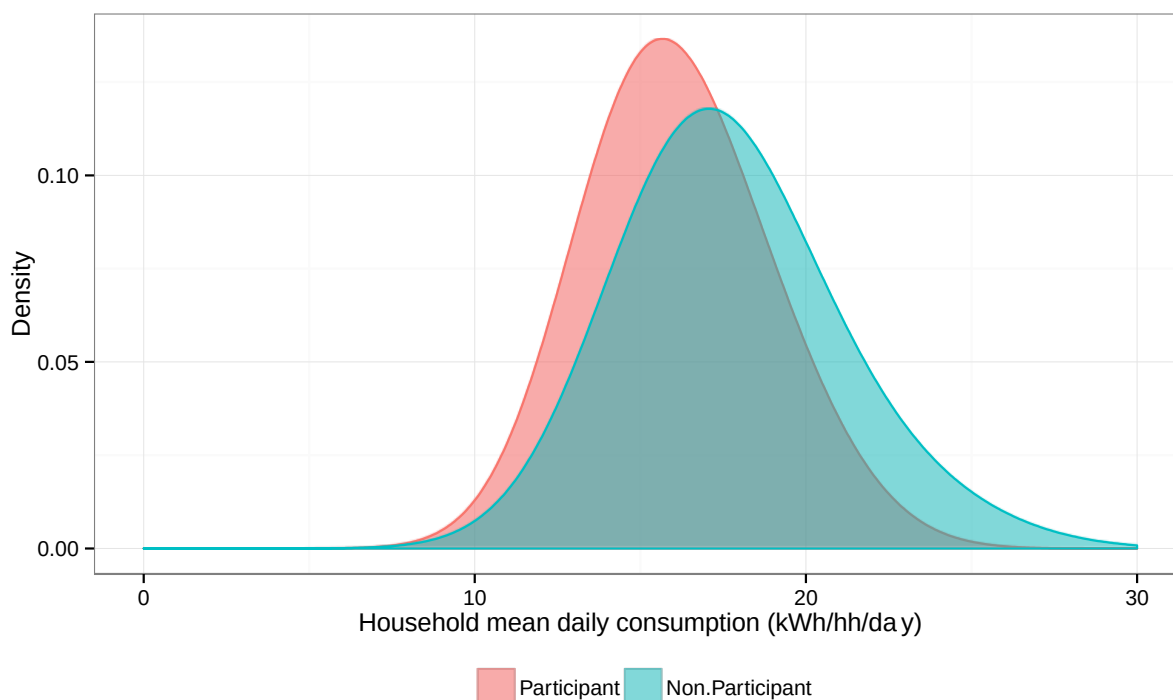
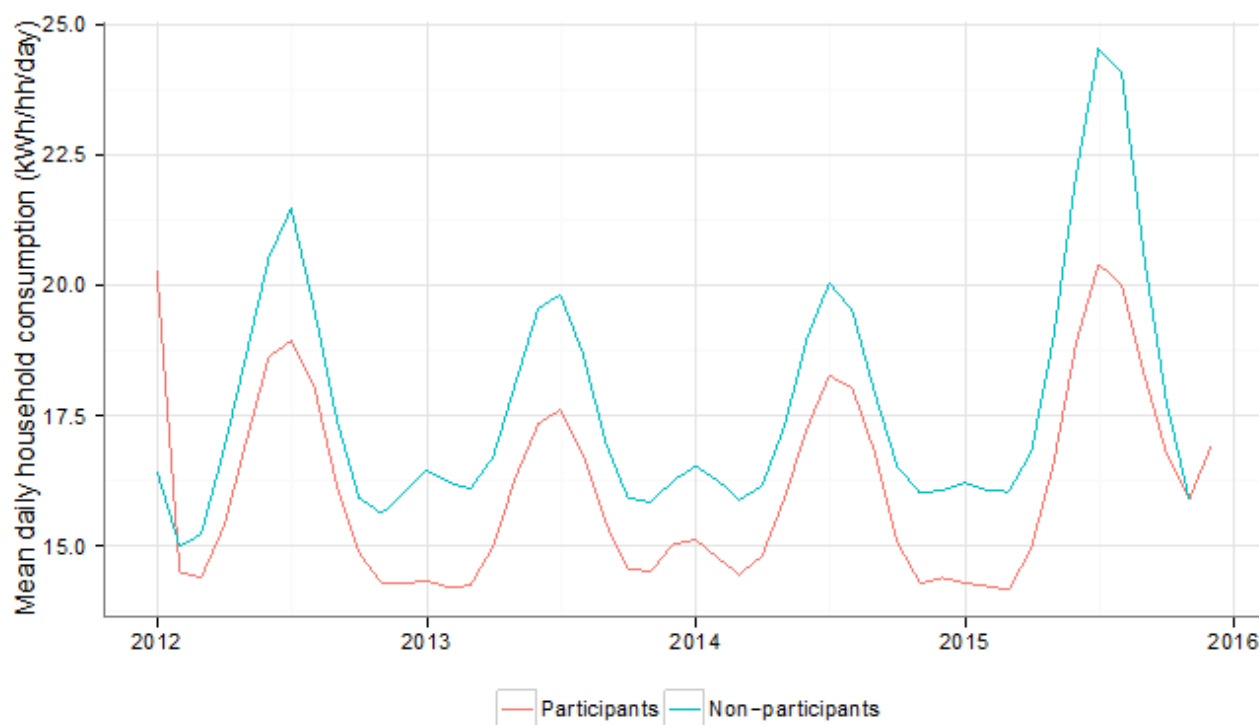


Figure 3 illustrates that both participants and non-participants follow a similar response to weather indicated by the similar peaks in consumption in each winter across the period. In particular, it illustrates peaks in electricity consumption during winters, likely indicating higher consumption of electricity for heating homes when compared to using electricity to cool homes in summer. It also illustrates that the winter of 2015 showed higher electricity use when compared to the winters of 2013 and 2014.

Following the trend in mean consumption over time, however, participant households (red line) consumed electricity at a lower rate than non-participant households (blue line). This is likely due to the participant households being low-income, therefore likely to be lower electricity consumers (IPART, 2006; Rickwood, 2009) and the non-participant households being drawn from a random sample of households irrespective of income bracket.

FIGURE 3: MEAN DAILY CONSUMPTION OVER TIME



Mean consumption over time

The analysis was then applied to the billing data using a matched pairs method. This used final matches for billing data for 396 households of the total 990 households from January 1st 2013 to November 30th 2015. Figure 4 and

Figure 5 show the mean consumption profiles of participants and non-participants are similar, but the largest difference in savings is in 2015. This correlates with the sharp rise in data records available at this time (see DER, Figure 2) showing that the more records available, the stronger the ability to detect electricity savings. Also illustrated on

Figure 5 are the time periods when home assessments were completed for each recruitment round, indicating the start of the treatments (i.e. At Assessment Retrofits).

FIGURE 4: MATCHED HOUSEHOLD DAILY CONSUMPTION DENSITY HISTOGRAM

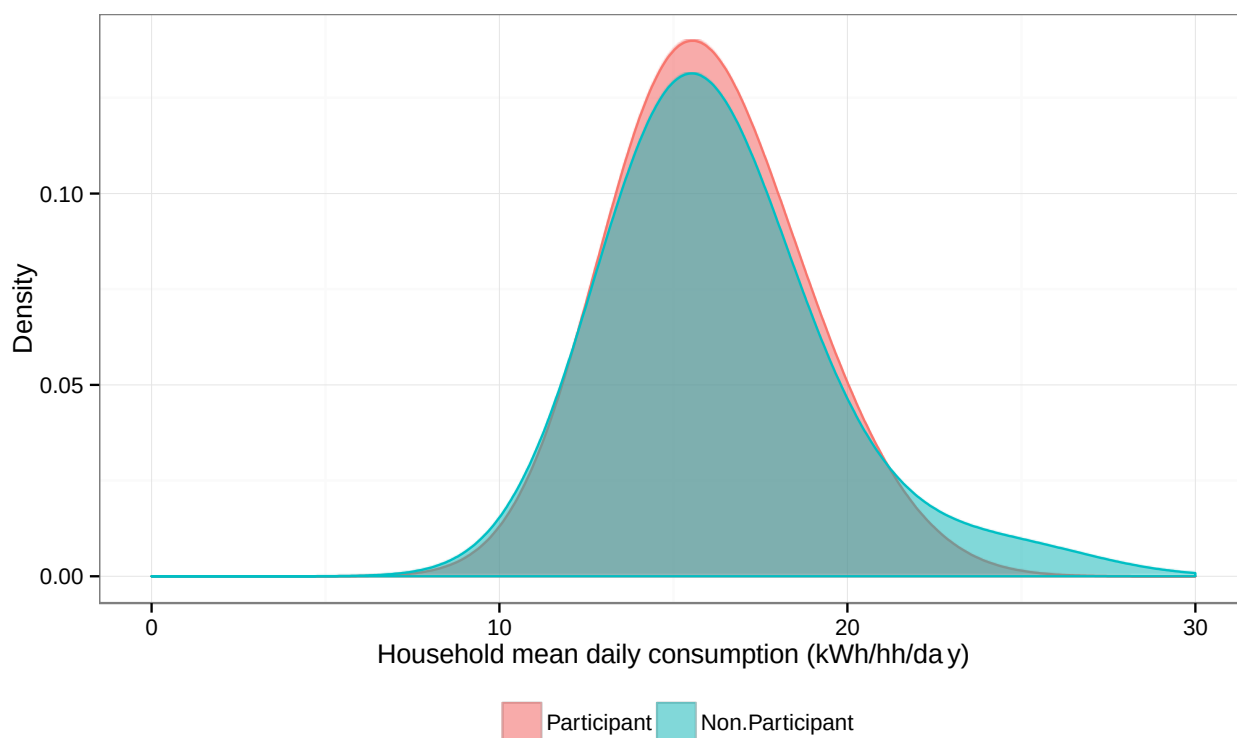
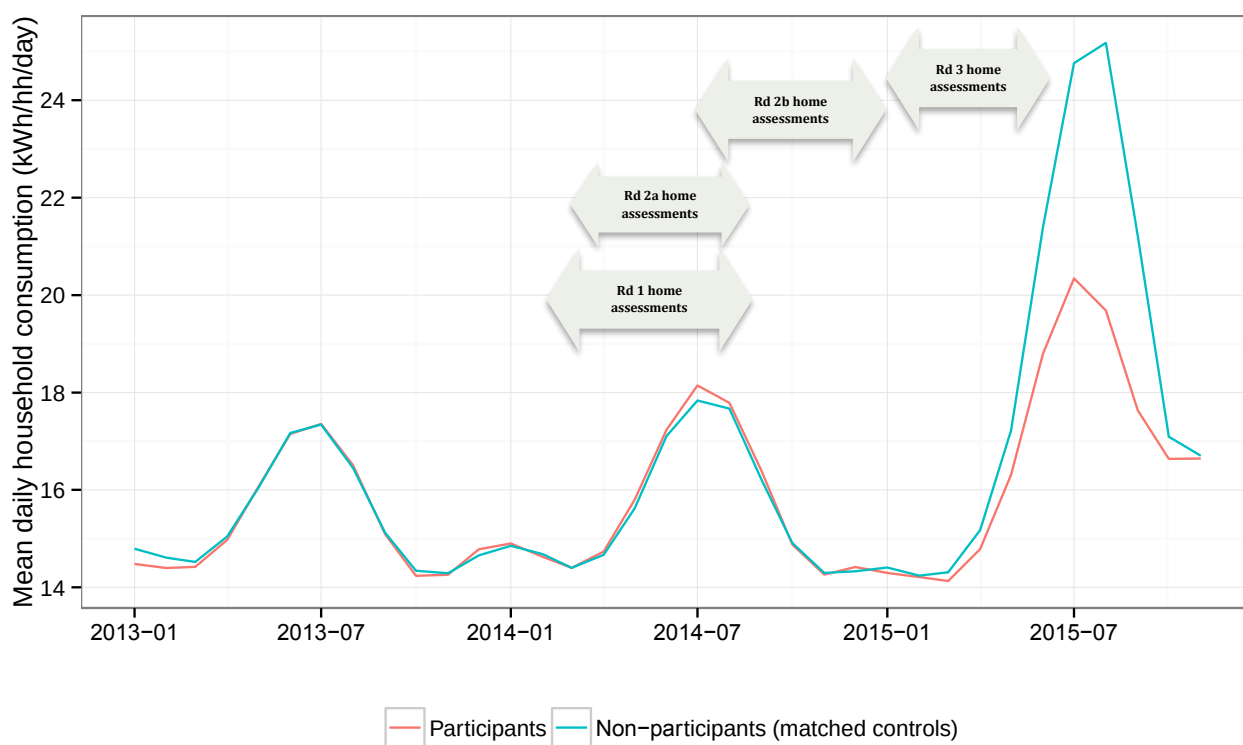


FIGURE 5: MATCHED HOUSEHOLD DAILY CONSUMPTION OVER TIME



Mean consumption total

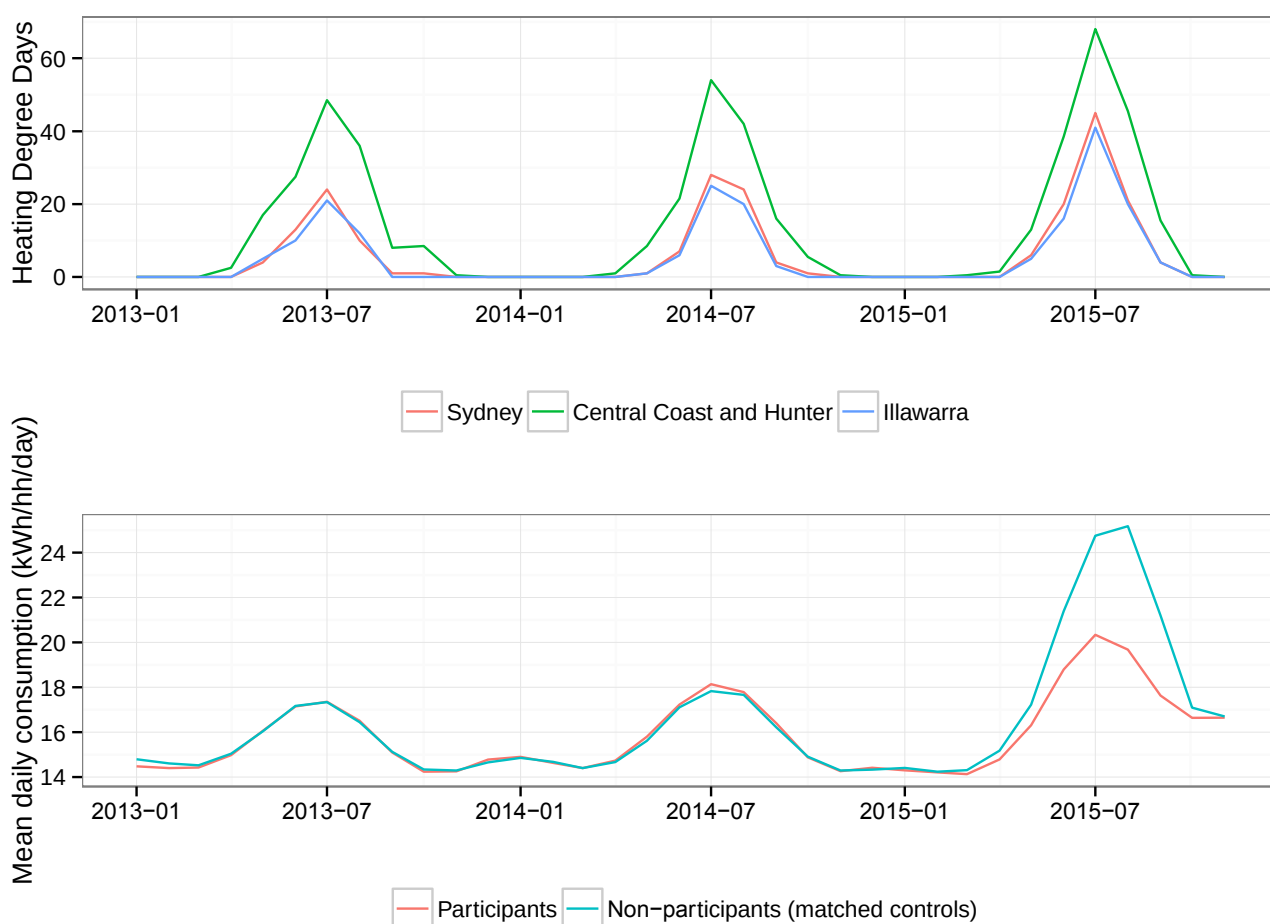
For the matched pairs sample across the evaluation period of January 2013 and November 2015, the mean electricity consumption was calculated to be 1,485 kWh per household per quarter and 16.3 kWh per household per day.

Mean consumption with heating degree days

Evident in

Figure 5 are peaks associated with the winter months in each year over the analysis period, most likely correlating with household heating use. A coarse heating degree day analysis was conducted to observe the response to colder weather pattern. Weather data was obtained from the Bureau of Meteorology to calculate heating degree days from a base temperature of 12 degrees Celsius for each of the three regions. This is shown graphically in the two graphs in Figure 6.

FIGURE 6: HEATING DEGREE DAYS AND MATCHED HOUSEHOLD DAILY CONSUMPTION OVER TIME



There is a clear difference in mean daily consumption between participants and non-participants in winter 2015, showing that the participant response to colder climate has reduced following the home energy assessment.

Following the home assessment, the Post Assessment Retrofits (PARs) implemented for insulation and draught-proofing, hot water system retrofits or upgrades, curtains/pelmets, reverse-cycle air

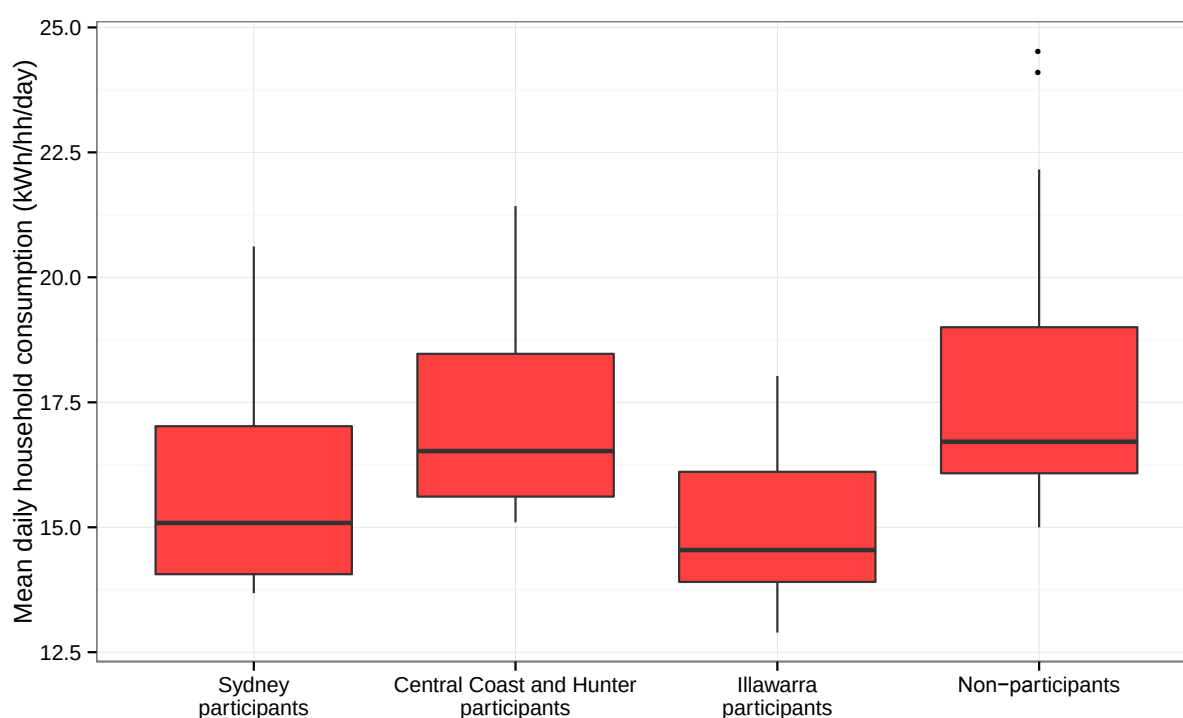
conditioning and blankets may have contributed specifically to the more efficient use of electricity in these households during winter.

However, these electricity savings cannot be directly attributed to the above PSP treatments without further qualifying analysis.

Regional Variation in Consumption

Figure 7 show boxplots describing the regional variations in mean daily consumption across the three PSP regions (Sydney, Central Coast and the Hunter, and Illawarra) compared with the non-participant group (i.e. the control group). The regions of Central Coast and Hunter were combined as the samples for these were very small.

FIGURE 7: REGIONAL VARIATION IN MEAN DAILY CONSUMPTION



Overall mean consumption is lower for PSP participants in all regions compared to non-participants. The results show PSP participants in the Central Coast and Hunter regions had higher mean electricity consumption than Sydney PSP participants and Illawarra PSP participants had the lowest mean consumption.

Reductions in electricity use and bills

Using the evaluation approach, savings have been calculated for:

- average kWh of **electricity saved** per day (and per quarter), per participant household
- average **percentage of electricity saved** per day, per participant household
- average **kilograms CO2-e avoided** per day, per household
- **average cost saved** per quarter, per household.

Savings calculated are summarised in Table 17. The table also indicates the confidence intervals for each average figure calculated.

TABLE 17: ESTIMATES OF PSP SAVINGS PER HOUSEHOLD

	Total Participants (396)	Sydney Participants	Central Coast and Hunter Participants	Illawarra Participants	Renters	Owners
Avg. kWh electricity saved per day	0.477 ± 0.232 kWh	0.421 ± 0.259 kWh	0.563 ± 0.596 kWh *not signif at 95%	1.23 ± 0.681 kWh	0.548 ± 0.323 kWh	0.46 ± 0.31 kWh
Avg. kWh electricity saved per quarter	43.41 ± 21.11 kWh	38.31 ± 23.57 kWh	51.233 ± 54.24 kWh	111.93 ± 61.97 kWh	49.87 ± 29.39 kWh	44.59 ± 28.21 kWh
Avg. % electricity saved per day	2.92% ± 1.42%	2.63% ± 1.62%	3.34% ± 3.52%	9.01% ± 4.99%	3.76% ± 2.2%	2.6% ± 1.8%
Avg. kg CO₂-e emissions avoided per day	0.458 ± 0.222 kg	0.404 ± 0.249 kg	0.541 ± 0.572 kg	1.181 ± 0.654 kg	0.526 ± 0.31 kg	0.44 ± 0.298 kg
Avg. \$ saved per quarter	\$11.88 ± \$5.78	\$10.49 ± \$6.45	\$14.02 ± \$14.84	\$30.64 ± \$16.96	\$13.65 ± \$8.05	\$11.46 ± \$7.72

Across the matched pairs PSP participant sample of 396 households over the period January 1st 2013 to November 30th 2015, the results show an average of 0.5kWh (± 0.2 kWh) saved per household per day and 43.41kWh (± 21kWh) saved per household per quarter. This is, on average, a 3% (± 1.4%) saving in electricity use per household per day. This kWh savings amounts to an average of \$12 (± \$6) saved per quarter per household and 0.5 kg (± 0.2 kg) of carbon dioxide equivalent emissions avoided per household per day.

Further to this, regional savings were also estimated, although due to small sample sizes, the estimate for Central Coast and Hunter was insignificant. This shows that the highest savings were experienced by PSP participants in the Illawarra region (1.2± 0.7 kWh/hh/day) and the lowest savings experienced by PSP participants in the Sydney region (0.4± 0.3 kWh/hh/day). This amounts to the highest average saving of 9% (± 5%) per household per day and \$30 (± \$17) per household per quarter experienced by Illawarra participants and the lowest of 3% (± 2%) and \$10(± \$6)per household per quarter experienced by Sydney participants.

When comparing to mean electricity consumption by region PSP participants in Illawarra had the lowest consumption, yet experienced the highest savings, which may mean the PSP treatments were more effective in this region at saving electricity. Conversely, Sydney PSP participants had the second highest mean electricity consumption, yet experienced the lowest savings, which may mean the PSP treatments were less effective in this region at saving electricity. Interestingly, the most participants were in Sydney (81%) reflecting a small savings across a larger sample, and the least were in Illawarra (6%) reflecting a larger savings across a small sample.

Savings were also estimated for participant households by tenure status. It was shown that renters saved on average 1.2% more electricity than owner occupiers. However, this savings estimate is potentially misleading, as household characteristics have not been taken into account. For example, renters may

occupy smaller dwellings than owner-occupiers, and this effect has not been considered. There was insufficient data available to properly account for dwelling characteristics on savings by tenure type.

Due to limitations in the data, PSP specific savings beyond regional location and tenure (including savings from individual treatments and the installation of Solar Hot Water systems) were not possible.

Considering these limitations, the method used is best available. However a more rigorous method with appropriate data would reveal more accurate savings estimates by participant subsets.

Total savings experienced across the 396 matched pair sample of PSP participants across 2014 and 2015 are illustrated in Table 18. Total electricity and carbon emissions savings were calculated by using the average savings, multiplying by the number of households marked as having an assessment done per months to give a total kWh saved per day, then multiplying by the number of days in the month to give kWh saved per month and summing to give a total kWh saved per year. Cost savings were by multiplying the total consumption by the average NSW figure of 0.2737 \$/kWh (also used to calculate the per household dollar savings). Results are presented by year to show the disparity between savings in each year of the program.

TABLE 18: TOTAL ELECTRICITY EMISSIONS AND COST SAVINGS BY PSP PARTICIPANTS (396 SAMPLE)

On 396 household sample only	2014	2015
Total kWh electricity saved by PSP participants	15,540	57,212
Total kg CO₂-e emissions avoided by PSP participants	14,918	54,924
Total \$ saved by PSP participants	4,253	15,659

The results show savings increasing from 2014, and the maximum savings being achieved by PSP participants in 2015. This aligns with the delivery of the first treatments to Round 1 participants in 2014 and Round 2 and 3 participants in 2014-15.

With overall average reductions of 3% (with the highest reductions of 9% in the Illawarra region), the PSP partially achieved the planned outcome of “electricity use reductions of 5-10% in participant households due to installation of retrofits”.

2. Participant perceptions of reductions

The Pre-intervention (PIPS) and Post-intervention surveys (POPS) conducted with participants before and after their participation in the project included three questions related to electricity use reductions:

1. How important is it for you to use less electricity in your home?
(Very important / Somewhat important / Not very important / Not important at all / Unsure) (n=490)
2. How motivated are you to reduce your electricity use?
(Very motivated / Somewhat motivated / Not very motivated / Not motivated at all / Unsure) (n=490)
3. How would you rate your household energy efficiency?
(1 - Not energy efficient / 2 - Inefficient / 3 - Adequate / 4 - Energy efficient / 5 - Very efficient (n=525).

Data from each survey was recoded numerically and then compared to determine if households reported increased motivation and energy efficiency at the end of the project, and by extension, reduced electricity use.

The post-survey also contained a direct question on whether participants were actively taking steps to reduce energy use. The results of this question were reported as is.

Participant reporting of the importance of, and motivation for reducing electricity were practically identical. The only differences were in the distribution between those rating very important/motivated compared to somewhat important / motivated. Both elements were very high at the start of the project - 96% rated reductions as somewhat or very important, and themselves as somewhat or very motivated, as indicated in Figure 8 and

Figure 9.

FIGURE 8: PARTICIPANT RATING OF THE IMPORTANCE OF REDUCING ELECTRICITY

In response to: How important is reducing electricity?

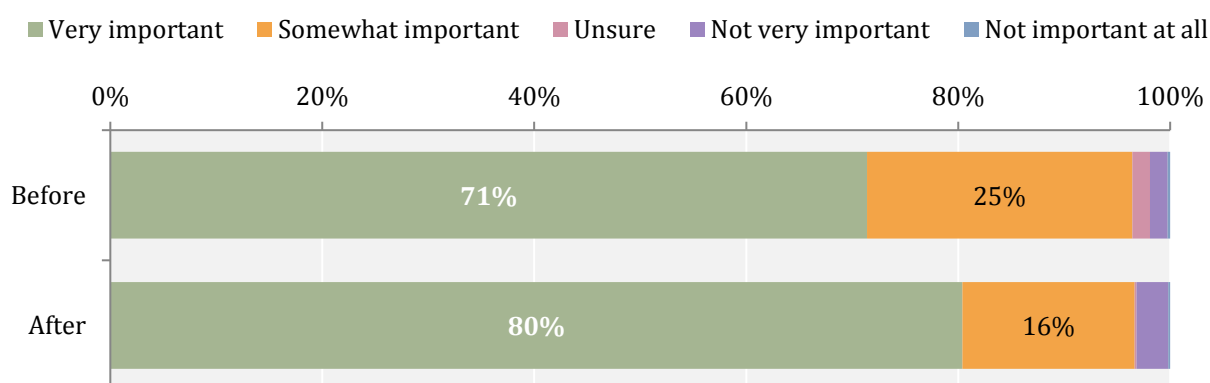
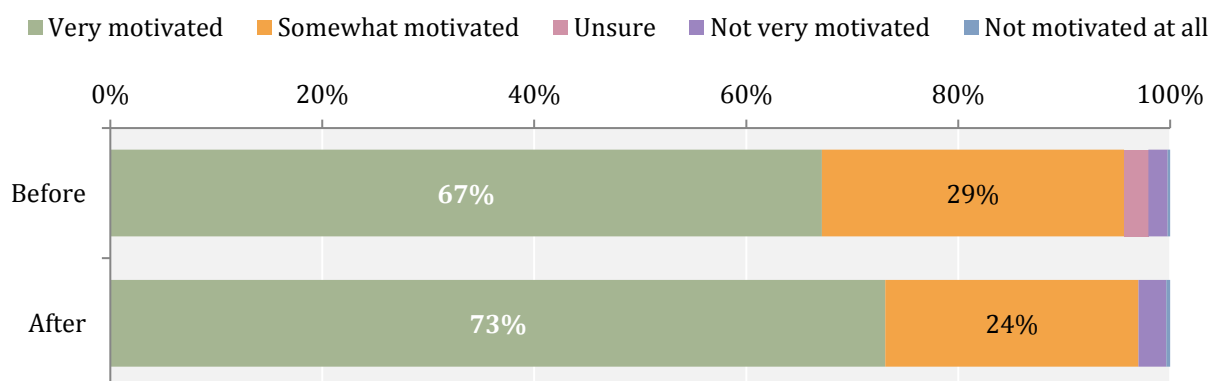


FIGURE 9: PARTICIPANT MOTIVATION FOR ELECTRICITY REDUCTIONS

In response to: How motivated are you to reduce electricity use?



This is potentially a result of self-selection (sampling) bias: those who believe that electricity reductions are important and who are motivated to act are more likely to agree to participate in an energy efficiency project. It is also likely a result of the deliberate selection bias in engaging this target population of low-income households who, on average, spend a large portion of disposable income on energy bills. Therefore, motivations to reduce these household costs may be higher than the general population.

This high baseline therefore only allowed for modest improvements in participant ratings of these indicators. The overall proportion of people rating these elements as 'very' or 'somewhat' increased by 1%. The main change was a shift of people from somewhat important/motivated to very important/motivated.

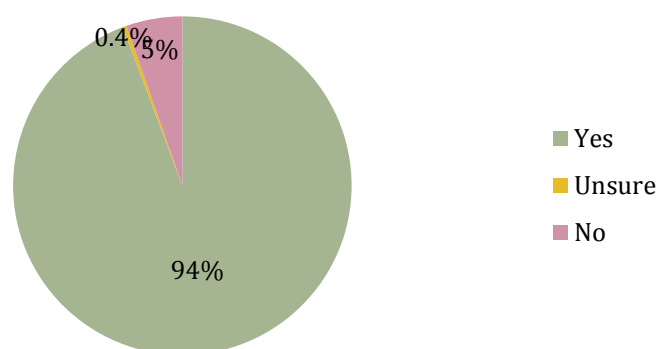
The proportion considering electricity reductions to be very important increased by 9% (from 71% to 80%) while the proportion rating themselves as very motivated increased by slightly less, at 6% (from 67% to 73%).

The subtle difference between the two highlights that attitudes (i.e. belief in the importance of reductions) do not directly translate into motivations to act.

However in this case, 94% of participants reported that they had actively taken steps to use less energy during the project (Figure 10).

FIGURE 10: PARTICIPANTS REPORTING ACTIVELY REDUCING ENERGY

In response to: Have you actively taken steps to use less energy?



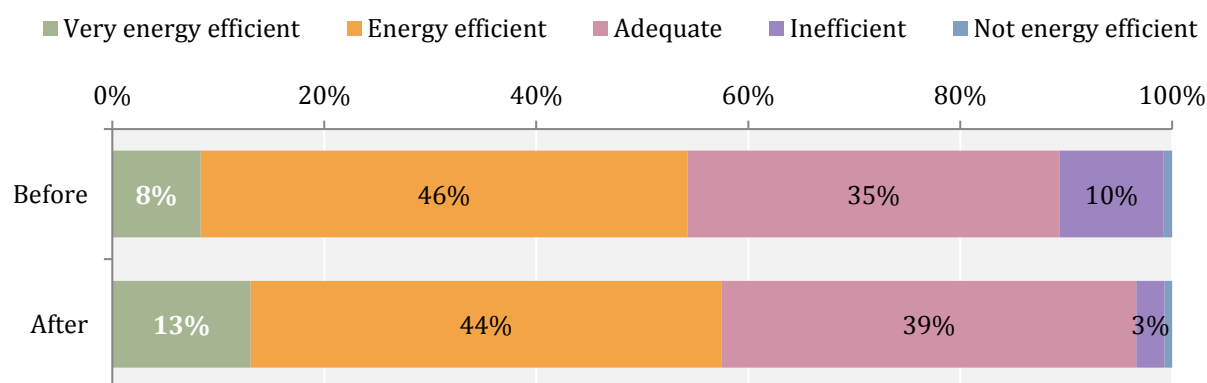
Despite the above, changes in participant ratings of their own energy efficiency were only modestly positive (

FIGURE 11).

Deep G. has made close to \$300 savings in his energy bills. His bills used to average \$740 a quarter, and they are now down to around \$450. Because of the PSP, he spoke with his real estate agent and got some faulty appliances replaced which is making a big difference to his bills.

FIGURE 11: PARTICIPANT RATING OF ENERGY EFFICIENCY

In response to: How would you rate your energy efficiency?



The proportion of participants rating themselves as energy efficient or very energy efficient increased from 54% to 58% (including an increase from 8% to 13% as 'Very efficient'), while the proportion who rated themselves as 'Inefficient' or 'not efficient' decreased from 11% to 4%.

Given the high proportion of participants "very motivated" to reduce electricity (73%) at the end of the project, the smaller proportion of participants confident that they are energy efficient (57% energy efficient, only 13% very energy efficient) indicates that some barriers still exist to the participant households reducing their electricity use.

3. Persistence of electricity reductions

Defined metrics and performance targets were unable to be developed to effectively and appropriately measure persistence within the timeframe of this evaluation (which concluded less than 3 months after the final participants completed their program). Analysis focused on anecdotal evidence of inputs and outputs that were designed to achieve persistence. However, in order to effectively evaluate persistence, a longer timeframe following completion of the program would be required.

The project's initial theory was that the provision of ongoing support and communication to participants would lead to persistent energy efficient behaviours amongst participating households.

The project aimed to provide this ongoing support through peer-to-peer networks. This occurred successfully through the Energy Champions and Powers Savers Teams process.

The project also planned and successfully implemented a comprehensive communication campaign to provide regular and continual communication with participants through quarterly phone call support, fact sheets and newsletters.

While persistence can only be measured by looking at the energy consumption patterns beyond the life of the PSP, several activities (Champions and Teams) have been put in place that may enable evaluation of this measure at a future date. Further collection of billing data would be required to link the impact of these activities to electricity reductions. This could form the basis of a future project focusing on peer-to-peer learning for energy efficiency in low income households and the impacts on persistence of electricity reductions.

Impacts on Participants

Evaluation of the impact of the project on participants was determined primarily through:

1. analysis of the Pre- and Post-intervention survey responses regarding literacy and control, and
2. the impact of peer-to-peer networks through the Champions and Teams aspects.

1. Literacy and control

The PIPS and POPS surveys contained three specific questions on each of the two key elements under consideration – energy literacy and sense of control – as shown in Table 19.

TABLE 19: LITERACY/CONTROL SURVEY QUESTIONS

Energy literacy	Sense of control
Which of the following things stop you from reducing energy use in your home? Not sure how to.* (Yes/No)	Which of the following things stop you from reducing energy use in your home? Lack of control to make improvements to the property.* (Yes/No)
I am aware of how my household electricity use compares to my neighbours, friends and family. (Strongly disagree / Disagree / Agree / Strongly agree / Unsure) (n=514)	I feel in control of my electricity use. (Strongly disagree / Disagree / Agree / Strongly agree / Unsure) (n=514)
When you receive your electricity bill, how clear and easy is it to understand? (Not at all clear / Not very clear / Somewhat clear and understandable / Very clear and easy to understand / Unsure) (n=513)	I feel in control of my electricity bills. (Strongly disagree / Disagree / Agree / Strongly agree / Unsure) (n=516)

* Showing only the question elements relevant to literacy and control. The full set of elements for this question is included in the surveys in Data Evaluation Report (Appendix 27).

As with the analysis of participant perceptions of savings, data was recoded numerically and then compared to determine if households reported increased literacy and control at the end of the project.

Rhonda.: “I have saved \$150 since joining the PSP. I received a clothes horse LEDs and fan from the PSP. I have also learnt so much more about energy saving, especially about Air-con temperatures.”

Electricity Literacy

Participant perceptions of energy literacy were identified through three questions included in the pre- and post-intervention surveys¹⁰. All three measures showed a substantial improvement:

- The proportion of participants who stated their bill was very or somewhat clear and easy to understand **increased from 47% to 79%** (

Figure 12).

¹⁰ The Post-Intervention Survey was not undertaken with the Round 3 participants (n=320, or 33% of sample), who are therefore excluded from this analysis. Results should therefore be interpreted with caution as they do not represent the full sample of participants.

- The proportion of participants who agreed or strongly agreed they were aware of how their electricity use compared to others **increased from 45% to 69%** (Figure 13).
- The proportion of participants who reported they were prevented from reducing their electricity use due to a lack of knowledge **decreased from 48% to 0.4%**(Figure 14).

In the Pre- and Post-intervention Surveys, participants were asked what prevented them from reducing their energy use, and were provided with a range of options. As seen in Figure 14, before taking part in the PSP, almost half of all participants identified a lack of knowledge as a barrier to reducing their energy use, while after, less than 1% identified this as still being a problem. This reveals that a substantive portion of the targeted demographic believed they lacked the knowledge required to reduce their energy use, and that this barrier was substantively removed as a result of the PSP.

Figure 14 In the Pre- and Post-intervention Surveys, participants were asked what prevented them from reducing their energy use, and were provided with a range of options. As seen in Figure 14, before taking part in the PSP, almost half of all participants identified a lack of knowledge as a barrier to reducing their energy use, while after, less than 1% identified this as still being a problem. This reveals that a substantive portion of the targeted demographic believed they lacked the knowledge required to reduce their energy use, and that this barrier was substantively removed as a result of the PSP. Overall this reflects the success of the PSP to increase electricity literacy amongst low income households.

FIGURE 12: ABILITY TO UNDERSTAND ELECTRICITY BILL

In response to: When you receive your electricity bill, how clear and easy is it to understand?

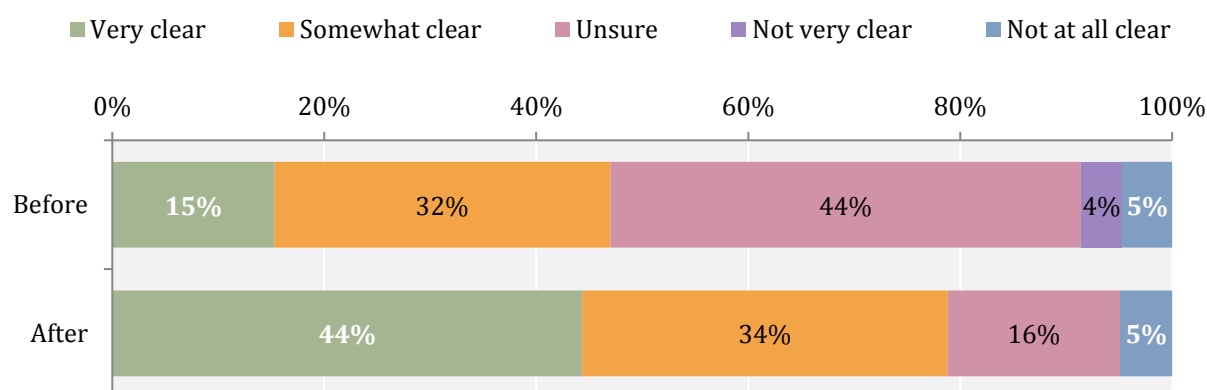
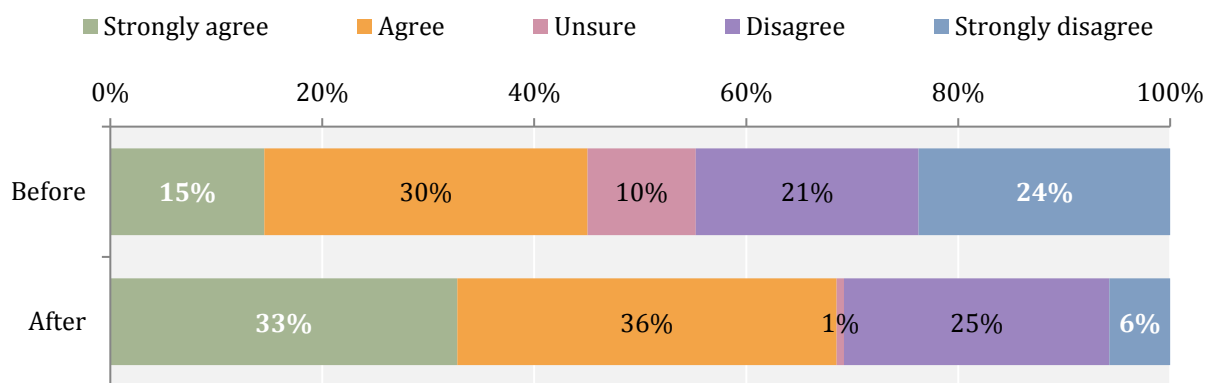


FIGURE 13: AWARENESS OF HOUSEHOLD ELECTRICITY USE COMPARES TO OTHERS

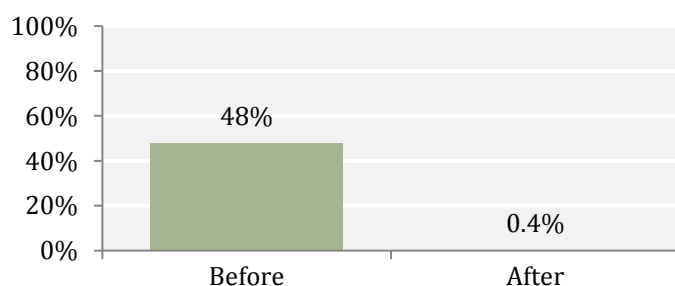
In response to: I am aware of how my household electricity use compares to my neighbours, friends and family



In the Pre- and Post-intervention Surveys, participants were asked what prevented them from reducing their energy use, and were provided with a range of options. As seen in Figure 14, before taking part in the PSP, almost half of all participants identified a lack of knowledge as a barrier to reducing their energy use, while after, less than 1% identified this as still being a problem. This reveals that a substantive portion of the targeted demographic believed they lacked the knowledge required to reduce their energy use, and that this barrier was substantively removed as a result of the PSP.

FIGURE 14: ELECTRICITY USE REDUCTIONS PREVENTED BY LACK OF KNOWLEDGE

In response to: Which of the following things stop you from reducing energy use in your home? Not sure how to.



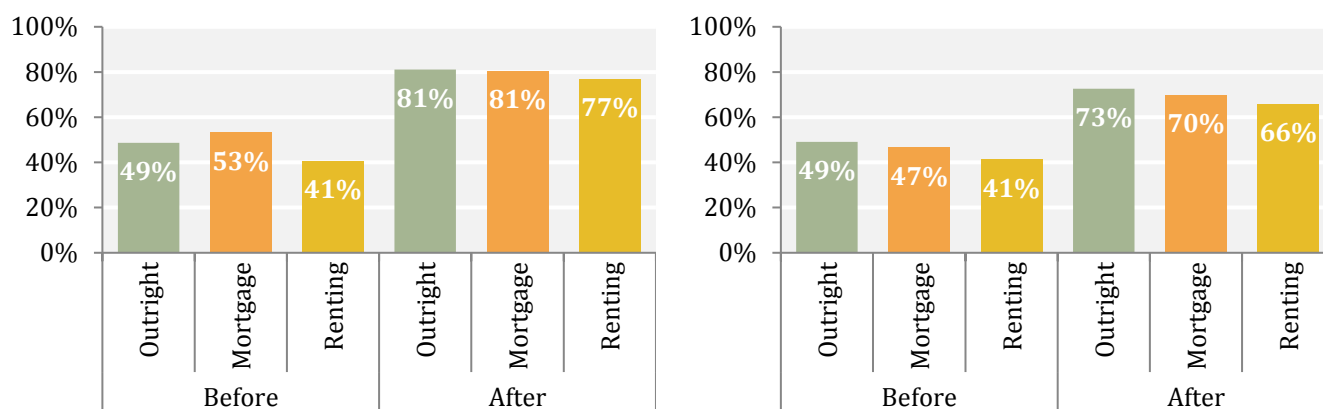
An analysis of literacy before and after participation broken down by home tenure type (Figure 15 and Figure 16), revealed similar patterns across the two measures:

- Before the program, literacy was similar across all tenure types, with those who owned their home either outright or mortgaged slightly more likely to agree than those who rented (6-8% difference in ability to understand bill and 7-12% difference in awareness of relative use).
- After the program, the differences narrowed further, though those who owned were still slightly more likely to agree (4-7% difference in ability to understand bill and 4% difference in awareness of relative use).

The narrowing of the gap between renters and owners is very slight but reflects that the PSP was equally successful in increasing the literacy of both owners and renters.

FIGURE 15: OWNERS VS RENTERS AGREEING THEY ARE ABLE TO UNDERSTAND ELECTRICITY BILL

FIGURE 16: OWNERS VS RENTERS AGREEING THEY ARE AWARE OF HOW HOUSEHOLD ELECTRICITY USE COMPARES TO OTHERS



David.: *“I now understand how to make sense of my energy bills. For instance, by examining my bill closely, I discovered I was incorrectly charged, even though I was overseas at the time. When I enquired with my energy company, I was given an \$80 discount.”*

Sense of Control

Participants were directly asked about their sense of control over electricity use and bills in the pre-and – post surveys¹¹.

At the start of the project over half the participants agreed that they felt in control of their electricity use and bills. Following the project, participant perception of their control demonstrated a substantial further improvement:

- The proportion of participants who agreed or strongly agreed they had control over their **electricity use** increased from 60% to 89%. The proportion of participants who strongly agreed increased by more than 6 times, from 7% to 44% (Figure 17).

The proportion of participants who agreed or strongly agreed they had control over their **electricity bill** increased from 53% to 87%. The proportion of participants who strongly agreed increased by more than 5 times, from 8% to 41% (

¹¹ The Post-Intervention Survey was not undertaken with the Round 3 participants (n=320, or 33% of sample), who are therefore excluded from this analysis. Results should therefore be interpreted with caution as they do not represent the full sample of participants.

Figure 18).

FIGURE 17: SENSE OF CONTROL OF ELECTRICITY USE

In response to: I feel in control of my electricity use.

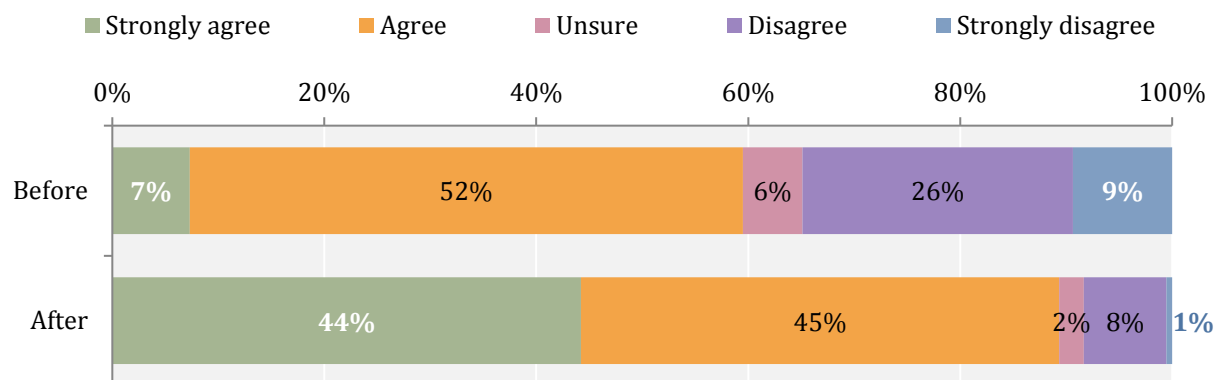
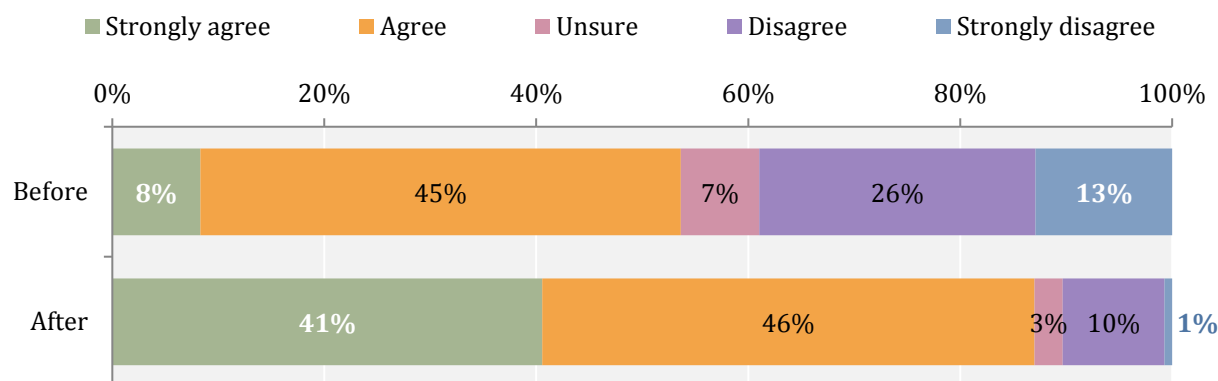


FIGURE 18: SENSE OF CONTROL OF ELECTRICITY BILL

In response to: I feel in control of my electricity bills



An analysis of sense of control before and after participation, broken down by home tenure type (Figure 19 and Figure 20), revealed slightly different patterns for control over use and control over bills:

- Before the program, control of electricity use was similar across all tenure types, though those who owned their home outright (63%) were slightly more likely to agree than those who owned through mortgage (59%) or rented (58%).
- After the program, the differences narrowed further, though those who owned via a mortgage aligned with those who owned outright, leaving a slightly larger gap between owners and renters

As above with literacy, the narrowing of the gap between renters and owners is very slight but reflects that the program was successful in increasing the sense of control of both owners and renters, though a very slightly more modest impact on renters.

FIGURE 19: OWNERS VS RENTERS AGREEING THEY HAD CONTROL OVER THEIR ELECTRICITY USE

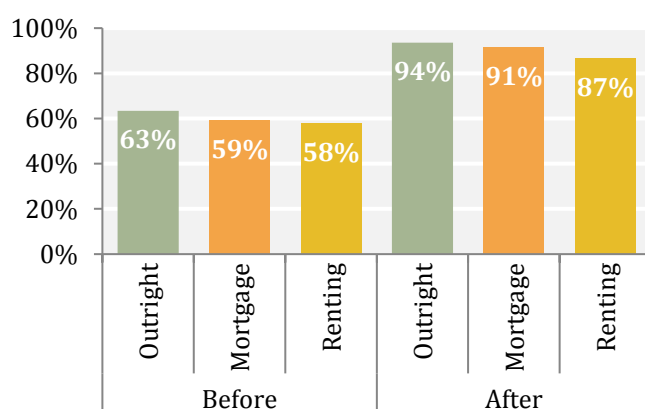
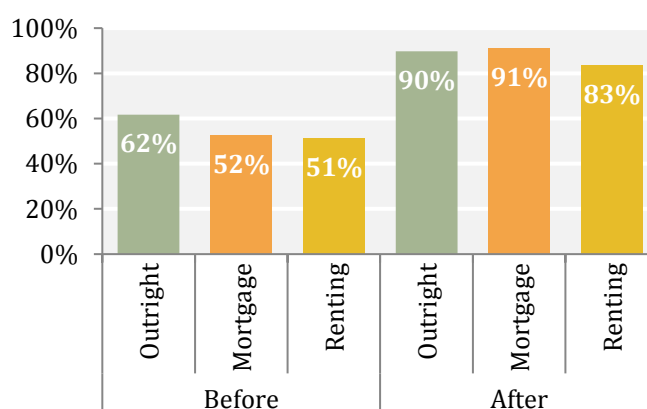


FIGURE 20: OWNERS VS RENTERS AGREEING THEY HAD CONTROL OVER THEIR ELECTRICITY BILL



Participants were also asked whether they were prevented from reducing their electricity use by a lack of control. Only a small proportion initially answered yes to this question (8%), despite 34% of participants disagreeing that they felt in control of their electricity use. This seems an unexpectedly low number, and it is hypothesised that this disparity of results from participants not understanding this question sufficiently.

An analysis of response by home tenure type (

Figure 22) reveals that no renter households chose this option in their pre-intervention survey. Given the barrier that renting creates for control over electricity use particularly with regards to upgrading equipment, this appears to confirm the hypothesis.

Therefore the improvement of 4% seen in Figure 21 does not adequately measure the improvement in this area.

FIGURE 21: ELECTRICITY USE REDUCTIONS PREVENTED BY LACK OF CONTROL

In response to: Which of the following things stop you from reducing energy use in your home? Lack of control to make improvements to the property.

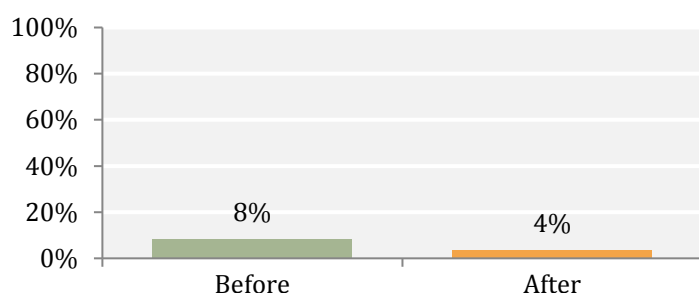
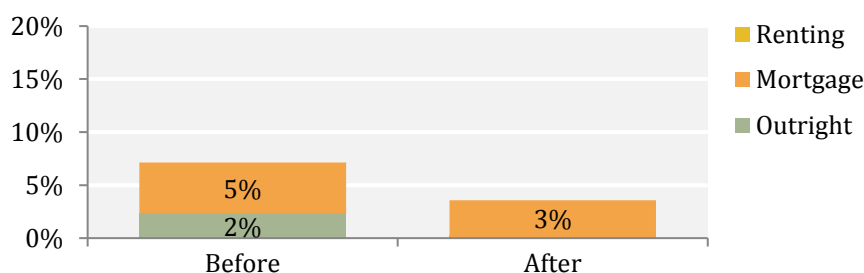


FIGURE 22: ELECTRICITY USE REDUCTIONS PREVENTED BY LACK OF CONTROL, BY HOME TENURE



2. Peer-to-peer networks

A key feature of the PSP was the use of “peer-to-peer” networks and storytelling to inspire and sustain energy-efficient behaviours. This was targeted through the development of individual leaders, or Energy Champions, with the potential of also forming a Power Savers Team(s).

Energy Champions

The PSP aimed to recruit and support a total of 60 ‘Energy Champions’. The purpose of the Champions initiative was to empower households to tell their stories to their peer networks and / or encourage others to get involved. United Voice led this aspect of the project, in collaboration with NCC.

CuriousWorks (digital media production subcontractors) worked with Pilot participants to create professional short videos to help promote the PSP. CuriousWorks carried out a formal training workshop series to enable the community to tell their stories through video and other digital means. Through digital storytelling (e.g. video, photography, other digital interactions), it was hoped others in the community would also be actively encouraged to get involved.

Four pilots took part in this, and a compilation of these four films can be found here:

<http://youtu.be/Ht0lwMOAhyI>. This video was screened at United Voice's delegates conference in late 2013 (resulting in a few recruits) and at a few industry meetings.

Champions' interaction was phone based initially, then increased into late 2015, as more time was available for face to face interaction.

The level of individual Energy Champion activity implemented in the PSP exceeded expectations, with 224 Champions being involved, compared to the target of 60.

This was primarily expressed through participants' one to one conversations with others about their own experience. Individual champion conversation strongly supported recruitment to the project and was the predominant way participants exercised leadership. 92 recruits (6%), and 86 (8%) of participants came from a champion conversation. However we are confident the actual number is greater than this as many participants didn't identify their referral.

Inspired by the Power Savers program, energy Champion Margaret from Toongabie has implemented various energy campaigns at her work place. She often speaks with her friends and colleagues on what she have learnt from the PSP, and have taken actions to reduce her energy use. Margaret has also undergone further energy training, and is now confident to discuss energy topics and strategies.

Table 20 outlines how many participants took part in each of the Champion actions. Many participants undertook more than one type of action.

TABLE 20: SUMMARY OF CHAMPION ACTIONS TAKEN

Action	Number of participants who took this action
Encouraged others to join	206
Attended Final Dinner	19
Engaged in media or story-telling	12
Spoke to others about saving energy	80
Set up a Power Savers team	11
Other	8

While the engagement of energy champions in energy efficiency in their homes (and encouraging their peers to engage) may have led to additional electricity reductions in their households, sufficient data was not available at the time of the evaluation in order to ascertain if this occurred.

Power Savers Teams

The PSP aimed to form 3 Power Savers Teams, but was able to create five Teams, which occurred between Milestone 8 and 9 of the project. These were formed using PSP Champions, generally establishing a team where an existing workplace or community structure was already in place. Team

development used four existing structures and an EOI process to connect individual champions to Power Savers Team activities.

Eleven (11) of the Energy Champions successfully facilitated the formation of the 5 teams, across a variety of structures including:

1. Workplace: Early Childhood Education and Care (ECEC) Centres
2. Industry Group: Catholic Care Homecare Liverpool
3. Geographical Location: Oatlands Retirement Village
4. UV Event: Delegates Conference
5. Other: The EOI Group - Connecting Individual Champions to Team Activity

Sandra from Katoomba has taken a lot of the energy assessor's recommendations on board. She has not only informed family and friends of the PSP, she is also heavily involved with setting up the ECEC Team, which worked on curriculum on energy efficiency.

Table 21 outlines the goals that were identified for each structure and team.

TABLE 21: GOALS OF THE POWER SAVERS TEAMS

Structure	Power Savers Team	Goal
Workplace	Early Childhood Education and Care (ECEC) Centres	Develop ongoing community and peer to peer EE education through Early Childhood Education and Care (ECEC) Communities
Industry Group	Catholic Care Homecare Liverpool	Progress peer to peer education and activity amongst work colleagues and community beyond the home assessment option
Geographical Location	Oatlands Retirement Village	Increase EE knowledge and action within the Oatlands Retirement Village Community
UV Event	Delegates Conference	To provide PSP participants the opportunity to connect with others who have been part of the program and to encourage sharing of EE learning with others in the broader member community
Other	The EOI Group - Connecting Individual Champions to Team Activity	Surface potential for ongoing activity or other teams outside of those identified as having an existing structural base

Goals were set across a combination of energy efficiency education, knowledge sharing, learning and action. With the exception of Team 1 (Early Childhood Education and Care Team), all team actions were a one-off event.

The key activities completed by each of the five Power Savers Teams are outlined below.

Team 1: Early Childhood Education Centres

- Three centres participated directly in the Power Savers Team
- Each centre nominated their sustainability officer to take part in "Sustainability in Early Childhood" training delivered by TTA and incorporating resources developed by Cool Australia - the training is based on curriculum outcomes set by the Federal Government and included using energy efficiency as an example within the training
- The key focus was sharing the knowledge of energy efficiency, alongside the broader topic of sustainability, with the wider community via the Early Childhood Education Centres' peer networks
- Training delivered online in a flexible format over 6 hours- enabled educators to improve their own practice as well as being a platform from which they could develop a resource to support other educators improve their capacity to teach sustainability
- supported by an NCC project worker, educators who took part in the training were invited to contribute to a guide to be distributed broadly
- trained educators were supported to each run a workshop to test the effectiveness of the guide
- at the time of writing, further educators were being enrolled to undertake the online training module
- 27 centres had their sustainability officer undertake training either through TTA (12) or from one of the original team of educators from the three key centres
- Table 22 outlines the key Power Savers Team activities undertaken by each centre

TABLE 22: POWER SAVERS TEAM – EARLY CHILDHOOD EDUCATION CENTRES

ECEC Centre and Location	Team Activity
Centre 1: Community based centre located in Randwick	• Led the ECEC project and contributed most strongly to the development of the guide • Early adoption of the training into their centre activities • Gave clear recommendation on the format and inclusions of the guide • Facilitated a workshop with 14 educators from 12 centres across NSW • Sustainability Officer undertook additional training in around 'getting others on board' with the training
Centre 2: Privately owned centre located in Strathfield	• Took part in an onsite energy assessment improve the EE of the centre • Develop resources for two audiences; (i) families who use the centre to improve EE in the home and (ii) Other ECEC Centres to improve EE in the workplace • Intend to expand their website to have EE information appropriate for the home included • Provided a pilot template which could be adopted by other centres to improve EE (developed by one of the PSP assessors who worked closely with this centre)
Centre 3: A national ECEC chain located in Western Sydney	• Committed to train educators from other centres in the area from the same provider • Hosted an after-hours workshop, inviting all centre staff and neighbouring sister centres to participate. 16 educators and 5 centres represented. • Intended to take the learning and guide back to their centre networks broadly

Team 2: Catholic Care Homecare Liverpool

- Identified and worked with PSP participant who was homecare workplace leader to coordinate and to determine the content of 1 hr workshop which aimed to:
 - give those colleagues who didn't participate in the PSP opportunity to learn about EE
 - give those who did participate in project opportunity to talk about their own learning and experience and
 - provide care workers with simple skills so they could pass EE advice on to clients
- Worked with a PSP assessor who had relationship with leaders to support presentation and facilitation
- Held workshop during September 2015 monthly team meeting
 - 50 care workers participated who did not participate in PSP (including those in the team)
- high level of interest from workers on how they could make their own homes more EE
- identified pressure on budgets of care workers and their clients from electricity bills was high
- PSP fact sheets made available to participants and encouraged to take copies for clients as well - high take up
- request to provide electronic copies of presentation prepared by the assessor
- further request to distribute electronic copies of the presentation

Team 3: Delegates Conference

- In 2015 United Voice hosted biannual delegate's conference of 250 members, 24 had participated in the PSP
 - conference is opportunity for members from different industries and geographical locations to come together
 - home assessment phase of the project had concluded by the conference date, so further participation was not possible
 - Provided a chance for PSP delegates to talk about what they had learned and to connect with others who had also been part of the project
- Phone and mail contact was made with PSP delegates ahead of conference to talk through their experience of the project and their willingness to act as an ambassador
- PSP delegates were encouraged to think about a key behaviour change or learning they had throughout the project and to be prepared to share that with others
- PSP delegates provided with a badge stating "I did the Power Savers Project, ask me about it" and were ready to tell a little about their experience and learning
- PSP fact sheets given to PSP delegates to distribute
- PSP delegates had conversations about the PSP with non-participants but the principal engagement came from PSP delegates connecting with one another
- PSP delegates had not met prior to conference but enjoyed the opportunity to talk about and compare experiences

Team 4: Oatlands Retirement Village

- 2 PSP Champions were residents of the village
- Champions attempted to work with the body corporate to develop a community based energy efficiency action to take place post July 2015
- After numerous on site visits and conversations to progress with champions they reported that it was difficult to get approval from the body corporate and team activity was discontinued

Team 5: The EOI Group - Connecting Individual Champions to Team Activity

- At QR3, and where relevant in other Champions conversations, participants were invited to take part in local Power Savers teams
- There was soft interest in local team potential

- An Expression of Interest (EOI) was sent to all PSP participants to gauge interest in attending a PSP workshop or other activity:
 - EOI surveyed interest area, availability and location possibilities
 - Translated versions of EOI were provided to those who required written translations at other points in the project
- 28 EOI's were returned, 24 indicated interest in an ongoing activity
- The majority of EOI's did not share similar location preference or availability
- Due to time and resource constraints, instead of workshops, appropriate local councils energy efficiency projects were identified:
 - Councils were contacted and interested participants were referred to these projects (in their own and neighbouring regions)
 - 14 participants elected to be referred to local council groups

While the program came across expected barriers to engaging low-income households in further engagement, the Power Savers teams successfully inspired energy-efficient behaviours amongst peer networks, which may serve to benefit from a similar offering to PSP in the future.

Additionally the teams in Early Childhood Education and Care as well as the Catholic Care Homecare Liverpool have resulted in a large group of workers having the skills to pass on their knowledge to their clients and students.

Investing Resources in the ECEC Team

A higher level of resources was invested in the ECEC team based on the capacity of this team to be sustainable beyond the life of the project and because of the potential for broad influence in local communities. Under the National Early Years Learning Framework (EYLF) Centres and Educators are required to meet mandated sustainability outcomes. Educators reported feeling uncertain of how to meet the outcomes and were interested in practical support to design lesson plans and integrate sustainability more holistically in their centres. The online training option offered by the PSP, delivered by Teacher Training Australia, covered many of the concerns raised by Educators.

Three Educators took part in pilot training and made early implementation of the learning in their own centres as well as contributing to the creation of a resource guide for broad ECEC distribution. The PSP received strong positive feedback from the pilot trainee's and supported this group to run workshops to train others. The pilot group of 3 trained an additional 30 Educators from 17 centres.

Based on the success of the ECEC team pilot the PSP enrolled a further 9 educators to undertake training which, by training date conclusion, will have trained, either formally or in a PSP workshop, Educators in 27 Centres.

The investment in improving the capacity of ECEC Educators to deliver sustainability curriculum has many positive benefits to the communities in which they teach. Educators who took part in the training report that the program provided new ideas on how to implement sustainability education in their centres as well as activities to involve families and the broader community,

The PSP had the highest level of team participation from the ECEC group and found ongoing interest from this group in continued training and development. The ECEC team was motivated to pass learning on to others and, supported by EYLF requirements, practices sustainability in everyday work. The training provided through the PSP substantially improved the capacity of Educators to meet the EYLF and enabled Educators to continue to access training support well beyond the life of the project.

Table 23 provides a summary of the outcomes of the Champions and Team aspects of the PSP:

TABLE 23: OUTCOMES OF CHAMPION AND TEAMS PROJECT

Objective	Outcomes
Select and train 60 champions to the program	The PSP exceeded target with 224 champions receiving training and taking action over the life of the project.
Form a minimum of 3 power savers teams in one or more of the Sydney, Hunter and Illawarra regions	The PSP formed 4 teams, 3 of whom completed team actions. A fifth group developed out of individual champions who were not in an area with capacity to form a team but who were interested in further EE action. This group, after consultation, were referred to appropriate local councils for ongoing community activity. Although the PSP reached target and 3 teams achieved action with successful community outreach; it is noted that; (i) Teams only succeeded when they were attached to an existing structure outside of the PSP, such as a workplace, industry group, geographical location or event. . (ii) Team formation and activity required a high level in kind PSP staff support (iii) With the exception of ECEC and, to a lesser extent the Homecare team, team actions were a one off event without strong capacity to be sustainable.
Increase recruitment to the program	Recruitment by PSP champions contributed strongly to the program reaching its participant target. 206 champions reported talking to others about joining the program. We have data showing 92 recruits (6%), and 86 (8%) participants came from a champion conversation. However we are confident the actual number is greater than this as many participants didn't identify their referral.
Spread knowledge gained through the PSP to the broader community and increase energy literacy of the broader community.	The PSP is confident that knowledge gained through the program was spread through the broader community. At an individual champion level 80 participants report talking to others about EE learning and 206 encouraged others to join the program. Discussion with participants throughout the program suggests that the actual number of peer to peer conversation was even higher than recorded. A number of participants took part in media or spoke publically about the program. Team activities achieved strong outcomes in reaching out to the broader community, in particular; (i) The Homecare team skilled a further 50 non PSP care workers to implement EE in their own homes and provided workers EE information to pass on to clients and others within their community. (ii) The ECEC team had very strong results in increasing knowledge in the broader community. The preliminary training group of 3 educators extended their learning to a further 31 educators across 18 centres. Each of these educators and centres then passes on the learning to their peers, children at the centre and their families, and increases the capacity of the centre to be a community leader and influencer in EE and sustainability. We have a further 9 educators taking part in the training and would expect similar levels of outreach into the broader community. This will result in 27 centres having their sustainability officer undertake training to develop their capacities in that role, and 38 Educators be engaged. The ECEC team has great ability to be a sustainable and to continue to use and develop the skills learned in the PSP well beyond the life of the program.
Increase skill set of participants	The PSP was successful in increasing the skill set of participants in a number of ways which evolved as the program matured; (i) Beyond increasing individual EE knowledge the PSP provided support and training for

	participants to talk about their EE learning with others and to encourage others to join the program. (ii) A number of participants took part in media activity or spoke publically about the PSP (iii) The Homecare team developed skills in developing a workshop and in advocating for EE training in the workplace and for clients. (iv) ECEC team received formal training, developed facilitation skills, contributed to the development of a resource guide for other ECEC educators and increased their capacity to teach sustainability to 0-5 year olds. (v) Training in interpreting electricity bills supported participants to both understand the bill and be confident to advocate for themselves, and others, around electricity charges. (vi) PSP improved participant understanding of consumer rights and, in some instances, tenancy rights
Build peer-to-peer interaction	The PSP provided good opportunity for peer to peer interaction. 206 participants report individually talking to others about joining the program, and 80 report passing on EE learning. Peer to peer interaction in team groups was strong in particular with ECEC and Homecare. Each team working collaboratively with their respective peers to complete their actions and share learning from the PSP.
Build a peer-to-peer network	Building a peer to peer network exclusively around participation in the PSP was difficult; however the PSP did enable existing networks to be strengthened. The PSP teams were all attached to an existing structure or community which developed new skills and stronger networks through shared involvement in the PSP.
Identify opportunities for the program to grow and develop.	PSP participant leaders were consulted throughout to inform the direction of the program. Leader consultation drove the direction of the champion and team program.

Participation evaluation

Participation in the project was evaluated against the following performance measures:

1. participant targets reached
2. retrofits and assessments delivered
3. solar hot water systems negotiated and installed.

1. Participation targets reached

UV had not undertaken a project like the PSP before, and there was little precedent to determine the potential success of a program like this.

Nevertheless, the project was able to meet the target of 1,010 participants overall in the timeline agreed to with the Department. This can be accredited to a few key factors:

- Engagement of an organisation, UV, with a pre-existing trusted relationship with their members for the program participants;
- Use of an outbound call centre (OCC), calling at targeted times (including outside of business hours) for the majority of the recruitment;
- Engagement and development of Power Savers Champions to recruit friends, family and colleagues;
- Use of a sophisticated CRM (Salesforce) to manage the whole of program database which allowed for efficient and clean management of data and participants journeys.

A focus on getting bills under control seemed to resonate very well with the PSP target demographic. Comfort and wellbeing were very important to them as well, but were perceived as secondary in importance. Empowering participants to increase their energy literacy seemed to be a powerful tool for engagement, which is perhaps why householders seemed to greatly value the home energy assessment.

PSP recruitment began with generating **leads** (those invited to the PSP), signing on **recruits** (those who fit the eligibility criteria for the PSP), moving **participants** through the PSP journey (those who were offered all elements of the project) and delivering the PSP to **completions** (those who received all elements of the PSP).

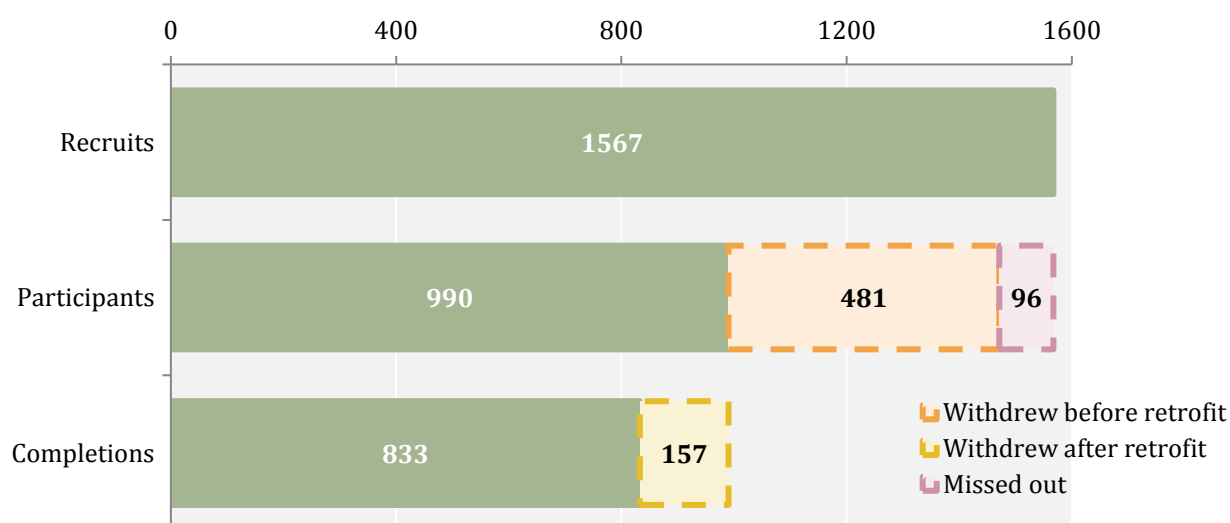
The project had a target of 990 participants, excluding the pilot. It contacted 10,914 leads, resulting in:

- **1,567 households recruited to the project**
(i.e. agreed to participate in the project)
 - 577 recruits (37% of the total households recruited) subsequently withdrew or dropped out from the project prior to starting their participation in the project. Of these, 481 explicitly requested to withdraw, while 96 'missed' out (either stopped responding to communication from the project, or were unable to find a suitable time to schedule and attend an assessment within the timeframe of the project).
- **990 households began participation in the project**
(i.e. completed a pre-intervention survey and received a home energy assessment)
 - 157 participants (16% of the total participating households) subsequently withdrew from the project following their assessment. Of these, 87 withdrew before the opportunity to receive a post assessment retrofit, while 70 withdrew after receiving a retrofit.
- **833 households completed the full project**
(i.e. remained as participants throughout the full term of the project, completing a post-intervention survey upon completion)

These numbers are shown in

Figure 23.

Figure 23: Recruits, participants and completions



* Missed out refers to participants who were unable to successfully book a home energy assessment, but never explicitly withdrew from the project. This includes households who simply stopped responding to communications from the project, but also households whose busy lives made it difficult to schedule and attend an assessment in the timeframes of the project.

The breakdown of leads, recruits, participants and completion by recruitment round are shown in Table 24.

The number of participants in Round 1 (128) fell short of the target of 200. This was largely as a result of the delayed participation of R1B participants, with only half of recruits going through to become participants.

This was partly offset by Round 2 exceeding its target of 500 by an additional 42 participants. The target for Round 3 was therefore adjusted from 300 to 320 in order to meet the overall project target.

Additionally, ISF had requested the program attempt to increase the percentage of participants in the intended control group.

Table 24 shows the final treatment groups that emerged from the PSP at conclusion – identified by their ‘recruitment round’. The table illustrates the time period across when the participants were recruited, how many leads were identified from the UV member base, the target of participants, those eligible to participate and the final participant numbers.

TABLE 24: LEADS, RECRUITS AND PARTICIPANTS BY ROUND

Round	Time Period for Recruitment	Leads	Recruits	Target	Participants		Completions	
Pilot*	Sept 2013 - Dec 2013	60	27	10-30	20		15	
Round 1a	Dec 2013 – Feb 2014	1,785	91	200	78	128	61	105
Round 1b			95		50		44	
Round 2a	Mar 2014 – Jun 2014	2,665	501	500	295	542	248	452
Round 2b	Jul 2014 – Dec 2014	3,732	397		247		204	
Round 3	Jan 2015 – Mar 2015	2,732	483	300(320)	320		276	
	Sub-Total	10,974	1,594	1,010	1,010		848	
	TOTAL ex pilot	10,914	1,567	990	990		833	

* The pilot group were subject to their own evaluation. This is available in the ISF Pilot Evaluation Report in Data Evaluation Report (Appendix 3). Therefore pilot participants are excluded.

The number of leads generated by United Voice from the membership base was significant (ten times more) than the target for participants. It was understood that not all of these leads would be eligible for the program, and that the targeted group would need to be large as they would have limited available time (a potential contributor to attrition).

Attrition rates were not planned for this section, rather the project developed a recruitment target. United Voice identified a target of recruiting 10% of their members in each of the 4 regions. This target was exceeded across all regions. A notable contribution to this effort was recruitment through:

- Union delegates and officials within the United Voice membership
- PSP Champions to friends and family outside of the United Voice membership

A range of strategies were adopted to try to mitigate barriers to recruitment that were identified in the original recruitment strategy. Most predominantly this existed in the inclusion of specific parts of the eligibility criteria to make it easier for people who are traditionally excluded from programs such as this to take part, flexibility and adaptability to participants’ specific needs and situation, and through extensive use of translators and interpreters to equalise the experience of NESB and/or CALD participants.

Strategies included:

- Use of over the phone and on-site interpreters wherever necessary;
- Inclusion of a short translation in 15 different languages in the recruitment mail-out;
- Translating documents where required for individual participants;
- Recruitment and ongoing communication calls at industry-specific and out-of-hours times to allow all industries to participate;
- Recruitment through bi- or multi-lingual organisers;
- Specific messaging in recruitment discussions, energy assessments and ongoing communications about steps that renters can take to reduce their energy use;
- Tailored participant journey's and interactions; and
- AARs and PARs provided participants with some energy efficient equipment or funding to go towards upgrading appliances to overcome resources issues. Additionally, for PAR Rebates participants were given as long as could be allowed by the program timelines to take up their rebate, allowing participants time to save up.

Early on in the recruitment piece, an additional barrier was identified, that there was a potential perception that the program is coming from an external body or that the program is trying to coerce them to change their power company. To combat this more emphasis was placed on highlighting how the program was developed, and the connection between United Voice members, the Real Voices survey and the program.

Linguistic and cultural diversity

The PSP aimed to reduce barriers where possible for participants of culturally and linguistically diverse (CALD) and non-English speaking (NESB) backgrounds to participate in the program.

The recruitment package was mailed out with a translation page with the 12 top languages of UV members, directing leads who needed the documents translated to the appropriate next steps to gain information about the program in their preferred language.

Table 25 shows that a total of 116 participants in the program requested assistance through interpretation, and 61 participants requested translation for written material (some of these did not request assistance for verbal communication). 20 different languages are represented in this group.

"As English is not my first language, I am very grateful that my energy assessor went the extra mile and took his time to discuss the complex energy efficiency topics with me!"

Sandra, Hinchinbrook

TABLE 25: PARTICIPANTS REQUESTING TRANSLATIONS OR INTERPRETERS

Language	Verbal Communication	Written communication
Arabic	12	2
Bahasa	1	0
Bengali	6	4
Bosnian	1	0
Cantonese	2	1
Dari (Persian/Afghani)	1	0
Filipino	2	0
Greek	3	2
Hindi	2	1

Indonesian	3	2
Korean	7	6
Macedonian	7	4
Mandarin	10	10
Nepali	18	10
Serbian	2	2
Spanish	19	9
Sudanese Arabic	3	0
Tamil	12	5
Thai	4	1
Vietnamese	1	1
Total	116	61

Over the phone interpretation

Over-the-phone interpretations were completed through TIS (Translating and Interpreting Service). During the period of 1/01/2015 and 16/12/2015 United Voice tried to manually record the calls made through TIS, shown in

Table 26.

Of the 16,162 calls made by the OCC during that period, a total of 357 calls to TIS were recorded, representing around 2% of calls made (including recruitment and post-recruitment calls). A total of 26 different languages were required for these calls.

Additionally, one of the call centre staff was able to interpret into Nepali for the 18 participants who requested Nepali interpretation and translation, and these calls were not recorded in this group. This was extraordinarily helpful for two reasons:

- TIS did not appear to have many interpreters who spoke Nepali so we were often only able to provide a Nepali interpretation if this staff member was on shift
- it is felt that conversations through an interpreter were often surface-level and did not enable the depth of interaction that two people speaking the same language would experience.

Many participants also used friends or family to interpret which are not recorded in this group, and may or may not be recorded as needed assistance with interpretation.

“When I was on the phone, I got several opportunities to talk to members directly in Nepali about the program. I realized that when I was talking to them in Nepali they were more engaging and understood the program better. I felt that they were more open and trusting and they were comfortable asking questions to me. On the contrary, when I was using TIS sometimes the questions and answers did not match up. The engagement was much stronger when I was able to speak to participants directly in their primary language.”

Nepali speaking OCC Part-time staff member

TABLE 26: NUMBER OF CALLS MADE THROUGH TIS BY LANGUAGE (1/01/2015 – 16/12/2015)

Language	# calls made through TIS
Arabic	25
Bahasa	3
Bengali	12
Bosnian	2
Cantonese	6
Croatian	1
Dari (Persian/Afghani)	1
Farsi	1
Filipino	7
Greek	15
Hindi	6
Indonesian	16
Italian	1
Korean	22
Macedonian	24
Mandarin	26
Nepali	25
Portuguese	1
Samoan	2
Serbian	1
Spanish	59
Sudanese Arabic	1
Tamil	68
Thai	22
Tigrinya	2
Vietnamese	8
Total	357

On-site interpretations for home assessments

The project used TIS for on-site interpretations. Originally this was a free service, however TIS policy changed mid-project which restricted this free service to business hours. Due to the nature of participants' availability and the desire to make the program accessible for participants from NESB/CALD participants the project decided to divert budget for these costs. The project was still able to access a substantive amount of free on-site interpretations which meant that the overall cost was likely to be very cost-effective for the benefit. Additionally, some participants chose to have a friend or family member interpret for them (not all of which we have necessarily recorded) and as described below (Table 27), TIS was unable to provide Nepali interpreters, so a Nepali speaking UV organiser attended 3 assessments as the interpreter.

TABLE 27: INTERPRETERS FOR ENERGY ASSESSMENTS - BY LANGUAGE AND TYPE

Language	Paid Interpretation	Friend/Family	Total
Arabic	4	0	4
Bengali	0	2	2
Bosnian	0	1	1
Cantonese	1	0	1
Dari (Persian)	0	1	1
Greek	4	0	4
Indonesian	3	0	3
Korean	3	0	3
Macedonian	3	0	3
Mandarin	4	0	4
Nepali	5 (3 UV)	2	7
Serbian	1	0	1
Spanish	7	0	7
Sudanese	1	0	1
Tamil	7	2	9
Thai	3	0	3
Not Recorded	0	2	2
TOTAL	46 (3UV)	10	56

One assessor noted that assessments with interpreters were difficult because of “*the limitations of the interpreters understanding of the concepts being explained, which would have almost certainly impacted on their ability to explain/translate to the participant. This also significantly prolonged the time of the assessment.*”

However another noted “*My experience of the interpreters was usually very professional, it often meant that the assessment was slowed down and the finer nuances of communicating energy efficient practices were only gleaned over. Overall the interpreters made the participants feel more at ease and often they commented how much they had learned for themselves.*”

Unfortunately the program had not budgeted for, and was sometimes unable to take the extra time with these participants because the time was not booked with the interpreter and assessors often had to travel to their next assessment. Future programs should look to build in extra time and resources to service this.

If the project was able, it would be helpful to have specific interpreters that had a greater understanding of the program which could be used, or use project staff who can speak an additional language and could attend. Additionally it would have been helpful for the project to provide some training to assessors on the best way to structure an assessment that would be done through an interpreter to improve the participants’ experience.

Translating and Interpreting Service

Bookings were usually required to be made at least 3 working days before the event, and earlier depending on the language required. Unfortunately, TIS did not seem to have any Nepali interpreters, and UV had some difficulty getting provision for some other languages as well. In some instances, Nepali speaking UV organisers were able to attend the assessment, or householders could have friends/family interpret, however, others were required to go without. Unfortunately TIS were not very punctual in providing notice of being unable to provide an interpreter, which resulted in UV needing to make last minute cancellations for participants.

No quote was provided before or after an assessment, which would make it difficult for budgeting. UV would receive an invoice once a month for assessments we paid for, and did not receive any feedback from TIS after each assessment.

UV did receive some complaints from participants, particularly from female participants who said that some interpreters were rude to them and would not explain what the assessor was saying. Where the participant wanted to, UV logged complaints, but did not receive any feedback. There were also a few cases where the interpreter turned up late.

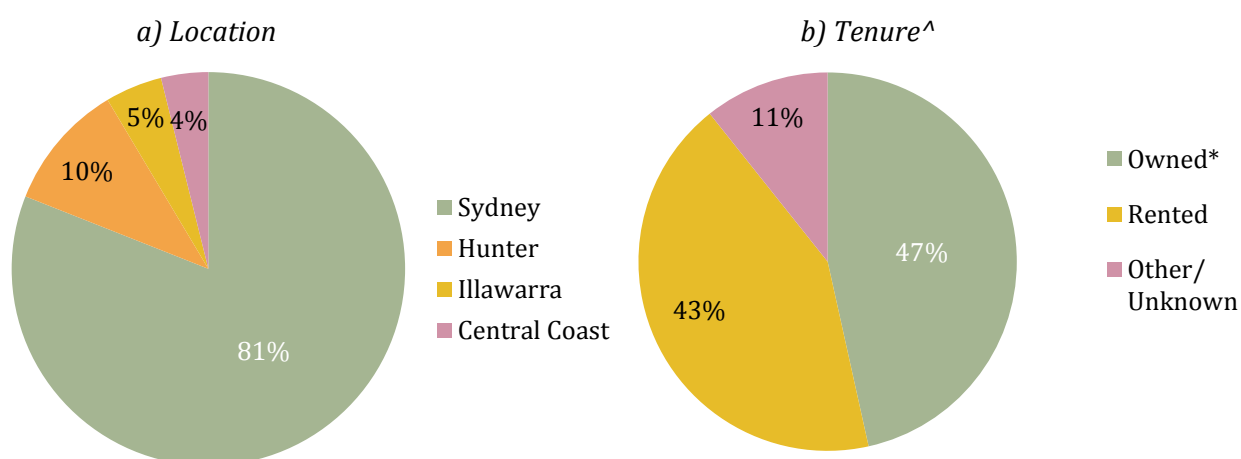
One assessor noted that on several occasions a translator did not arrive, and due to direct contact details of the interpreters not being provided these situations were difficult, as the assessor was required to contact UV, who needed to call the call centre at TIS and attempt to resolve the problem from there. Additionally on at least 2 occasions for this assessor the translator arrived more than 1 hour late.

Demographics of recruits

During project design, four key regions (Sydney, Hunter, Illawarra and Central Coast) were identified for the PSP. In addition, a key project objective was to target both homeowners and renters in low income households. These demographic characteristics for the final 1,567 PSP recruits were analysed.

It was found that the majority of recruits (81%) were from Sydney, as shown in Figure 24a, with another 19% coming from regional areas around Sydney. Recruits were split roughly equally between owners (47%) and renters (43%), (with the remainder other/unknown) see Figure 24b. These proportions remain approximately the same across both the participant and completion cohorts.

FIGURE 24: BREAKDOWN OF RECRUITS BY LOCATION AND HOME TENURE



* Owned includes "Outright" and "Mortgaged" as this question was not disaggregated at the Recruitment stage.

[^] Does not add to 100% due to rounding

The majority of households that participated in the PSP were in the Sydney region. It is not surprising that the area with the highest population density (Sydney) resulted in having the most PSP recruits.

The PSP was successful in recruiting almost half homeowners and half renters to the PSP, which may be a reflection of the United Voice membership base. The 2011 Sydney census¹² of households across all income levels identified 62% of households were homeowners, 30% renters and 8% other or not stated.

¹²<http://profile.id.com.au/australia/tenure?WebID=250>

This demographic spread for the PSP recruits may indicate a higher rate of renters compared to homeowners in low income households as defined by the PSP eligibility criteria.

Recruitment strategy and methods

Originally the majority of the recruitment was intended to come through phone contact and United Voice organisers relatively evenly (400 and 450 recruits respectively), backed up by 150 recruits sourced through existing member structures and 120 via Power Savers Champions.

However, this was revised to see the majority of the recruitment through phone contact, backed up by champion and organiser recruitment. See the comparison between targeted recruits, final recruits and participants in Table 28 below.

TABLE 28: ORIGINAL VS. ACTUAL RECRUITMENT FROM DIFFERENT RECRUITMENT METHODS

Recruitment Method	Original Target	Final Recruits	Participants
Phone Contact	400	1,278	754
Organisers	450	133	101
Existing Member Structures	150	N/A	N/A
Mail Out	50	70	58
Champions	120	92	86
Conference and Events	40	9	8
Newsletters and Social Media	30	5	3
Retired United Voice members	20	N/A	N/A
Total	1,260	1,587	1,010

Phone contact/Mail out

With the scale of recruitment, and the short-time period in which this needed to occur, United Voice revised the recruitment strategy, in consultation with NCC, to focus efforts on this recruitment method.

United Voice adopted a strategy of layering recruitment methods, which is known to increase knowledge of the product/message being promoted. A recruitment package was mailed to all members in the recruitment catchment area, and then followed up by a round of phone calls by United Voice project staff/call centre. This was done on a rolling basis to allow for timely follow up calls and booking of assessments.

While there was a substantive drop-off rate of recruits through the phone contact, this is less significant when methods were implemented, from Round 2b onwards, to reduce the time between recruitment and assessment, and can be attributed to the large drop off of participants recruited in Rounds 1B and 2A who waited for a substantive amount of time for their assessment. For more information about drop-off rates per recruitment round, see

Table 29, below.

TABLE 29: DROP OFF RATE FROM PHONE CONTACT RECRUITS OVER ROUNDS.

Round	Recruits	Participants		Drop Off Rate	
Pilot*	27	20		15	
Round 1a	91	78	128	14%	31%
Round 1b	95	50		40%	
Round 2a	501	295	542	41%	40%
Round 2b	397	247		31%	
Round 3	483	320		34%	
	1,594	1,010		37%	
	1,567	990		37%	

The development of the outbound call centre and the use of this method was largely responsible for the meeting of project requirements on time and on budget, being responsible for 75% of participants. The PSP would recommend that future programs set up similar resources to undertake projects of this scale, though it is important to reflect that the pre-existing relationship between UV and its members meant that these calls were not traditional cold calls, meaning there was a pre-existing level of trust and interest which would reduce the effectiveness of this method without it.

Organisers

United Voice engages with members in various ways, one of the highest intensity is through on-the-ground organisers who are in regular contact with members and delegates.

United Voice Organisers were trained about the Power Savers program in late 2013, and new organisers were briefed on the program as they came on board.

In practice this method worked sporadically. We were able to put this method to use very successfully when a specific industry team, who predominantly works with ESL/NESB members, set a period of time where they would talk to members about the program.

It was anticipated that the United Voice PSP Coordinator would have time to go along with Organisers to meetings with organisers to embed this program, however due to time constraints around project management, development of the database and high-rates of recruitment early in the project this was not possible.

This method can be extraordinarily helpful in reducing barriers to involvement for NESB/CALD people, and brought positive results in terms of transfer from recruitment to participation. In future programs we would look to embed the method more strongly and earlier in the program, and properly resource the method.

Existing Member Structures

United Voice has many pre-existing relationships with members, and leadership structures within different industries. Leaders and Delegates often use local area member meetings and industry delegate meetings to communicate with other members. It was planned for these meetings to be used for United Voice leaders to promote and recruit people to the program.

It was decided that this would be more effective and easier for the leaders if this was done by people who had participated in the program. This method was rolled into the Champions method and this strategy was removed from the amended Recruitment Strategy submitted with Milestone 7.

Power Savers Champions

As will be outlined further in the Champions and Teams sections, the PSP undertook a project to develop and train Power Savers champions, who would take what they had learnt through the PSP and encourage further engagement in energy efficiency throughout their community.

One of the ways this was done was through Champions recruiting friends, family and colleagues to the PSP. One of the first actions Champions were asked to undertake was to talk to others about their experience in the PSP and encourage them to also take part.

For most participants this conversation took place at the first quarterly follow up, around 3 months into their journey. After reflection it was later decided that it would be more beneficial to ask participants either at or closer to their assessment.

For later participants they were asked by assessors during the assessment if they would like to recommend others. Additionally due to the slow pace initial roll out of assessments during Round 2, and the high-pace of Round 3, the potential for large recruitment through this method did not eventuate until later in the project, and for Round 3 participants recruitment had ceased by the time these discussions were had.

This was a successful method of recruitment and would be encouraged to be used again. However we would recommend that it was forward planned to allow time.

Promotion through United Voice events and communications

The PSP was promoted through a range of United Voice events and communications in particular through the 2013 Delegates Conference and sharing the Pilot videos on Facebook. Some pilot participants were recruited from the delegates conference, however other methods were not used extensively nor successful in recruitment.

Retired United Voice members

The United Voice Project Staff attended retired members meetings in 2013 to offer involvement in the program, however unfortunately was unable to recruit any participants from this pool.

Retention Strategy - Between Recruits and Participants

From the Pilot phase a 27% attrition rate was identified in converting recruits into participants. In the June 2015 PSP Project Plan delivered to the Department, it was expected “that a 30-50% attrition rate would be realistic and due to the timelines of the program there will be a pool of recruits at the end of each assessment period that were unable to be booked in the period – either due to number constraints, or inability to contact the participant and find an appropriate time”. Therefore a 37% attrition rate is in the lower range of estimates for the PSP.

Due to the high anticipated attrition rate as identified by CSIRO, the program put in place contingencies to ensure that project targets were met. Additionally the project monitored methods and attrition rates, and adapted methods to minimise attrition.

To ensure project targets were met, United Voice planned a contingency recruitment target of 1,270 recruits to recruit the remaining participants, in line with the 27% Pilot attrition rate.

Unfortunately, due to changes in the project timelines and evaluation plans around the control group, recruits in Round 1b and Round 2a were required to wait a substantive amount of time between recruitment and assessment. This resulted in a high drop off rate.

After reflecting on these drop off rates UV, in consultation with NCC, decided to trial a new method of recruitment roll out. This was called the ‘trifecta’ method, where, when possible, callers would attempt to recruit, complete the PIP survey and book an assessment in one call. Where this wasn’t possible, a

booking was made as soon as practical. This method was enabled by the shift to Salesforce where all these parts were managed on the same system. In order to do this recruitment mail outs were changed from a bulk mail out at the beginning of a round to being mailed out on a rolling basis, electorate by electorate.

This method was trialled during Round 2b and was found to be successful, thus was repeated in Round 3. This method also enabled the project to complete the high rate of assessments for Round 3, in the short time-period required (where 300 assessments needed to be completed in 3 months, at a rate the project had not done at any point before in earlier rounds).

Retention Strategy - Between Participant and completion

Not all 1,010 participants remained in the program through their 9-12 month journey. During this period some became unable to contact, and others chose to withdraw from the program.

84% of the total 990 participants completing the PSP project received the full experience of *both* home assessments and retrofits

Additionally, some participants were required to skip certain steps of the program for a range of reasons (including delayed PARs, difficulty contacting, travel outside of the country).

The project had 157 participants withdraw from the program after assessment, 65 of which requested to drop out and 92 of which were unable to be contacted. Throughout the project UV made various efforts to get in contact with the participants that contact had been lost with through sending out a letter asking them to 'update their details', checking with organisers for updated contact details, and calling from a mobile phone. Additionally the OCC regularly called through the list of unable to contacts. These methods were able to reduce the rate of unable to contacts and re-engage some participants.

Participant interest was largely maintained through well-developed scripts and personal conversations with participants, which focused on intrinsic motivators such as working as a collective in their union and to a group of active and motivated individuals who were empowered to take action on their bills.

Overall, participants appeared to welcome the first few phone conversations following from the energy assessment. The PAR conversation directly following their energy assessment was an important follow-up conversation to enable the householder to take action over their bills, and the mid-point (6-month) follow-up call being a valuable conversation to ascertain whether participants felt more in control over their bills and if they were actually noticing changes.

However, the phone call channel became a bit tired over time (we had three follow-up phone calls after the energy assessment and an additional call to complete the final survey for the Round 1 and 2 participants, to encourage persistent behaviour change). A number of participants requested to drop out of the program because they were getting too many phone calls.

SMS communications worked very well with this audience as they were able to respond in their own time. SMS communication evolved as one of the key mechanisms for communicating with participants, particularly those difficult to contact, or if we were communicating a recommended fixture or sending reminders regarding expiry dates for products.

2. Assessments and retrofits delivered

Home energy assessments were completed for all 990 participants.

During the Assessment, At-Assessment Retrofits (a range of energy efficiency equipment) were delivered to all but 3 participating households.

Post assessment retrofits were installed for 837 households¹³. These numbers are summarised in Table 30.

TABLE 30: HOME ENERGY ASSESSMENTS AND RETROFITS DELIVERED

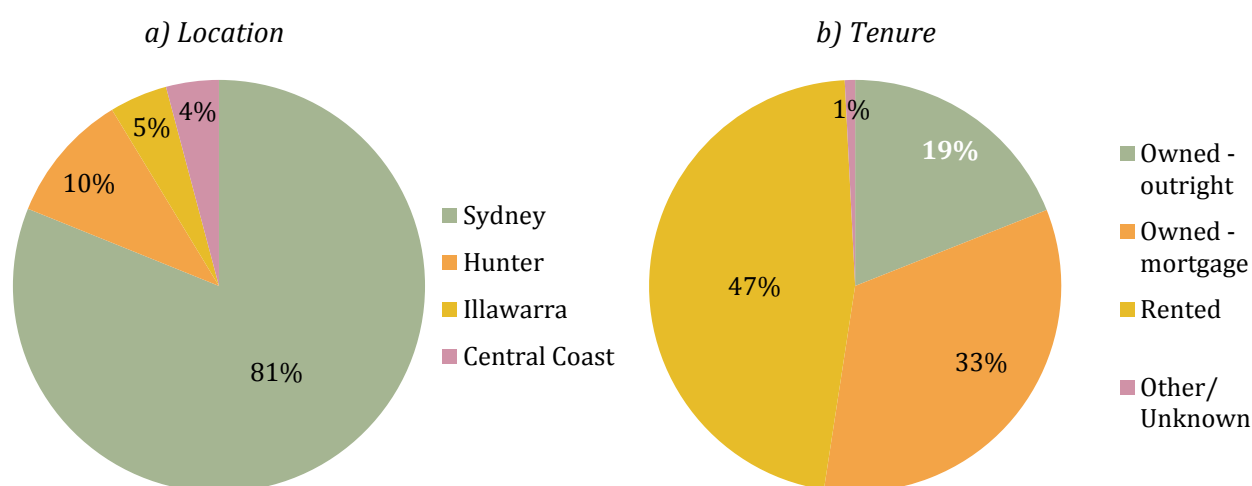
Home energy assessments (HEAs) completed:	990
At-Assessment Retrofits (AARs) installed	987
Post-assessment retrofits (PARs) installed:	837*

Assessments

Figure 25 shows the breakdown of participant households receiving home energy assessment by location and home tenure. The breakdown by location is similar to that in Figure 24a.

On the other hand, the breakdown by tenure shows a much smaller proportion of 'unknown' tenure and is therefore a better representation of household tenure with 52% of participants owning a home and 47% renting. In the 2011 Sydney census of households across all income levels¹⁴, 64% of households identified as homeowners and 36% identified as renters. Therefore the PSP participants included more people who were renting their home than average.

FIGURE 25: BREAKDOWN OF PSP HOUSEHOLDS RECEIVING HOME ENERGY ASSESSMENTS¹⁵ BY LOCATION AND TENURE



Home ownership breakdown shows that 19% of PSP low income households who received a home assessment owned their homes outright and 33% had a mortgage.

¹³ *Post-assessment retrofits were offered to an additional 66 households, but not deployed

¹⁴ <http://profile.id.com.au/australia/tenure?WebID=250>

¹⁵ Proportions for PARs were within 1% of shown HEA figures.

Of the 62% of households identified as homeowners in the 2011 Sydney census¹⁶ of households across all income levels, 29% owned their houses outright and 33% had a mortgage. Therefore the PSP participants who owned their homes included less people who owned their homes than the average.

Home assessments (HEAs) were completed at a rate of around 6-10 HEAs per week, per assessor, for the PSP's three Sydney-based assessors. Additional assessments were conducted by an assessor in the Hunter/Newcastle region, where there were difficulties with booking reliability.

The face-to-face energy assessment was vital to the success of the program. It was the main education point. There was very positive feedback regarding the energy assessments. This is known because during the PAR conversation and 3-month follow-up phone call we asked what participants thought about the energy assessment, and many commented upon the valuable lessons they learnt during the assessment.

Retrofits

During the home assessment (across 990 households), At-Assessment Retrofits were delivered to 987 participating households, which consisted of energy efficiency equipment, as follows (Table 31):

TABLE 31: AT ASSESSMENT RETROFITS - INSTALLATIONS

AARs (at assessment retrofits)	TOTAL	% of households that received product
Shower Timer [\$2]	911	92.0%
Door Snake [\$3]	916	92.5%
Thermometer [\$3]	943	95.3%
Valvecosy [\$13]	739	74.6%
LED Globe [\$13]	979	98.9%
EcoSwitch [\$13]	874	88.3%
Door Seal (RP17)	622	62.8%
Window and door seal (RP14)	648	65.5%
Tap Aerator	198	20.0%
Lagging (insulation)	647	65.4%
Lagging - how many metres	779.5	
Renshade®	126	12.7%
Renshade® - how many metres (lengthwise)	352.95	

At-assessment retrofits were only distributed to participants where they were deemed relevant for the household by the assessor. Note that the door seal (RP17), window and door seal (RP14) and tap aerators only started being distributed in June 2014 (on the 225th assessment), which explains the lower quantities of these. This is because these items were provided in-kind to us by the NSW Government Office of Environment and Heritage. Due to budget constraints, these items had not been planned for purchase earlier

Following the home assessment 837 participants received at least one type of Post-Assessment Retrofits (PARs) (as shown in Figure 26):

- Energy efficiency equipment up to a total value of \$250 – 56% of households

¹⁶ <http://profile.id.com.au/australia/tenure?WebID=250>

- A rebate for energy efficiency appliances and/or fixtures/services up to a total value of \$250 – 34% of households.
- An In-Home monitor Device (IHD) up to a total value of \$250 – 13% of households.

A small number of the 837 households (5%) received more than one type of retrofit – these are counted twice in the above percentages. The full breakdown of combinations is shown in Table 32.

FIGURE 26: BREAKDOWN OF RETROFITS DELIVERED

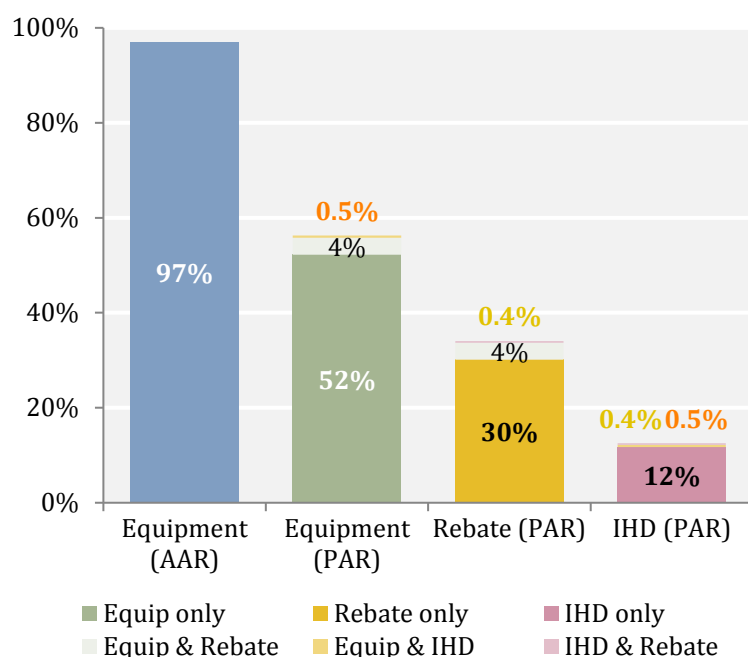


TABLE 32: RETROFIT COMBINATIONS

	Equip	Rebate	IHD
At Assessment Retrofit (AAR)			
Equip only	99.7%		
Post Assessment Retrofit (PAR)			
Equip only	53%		
Rebate only		30%	
IHD only			12%
Equip & Rebate	4%		
Equip & IHD	0.5%		0.5%
IHD & Rebate		0.4%	
	57%	34%	12%

66 households completed the project without having a retrofit deployed, due to the following reasons:

- chose not to take up PAR offer (55 households)
- difficulty contacting (12 households)
- refused to sign BDC (9 households).

Rebates

Throughout the entire implementation phase of the PSP, a total of 541 participants were initially offered a \$250 rebate option as part of their PAR. Of these, 286 participants, or 52% of those originally offered the rebate, ended up taking up a rebate as their PAR option.

This rebate option was based on the recommendation of the energy assessor and the agreement of the householder, upon the completion of a home energy assessment. PAR rebate options are presented in Table 10.

The rebates sometimes required participants to spend additional money of their own (which was likely already limited), whereas the equipment did not. This may explain the preference for households to receive equipment rather than a rebate. Limited time, motivation and knowledge of participants to select and purchase equipment may also have contributed to this result.

The PSP captured in Salesforce, in most instances, the approximate magnitude of extra dollars households invested, i.e. above the \$250 rebate provided. For example, a householder who purchased a fridge for \$750 invested \$500 of their own money to be able to implement the PAR.

After the home energy assessment, PSP staff would then discuss the rebate option over the phone with the participant, and upon agreement, send a PAR letter outlining the details of the particular rebate offer chosen, with guidelines for purchase and installation. It was then up to the participant to purchase their PAR item(s).

Gillian T. from Figtree thought that the rebate process to claim for her LED light upgrades was seamless. She felt that the payback period was excellent, and the LEDs are more energy efficient than halogens. Gillian has learnt from the PSP that LEDs are a good investment for the long run despite the initial high investment, as they would cost less to run than her old halogens.

The breakdown of the rebate offer uptake is as follows:

Completed rebate	286
Products (rebate cancelled)	176
Chose not to take up PAR	52
Difficulty contacting	17
Paid electrician, not rebate*	2
Paid vendor, not rebate**	1
Refused to sign BDC	7

* 'Paid electrician, not rebate' means that the participant was provided an electrician rebate at the very beginning and was told to find his or her own electrician to install the IHD. Unfortunately, this never materialised, and the PSP had to source an electrician for the participant instead. The rebate was eventually cancelled, and the PSP paid the electrician directly. ** 'Paid vendor, not rebate': Similar to the above scenario, the participant was initially given a PAR rebate. However, the PSP ended up paying the supplier for the product, instead of the usual reimbursement process. This was likely due to participant being confused with the PAR rebate instructions.

Upon analysing the 286 participants who did go forward with the rebate as their PAR option, it was discovered that many of them were willing to spend above the \$250 rebate that the PSP provided.

A total of 176 participants ended up receiving an energy efficient product(s) instead of making use of the offered \$250 rebate. Some of the common reasons for going with the alternative product instead of the rebate seemed to include that householders did not have the time to research and purchase the product and / or had insufficient savings (e.g. to purchase a new fridge with limited lead time).

Due to the high level of tailoring the PAR rebates to suit the varying needs of households, it was a time-intensive logistical process for PSP staff to manage.

Some participants were not interested in receiving PARs, or PSP staff had difficulties contacting them, despite repeated attempts.

After decisions made to increase the rate of BDCs returned in 2014, participants who were unwilling to sign the Billing Data Consent Form were excluded from the rebate offer.

In-Home Displays

The low take-up rate of IHDs should not necessarily be seen as a reflection on the use of IHDs generally. IHDs, as identified in the ISF Background Research Report, are a tried and tested strategy for enabling behaviour change. IHDs were identified by the PSP as one of many PAR approaches to trial.

The Pilot prioritised installation of IHDs. 20 Pilot participants received an IHD but did not receive any other PAR type. Feedback on the IHD process was very positive, and participants enjoyed the experience of having more understanding and control over their energy usage. However, the design of full roll-out of the program did not prioritise IHDs over other PAR options. IHDs were only one option in a suite of options that were discussed between assessor and householder. The concept was to tailor the approach, to maximise the \$250 budget to produce the best outcome (most benefit) for the householder.

Overall, IHDs installation for participants during the main implementation of the PSP were less successful than the Pilot. Several participants reported issues with installation and also had some difficulty in using the IHD. It can be assumed that the purpose of the IHD was well communicated to participants at the point of assessment since energy assessors had excellent knowledge of how and when the IHD should be recommended to participants. In spite of this, participants in the full program were, in general, less satisfied with the IHD than Pilot participants. Program staff have reflected upon possible reasons for the differences in levels of participant engagement with the IHD between Pilot and full program roll-out. There are a range of factors that could have influenced the level of success for IHD installation for Pilot versus the full program:

- A different contractor was used to install the IHDs for the Pilot versus the full program. While the contractor used for the Pilot was excellent and highly professional, upon careful evaluation of the Pilot, they were considered too expensive, limited in their geographic reach and inability to install en masse. Therefore, a qualified electrician was employed and trained in the IHD installation in their stead. Unfortunately, in spite of best intentions, the contractor selected for the full program demonstrated an inability to follow instructions from PSP staff, and this created some issues along the way.
- Pilot participants may have been more motivated or inclined to understand and use the IHD by virtue of their participation in the 'pilot', than the average participant involved in the full program.
- Participants in the Pilot were only offered one PAR option – the IHD. For the full program, a few different options were discussed with the participant to maximise value for participant. This may have had an adverse effect with regards to diluting the 'IHD message'.
- Further, the energy assessor employed for the Pilot was very enthusiastic and passionate about the virtues of the IHD and sold the IHD as a great solution for householders. Assessors' messaging around the IHD for the full implementation was not as fervent in its delivery.
- Installation delays of as much as 4-8 weeks between energy assessment and PAR phone call may have contributed to misunderstandings about IHD purpose, benefits, installation process and usage instructions. Despite PSP staff communicating the IHD process over the phone (and then via written instructions upon delivery of the IHD), the time lag between assessment, phone call and eventual installation may have been a factor behind the relative confusion and misunderstanding around the IHD that participants for the full program versus the Pilot.

Assessment appointments and cancellations

A key to understanding the implementation of home energy assessments is the effort that was required to secure and complete the appointments, in this case the number of home energy assessment appointments that had to be rescheduled due to cancellations.

At the beginning of the project, records on number of cancellations were not kept due to project system limitations, however anecdotal evidence suggested the rates of cancellation were increasing and needed to be addressed more formally.

In May 2014, the PSP home assessors, UV and NCC came together to discuss measures to be taken to minimise cancellations. Specific measures were put in place by UV to reduce the cancellation rate, including:

- Introduction (from Round 2a, August 2014) of the 'Trifecta call': booking the assessment during the recruitment call for the assessment to occur within 2 weeks
- confirmation calls by assessors prior to the appointment
- booking assessments with at least 48 hours' notice for assessor.

At the same time, Salesforce was implemented, which allowed for cleaner access to information and communications between the call centre making the appointments and assessors. It also enabled the recording of cancelled appointments.

Table 33 shows the cancellations for each round, beginning with Round 2a¹⁷. As expected the effort to secure assessments resulted in decreased cancellations as time went on, reflecting the improvement of process. The substantial drop from Round 2a to Round 2b is likely a reflection of all Round 2b assessments being booked as part of the ‘Trifecta’ call described above.

TABLE 33: HOME ENERGY ASSESSMENT APPOINTMENT CANCELLATIONS

	Appointments scheduled	Cancellations	Assessments completed	Effort to secure assessment
Round 2a ¹⁸	393	98	295	1.33
Round 2b	293	46	247	1.19
Round 3	361	41	320	1.13

Cancellations took a bite out of the budget, if cancellations occurred at the last minute, as assessors generally needed to be paid for a minimum of 6 home assessments per week and if assessments were unable to be booked to ensure this at late notice, payment was required to be made to compensate..

This was exacerbated by extremely high cancellation rates in the Hunter Region, at times almost 50%.

A range of efforts were made between the Hunter assessor and the PSP team both at NCC and UV such as revising scripts, and fine tuning procedures for assessors and the OCC which specifically covered details such as extending confirmation phone bookings to within 48-72 hours in advance.

As the Hunter assessor was also managing their own separate environmental business, the PSP home assessments were only part of his workload each week, meaning he had less availability due to needing to attend to such other work as part of their business operations. The Hunter assessor booked their assessments for the majority of their involvement in attempt to overcome this, however it resulted in a much lower rate of bookings than required and long wait times for potential participants.

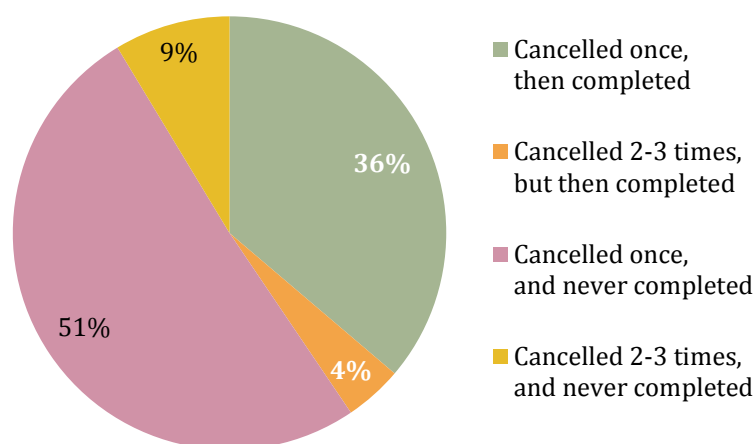
Despite our best efforts, by September 2014 it had become untenable for the Hunter assessor to continue. An agreement was reached that the Hunter assessor would complete some of the remaining home assessments closest to Newcastle. We then organised another one of our assessors to travel up from Sydney to complete the remaining home assessments in the greater Hunter and Central Coast regions. These home assessments had to be done but they were more expensive as we paid the assessors travel (in the form of an increased service fee of \$225-\$250, instead of \$200/home assessment) and accommodation expenses (to a maximum of \$160/night), whenever necessary. When required, the assessor would spend 2-3 consecutive days up in the Hunter region and Central Coast to get all the assessments done in a block.

Of those who cancelled, 13% cancelled two to three times. In total, 40% went on to successfully complete an assessment (36% after only cancelling once, but 4% after cancelling two to three times) (Figure 27). Interestingly further analysis of the data found that those participants who cancelled two to three times, had almost the same eventual completion rate as those who only cancelled once (39% vs 41%), indicating that it is worth persevering. Recruits were informed that they would not be able to rebook if they cancelled their second booking, only in special circumstances was this extended to a third booking.

¹⁷ The large majority of assessments for Round 1 were scheduled and completed prior to the implementation of Salesforce and the beginning of capturing data on cancellations.

¹⁸ Salesforce was implemented during the middle of the assessment period for Round 2a, which means that some cancellations may have occurred that were not recorded, so this data may understate the effort required for Round 2a.

FIGURE 27: CANCELLATIONS LEADING TO SUCCESSFUL ASSESSMENTS



3. Solar hot water systems negotiated and installed

The PSP set a target to install 100 solar hot water systems in low income households: 50 for participants who owned their homes (by offering a free solar hot water system) and 50 for participants that rented (by offering a discounted solar hot water system to landlords under a cost-sharing arrangement with tenants).

The PSP had a funding pool of \$250,000 available for the installation of 50 fully-funded SHWSs for home owners.

No funding was allocated to the installation of SHWSs for tenants and landlords. The project aimed to fund the cost of a solar hot water system by offering a significant discount and sharing the remaining cost between the participant's landlord and the tenant under a cost-sharing or 'split-incentive' arrangement.

A total of 148 participants were approached regarding a solar hot water system, 85 of whom owned their own home, while 63 rented.

Overall, in collaboration with Solahart, a total of 79 fully funded solar hot water systems were installed for home owners, which far exceeded the target of 50 households. However, despite the best efforts of program staff, the split incentive (cost-sharing) arrangement program target was not met, and no systems were installed.

Rental households

For the renter households, the PSP faced complications. A number of stages had to be successfully navigated in order to successfully install a solar hot water system in rental properties:

1. the tenant had to agree to their landlord/real estate agent being contacted and provide contact details to NCC
2. the landlord/real estate agent had to agree to participate in the program
3. a Solahart site inspection had to deem the house suitable for solar hot water
4. the landlord had to agree to a cost-sharing arrangement (or pay outright)

Table 34 shows the outcome for each renter household by stage.

TABLE 34: STATUS OF SOLAR HOT WATER SYSTEMS IN RENTER HOUSEHOLDS

	Sub Total exited	Cumulative exited
Stage 1: 63 renter households contacted		
2 participants deemed not eligible (homeowners)	2	2
8 participants unable to be contacted, following 10 attempts each	8	10
31 participants declined to be part of project 13 due to circumstance (9 were soon moving home, 3 had or were about to get new hot water systems, 1 had gas) 11 thought the landlord would not be interested 3 did not want to disturb the landlord or real estate agent 2 believed the project too hard or were too busy 2 gave no reason	31	41
Stage 2: 22 real estate agents / landlords were contacted		
4 real estate agents were unable to be contacted	4	45
1 real estate agent declined to participate	1	46
13 landlord declined to participate	13	59
Stage 3: 4 properties were assessed for suitability*		
2 properties were deemed unsuitable	2	61
Stage 4: 2 landlords discussed cost-sharing arrangements		
2 landlords declined the cost-sharing arrangements	2	63
Stage 5: 0 solar hot water systems installed in rentals		

*Using Salesforce data obtained during Home Assessment

41 (65%) of rental households exited the initiative due to the circumstances of, or decision by the participant. A further 20 (32%) rental households exited the initiative due to decisions by the real estate agent or landlord. The remainder (3%) were assessed as being unsuitable properties. This resulted in no hot water systems being installed in renter households.

This demonstrates the significant efforts by NCC and UV to engage tenants and landlords, without success.

As discussed later in this report, Renters face substantive structural barriers which prevent them from engaging in and benefiting from the energy efficiency gains being made by home owners. Many participants raised previous experiences with their landlords not engaging in general repairs and fear of changes to their rental arrangements if they engaged their landlords about the split incentive program.

Karen said “I’m not going to even ask the landlord. They don’t want to spend a cent on the place,” and Aprial said “I’ve lived here for 10 years and can’t even get general repairs done,”

Other participants did talk to their landlords or real estate agents about the program, without much success. Suresh said “We sent the letter of offer to the Real Estate Agent. The agent said the landlord rejected it but they didn’t give a reason,” and Jarrod said “I have a good relationship with my landlord and talked to him about it. He didn’t want to spend the money,”

To reflect this change to the evaluation, the number of rental properties *engaged*, rather than having solar hot water systems *installed*, was an additional target evaluated. The target, introduced via a Deed of Variation executed on 4 June 2014 with the Department, was: “50 landlords and their tenants engaged to develop up to 50 cost sharing arrangements for installation of solar hot water systems”. In total, as illustrated in Table 34, 63 renters were contacted and as a result 22 landlords (and/or their real estate

agent) were then contacted, demonstrating that the target of '50 landlords and their tenants engaged' was partially achieved.

Owner Households

In contrast, for owner households, the situation was more straightforward.

The PSP had a funding pool of \$250,000 available for the installation of 50 fully-funded SHWSs for home owners. Due to system cost reductions and a changing STC (Small-scale Technology Certificate) price along with Solahart in-kind discounts, 85 households were offered a fully funded solar hot water system.

5 households (including 1 where the Strata did not approve) were deemed not suitable for solar hot water during a site inspection, 2 declined and the remaining 79 (including 1 Pilot) had a fully funded solar hot water system installed at their home (Table 35).

TABLE 35: STATUS OF SOLAR HOT WATER SYSTEMS IN OWNER HOUSEHOLDS

	Offered	Declined	Not suitable	Target	Installed
Owners	86	2	5	50	79

Case Study – Strata Barrier for Homeowner

Due to time constraints on the SHWS HO project, Kirsty was unable to receive a fully funded system because her strata was unable to approve her installation in time. Her strata informed her that there were plumbing works that needs completion on her apartment building before they can look at her SHWS installation. This is an example of barriers homeowners who live in apartment dwellings face when it comes to installing SHWS for their apartment.

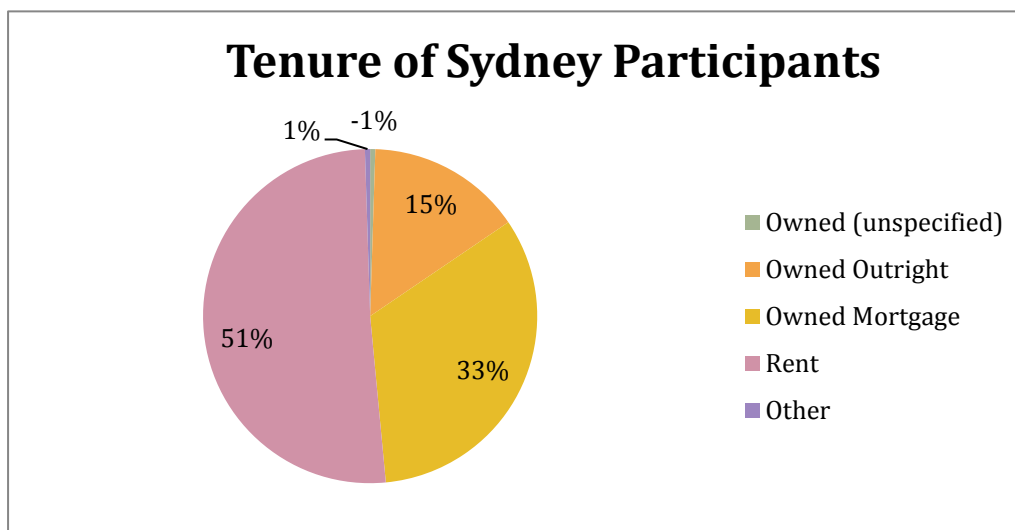
Impact on Tenants

The PSP was successful in recruiting renter households to the program with 47% of participants identifying as renting.

The 2011 Sydney census¹⁹ of households across all income levels showed 29% owned their houses outright, 33% had a mortgage, 30% were renting with the remainder other or not stated. Figure 28 shows that the low-income households in the Sydney region of the PSP showed a drastically different breakdown by tenure type with 15% owning their houses outright, 33% owning through a mortgage and 51% renting showing a substantially lower rate of outright ownership and higher tenancy rates in this demographic.

FIGURE 28: BREAKDOWN OF SYDNEY PSP HOUSEHOLDS RECEIVING HOME ENERGY ASSESSMENTS BY TENURE

¹⁹ <http://profile.id.com.au/australia/tenure?WebID=250>



Assessors experience with Tenants

Part way through the program we suspected that renters were not gaining the same benefit as owners. In August 2014 meeting was held with NCC, UV, the assessor's and the Tenants Union NSW to see how we could adapt the program to better meet the needs of renters. Additionally a meeting was held post assessments, July 2015 with the assessor's to reflect on their experience in the program, which reinforced the experience discussed at the 2014 meeting.

At the August meeting the assessor's were able to give real insight into what they were seeing inside people's homes. They reported seeing a broad divide between households in terms of comfort and energy efficiency. The key points raised by assessors were:

- The most vulnerable renters are already very energy conscious and frugal and there was not much we could offer them.
- The main problems in tenants homes are things they generally cannot change
- Tenants are living in older draughty housing stock, with no insulation, poor passive heating/cooling, and thus poor comfort levels and/or higher energy costs
- Tenants use energy mainly on electric (or gas) cooking and old inefficient electric storage hot water systems
- Retrofit restrictions on tenants meant we were unable to tailor our assistance as well as we would have liked
- Failure of our Solar Hot Water System split-incentive with Landlords / Real Estate Agents
- Tenants apprehensive about seeking improvements
- Real Estate Agents disinterested
- Landlords disengaged about property
- Tenants' rights not being adhered to by Landlord
- Tenants not aware of their tenancy rights
- Tenants avoid raising issues because they are cautious about termination of their tenancy or incurring a rent increases
- Insecure tenancies and fear of Lease being ended / moving home
- Expensive and competitive rental housing market in NSW

PSP assessor: Two serious issues exist in the apartments commonly built in the 1960's & 1970's, and research indicates there is little financial incentive to replace or upgrade these apartments, which generate high rental return for landlords with low capital gain. The first, is social equity – apartments have inefficient cooking, heating and continuous (expensive) hot water systems. This equates to considerably higher basic services costs. The second is health risks during heat waves – west facing, upper storey apartments without air conditioning or insulation present potentially lethal risks to the very young or elderly. Heat stress is Australia's number one natural killer, accounting for more deaths than floods, cyclones and storms combined.

Within the scope of the program there were relatively modest adaptations which could be made. The adaptations included testing/costing additional retrofit items suggested by the assessor's, offering participants referral to tenant's advocacy services and having tenants' rights facts sheets to hand. Largely the barriers to improving energy efficiency for renter participants were structural.

As noted above, the PSP did not record or have the ability to fully analyse the difference in experience between tenants and home-owners. Due to the amount of time assessors spent with participants, in their home, during the home assessment, and the ongoing communications through the participant journey, assessors and project staff have been able to gain an understanding of the difficulties faced, and some potential solutions, which is reflected on later in the 'Discussion and recommendations' section.

Analysis by ISF into the experience of tenants vs homeowners has shown that the program was able to see impacts across the renter/owner divide in terms of understanding, education and feelings of control.

The literacy of participants in ability to understand electricity bills and awareness of how household electricity use compares to others increased substantially and appears to have increased a similar rate between renters and owners.

Additionally the analysis of the sense of control before and after participation, revealed slightly different patterns for control over use and control over bills. However, as above with literacy, the change as a result of the program shows the program was successful increasing the sense of control of both owners and renters, though seeing a slightly more modest impact on renters.

Measuring Tenant Specific issues

In the program design, sufficient detail and questions to analyse the experience and barriers of renters was not properly planned for and therefore not adequately measured.

The main measure was where participants were asked in the PIPS and POPS whether they were prevented from reducing their electricity use by a lack of control.

Only a small proportion initially answered yes to this question (8%), despite 34% of participants disagreeing that they felt in control of their electricity use. This seems an unexpectedly low number, and it is hypothesised that this disparity of results from participants not understanding this question sufficiently.

No renter households chose this option in their pre-intervention survey. Given the barrier that renting creates for control over electricity use particularly with regards to upgrading equipment, this appears to confirm the hypothesis. Therefore the improvement of 4% does not adequately measure the improvement in this area.

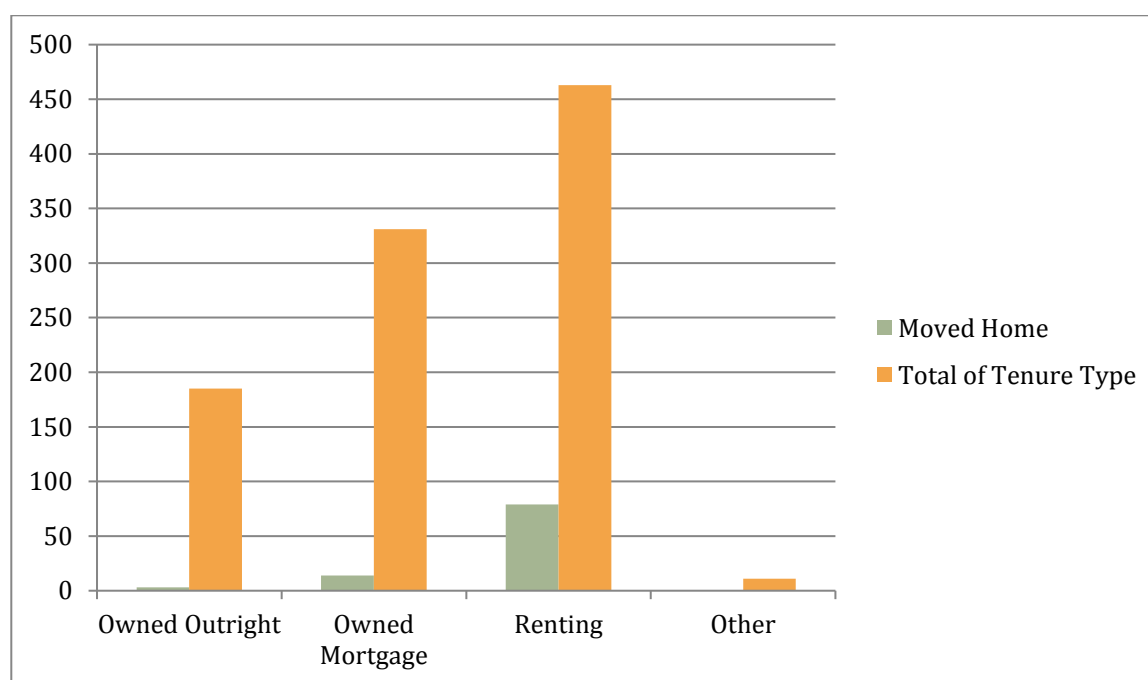
Unfortunately as a result of this, the program was unable to provide or analyse information about the participants feeling of a lack of control over their homes. However, as seen below, conversations with participants has identified that this is a substantive barrier to energy efficiency and security of tenancy.

The program recorded participants who moved home throughout the program, resulting in 10% of participants reporting moving home within the 12 month participant journey. A breakdown of this (Figure 29) shows that a large group of tenants moved home in comparison to those who owned their home.

17% of the total renter participants reporting moving home within their 12 month participant journey, in comparison to 2% of those who own their homes outright, and 4% of those who mortgage their homes. This is likely to have an impact on a renters capacity to reduce their energy use and build up resources to upgrade to more energy efficient appliances.

It is also expected that some of those participants who withdrew from the program due to inability to contact may have moved home as well.

FIGURE 29: PARTICIPANTS WHO MOVED HOME VS TOTAL PARTICIPANTS OF THAT TENURE TYPE



Structural barriers to quality of renter experience:

Tax Incentives

There is very little to persuade landlords to improve the energy efficiency of their property. Australian Tax Law does not allow landlords to claim a tax deduction or depreciation for energy efficiency upgrades, installation of solar hot water or embedded generation on their rental properties. These upgrades, considered capital improvements, are added to the property cost base for calculation of capital gains when the property is sold.

In contrast, spending on maintenance, including 'like for like' replacement of inefficient equipment, is tax deductible²⁰. This means there was little incentive for landlords to upgrade a hot water system to a solar

²⁰ ACOSS, *Energy Efficiency and People on Low Incomes*, 2013

hot water system, as this was not considered 'like for like', but rather it was better for them to replace it with an electric or gas system. Most Australian landlords are small scale investors seeking annual tax offsets and are not incentivised by a tax deduction which will only be realised at the point of sale, if at all²¹.

This tax incentive barrier was evident in the failure of the PSP to install any of the split incentive Solar Hot Water Systems. Some comments from PSP participants around approaching the landlord for Solar Hot Water include:

- *"I'm not going to even ask the landlord. They don't want to spend a cent on the place,"* Home Care worker
- *"I've lived here for 10 years and can't even get general repairs done,"* School Cleaner
- *"We sent the letter of offer to the Real Estate Agent. The agent said the landlord rejected it but they didn't give a reason,"* School Cleaner
- *"I have a good relationship with my landlord and talked to him about it. He didn't want to spend the money,"* Security Guard

Lack of regulation and disclosure on quality and energy efficiency of rental properties

A further disincentive for landlords to improve the energy efficiency of their property is lack of regulation, or, a requirement to disclose the energy efficiency of the properties they are leasing.

PSP participants expressed concern about a lack of information to make informed choices about properties:

- *"I think it's unfair that landlords get all the information about us, but we get no information about them or the property. That would help you make a decision about where will be a good place to live. We get nothing to go on,"* Cleaner
- *"You're not getting very good quality for the price, and you can't really tell what the place will be like to live in until you're living in it,"* Home Care worker

Insecurity of tenancy

Insecurity of tenure was another key barrier for renters to experience equal benefit from the program. During recruitment a number of renter households declined to participate because they did not believe they would be in the property long enough to benefit or that participation in the program could compromise the security of their tenure. These households are largely unrepresented in the data but are an important group to recognise. We would recommend future programs give early consideration on how to capture quantitative information on declines of this type.

Whilst we do not have accurate record of declines based on tenure type, data from the PSP does show that renter participants experienced dramatically higher incidence of moving house during the life of the program compared to owners (Reference to data result above). Of the 434 renter households involved in the program 79, or 18.2%, report moving house. In contrast only 17 of the 576, or 2.3%, of owner occupiers report moving.

Another indicator of comparative benefit from the program is the take up rate of the Post Assessment Retrofit (PAR) offers. Although there is a modest difference in the decline rates of owners, 6.8%, compared to renters at 9.4%, the basis for decline indicates renters were more likely to decline the PAR because they did not think they would benefit from them;

- *"I didn't think it was worth taking the curtains, they'd only end up benefitting the landlord,"* Casino worker

²¹ Ibid

²¹

On some occasions renters who took up the PAR were prohibited from using them;

- *"I got some Rensshade for my windows, but Strata made me take it off"* School cleaner

Lack of regulated maintenance planning for rental properties:

Many PSP renter participants reported an ad hoc approach to the maintenance and repair of their property. The existing regulation says that the landlord is required to provide and maintain the property in a reasonable state of repair and that the tenant is to notify the landlord as soon as practicable after becoming aware of any damage. In practice the effect of this provision is that landlords sometimes fail to make themselves aware of a property's repairs and maintenance needs, preferring instead to rely on notifications from the tenant. This can mean repairs are not acted on until they become chronic or acute;

- *"There was something wrong with my hot water system. I kept telling the real estate, but they wouldn't listen to me. I don't speak English well, and, after a month of them not doing anything, I asked my daughter to tell them. When the plumber came out they found a problem in the wall. My electricity bill for 36 days was \$1,920.00. I couldn't afford that. I asked the real estate to recognise it was not my fault, but they said I hadn't notified them of the problem when I had! It was very bad, and I had to move out of this place because of it. It took a long time to sort it out the electricity bill,"* School Cleaner
- *"I reported a leaking shower and toilet and, in spite of frequent reminders, had to wait months for the repairs. My water bill went from \$120 to \$300 per quarter. When it was eventually repaired the bill returned to \$120-\$140 so I know it was the leaks that caused the increase"* Cleaner

To counter this, consideration should be given to requiring landlords to commission a regular maintenance report outlining the condition of the property, including any ongoing or potential maintenance needs and how they may be addressed, at least once every five years. While the report itself would not impose any new repairs and maintenance obligations on the landlord, it would bring the condition of their property into focus and allow for them to make a comprehensive plan for the ongoing repair and maintenance needs of their property. Governments should also develop mechanisms to require landlords to uphold their legal requirement to provide and maintain the property in a reasonable state of repair.

Lessons Learned

The PSP is encouraged by the amount of renter households who took part in the program but recognises that the participation rates and data collected do not represent the full picture. The PSP acknowledges a substantial group of renter households who declined to participate in the program at all and would recommend future programs give early consideration on how to collect this data so those households are represented.

Consideration should also be given to the value of including owner and renter households in the same EE program. Although the PSP went to great effort to maximise the quality of experience for tenants there is an inherent power difference between the two groups. A program exclusive to renters, albeit a greater challenge, would ensure the focus, design and innovation of the program rested solely on the experience of renters.

All efforts in improving EE in low income renter households should acknowledge the structural barriers in place and the subsequent limits on low income individuals to counter them. There is considerable opportunity to improve the energy efficiency, quality and stability of private rental property in NSW.

Additionally the PSP has learned that programs like this need to *better plan to analyse tenants experience throughout the program*. Our Project plan did not properly allow for analysis of tenants experience in a

comprehensive research mechanism, rather the findings of the report are based on reports from assessors and conversations with tenants in the program. Programs working with tenants must work to ensure any retrofitting items or engagement does not challenge the security of their tenancy or put tenants in positions which may make them feel as such.

BUDGET

Administration

NCC, as the Lead Partner, was in charge of the overall PSP budget.

As set out in the PSP Consortium Agreement, Consortium members needed to reach certain milestones in order to receive payments for their work. They reported to the NCC by providing milestone reports, setting out their expenditure to date (both in-kind and actual expenditure), and a report on their work progress. All the deliverables and dates of these reports were set out in the Consortium Agreement.

Internally, NCC kept an up-to-date budget of income and expenditure. Any expenditure was kept in an internal procurement document. On a monthly basis, NCC's accountant provided an internal 'dump' report, which set out all the income and expenditure that had occurred during that month. This was checked off against invoices that we have received and our internal procurement document. This allowed NCC to pick up any errors or omissions, and keep track against our budget.

All procurement activities and expenditure was overseen by the Program Director and/or CEO. When a team member needed to pay an invoice, for example, an internal form was completed (via Xero software) which required two people's signatures – the Program Director/CEO, and the person raising the invoice. This form was then sent to our accountant for payment processing.

When making procurement decisions, such as with the significant purchase of retrofit items, processes and considerations included:

- risk management – warranties on products were sought wherever possible
- value for money. For example, whenever we need to purchase retrofits, we would gain at least 3 quotes from different suppliers
- discounts that may be available to non-profit
- partnerships and further discounts where possible
- opportunities to streamline procurement process e.g. through automated ordering systems.

Any internal budget changes were made by NCC's Program Director, and approved by the CEO. If budget changes affected other Consortium partners, or they wished to make a change, an approved written variation to the Consortium Agreement was required. More significant budget changes required approval by the Department. Any variations to expenditure items throughout the course of the project were highlighted to the Department in Milestone Reports, which all included an updated budget.

Initial vs Final Budget

At the time of writing, we have submitted our budget to the Departments' extranet, showing income and expenditure for the PSP to end of January 2016. The implementation of the project has been achieved in full, on time, and within budget, as indicated by the successful delivery of all 9 Milestones thus far, and the subsequent release of Departmental payments.

Budget variations

At various times throughout the PSP, budget adjustments of various scales were required mainly due to:

- line items that were not scoped in the original budget
- spending less than what we predicted for particular line items
- spending more than we forecast for particular line items

Initial budget

Following the formalisation of the Funding Agreement, the initial budget was submitted to the Department with the PSP Project Plan on 21 June, 2013.

Based on the original budget, the following summarises the key changes that were made over the course of the project:

- Database - no budget was originally allocated to a participant database. A database was an essential component in implementing the project in an efficient and effective manner, and allowed integration and communication across and between NCC and UV, as well as assessors.
- Energy Assessment tool - no budget was originally allocated to a tool for assessors to collect data in the field. This was clearly essential.
- Website - the target audience for the PSP were unlikely to access the internet and/or a specific PSP website. Thus, a significant portion of the original budget for 'communications' was fortunately able to be reallocated to other line items, namely the two items mentioned above.
- Travel – it was originally scoped that a PSP staff member would attend a large number of assessments, alongside energy assessors. This was deemed unnecessary other than some initial induction and training periods for each assessor.
- Outbound Call Centre (OCC) - extra staff hours were required for managing bookings and cancellations, as well as implementation of both pre- and post-intervention phone surveys. United Voice made two changes to its budget for the project. Firstly, in October 2014, funding was moved from the Printing and Postage allocation to provide additional budget for the OCC, in line with the project work schedule and reduced need for printed materials. Secondly, in September 2015, the budget was tightened up for the last 6 months of the project, and some funding was sourced from 'Incentives' to allow 2 dedicated experienced Power Savers Phone Organisers to work Part-time to complete the participant contacts and POPS.

Other more minor adjustments were necessary throughout the course of the project and were negotiated in monthly consortium meetings, or as required.

For example, translation and interpreter costs were greater than UV expected but were covered by less than expected costs in other budget line items. The project used TIS for on-site interpretations. Originally this was a free service, however TIS policy changed mid-project which restricted this free service to business hours. Due to the nature of our participants' availability and the desire to make the program accessible for participants from NESB/CALD backgrounds, the PSP team decided this was a necessary cost. The project was still able to access a substantive amount of free on-site interpretations which meant that the overall cost was relatively low, while being of great benefit.

With the accessing of billing data, no payment was made to Endeavour and Ausgrid, but this funding helped to cover extra time ISF needed to spend on legalities and negotiations with these companies, along with additional data evaluation tasks.

Final budget

A better indication of the final budget will not be known until approximately June 30, 2016. NCC has been requested to provide a 'Final Financial Report' for the final Milestone (M11 on April 1, 2016), but this will not be possible as we will only have budget figures to end of February 2016.

Additionally, there will be further expenses beyond April, such as for requested attendance at the LIEEP Forum in May 2016, as well as PSP staff and core administrative costs. Such costs can be forward forecast but will only be approximates.

NCC has also requested an extension for the submission of the final PSP Audit, which cannot occur until beyond the end of the 2016 financial year, as per the PSP Audits submitted for each of the past two financial years.

In-kind

The LIEEP funding agreement required grant funding to be complemented with in-kind time by consortium members, therefore in-kind staff time was forward planned from the initial stages. At the time of writing, in-kind contributions were substantial, as outlined in the PSP's Milestone 10 submission.

NCC

At various times in the PSP, volunteers lent assistance with various aspects of the project, particularly in regards to administrative tasks and coordination of PAR deployment. Additionally, NCC's CEO and Communications Officer provided considerable in-kind assistance on a weekly basis.

NCC was also able to gain in-kind contributions via the free and discounted retrofit items mentioned below, along with not-for-profit discounts, most notably in the essential purchase of Salesforce for data management (CRM).

United Voice

In-kind staff time was originally planned for the PSP to assist the work of the Power Savers staff member. This included hours for casual staff to be recruited by UV. The in-kind contributions over the period of the program came in substantially over budget.

In practice, the majority of the in-kind contributions occurred with organisational staff engaging to supervise and assist the 1 FTE project staff to undertake required tasks. This indicates that the number of paid staff recruited was not sufficient, and that more paid staff would be required to complete a program such as this in the future.

Institute for Sustainable Futures

In-kind staff time was provided by ISF for participation in consortium meetings, assisting NCC with data manipulation to meet the CSIRO schema requirements, and as needed meetings to discuss and clarify evaluation requirements. The number of meetings exceeded the in-kind time planned by ISF for the PSP.

The time allocated for the implementation and evaluation of the PSP was underestimated by ISF and ISF staff turnover contributed to a portion of the additional time spent by ISF.

NCC under-estimated the level of contributions that were required of a LIEEP 'research partner'. The level of contributions requested by the Department also grew throughout the project.

ISF had a budget for the delivery of the initial tasks outlined in the DIS-approved Consortium agreement. Due to this, NCC and UV had to take on some tasks that it was not prepared for, not experienced in, and inadequately resourced to carry out efficiently, particularly in relation to data management and manipulation.

Solahart

In-kind staff time was provided by Solahart for participation in consortium meetings, coordinating installations of the 79 solar hot water systems with NCC and various Solahart dealerships, and completing associated paperwork such as the reporting evidence required by the Department for Milestones.

Solahart also provided a substantial in-kind contribution in the form of SHWS discounts.

Cost-efficiencies

The PSP was able to achieve cost-efficiencies across a few areas of note.

Free retrofit items

NCC approached the NSW government Office of Environment and Heritage (OEH) who were conducting a large scale residential energy efficiency project (Home Power Savers) that was coming to a close. We were able to negotiate the supply of the following AAR items free of charge:

- 100 x 'Jackson Powerboards'
- 1,000 x thermometers
- 500 x shower timers
- 500 x tap aerators
- 500 x door snakes
- 600 x door seals (Raven - RP17)
- 600 x window and door seals (Raven - RP14)
- 100 x showerheads, 9L/min, fixed and hose types

Ausgrid were also able to supply the PSP free of charge with 500 shower timers and 500 door snakes.

Both OEH and Ausgrid provided a representative on our PSP Advisory Committee which no doubt assisted with negotiating the supply of these items for free.

Discounts from suppliers

The PSP team purchased and paid for other AAR items, which included:

- *Ecoswitch*
- LED globes
- *ValveCosy*
- Lagging (insulation) for hot water pipes
- *Renshade*

However, in all cases, NCC was able to negotiate a small percentage discount with the suppliers. Further discounts might have been available if we could have had more certainty as to the total number of items required to be ordered, i.e. just providing every household with a standard AAR kit. A certain amount of risk management needed to be applied to prevent over-ordering, as the PSP retrofits (AARs and PARs) for each household were only known at and after the assessment. In addition, NCC had limited storage capacity.

Options for PAR products and rebates evolved over time and were procured carefully by NCC in partnership with a few program providers who offered tailored customer service and some discounts, including:

- Appliances Online – priority customer, fixed prices (heaters; fans);
- Bunnings – PowerPass 5% discount (9-watt LEDs);
- Electrician – only \$55 per IHD install
- Eco-Switch – 30% discount;
- Ezy-as LED – 20% discount, priority customer (LED and downlights);
- Lighting Matters – 20% discount, priority customer (LED and downlights);
- Green Eco Store – professional relationship developed (PAR 30 lights);
- Wren Industries – professional relationship developed (Renshade)

COST EFFECTIVENESS AND COST BENEFITS

This section of the Final Report details the cost analysis conducted by NCC, based on findings from ISF's Data Evaluation Report. NCC would like to acknowledge support provided by the Department and fellow LIEEP Grant Recipient 'Get Bill Smart' Program in guiding this analysis.

In this analysis, NCC has explored the costs of various components of the PSP, relative to actual financial, consumption and other positive outcomes generated by the PSP.

All Grant Recipients were required under LIEEP to "test and demonstrate, where possible, the cost-effectiveness and cost-benefit of their trials both as a whole, and with individual trial components".

LIEEP program objectives relevant to this analysis include:

"Assist low-income households to implement sustainable energy efficiency practices to help manage the impacts of increasing energy prices and improve the health, social welfare and livelihood of low-income households."

"Build capacity of Australia's energy efficiency technology and equipment companies by maximising the opportunities for Australian industries to participate in the projects."

Note that this analysis is only one of many elements that could be considered in the development of future policy and program options for energy efficiency for lower income households across Australia.

Overview of this Chapter

This Chapter describes the method used to identify the various benefits and co-benefits of the PSP.

For the PSP, where accurate data is available, a **quantitative cost analysis** has been undertaken for both cost-effectiveness (consumption savings for the householder, in kWh) and cost-benefit (in financial savings for the householder, in \$).

Where other positive outcomes of benefits and co-benefits of the PSP could not be quantified as a ratio, such as improvement in thermal comfort and improvements in health and wellbeing, NCC has conducted a **qualitative cost analysis** of these benefits.

Quantitative Cost Analysis

Overview

There are two types of quantitative cost analysis that have been possible with the existing dataset, and as requested by the Department. Note that the basic methodology used by NCC for the PSP cost-effectiveness and cost-benefit analyses were developed by the Department (for example, definitions of the analyses and ratios for each), and then adapted to the unique PSP trial.

The different types of quantitative cost analysis include:

1. **Cost-effectiveness analysis** (kWh savings per participant per day, and equivalent CO₂-e emissions avoided per day, relative to cost investment); and
2. **Cost-benefit analysis** (\$ savings per participant relative to cost investment);

Cost-Effectiveness Analysis

According to guidance provided by the Department, “cost-effectiveness analysis relates the costs of a program to its outcome or benefits”. Cost-effectiveness analysis is used where the outcomes or benefits are difficult to value and cannot be expressed in monetary units. Rather, the benefits are expressed in physical units, for example energy consumption expressed in kWh.

Only one quantifiable non-monetary benefit resulting from the trial, for which a dollar value could not be attributed, was identified, being per household savings in energy consumption (\$ per kWh)

Cost-Benefit Analysis

Cost-benefit analysis involves, where possible, translating the benefits and costs of a program, with the aim of informing future program opportunities. 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. Costs are quantified as financial savings (\$) per household, as converted from savings in consumption (kWh) per year

Methodology for calculating Cost-Effectiveness and Cost-Benefit Ratios

The following steps were taken to calculate the ultimate cost-effectiveness and cost-benefit ratios provided in the results section of this analysis:

1. Calculate the costs of the various components of the PSP
2. Identify Treatment Groups for the analysis
3. Calculate costs according to cost levels and for each treatment group
4. Ascertain average savings per household per year (for use in the ratios)
5. Calculate the Cost-Effectiveness and Cost-Benefit Ratios for each Treatment Group

1. Calculate the costs of the various components of the PSP

Costs of various PSP components (e.g. the cost of delivering a home energy assessment project, the cost of delivering a recruitment project) were calculated (Table 37) using the methodology suggested by the Department (Table 36). The various cost levels have been applied in recognition that the PSP was one of several ‘trial’ projects funded by LIEEP. Inherent in its nature as a ‘trial’ project, there were additional and substantive research, development and reporting costs associated with the PSP.

TABLE 36: COST LEVELS OF ANALYSIS AND DESCRIPTION OF HOW LEVELS WILL BE CALCULATED²²

Cost Levels	Description
Level 1 - Direct trial approach	The cost of delivering the trial approach (treatments) only to a participant, such as: • Home energy assessment • Post-assessment retrofits (IHD, rebate or retrofit); and • Solar hot water system (where applicable).

²² Source: LIEEP Final Report Recipient Guidance, December 2015, Department of Industry, Innovation and Science.

Level 2 - Trial Component	<u>Level 1</u> + Recruitment and participant maintenance costs (Data Management, Comms, Champions)
Level 3 – Total Business	<u>Level 1 + Level 2</u> + associated administrative costs (overheads etc.)
Level 4 - Total Trial	<u>Level 1 + Level 2 + Level 3</u> + 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 to meet Funding Agreement requirements).

Calculating cost levels for PSP Components

Table 37 details the estimated cost to deliver various elements ('components') of the PSP. Costs include in-kind contributions. In order to calculate the different cost levels required to produce the cost effectiveness and cost benefit ratios for treatment groups 1 and 2, NCC has estimated costs required to deliver each of the various PSP components. Some of these were related directly to the 'Treatment' (or 'Trial') approach (e.g. delivery of Home Energy Assessments, Retrofit project, Solar Hot Water system project), while others were components related to or essential for the delivery of the Treatment approach (ie Data Management, Recruitment, ongoing retention, champions and teams).

These figures may also be in the interest of future Project Managers interested in implementing similar projects in the Sydney region.

TABLE 37: ESTIMATED COSTINGS OF PSP COMPONENTS

Component Description	Component cost less business costs	Business costs per component	Overall cost of PSP Component
Home energy assessments (990 households)	\$476,558	\$60,918	\$537,476
Retrofits - Products (477 households)	\$232,101	\$34,723	\$266,824
Retrofits - Rebates (284 households)	\$138,924	\$20,712	\$159,636
Retrofits - IHDs (76 households)	\$36,660	\$5,483	\$42,143
Solar Hot Water Systems (79 households)	\$315,320	\$60,918	\$376,238
Data management (990 households)	\$58,130	\$24,141	\$82,271
Recruitment (1500 households)	\$122,500	\$40,612	\$163,112
Ongoing Retention (990 households)	\$179,214	\$60,918	\$240,132
Champs and teams (250 households)	\$40,744	\$10,153	\$50,897
Total Trial Costs (time and resourcing for R&D, Reporting, associated business overheads etc) for 1010 households	\$976,250	\$304,434	\$1,280,684
TOTALS	\$2,576,401	\$623,012	\$3,199,413

Assumptions behind cost calculations:

- All costs are based on the PSP delivery period from 1 May 2013 (Project Start Date) to 31 May 2016 (Projected end date).
- Initial budgeting did not account for the level of detail of reporting required as laid out in these project costings. Therefore, figures provided are largely estimates, based on best available evidence, and are intended as a resource to guide budgeting for future projects.
- Estimated figures are accurate to the best knowledge of PSP staff. This is based on the experience of project staff and averaged across the project.
- Project staff time = \$1,875 per person per week (\$375 per person per day, \$47 per hour, incl on-costs, ex GST). This has been averaged out from Manager level to Project Officer level (1 day = 8hrs) (1.0 FTE = 5days x 8 hours)
- Business administration costs are based on total administration cost of PSP, for the time frame between May 2013 – May 2016. Business Administration Costs = \$15,613 per month or \$781 per day
- Due to reduced sample sizes, different retrofit treatment types could not be compared for the consumption analysis conducted by ISF. Therefore, these are averaged across the Program
- Call Centre costs totalled \$150,000 for recruitment and ongoing retention (PIPs, QR calls, POPs), including call centre staff salary, direct costs (phone calls), excluding business administration costs (e.g. rent, line hire etc). Project loadings for call centre have been estimated as follows:
 - Recruitment – 20% (= \$150,000 x 0.2 = \$30,000)
 - QR1, QR2, QR3 (retention) – 50% (\$75,000)
 - PIPs, POPs (evaluation) – 30% (\$45,000)
- Energy Assessment Interpreter costs @ \$150 per visit are an estimated cost (and provided as an indicative contribution only) – this is a value unconfirmed with that Department.
- In-kind staff contributions are factored in as costs, and are included as a line item in the cost workings.
- Products donated to the program are factored in as costs, and are included as a line item in the cost workings.
- Other cash contributions such as discounts negotiated for products and services are NOT factored as costs, but MAY require consideration for future program development. Programs operating at larger economies of scale may be able to negotiate even higher discounts. These discounts are outlined in the 'Recommendations' Chapter of this Final Report.

2. Identify Treatment Groups for the analysis

Two PSP 'Treatment Groups' were identified, which received substantially different treatments (and therefore achieved different levels of savings). These Treatments – Group 1 (standard treatment) and Group 2 (standard + solar hot water system treatment) – are outlined in Table 38.

TABLE 38: TREATMENT GROUPS AND DESCRIPTIONS

Name of Treatment Group	Description	Standard treatments	SHWS
Group 1: Standard treatment	Group 1 received the following 'standard treatments' and did NOT receive a SHWS: • Home energy assessment (in-home education); • At-assessment retrofits (AAR); • Post-assessment retrofits (PAR); • Ongoing communication and education.	✓	X
Group 2: Standard + SHWS	Group 2 received a Solar Hot Water System (SHWS) in addition to the standard treatments.	✓	✓

3. Calculate costs according to cost levels and for each treatment group

Costs were calculated for the different cost levels as outlined above in Table 36, and applied against each Treatment Group. Results of this cost level analysis are provided in

Table 39.

Table 39: PSP per household costs invested for the two Treatment Groups by Analysis Level

Cost Level	Group 1 – Standard Treatment	Group 2 (Standard + SHWS)
Level 1 - Direct trial approach	\$977	\$4,969
Level 2 - Trial Component	\$1,458	\$5,449
Level 3 – Total Business	\$1,746	\$6,508
Level 4 - Total Trial	\$3,014	\$9,522

4. Ascertain average savings per household per year

Financial (\$) and consumption (kWh) savings were calculated for the different treatment groups (per household per year), and these are provided in Table 40.

TABLE 40: DATA UTILISED IN COST-EFFECTIVENESS AND COST-BENEFIT RATIOS

Treatment Type	Average kWh saved / household / year	Average \$ saved / household / year
Group 1 (Standard)	259*	\$70.64*
Group 2 (Standard + SHWS)	2081^	\$562^

*Compared to control group (as per 'matched pairs' method outlined in Evaluation Chapter)

^Calculated for the average PSP household, based on 200 litres (4 person household, 302L system) replacing an electric 250 litre hot water system.

5. Calculate the Cost-Effectiveness and Cost-Benefit Ratios for each Treatment Group

Cost-effectiveness ratios and Cost-Benefit ratios were calculated, and the findings of this analysis are provided in the 'Results' chapter of this report.

Cost-effectiveness Ratio Calculation

The costs of the trial (according to the four Analysis Levels outlined in Table 36) were assessed against quantifiable benefits that were attributed to the trial, using the following cost-effectiveness ratio:

$$\text{Cost-Effectiveness Ratio} = \frac{\text{Cost (\$)}}{\text{Unit of effectiveness (e.g. kWh savings p.a.)}}$$

Interpretation of results

In the context of LIEEP, the most cost effective option would be the trial approach with the lowest cost that achieves a similar outcome compared to other more costly alternatives.

Cost-benefit analysis

The relative cost benefit of the program was calculated using the following ratio, in order to get a payback period for the program.

$$\text{Cost-Benefit Ratio} = \frac{\text{Cost (\$)}}{\text{Benefit (\$)}}$$

Interpretation of results

According to Guidelines provided by the Department, options are economically viable for LIEEP trial intervention only where the net benefits are equal or greater than the total costs (B/C =>1).

Dataset description and limitations

Group 1: 'Standard' Treatment

The quantitative analysis on electricity consumption data, conducted by ISF using the 'matched pairs' method, was limited to 396 of the total 990 households that received home energy assessments.

It is assumed that all households received a similar or standard treatment (termed 'Group 1 – Standard Treatment' for the purposes of this analysis). The following elements were largely controlled for in the trial design:

- Home energy assessments – conducted by qualified and certified assessors the energy assessments, using the standard tool;
- At-assessment retrofits (AARs) – these are the small energy efficiency measures installed during the energy assessment. The vast majority of households (99.7%) took up the a very similar combination of AARs (including the more significant retrofits, being the valve cosy and hot water pipe insulation)
- Ongoing communication – wherever possible, all participants received the same communications and at specific time periods post-assessment.

The post-assessment retrofits (PARs) were not controlled for, due to the specific tailored design of the PSP to enable and maximise outcomes for each individual household in line with available budget. However, compounded with attrition in available billing data from distributors, the sample

sizes for each PAR type were too small to effectively analyse whether there were significant differences in savings between different PAR approaches. Therefore, total costs and savings generated by the three different retrofit approaches have been averaged out, and included under the general 'standard' treatment suite of treatments.

The Matched Pairs method revealed the following savings for the 396 records analysed (compared to the control group).

Table 41 shows the units that will be applied to the cost-effectiveness ratio and the cost-benefit ratio.

TABLE 41: PSP UNITS UTILISED IN CALCULATING THE COST-EFFECTIVENESS RATIO AND THE COST-BENEFIT RATIO

Metric	Unit for Cost Ratios	How was this calculated?	How will this be applied?
Average kWh electricity saved per household per day	0.709 kWh per household per day	By adopting the higher end of the confidence interval provided by ISF of 0.477 ± 0.232 savings per day =, and dividing by the average number of days per quarter (90 days).	To yield the cost-effectiveness ratio for the Group 1 treatment group and inform the discussion for cost-effectiveness of the PSP.
Average \$ saved per household per year (estimated from quarterly savings)	\$70.64	By adopting the higher end of the confidence interval provided by ISF of $\$11.88 \pm \$5.78$ savings per quarter = \$17.66, and multiplying by four to get an annual cost saving.	To the Group 1 treatment group cost-benefit ratio and inform discussion for cost-benefit of the PSP.

Potential for SHWS installation impact on 'standard treatment' dataset

Only 19 Solar Hot Water recipients were included in this matched-pairs analysis (less than 5% of the total dataset) to achieve. For the purposes of this cost analysis, NCC has assumed that the inclusion of these 19 SHWS records in the 396 did not have a significant impact on the overall savings estimates. Therefore, the cost savings provided are considered by NCC to be mutually exclusive from the SHWS treatment.

Group 2: Standard + SHWS Treatment

For the purposes of this cost-analysis, an estimate of average annual kWh savings per household generated by SHWS installation of SHWS was used in lieu of actual data. This estimate applies rigorous modelling techniques as developed and endorsed by Solahart.

79 households had a Solahart Solar Hot Water System installed during the PSP, however, as explained above, the dataset able to be obtained from the Energy Distributors yielded too few records to conduct an accurate or significant analysis of these. SHWS during the ISF attempted an

analysis on this small dataset, but found no significant results from the analysis and noted that “a savings analysis on these particular households [was] inappropriate²³”. An accurate analysis of the SHWS treatment was not possible using the existing dataset obtained from the energy distributors.

Discounts not factored into calculations

- discounts negotiated for products and services were not factored as costs in the PSP Cost-Benefit Analysis. Programs operating at larger economies of scale may be able to negotiate even higher discounts.

Discounts negotiated included:

- Contributions / discounts for Solar Hot Water system component:

	Total discount (overall)	Per household discount
Discount contributed by Solahart (79 systems)	\$83,800	\$1,061
STC contributions to total value of 79 systems	\$82,472	\$1,044

- Discounts applied by suppliers for Retrofits (Products) Component

	Total discount (overall)	Per household discount
Discounts applied by suppliers for PAR products (equivalent cash value contribution)	\$23,981	\$50.27

- Data Management discounts negotiated by virtue of non-profit status:

	Total discount (overall)	Per household discount
Non-profit discounts: 10x free licenses, 9 additional licenses @ 76% discount on commercial rate. 2013-14 financial year: 7 licenses (pro-rated as required, 76% discount). 2014-15 financial year: 9 licenses (annual subscription). + associated premier success support discounts.	\$72,533	\$73
Non-profit discounts for subscriptions to 3rd party apps.	\$500	\$0.50

²³ ISF DER, p94

Results of the Quantitative Cost Analysis

This translates to the following cost-effectiveness ratios for the PSP at the different cost levels:

TABLE 42: COST-EFFECTIVENESS RATIOS FOR THE TWO TREATMENT GROUPS

Cost Level	Cost Effectiveness Ratio	
	Group 1 (Standard Treatment)	Group 2 (Standard + SHWS Treatment)
Level 1 - Direct trial approach	4	2
Level 2 - Trial Component	6	3
Level 3 – Total Business	7	3
Level 4 - Total Trial	12	5

TABLE 43: COST-BENEFIT RATIOS FOR THE TWO TREATMENT GROUPS

Cost Level	Group 1 (Standard Treatment)	Group 2 (Standard + SHWS Treatment)
Level 1 - Direct trial approach	14	9
Level 2 - Trial Component	21	10
Level 3 – Total Business	25	12
Level 4 - Total Trial	43	17

The direct trial approach yields a 14 year payback period for the Group 1 standard treatment at Level 1 (Direct Trial approach, i.e. assessments and retrofits alone), for the PSP participants.

Co-Benefits of the PSP (Qualitative Analysis)

Where other positive outcomes (co-benefits) of the PSP could not be quantified as a ratio, such as improvement in thermal comfort and improvements in health and wellbeing, NCC has conducted a qualitative cost analysis of these co-benefits. Co-benefits have been defined by Grayson and Nina as “the additional direct and indirect benefits of energy-efficiency policies and measures other than energy savings”²⁴. For an energy efficiency program, these encompass:

- Direct financial co-benefits
- Indirect economic co-benefits
- Social welfare and livelihood co-benefits

Some of the co-benefits are measurable quantitatively, whereas factors such as improvement in a participant’s health and comfort level, or an increase in energy literacy are difficult to measure. Furthermore, it is difficult to collect and evaluate these factors, as opposed to direct energy savings in dollars or kWh.

The following qualitative benefits of the PSP were unable to be quantified accurately because specific metrics for cost analysis were not incorporated into the original evaluation design upon the program’s inception. As

²⁴ Grayson and Nina, 2011, *Evaluating the co-benefits of low-income energy efficiency programmes*, OECD / IEA

such, qualitative outcomes are listed as findings or outcomes, and evidence of these benefits are outlined, where possible.

Measurable Qualitative Benefits

Direct Benefits to participants

The following indicators were measured in the PSP program design as a before and after self-reported value quantified in the PSP program design as a before and after self-reported value, and evaluation has found these translate to benefits for participants:

- Improvement in thermal comfort rating
- Improvements in energy literacy
- Sense of control (relative 'empowerment' over energy use)
- Energy advocacy and community development

Additional co-benefits of the PSP (beyond participant)

The PSP has collected some data and evidence to illustrate the following benefits directly achieved by the program:

- Supporting local business growth and 'green economy' by including local business engagement and employment opportunities for local workers.
- Increased knowledge and capacity of consortium members to encourage long-term energy efficiency among their customers and clients

Indirect Benefits (not measured by program)

Unfortunately, these indirect benefits were unable to be measured within the scope of the original PSP design. These indirect benefits will be explored briefly in the Results and Discussion section of this Cost Analysis Report.

- **Indirect participant benefits –**
 - Energy efficiency can lead to subsequent improvement to householders' health, lifestyle and social well-being.
- **Indirect co-benefits (Impact on broader society, environment, economy) –**
 - Reduced medical bills, subsequently reducing strain on medical system.
 - Ratepayer benefits: the benefits that accrue to all electricity customers through reduced electricity demand, reduced costs associated with hardship programs
 - Total public cost effectiveness: benefits accruing to society in general including reduced electricity costs, displaced health and welfare spending and local business benefits.

Qualitative Analysis Results

Direct benefits

PSP Direct Benefit 1: Improvement in thermal comfort rating

Before and after self-reported comfort levels (likert scale):

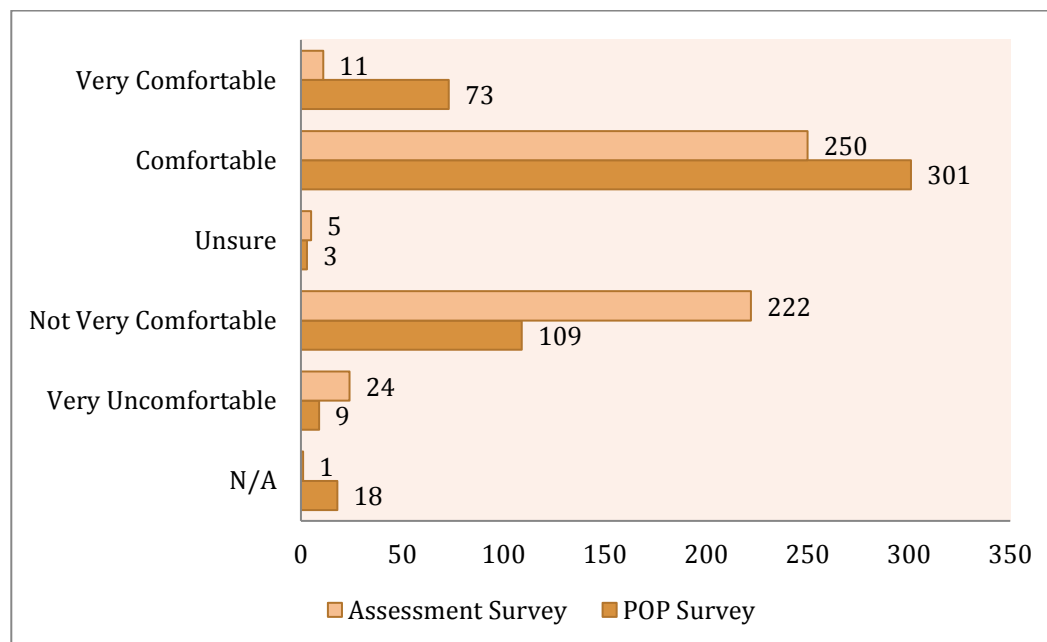
- How comfortable do you feel in your home in the cooler months? (Very comfortable, comfortable, not very comfortable, very uncomfortable, unsure)
- How comfortable do you feel in your home in the warmer months? (Very comfortable, comfortable, not very comfortable, very uncomfortable, unsure)

Any improvement to a participant's warmth and cooling comfort could lead to other difficult to measure co-benefits such as improvements in health, increase in work productivity or even educational outcomes.

Participants' self-reported perception of thermal comfort levels. These points are in relation to the social welfare and livelihood co-benefits of participants.

Figure 30 shows data that was collected at 2 points of the PSP. At the beginning of the PSP (during the assessment), and at the end of the PSP, during the call for the POP survey. The graph shows encouraging results in the comfort levels of participants during the cooler months.

FIGURE 30: COMFORT LEVEL – COOLER MONTHS



**Total of 513 participants data available for "comfort level – cooler months" comparison*

**Participants not compared include:*

- Participants from Round 3
- Participants who withdrew from PSP
- Participants who did not complete POPs

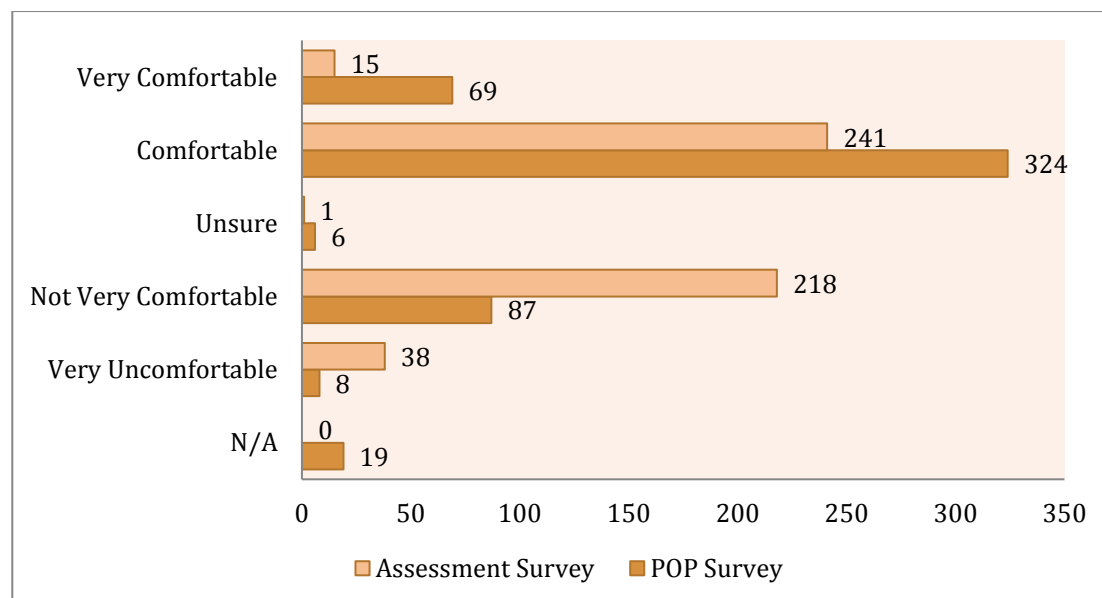
At the end of the PSP, there were fewer participants who claimed that they were either "very uncomfortable" or "not very comfortable" in their homes by 63% and 51% respectively. On the other hand, more participants were recorded to have marked improvements in their homes. A total of 51 more participants told the PSP they feel "comfortable" in their home, whereas 62 additional participants claimed to be "very comfortable" after the PSP.

Diane: *"Because of the tips I've learned in the Power Savers program, I've been able to change my comfort at home. Leading into summer, I'm going to avoid using my air conditioner by opening up my home in the morning to let the cool in and then closing things off when it gets hot! Since I've been part of the Power Savers program, I feel like I've taken back control of my bills. Electricity is so expensive, but, because of the knowledge I've gained in Power Savers, I've been able to take responsibility over my bills and make a change!"*

These results are a clear indication that many participants have taken on the energy efficiency advice and information provided by the PSP, and have also actively improved their comfort level via home retrofit improvements.

Similarly to participants' experience of comfort levels in cooler months, warmer months also show an improvement in participant's comfort, with less participants recorded to be uncomfortable in their homes, and more participants being comfortable after joining the PSP. This is outlined in Figure 31.

FIGURE 31: COMFORT LEVEL – WARMER MONTHS



**Total of 513 participants data available for "comfort level – cooler months" comparison*

**Participants not compared include:*

- Participants from Round 3
- Participants who withdrew from PSP
- Participants who did not complete POPs

The breakdown of the results is as follows:

- Very Comfortable - Increased by 54 participants
- Comfortable - Increased by 83 participants
- Not Very Comfortable - Decreased by 131 participants
- Very Uncomfortable - Decreased by 30 participants

The data obtained for the improvement in comfort level during warmer months amongst PSP participants are as encouraging as those for the cooler months. Although it may be difficult to put a dollar figure on comfort levels, there could be potentially be a continuous improvement to indirect economic, social welfare and livelihood co-benefits for PSP participants.

PSP direct benefit 2: Energy Literacy

The PSP has been very successful in increasing relative energy literacy amongst the low income households engaged.

PSP Benefits measured	Evidence of benefits realised through PSP approach
Energy literacy – increased ability to understand electricity bill	The proportion of participants who stated their bill was very or somewhat clear and easy to understand increased from 47% to 79% .
Energy literacy – increased awareness of energy use compared to others	The proportion of participants who agreed or strongly agreed they were aware of how their electricity use compared to others increased from 45% to 69% .
Energy literacy – increase in knowledge	The proportion of participants who reported they were <u>prevented</u> from reducing their electricity use due to a lack of knowledge decreased from 48% to 0.4%

Direct benefit: Sense of control (or ‘empowerment’) over energy use

PSP Benefits measured	Evidence of benefits realised through PSP approach
Sense of control over how electricity is used.	The proportion who strongly agreed they had control over their electricity use increased more than six-fold, from 7% to 44%. The proportion of participants in the group that either agreed or strongly agreed increased from 60% to 89%.
Sense of control over electricity bill.	The proportion of participants who strongly agreed they had control over their electricity bill increased five-fold, from 8% to 41%. The proportion who agreed or strongly agreed also sharply increased from 53% to 87%.

PSP direct benefit 3: Community Development – Community capacity building activities

A key feature of the PSP was the use of peer-to-peer networks and storytelling to inspire energy efficient behaviours in others. This has led to an extensive community of practice within United Voice’s membership.

United Voice, being a union, had the appropriate skills and resources to conduct community organising and community development activities. It is therefore not too surprising that the program greatly exceeded community development targets.

The following points summarise the key outcomes (benefits) of the PSP Champions Program (community development initiative).

Champion outreach –224 champions recruited from the participant base, and trained in basic storytelling. These Champions took the following positive actions within their wider peer networks – for what was able to be measured:

- 80 participants spoke to others about saving energy
- 206 participants encouraged others to join the PSP
- 19 participants (bringing along 36 of their family or peers) attended the Final Dinner Event

- 12 participants engaged in media or storytelling activities (e.g. short films, newspaper articles, newsletters, case studies)
- 11 participants facilitated the formation of five different 'Power Savers Teams' and related workshop events in Champions' workplaces and peer networks, which further expanded the reach of the Power Savers program.

United Voice's network of members who are engaged and interested in energy efficiency continues to develop and expand, particularly in the Early Childhood sector, with several early childhood educators opting to receive 'sustainability' training through Cool Australia's sustainability education program. The PSP has enabled a number of motivated and enthusiastic educators, alongside early childhood centre Directors, to bring the benefits of energy efficiency to their centres, the children and families and communities they work with.

The success of the Champions program is one of many indicators that involvement in the PSP inspired participants to take action and advocate for better energy efficiency amongst their peer networks, to the benefit of their peers and for themselves.

Additional co-benefits of the PSP (beyond participant)

Building the Energy Efficiency industry ('Green economy')

One of the LIEEP Objectives was *"to build the capacity of Australia's energy efficiency technology and equipment companies by maximising the opportunities for Australian industries to participate in the projects."*

Related to this objective, to the benefit of local economies and the energy efficiency industry, **the PSP contributed a total of \$765,392 to local economies**, through procurement of products or services from at least 15 different locally based companies, in various ways as listed below:

- \$247,392 was spent with local company Solahart to purchase of Solar Hot Water systems installed at 79 different households. (Note: Solahart also made a significant in-kind contribution to these systems, totalling \$83,800).
- At least \$164,200 was spent on direct purchase of energy efficient equipment purchase and installation of AARs and PAR Products / IHDs (excluding products donated to the program by OEH).
- A total of \$129,000 was spent by 284 households who received a \$250 rebate to purchase / upgrade equipment and appliances in their home for better energy efficiency.
- At least \$205,000 was spent on wages to employ and train 5 energy efficiency specialists from the local area for substantive periods through the PSP.

Contribution to energy efficiency research and policy development

A large number of relationships and connections were made between PSP staff and various stakeholders including the members of the Advisory Committee, other NGOs, universities and others. Key findings of the PSP were communicated as the PSP evolved, through LIEEP forums, active participation in GEEAR and most recently, PSP participation in OEH *Co-design* workshops for their *Home Energy Action* program.

DISCUSSION AND RECOMMENDATIONS

The following section of the Final Report recaps the key aspects of the project with a brief discussion of the main issues, lessons learnt, along with some take-away recommendations based on the results and the experiences of the project team. The following PSP aspects will be covered:

- Project management
- Recruitment & assessment bookings
- Home energy assessments
- Retrofits
- Solar Hot Water systems
- Champions and teams
- Impact on tenants
- Linguistic and cultural diversity
- Data management
- Billing data
- Survey design and data exports
- Control Group
- Cost-benefit, cost-effectiveness and co-benefits

Project management

A Consortium of 4 organisations worked effectively together to deliver the project on time and within budget with some key successes, as outlined in this Report, despite a number of obstacles.

A total of 1,010 participants received significant and free assistance over a 12 month period, including a home energy assessment delivered by highly experienced and engaging experts, tailored retrofits, and ongoing support and tailored advice.

Delays to the start of the project of approximately 6 months while the Funding Agreement was being finalised between NCC and DIIS, as well as shortening of LIEEP timeframes at the end of the project, caused project management challenges, resulting in the project schedule needing to be reviewed and altered on a number of occasions over 2013-2014.

The budget for the project was insufficient (non-existent) in the key area of data management for both the energy assessment data collection tool and the CRM software to track participant interactions. However, this was overcome by over-allocation of funding in other areas, such as the website, along with not-for-profit discounts.

Significant time and effort was also made by PSP staff in order to research and tailor the FluidSurveys and Salesforce data management applications. However, the use of this software led to significant efficiencies and positive outcomes for the implementation of the PSP, including efficient use of staff time at United Voice.

In-kind hours by staff, principally at UV and ISF, far exceeded the planned time, which included increased reporting requirements, delays in project planning, data management, evaluation, and project administration.

The volume of data required to be collected, for example to meet DIIS/CSIRO requirements for the Data Schema (as well as ongoing changes to the Schema), address privacy matters, and collect billing data consent and pre and post intervention surveys from participants for evaluation proved challenging and time-consuming.

The use of the call centre was an effective and efficient way to meet the project requirements and timelines. Without it, and the key pre-existing relationship between UV and its members, the PSP would not have met its requirements.

Not until the number of assessments began to increase was the need and budget identified to compensate assessors for attendance at late cancellations and 'no-shows'.

RECOMMENDATIONS – PROJECT MANAGEMENT

- **That future low income energy efficiency programs run by consortia should include as one of the consortium partners an organisation with a pre-existing relationship to the participant base.**
- **That the consortium partner with a pre-existing relationship to the participant base has a central role in project management.**
- **Maintaining project scheduling and timeframes is of key importance to being able to effectively roll out a project as originally intended**
- **Budget for the key aspects of data management must be compulsory for future projects (see data management recommendations)**
- **Ways of reducing the volume of data needing to be collected by assessors, and other potential barriers such as participant consent, need to be re-considered**
- **Budget allowances need to be made to compensate assessors for late cancellations**

Recruitment & assessment bookings

United Voice was highly successful at recruiting the required number of participants, while also allowing for a significant number of pre-assessment withdrawals.

The key to this was the pre-existing relationship between UV (as a member-based organisation) and its members. A large, readily available database of potential participants recruited through a trusted organisation via a well-trained internal call centre was critical to obtaining the required number of participants, and maintaining their involvement over a 12 month period.

Workplace structures also allowed for the development of Champions and Teams, which resulted in further solidifying recruitment efforts and successes, particularly those of NESB/CALD backgrounds. Participants recruited through champions or organisers or who signed up through sending in the PSP brochure were more likely to go from being a recruit to being a participant than those recruited through the call centre phone call.

The recruitment and assessment booking piece was highly resource intensive and required delicate management of assessors and participants calendars, as well as minimising excessive travel between bookings and minimisations of cancellations. This was particularly complicated by the lack of security and structure many of UV's members face in the nature of their work.

Some difficulties resulted from excessive delays of time between when participants were recruited and when they had their assessment. As a result, some participants and potential participants withdrew from the PSP.

The PSP was able to develop strong processes and procedures throughout the project which effectively overcame these challenges for the most part.

RECOMMENDATIONS – RECRUITMENT & ASSESSMENT BOOKINGS

- **Utilise a member-based organisation which has pre-existing relationships (and trust already established) with potential participants**
- **Incorporate an attrition rate between both leads and recruits, and assessment and project completion, and factor this into evaluation targets**
- **Early on, identify leaders within peer-to-peer networks such as workplaces, and support these individuals to aid recruitment**
- **Utilise a call centre to allow for the scale of recruitment, assessment bookings and ongoing engagement**
- **Tailor recruitment (and other) phone call times as well as assessor availability to specific work industries timing.**
- **Factor the lack of structured work and stability of low-income workers, specifically shift workers, into planning around cancellation rates and assessor availability.**
- **Combine phone call tasks wherever possible, as some households can be difficult to contact. For example, combine the initial eligibility and recruitment call with a pre-intervention survey and assessment booking.**
- **To reduce withdrawal rates, complete the assessment within two weeks of the recruitment call.**

Home energy assessments

The home energy assessments were received by all 1,010 participants in the PSP and were a critical aspect of each household's intervention and their journey through the project.

Of very high importance was the congeniality and energy efficiency experience of the assessors recruited by NCC.

A total of 5 assessors were engaged throughout the project. The PSP team (and assessors) received consistent feedback from participants that the best aspects of the assessments were:

- the assessors, their individual approach (one-on-one), and the amount of quality time they spent on educating participants and answering queries
- education in how to read their energy bills
- assessors explaining the use of specific retrofits so households could gain direct control of energy use

This may help to explain the successful outcomes on electricity literacy and sense of control for participants as a result of the PSP.

RECOMMENDATIONS

- **That Home Energy Assessments balance the need to collect data with the need to educate participants about how to read energy bills and household energy efficiency.**
- **Structure the Home Energy Assessment based on a tailored and personal approach.**
- **Recruit experienced and personable assessors who have a high degree of time-flexibility**

Retrofits

At-Assessment Retrofits (AARs)

It was reported by assessors that providing some free and tangible retrofit items at the point of assessment (AARs) helped to break down barriers and assisted with assessor-household engagement and trust.

Retrofits such as draught-proofing and insulation were of clear need considering the older housing stock either owned or rented by participants, a large number of whom were in western Sydney where it tends to be hotter in summer and cooler in winter, especially compared with Sydney coastal regions.

For owned homes, the more retrofits you could install at the assessment, the better. This is where the additional skills of assessors, such as handyman or electrical skills, would be very beneficial. However, this may be problematic in relation to management of assessors calendars and bookings, if the time the assessor will need in each home is an unknown. It would also likely reduce the amount of assessments an assessor could do in one day, resulting in a higher number of assessors or a longer period being required to complete this amount of assessments. Additionally, there would be substantive logistical issues with ensuring assessors could transport and store the required additional retrofitting items.

For rented homes, there was an additional barrier to overcome, especially with retrofits such as draught-proofing, insulation or shading that usually required changes to home fixtures and / or more significant investment. Such investment by tenants, if undertaken, is often to the benefit of the landlord.

Post-Assessment Retrofits (PARs)

The PSP set an unrealistic target of 100% PAR installation, which in hindsight did not account for factors such as participants refusing to sign the BDC form, being uncontactable, or withdrawing from the project at some point after the assessment.

There were differing needs of households in regards to completing their PAR retrofit, especially in regards to rebates. Some participants were very keen and did a lot of their own research to find the item(s) they required, whether it be a major whitegood or LED downlights. Others had barriers to purchasing and installation, whether it be time, knowledge, additional finances, or other reasons.

Having a flexible and wide-ranging set of options for PARs contributed to being able to provide tailored assistance, especially more options for renters. Some types of PAR installations were more complicated than others to try to coordinate, such as halogen downlight replacement, draught-proofing or installation of curtains and pelmets. This was especially the case for busy households, NESB/CALD participants, or renters (landlord or real-estate agent negotiations).

Some participants either did not utilise, or were unable to utilise their full PAR budget (\$250 value). They may have had more limited PAR options (eg. renters), may have already been quite energy efficient, or were unable to find the additional money (above the \$250 rebate) to purchase, for example, an appliance.

RECOMMENDATIONS

- **A 'traffic light' approach to PARs with three levels of support would seem most beneficial. The amount of assistance should be tailored to each households individual needs, both in terms of financial assistance and coordination of installation.**
- **Organise agreements where possible with tradespeople and companies to supply, as needed, a certain service at a fixed cost, eg. installation of curtains/pelmets, draught-proofing.**
- **Wherever possible, engage assessors who are also qualified electricians or tradespeople in order to install more intricate retrofits (eg. draught-proofing; IHDs) as needed at the point of assessment**
- **When using rebates for more energy efficient appliances programs should allow substantive amount of time for participants to save the necessary additional funding for purchase.**
- **Instructions for claiming rebates, including eligibility requirements and expiry dates must be clearly communicated**

- **Provide financing options up-front to assist participant with rebate purchases (e.g. NILs)**
- **The time between the assessor visit and the IHD install should ideally be less than 2-3 weeks**
- **Clearly explain (with images/illustrations) all available PAR options at the point of assessment, so that householders are aware of the best options for their circumstances**
- **Clearly explain (with images/illustrations) the purpose of the IHD, the process that will be followed for installation by an electrician, and what to expect in the coming weeks.**
- **Engage an electrical company with multiple electricians to install IHDs, who are able to easily access the geographic region targeted, and willing to invest time communicating with householders to both arrange the installation (ideally when they are home), as well as demonstrate and set up the IHD for them where possible**

Solar Hot Water systems

Due to system price reductions and STC price increases, the PSP was able to install more solar hot water systems (SHWS) for home owners than planned, with 79 households benefitting.

Working with a professional installation partner (Solahart) with decades of experience in the Australian market meant that the program saw minimal problems with installation. This reduced risk was a key to the success of this aspect of the PSP

Unfortunately, planned SHWS installations for tenants under a cost-sharing (split incentive) arrangement were not successful, with no SHWS being installed for tenants. This trial has given evidence to the structural barriers both in terms of tenancy rights and regulations/incentives on owners which lock tenants out of these energy efficiency reductions.

Tenants approached for the project raised concerns about rent increases or lease changes, fear of disturbing the landlord, predicted low level of interest and past interactions of being unable to get landlords to tend to maintenance.

Additionally, real estate agents were a barrier, showing little to no interest in being a liaison between the PSP and the landlord.

RECOMMENDATIONS

- **That Government, at state and federal levels, should work to amend legislation and policy to ensure that energy efficiency of tenancy properties is brought up to standard and opportunities to improve efficiency are open to tenants as well as home owners.**
- **That future programs incorporate photovoltaic solar.**
- **That Government amend legislation to encourage the upgrading of appliances in rental homes, such as hot water systems, to energy efficient alternatives.**

Champions and teams

The Champions program was highly successful, with the involvement of 224 champions vastly exceeding the target of 60 champions. Champions activity flourished and exceeded expectations through peer-to-peer education and recruitment to the program, which played a significant role in the PSP meeting recruitment targets. The ongoing actions by champions to share their knowledge gained through the program with others is a valuable ongoing legacy of the program.

The Final Event had less participants than originally planned, however the PSP team decided to focus rather on a celebration of core participants who had stepped up to further the program. This enabled the PSP to provide work place release and accommodation for attendees who were restricted in their ability to attend due to work or regional location

Additionally the teams program saw 5 teams developed.

Unfortunately, the UV PSP Coordinator had less capacity than expected to undertake substantive face-to-face development with Champions, because of the higher administration and program management required by that position. In order for the Champions program to occur UV contributed additional funds in-kind, above what was originally budgeted.

Despite the high success in numbers of Champions and teams, participants availability for further actions were limited, as expected when engaging with low-income households, many working irregular hours or shift work. The geographical spread of participants also meant bringing people together at the same time and place was challenging. Future programs should recognise and respect lifestyle pressure and time constraints of low-income households.

The design of the champions activity developed over time, and clear reporting and evaluation requirements were not provided by either the Department nor the research partner. Therefore, subsequent information at some stages was not detailed enough to enable a comprehensive evaluation.

RECOMMENDATIONS:

- **Develop peer-to-peer engagement on energy efficiency that:**
 - **targets the barriers low-income workers face when involved in community and activities outside the workplace**
 - **is built through existing community structures such as workplaces**
 - **targets sectors with mutual self interest in improving education of the work force on energy efficiency (e.g. Home Care, Early Childhood Education)**
 - **targets workplaces where employer may support facilitated training on energy efficiency**
 - **subsidises and incentivises to improve participation by those vulnerable due to precarious employment or insecure housing**
 - **partner with external organizations, such as local councils, to expand opportunity for ongoing and sustainable involvement in community energy efficiency action**
- **Future programs should factor in program time to develop strong leadership systems early in the program.**
- **UV continue providing ongoing support for Champions and teams, as well as other members of the union around energy efficiency**
- **Future programs should recognise and respect lifestyle pressure and time constraints of low-income households.**
- **Set clear expectations in regard to reporting and evaluation prior to project commencing**

Rental households

Although the PSP was successful in engaging a large proportion of tenants in the program, this does not represent the full picture.

The PSP did not track, but acknowledged that a substantial group of renters opted not to participate in the program, and future programs should consider how to collect this data at the beginning of programs. Additionally, although the PSP went to great efforts to tailor the program to renters, there are substantive structural barriers which stop tenants making changes to their home and enjoying the same level of energy efficiency and comfort in their homes as owners.

The SHWS Split Incentive project highlighted the structural barriers which prevent tenants accessing the full suite of energy efficiency options available to owners.

There is very little to encourage landlords to improve the energy efficiency of their property. Australian Tax Law does not allow landlords to claim a tax deduction or depreciation for energy efficiency upgrades, installation of solar hot water or embedded generation on their rental properties.

These upgrades, considered capital improvements, are added to the property cost base for calculation of capital gains when the property is sold. In contrast, spending on maintenance, including 'like for like' replacement of inefficient equipment, is tax deductible²⁵. Most Australian landlords are small scale investors seeking annual tax offsets and are not incentivised by a tax deduction which will only be realised at the point of sale, if at all²⁶.

A further disincentive for landlords to improve the energy efficiency of their property is lack of regulation, or, a requirement to disclose the energy efficiency of the properties they are leasing.

RECOMMENDATIONS:

- **All efforts in improving energy efficiency for tenants and their homes should acknowledge the structural barriers in place and the implications they have for the ability for tenants to enjoy the same level of energy efficiency and comfort in their homes as owners.**
- **Future programs should plan to record and analyze tenants experience through all steps of the program from recruitment to completion.**
- **Future program working with tenants must work to ensure any retrofitting items or engagement does not challenge the security of tenancy or put tenants in a position which may make them feel as such.**
- **That rental household energy efficiency education must be broad and incorporate learning about tenancy rights, consumer rights and the retail electricity market.**
- **trusted networks or peer-to-peer engagements can engage renters more easily due to unpredictable work hours, cultural and linguistic background, otherwise uncontactable householders due to property type or lack of landline phone connection.**
- **That split-incentive barriers to greater rental household energy efficiency are significant and persistent and that policy options designed to overcome split incentives should be reviewed.**

The PSP believes there is great opportunity to improve the energy efficiency, quality and stability of private rental properties.

At NSW State level amendments to the *Residential Tenancies Act 2010* to better balance the interests of tenants and landlords:

- (i) Improve security of tenure and limit retaliatory termination by prohibiting no grounds termination.

²⁵ACOSS, *People on Low Income and Energy Efficiency*, 2013

²⁶ACOSS, *People on Low Income and Energy Efficiency*, 2013

- (ii) Improve affordability and minimise retaliatory increases by restricting rent increases to once per year and limit increases to the consumer price index. If the increase exceeds the consumer price index the obligation to show the increase is not excessive should be on the landlord.
- (iii) Introduce energy efficiency standards for all rental properties in NSW and that landlords be required to commission a report, at least once every five years, outlining the condition of the property, its ongoing maintenance needs, and its energy efficiency rating. A copy should be provided to tenants at the commencement of a new tenancy, and when subsequent reports are compiled.

At a National Level;

- (iv) Cooperation between State and Federal Governments to explore receipt of tax concessions being conditional on meeting minimum energy efficiency and property standards.
- (v) Comprehensive review of all tax incentives paid to landlords.

Cooperation between State and Federal Governments is required to explore receipt of tax concessions being conditional on meeting minimum energy efficiency and property standards. Introduce energy efficiency standards for all rental properties in NSW and that landlords be required to commission a report, at least once every five years, outlining the condition of the property, its ongoing maintenance needs, and its energy efficiency rating. A copy should be provided to tenants at the commencement of a new tenancy, and when subsequent reports are compiled.

United Voice recommends the introduction of energy efficiency standards for all rental properties in NSW and that landlords be required to commission a report, at least once every five years, outlining the condition of the property, its ongoing maintenance needs, and its energy efficiency rating. A copy should be provided to tenants at the commencement of a new tenancy, and when subsequent reports are compiled.

Linguistic and cultural diversity

The PSP went to substantive effort to ensure NESB/CALD participants were able to access all levels of the program to the same extent as English speaking participants. As a result substantive resources were allocated to the use of interpreters and to translate written materials.

Unfortunately, there were some difficulties in using external interpreters who were unfamiliar with the program.

Translators varied between assessments and at other points of contact in the PSP. Assessors noted that if a translator had attended at one of the assessments previously, then they were much more effective at getting the message across to householders, as they had developed a familiarity with the assessment aims and processes.

RECOMMENDATIONS

- **Engage a limited number of translators for the life of the project to maximise efficiencies of delivery and minimize language barriers**
- **That adequate budget and resources be allocated to ensure all target audiences can engage in the program, irrespective of language, culture or physical ability.**
- **We found that while use of an interpreter was beneficial, conversations were much more fruitful between a project staff who spoke the language and a participant than through an interpreter.**

Data management

It was a significant oversight in the initial PSP planning stages by both DIIS and NCC that no budget had been allocated for data management, including the identification and implementation of record keeping and participant management systems. Data management was vitally important in a program such as LIEEP due to high reporting requirements for program evaluation.

This resulted in the program staff sourcing, developing and implementing a data management system, whilst implementing the program which affected the cleanliness of data management, the efficiency of implementation and the ability for the project to meet its targets.

Not for profit organisations, such as NCC, are often under-resourced and / or do not have experience in sourcing and tailoring data management systems suitable to the roll-out of a large project such as LIEEP.

Fortunately, budget was able to be reallocated from other line items, namely the website, which was of less importance and would have less impact on the target audience.

After significant effort in scoping various systems available on the market, the PSP landed with 2 main data management platforms:

- FluidSurveys – for collecting home energy assessment data, and
- Salesforce CRM – for managing a multitude of participant interactions

Although the intention was to map all FluidSurveys data across to Salesforce, it proved to be too great a task mainly due to budget and logistics. FluidSurveys also unexpectedly upgraded their platform mid-project.

Salesforce proved to be a very effective and highly adaptable platform as:

- it was agile – it could be customised to grow with the project's needs
- it enabled interactions and the journey of each household to be tracked centrally
- it enabled quick and effective communication between program staff across organisations, and also allowed for efficient communications with energy assessors. This was important particularly for the call centre (a large team) to communicate with project staff in real time, despite working outside of office hours

RECOMMENDATIONS

- **The data management requirements for LIEEP were significant. Future projects such as LIEEP should ensure all grant applications have a compulsory budget allocation and plan for data management, i.e. tools to capture data from assessments and from participant interactions (CRM), ideally within the one platform. Alternatively, DIIS should provide access to an adaptable, tailorable data management system(s) purchased on mass and readily available for use and tailoring by grant recipients at the commencement of projects, along with IT support**
- **Future programs could provide greater guidance to grant recipients with regards to scoping requirements underpinning quality data management.**
- **the use of Salesforce CRM as a tool for data management and inter / intra-organisational communication**
- **Broader scoping of required research and data management requirements should be undertaken at the beginning of the program with research partners and the Department.**

Billing data

As outlined in this report, a number of notable challenges were faced in collecting billing data, with the view that such data would be essential to evaluating the project's impact on participant households and the overall effectiveness of the PSP.

While implementing the program, the project identified difficulty in getting some participants to return their billing data consent form.

A decision was made mid-2014 to tie the ability to take up post-assessment retrofit items to the return of the form. The program found this was a good strategy and increased our return rates.

Further to the issues encountered with resistance and lack of incentives to signing, along with the logistics of household's signing and returning BDC forms, other challenges included:

- electricity account holders not being present at the assessment
- errors in household accuracy in entering NMI numbers on the BDC form
- misunderstandings compounded by households having English as a Second Language
- participants being outside the Ausgrid and Endeavour Energy networks
- households who withdrew from the program
- households who moved home mid-way through the program
- out of date / inconsistent records held between energy retailers and the distributors, Endeavour and Ausgrid, leading to problems with NMI data validation
- incomplete billing cycles
- lack of a more formal agreement between Endeavour and Ausgrid to offset staff turnover, and changing expectations by Endeavour and Ausgrid in regards to customer consent
- differing legal privacy requirements of releasing data between electricity distributors

Further, the evaluation method for quantitative analysis conducted by ISF relied upon creating matched pairs with data from a control group, which further reduced the sample size for analysis. This could not be avoided, however, future programs should seek to expand the sample size.

All of these factors had an impact on attrition of the billing dataset and, hence, the data sample size, as outlined in the report.

While the data sample was smaller than expected, and despite the challenges faced, under rigorous analysis against a matched control group, the PSP achieved notable electricity and cost savings for low income households across all PSP regions.

RECOMMENDATIONS

- **Allow for a substantial rate of attrition (greater than 50%) in available billing data. This would likely require a greater sample size in order to conduct rigorous evaluation.**
- **At or before the commencement of projects, coordinate formal arrangements and data export / transfer procedures between grant recipients and electricity distributors regarding specifics on the supply of data**
- **Incentivise the return of billing data consent forms by households, where the form is unable to be completed and collected at the assessment**
- **Implement more sophisticated online systems to make it easier for the return of signed BDC forms by householders**
- **That energy providers be required to maintain updated databases**

Survey design and data exports

A number of key surveys needed to be designed and formulated almost from scratch by the PSP team to match the general requirements outlined by both DIIS via the CSIRO Data Schema. Such surveys included:

- The home energy assessment survey developed in FluidSurveys
- Pre-intervention phone survey (PIPS)
- Post-intervention phone survey (POPS)

There is no doubt that there were limitations in the design of some of the PSP surveys. As with many surveys, much of the data was, necessarily, self-reported by households.

Despite this inherent bias, the results of the PSP across many aspects of the evaluation, indicate significant impacts. For example, the proportion of participants who reported they were prevented from reducing their electricity use due to a lack of knowledge decreased from 48% (pre-intervention) to 0.4% (post-intervention) indicating that participants were feeling much more informed and in control of energy use.

Throughout the program it was identified that it would be beneficial to ask participants about additional areas to fully delve into barriers and changes as a result of the program. Primarily the PSP realised that it should have set up more evaluation about the experience of tenants at the outset of the program to gain more insight into the experience of tenants.

Further, it would have been useful to ask participants about whether they felt they reduced their energy over the course of the program. The QR2 conversations did touch on those points, however, due to them not being a major survey, they have not been included in the evaluation.

Additionally, the surveys had to be adjusted mid-way in response to various changes including additions made by DIIS to the CSIRO Data Schema at various stages throughout the project, as well as a realisation that we would have to factor in methodologies for analysis for participants who moved home. These elements made it difficult to produce a consistent data set throughout the entirety of the project.

Difficulties were also encountered in ensuring compatibility between the data collected and the methods for exporting data via the Tables in the CSIRO Data Portal.

RECOMMENDATIONS

- **CSIRO and a group of researchers to develop a research project to guide and support research efforts in this area, including a comprehensive data schema, data management guidance, and evaluation manual to inform both quantitative and qualitative evaluation and research outcomes specifically for low-income households.**

Control Group

Designing the project to select the control group from within the original sample of 1,010 households (i.e. 500 households), in hindsight, should never have been considered, given the already small sample and the realities of the roll-out of a project to a low-income target audience who could not be denied the assistance of the PSP. That is, all participants who were eligible for the project, should, and did, have access to the benefits of the PSP.

The shortening of the total PSP by 5-6 months (without extension to the final deadline) led to an inevitable need for changes to program design. Despite these barriers, the PSP team attempted to create a control group several times with significant effort. However, in the end, the intended households were unable to be used as a control group for evaluation purposes.

The consequence was that time and effort ensuring the control group was in place could have instead been spent on maximising the participation experience for all PSP households.

However, data from all 990 households was still utilised in the evaluation and increased the size of the participant group resulting in more statistical significance of the results.

Had the original 500 controls been established in a strict 'control' manner (randomly selected with no bias and no participation in the project), this would have resulted in only 500 participants, which with attrition would have made project impacts impossible to evaluate. Impact evaluation remained challenging even when all 990 household records were included.

Had the request for de-identified billing data not been made to provide an alternative control group, it would not have been possible to identify savings from the PSP.

Therefore the final result, despite the challenges faced with the control group creation, is probably the best solution for an energy efficiency program such as LIEEP i.e. using de-identified billing data as the control so that no participants miss out on the benefits of the program.

RECOMMENDATIONS

Future programs of a similar nature to the PSP could apply the following when developing a control group:

- **Maintain project length**
- **Increase budget for larger participant sample**
- **Source a control group from de-identified billing data to enable rigorous evaluation**

Cost-benefit, cost-effectiveness and co-benefits

- High values
- Sydney costs are going to be higher
- Governance –
- Research and development costs very high as expected.
- Operationalising PSP ?? What would it take?
- Inherent 'trial' approach meant that operating at scale was difficult. Expect it would be substantively cheaper if things could be scaled up.
- Energy assessments require qualified assessors – operationalising at scale would require a good base.
- Suppliers and market need significant regulation – accreditation.... and injection of more \$\$

While the PSP always intended to carry out an analysis of cost and electricity savings for participants and a basic project cost-effectiveness analysis, it was not until two years into the project in 2015 that we were made aware of the additional depth of requirements to analyse cost-benefit, cost-effectiveness and co-benefits. This has allowed little time to prepare and complete this task.

Further, until late February 2016, there was a misunderstanding between DIIS and the Consortium regarding the extent of requirements, the analysis methodology and the final expected output for this analysis.

In August 2015, CSIRO presented a brief overview of their cost-benefit / cost-effectiveness methodology. Following this, the Department developed a set of very broad parameters to guide the cost-benefit analysis that were to be conducted by each grant recipient. These guidelines were interpreted by ISF as follows:

- Embarking on this project, ISF had only planned and resourced to undertake a very basic analysis of cost-effectiveness, as our understanding as per the original guidelines is that is all that was required.

The 'Cost-Benefit, Cost-effectiveness' ratio template provided in this report is an indicator of the level of analysis that ISF and the PSP had had planned for.

RECOMMENDATIONS

- **At the Funding Agreement stage of future programs, expectations for cost-benefit analysis be more effectively communicated to grant recipients. Providing a reporting template and example calculations or analysis methodology would go a long way towards achieving this. This will allow for Project Managers to appropriately factor the cost-benefit analysis into budgets and reporting.**
- **Cost effectiveness and benefit should not be considered without also looking at the co-benefits of the PSP such as increase in energy literacy, sense of control over energy use, change in perceived comfort in the home and the peer-to-peer learning that occurred through the Champions and Power Savers Teams activities. By only considering cost effectiveness in terms of participant benefit (program cost versus participant energy savings) other benefits are being ignored such as:**
 - **ratepayer benefit: the benefits that accrue to all electricity customers through reduced electricity demand, reduced costs associated with hardship programs**
 - **total public cost effectiveness: benefits accruing to society in general including reduced electricity costs, displaced health and welfare spending and local business benefits**
- **Provide guidance to recipients about how to handle 'other' cash contributions in the calculations, for instance, discounts negotiated for products and services were not factored as costs in the PSP Cost-Benefit Analysis. Programs operating at larger economies of scale may be able to negotiate even higher discounts.**

Performance against LIEEP benefits

The following table represents ISF's review of the PSP's performance against identified LIEEP benefits.

PERFORMANCE AGAINST LIEEP BENEFITS

LIEEP Benefits	Observations at conclusion of PSP
Assist low-income households to implement sustainable energy efficiency practices to help manage the impacts of increasing energy prices and improve the health, social welfare and livelihood of low-income households.	- Assisted over 1000 LIHs including those that are NESB and CALD to not only implement EE practices, but also to increase their understanding of EE in the home, in particular: - Understanding electricity bill - Raising awareness about the importance of saving energy - Education on energy efficiency and what it means via brochures, in person home visits, in home displays, peer to peer learning via videos etc - Achieved electricity reductions and cost savings, as well as emissions reductions for some LIHs participating in the project, helping to manage the impacts of electricity prices - Health, Social Welfare and Livelihood are discussed in the Final Report
Build the knowledge and capacity of consortium members to encourage long-term energy efficiency among their customers or clients.	Knowledge of NCC, UV, ISF and Solahart to implement energy efficiency projects increased significantly due to PSP through: - design (and redesign across changes in government) of a large scale multi-year residential energy efficiency project - identifying, attracting and recruiting households where energy efficiency was a relatively new topic - completing iterations of a project design based on what was possible with participants - development and delivery of energy efficiency education materials - recruitment of home energy assessors and call centre staff - delivery of residential home energy audits - delivery of tailored residential energy efficiency retrofits - design and delivery of self-assessment surveys - collection, storage and manipulation of participant and household data - evaluation of the project's implementation and impact - wrap up activities with participants Customers and clients that may benefit from the outcomes of PSP include: - Low income households - NESB/CALD households - United voice members who did not participate in PSP - NCC members or prospective members - Residential energy efficiency projects ISF may evaluate in the future - Solahart customers from LIHs or NESB/CALD

LIEEP Benefits	Observations at conclusion of PSP
Build capacity of Australia's energy efficiency technology and equipment companies by maximising the opportunities for Australian industries to participate in the projects	The following energy efficiency technology and equipment companies participated in the PSP: ○ Solahart – provision and installation of solar hot water systems ○ Arxxus and Clouding Around– CRM implementation development and assistance ○ Valvecosy and other equipment providers, as indicated in the retrofits and rebates sections

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Appendix 1



POWER SAVERS PROJECT

Low Income Energy Efficiency Program (LIEEP)

SUBCONTRACTOR AGREEMENT

Energy Assessor

February 2014

BETWEEN

(1) **The Nature Conservation Council of NSW Inc.** (ABN 96 716 360 601) (**hereafter 'NCC'**) having its registered office at Level 2, 5 Wilson Street, Newtown NSW 2042;

AND

(2) **Ian Moxon** (ABN 66 286 785 438) (**hereafter 'The Subcontractor'**)

Details

Interpretation – definitions are outlined in Clause 19.

Parties

Name	Nature Conservation Council of NSW
ABN/ACN	96 716 360 601
Street Address	2/5 Wilson Street, Newtown NSW 2042
Mail Address	PO Box 137, Newtown NSW 2042
Contact person	Mr Pepe Clarke
Telephone	02 9516 1488
Position	Chief Executive Officer
Email	ncc@nccnsw.org.au

Name	Mr Ian Moxon
ABN/ACN	66 286 785 438
Street Address	1403a Putty Rd, Blaxlands Ridge, NSW, 2758
Mail Address	As above
Contact person	Ian Moxon
Position	Sole Trader
Mobile	0415 658 686
Email	ibox@pnc.com.au

Governing law	New South Wales

Date of Agreement	See signing page.

Introduction

1 Background and Purpose

The Nature Conservation Council of NSW (NCC) was successful in its application to the Department of Resources, Energy and Tourism (DRET) (now Department of Industry (DOI)) for funding under the Australian Government's Low Income Energy Efficiency Program (LIEEP).

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

This Agreement has been developed in relation to the Subcontractor, **Mr Ian Moxon**, carrying out the deliverables as the **Energy Assessor for Rounds 1 - 3** of the LIEEP grant funded program.

Both parties agree to work together in good faith on the Activity.

2 Commencement and Operation

2.1 Term of Agreement

This Agreement commences and becomes binding on the parties once this Agreement is signed by both parties, and terminates at the conclusion of this Agreement (**attached as Schedule 1**), or as otherwise adjusted by NCC, in accordance with clause 16 ("Termination"). The Term of the Agreement spans the period involved in carrying out the deliverables as the **Energy Assessor for Rounds 1 - 3** only of NCC's Power Savers Project.

3 DOI Funding Agreement

3.1 Authorisation

The Subcontractor authorises NCC to provide all relevant information to DOI in connection with their entry into and performance of the *Power Savers Project Funding Agreement* of May 2013.

3.2 Reporting

The Subcontractor agrees to provide information to NCC, as necessary, to allow NCC to prepare reports (including audited financial reports) to be provided to DOI in accordance with the Funding Agreement.

4 Financial Arrangements

4.1 Payment for Services

NCC will provide funding to the Subcontractor within 30 days, in accordance with the payment milestones set out in Schedule 1, provided that:

- (a) the Subcontractor provides a correctly rendered tax invoice (monthly invoicing);
- (b) the relevant deliverables have been completed; and
- (c) if applicable, sufficient information has been provided by the Subcontractor to enable NCC to report on completion of the milestone to DOI.

5 Reporting and Records

5.1 Reporting

The Subcontractor is required to report to NCC on the performance of their obligations under this Agreement, as set out in Schedule 1.

5.2 Records

The Subcontractor must keep adequate books and records, retaining them for a period of seven years after termination or expiration of this Agreement.

6 Subcontracting

6.1 Arrangements with Third Parties

The Subcontractor may not subcontract any of its obligations under this Agreement or enter into any other arrangement that would involve additional parties in the provision of the Services or performance of this Agreement unless NCC agrees to the proposed subcontracting in writing.

7 Relationship between parties

7.1 Liability

Each Party will be responsible to the other Party for the activities that it performs in respect of this Agreement.

7.2 Obligation of parties

Each Party is responsible for its own obligations arising under this Agreement and the Funding Agreement and is not liable for any other Party's obligations.

8 Conflict of interest

Each Party warrants that no conflict of interest exists or is anticipated relevant to its role in this Agreement or the Activity.

If a conflict of interest arises, the Party affected will notify the other Party immediately and the Party will seek to resolve the conflict to ensure that the successful performance of the Activity is not jeopardised.

Soliciting of products, outside of approved project materials, would be considered a serious breach of this contract.

9 Confidentiality

9.1 Confidential Information Not to be Disclosed

Subject to clause 9.3, a party must not, without the prior written consent of the other party, disclose any Confidential Information of the other party to a third party, including any subcontractors.

9.2 Written Undertakings

A party may at any time require the other party to arrange for:

- a. the other party's Personnel; or
- b. any person with a Third Party Interest, to give a written undertaking in the form of a deed relating to the use and non disclosure of the first party's Confidential Information.

9.3 Exceptions to Obligations

The obligations on the parties under this clause 9 will not be taken to have been breached to the extent that Confidential Information:

- a. is disclosed by a party to its Personnel solely in order to comply with obligations, or to exercise rights, under this Agreement or the Funding Agreement, provided that the receiving person agrees to keep the information confidential;
- b. is disclosed to a party's internal management Personnel, solely to enable effective management or auditing of Agreement-related activities, provided that the receiving person agrees to keep the information confidential;
- c. is authorised or required by law to be disclosed; or
- d. is in the public domain otherwise than due to a breach of this clause 9.

Where a party discloses Confidential Information to another person, the disclosing party must notify the receiving person that the information is confidential.

The Subcontractor must secure all of NCC's Confidential Information against loss and unauthorised access, use, modification or disclosure.

9.4 Use of Confidential Information

Either party who has received Confidential Information from another under this Agreement must not use it except for the purpose of exercising its rights or performing its obligations under this Agreement.

9.5 Return of Confidential Information

Either party who has received Confidential Information from another under this Agreement must, on the request of the other Party, immediately deliver to that Party all documents or other materials containing or referring to that information which are in its possession, power or control or in the possession, power or control of persons who have received Confidential Information from it.

9.6 No Reduction in Privacy Obligations

This clause 9 does not detract from any of the Contractor's obligations under the Privacy Act or under clause 12 (Privacy), in relation to the protection of Personal Information.

9.7 Survival

This clause 9 will survive termination (for whatever reason) of this Agreement.

10 Intellectual Property

10.1 Ownership

Intellectual property developed in the course of the Activity will vest immediately with NCC, **excepting the collateral developed by Ian Moxon prior to his involvement with the Power Savers Project Program.**

10.2 Name, logo and branding

Notwithstanding any other provision of this Agreement, the program name, logo and branding developed in the course of the Activity must not be used for any purpose other than the Activity without the consent of NCC.

10.3 Survival

This clause 10 ("Intellectual Property") will survive the expiration or termination (for whatever reason) of this Agreement.

11 Individual Members' Intellectual Property

11.1 Permission to use an Individual Members' Intellectual Property

In some circumstances, in the course of performing its obligations under this Agreement, a Party may need to use intellectual property belonging to another Party ("**Owner**").

Before using the Owner's intellectual property, a Party must first obtain written consent to such use.

11.2 Non-exclusive license

The Party using the Owner's intellectual property ("**Licensee**") acknowledges that the rights granted to it in clause 11.1 ("Permission to use an Individual Members' Intellectual Property") are non-exclusive and that the Owner may use or permit any other person to use any of its intellectual property in relation to any goods or services.

11.3 Sub-licensing

A Party permitted to use intellectual property under this clause 11 ("Individual Members' Intellectual Property") may not sub-license any of its rights in respect of the intellectual property to any person.

11.4 Permitted use

Where a Party uses the Owner's intellectual property, it must comply with all reasonable directions, instructions and specifications given by the Owner from time to time regarding the representation of the intellectual property and the manner of its use.

11.5 Intellectual Property Infringement

The Owner indemnifies any Licensee using its intellectual property against liability under any final judgment or settlement agreed by the Owner in proceedings brought by a third party in respect of any claim for intellectual property infringement. This indemnity is conditional on the Licensee:

- a. notifying the Owner immediately of any suspected or actual Infringement Claim;
- b. giving the Owner the option to conduct the defence of the Infringement Claim, including full authority in respect of any settlement or compromise negotiations;
- c. giving the Owner all necessary assistance relating to the Infringement Claim; and
- d. authorising the Owner to procure the right for the Licensee to continue using the Trade Marks that are the subject of the Infringement Claim.

12 Privacy

12.1. Interpretation and Application of Clause

12.1.1. In this clause 12:

Information Privacy Principle has the same meaning as it has in the Privacy Act

National Privacy Principle has the same meaning as it has in the Privacy Act; and

Personal Information has the same meaning as it has in the Privacy Act.

12.1.2. This clause applies only where either Party deals with Personal Information when, and for the purpose of, conducting the Activity.

12.1.3. The Subcontractor acknowledges that:

- a. it is a contracted service provider, within the meaning of the Privacy Act, in performing the Activity under this Agreement; and
- b. complaints about acts or practices of the Subcontractor, in performing the Activity, as a contracted service provider within the meaning of the Privacy Act, may be taken to the Privacy Commissioner during or after the Term of this Agreement.

12.2. Obligations of Subcontractor in Relation to Privacy

12.2.1. The Subcontractor must, in conducting the Activity:

- a. issue (and have participants sign) where necessary the Privacy Notice in Annexure B to Schedule 1, or an approved variation of, prior to collecting personal information for the Activity;
- b. keep records and copies of all Privacy Notices and provide them to NCC on request
- c. not do any act or engage in any practice which, if done or engaged in by NCC, would be a breach of an Information Privacy Principle;
- d. not use Personal Information collected under this Agreement for direct marketing purposes;
- e. comply with any directions, guidelines, determinations or recommendations of NCC, to the extent that they are consistent with the Information Privacy Principles;
- f. comply with any other obligations in relation to privacy as required by the National Privacy Principles as they apply to the Subcontractor.

12.2.2. The Subcontractor must notify NCC immediately if it becomes aware of:

- a. a breach or possible breach of any of its obligations under this clause 12; or
- b. any unauthorised access or attempted unauthorised access to Personal Information held in relation to this Agreement.

12.2.3. The parties agree, in respect of any personal information held or collected in connection with this Agreement:

- a. to comply with the National Privacy Principles in the Privacy Act 1988 (Cth) and any other applicable law regarding privacy;
- b. to use that information only for the purposes of this Agreement and the Activity.

13 Acknowledgement and Publicity

13.1. Review of Material

The Subcontractor must not publish, produce or provide any Material until it has been approved by the NCC.

Nothing in this clause 13.1 affects any of the NCC's rights or obligations under this Agreement and NCC does not accept responsibility for, or provide any warranty in relation to the accuracy of, the information or advice contained in any draft Material that it reviews.

13.2. Acknowledgement of Support

13.2.1. Where applicable, the Subcontractor must obtain NCC's prior written approval for each major public announcement or publication the Subcontractor makes that relates to the Activity or

this Agreement, prior to the making of that announcement or publication. NCC will use all reasonable efforts to ensure its approval under this clause is not unreasonably withheld or delayed.

13.2.2. Where applicable, the Subcontractor must ensure that they acknowledge the provision of the Funding by the Commonwealth by:

- a. use of the Australian Government Logo in accordance with the Australian Government Branding Design Guidelines (as released by the Australian Government Department of Prime Minister and Cabinet from time to time); and
- b. by including the following statement:
“This activity received funding from the Department of Resources Energy and Tourism as part of the Low Income Energy Efficiency Program.”

13.2.3. All approved Activity Material published by the Subcontractor with the Australian Government Logo must contain the following disclaimer:

“The views expressed herein are not necessarily the views of the Commonwealth of Australia, and the Commonwealth does not accept responsibility for any information or advice contained herein.”

13.2.4. NCC reserves the right to examine all of the Subcontractor's publications and promotional material, at any time with reasonable notice.

13.2.5. The NCC may, acting reasonably, withdraw its approval for the use by the Subcontractor of any statement, acknowledgment or logo indicating a connection with the Program, where the NCC considers that the use would adversely impact on the reputation of the NCC, other Consortium Members, DOI, the Commonwealth or the Program.

13.3. Right to Publicise Funding and Third Parties

As per clause 13.3 of the Funding Agreement between DOI and NCC, DOI reserves the right to publicise and report on the awarding of Funding for the Activity. DOI may do (but is not limited to doing) this by including the Subcontractor's name, the amount of the Funding given to the Subcontractor, the title and a brief description of the Activity, in media releases, general announcements about the Funding, annual reports or through any other means as determined by DOI.

NCC also reserves the right to publicise and report on the awarding of Funding for the Activity. NCC may do (but is not limited to doing) this by including the Subcontractor's name, the amount of the Funding given to the Subcontractor, the title and a brief description of the Activity in media releases, general announcements about the Funding, annual reports or through any other means as determined by NCC.

13.4. Copies of Publications

Where the Subcontractor has been provided with Funding to produce any advertising materials, public announcements and promotional activity by the Subcontractor or on the Subcontractor's behalf in relation to the Activity, a draft copy of the publication must be provided to NCC for review for accuracy (which will then be forwarded by NCC to DOI for review for inconsistency with Commonwealth laws and policies before the final is published).

13.5. Invitations

Where the Subcontractor is holding an approved event to promote the Activity or Activity Material, the Subcontractor must provide an invitation, at least 30 Business Days prior to the event, to NCC to allow for arranging a representative from DOI and the Minister to attend the event if necessary.

14 Insurance and indemnity

The Subcontractor will effect and keep on file all current insurances, including but not limited to Workers Compensation, Professional Indemnity and Public Liability Insurances required for the protection of themselves, their employees and any others engaged in the provision of Activity services under this Agreement.

The Subcontractor hereby releases and indemnifies the NCC from and against all liability for and in respect of physical injury (including death) to persons or damage to property or any claim of professional negligence arising directly out of any negligent act or omission of the Subcontractor, done or omitted in the course of carrying out the project services under this Agreement.

NCC will not indemnify the Subcontractor in any and all of the following circumstances:

- a. Any personal injury, illness or death to any person arising from any materials or activities carried out during the Activity beyond the agreed deliverables and objectives of this Agreement, within reason; and
- b. Any wilful misconduct, negligence or fault of the Contractor.

At all times while this Contract is in force, the Subcontractor must ensure that the following insurance is taken out and maintained:

- a) Public liability for not less than \$10 million;
- b) Personal sickness and accident cover (sole trader) / Workers Compensation (Company)
- c) Comprehensive motor vehicle insurance for all vehicles used by the Subcontractor in connection with this Agreement; and
- d) Professional indemnity insurance for not less than \$10 million.

The Subcontractor must produce to the NCC on written request evidence of the insurance set out in Clause 14 to the satisfaction of the NCC.

NATIONAL CRIMINAL HISTORY CHECK

- a) All Personnel who are required to enter residential and/or commercial properties must have a National Criminal History Check (NCHC);
- b) All NCHC's will be issued by the Australian Federal Police or other appropriate government authority;
- c) The NCC will work with the Subcontractor to assist in obtaining the NCHC; and
- d) The Subcontractor must pay for the cost of obtaining a NCHC.

15 Dispute resolution

15.1 Procedure for dispute resolution

The parties agree that a dispute arising under this Agreement will be dealt with as follows:

- a. the party claiming that there is a dispute will give the other party a notice setting out the nature of the dispute;
- b. the parties agree to negotiate in good faith on a commercially realistic basis to resolve the Dispute and will refer the Dispute to officers within each Party who are authorised to hear the Dispute;
- c. within 5 Business Days each party will nominate a representative not having any prior involvement in the dispute;
- d. the representatives will try to settle the dispute by direct negotiation between them;
- e. failing settlement within a further 10 Business Days, the parties may agree to refer the dispute to an independent third person with power:
 - i. to intervene and direct some form of resolution, in which case the parties will be bound by that resolution; or
 - ii. to mediate and recommend some form of non-binding resolution;
- f. the parties will co-operate fully with any process instigated under this clause in order to achieve a speedy resolution;
- g. if a resolution is not reached within a further 20 Business Days, either party may commence legal proceedings.

15.2 Costs

Each party will bear its own costs of complying with this clause 15 and the parties will bear equally the cost of any third person engaged under clause 15.

15.3 Application of Clause

This clause 15 does not apply to legal proceedings by any Party for urgent interlocutory relief.

15.4 Performance of Obligations

Despite the existence of a dispute, the Parties will (unless requested in writing by NCC not to do so) continue to perform their obligations under this Agreement.

16 Termination

16.1 Termination for Convenience

16.1.1. NCC may by notice, at any time and in its absolute discretion, terminate this Agreement or reduce the scope of this Agreement immediately.

- 16.1.2. The Subcontractor must, on receipt of a notice of termination or reduction:
- a. stop or reduce the performance of the Subcontractor's obligations as specified in the notice;
 - b. take all available steps to minimise loss resulting from that termination or reduction;
 - c. continue work on any part of the Activity not affected by the notice; and
 - d. immediately return to NCC any Funding or deal with any such Funding as directed by the NCC.
- 16.1.3. In the event of termination under clause 16.1.1, NCC:
- a. will be liable only for payments due and owing to the Subcontractor under the payment provisions of the Agreement as at the date of the notice;
 - b. will be liable to reimburse any reasonable costs and liabilities incurred by the Subcontractor that are directly attributable to the termination of the Agreement or attributable to performance of obligations under the Agreement up to the date on which the notice of termination is received;
 - c. will be liable to reimburse any Activity related work performed to the NCC's satisfaction prior to termination;
 - d. will not be liable to pay amounts under 16.1.3.a and 16.1.3.b which would, added to any payments already paid to the Subcontractor under this Agreement, together exceed the Funding set out in Schedule 1;
 - e. will be entitled to recover from the Subcontractor any part of the Funding which:
 - i. has not been legally committed for expenditure by the Subcontractor in accordance with the Agreement and payable by the Subcontractor as a current liability by the date that the notice of termination is received; or
 - ii. has not, in the NCC's opinion, been spent by the Subcontractor in accordance with the Agreement.
- 16.1.4. In the event of a reduction in the scope of the Agreement under clause 16.1.1, the Nature Conservation Council's liability to pay any part of the Funding will, unless there is agreement in writing to the contrary, reduce in accordance with the reduction in the Activity.
- 16.1.5. The NCC's liability to pay any compensation under or in relation to this clause 16.1 is subject to:
- a. the Subcontractor's compliance with this clause 16.1; and
 - b. the Subcontractor's substantiation of any amount claimed under clause 16.1.3.b.
 - c. the Subcontractor will not be entitled to compensation for loss of prospective profits or loss of any benefits that would have been conferred on the Subcontractor.

16.2. Termination for Fault

- 16.2.1. NCC may by notice terminate this Agreement immediately (but without prejudice to any right of action or remedy which either party has or may have) if:
- a. the Subcontractor fails to fulfil, or is in breach of any of its obligations under this Agreement, and NCC considers that this failure or breach is not capable of remedy;
 - b. the Subcontractor fails to fulfil, or is in breach of any of its obligations under this Agreement, and does not rectify the omission or breach within 20 Business Days of receiving a notice from NCC to do so;
 - c. the Subcontractor, by written notice to the NCC, withdraws from the Activity;

- d. the Subcontractor is unable to pay all its debts as and when they become due and payable;
- e. the Subcontractor has applied to come under, received a notice requiring it to show cause why it should not come under, or has otherwise come under one of the forms of external administration referred to in Chapter 5 of the Corporations Act 2001 (Cth) or equivalent provisions in legislation of the States and Territories pertaining to incorporated associations or Chapter 11 of the Corporations (Aboriginal and Torres Strait Islander) Act 2006 (Cth) or an order has been made for the purpose of placing the Subcontractor under external administration;
- f. being an individual, the Subcontractor becomes bankrupt or enters into a scheme of arrangement with creditors;
- g. in relation to the Agreement, the Subcontractor breaches any law of the Commonwealth, or of a State or Territory;
- h. NCC exercises any other specific right of termination under the Agreement; or
- i. DOI terminates or reduces the scope of the Funding Agreement with the NCC.

16.2.2. Where the NCC terminates this Agreement under clause 16.2.1, the NCC will be liable for payments due and owing to the Subcontractor under the payment provisions of the Agreement as at the date of the notice.

16.3. Preservation of Other Rights

16.3.1. Clause 16.2 does not limit or exclude any of the NCC's other rights under this Agreement.

16.4. Default

The NCC may, by written notice, terminate this Agreement and recover from the Subcontractor any loss or damage suffered if the Subcontractor fails within seven (7) days after receipt of written notice to remedy any default in the performance of the following obligations:

- a. To commence or proceed at the rate of progress strictly in accordance with this Agreement;
- b. To perform or observe the terms and conditions of the Agreement; and / or
- c. To comply with a reasonable direction from the Program Coordinator, Program Officer, Chief Executive Officer or the Chairperson of NCC.

16.5. Damages

Where there is no appropriate remedy for a breach in this Agreement (other than termination), the non-defaulting Party is entitled to damages for losses suffered by it and expenses incurred by it as a result of the breach of the terms of this Agreement.

16.6. Termination or reduction in scope of the Funding Agreement

- a. If DOI issues a notice of termination or reduction of the Funding Agreement, NCC must immediately provide a copy of such notice to the Subcontractor.
- b. Upon receipt of such notice, both Parties must do all things reasonably necessary to give effect to the rights and obligations of NCC under clause 16.1 of the Funding Agreement.

16.7. Survival of obligations

The termination of this Agreement with respect to any Party does not affect:

- a. Any obligation of that Party which accrued prior to that termination and which remain unsatisfied; and
- b. any provision of this Agreement which is expressed to come into effect on, or continue in effect after, that termination.

17 Workplace Health and Safety

17.1. Interpretation

In this clause 17:

- a. notifiable incident has the same meaning that it has in the Work Health and Safety Act 2011 (Cth);
- b. WHS means work health and safety; and
- c. WHS Rules means all relevant legislation, codes of practice and national standards relating to work health and safety.

17.2. General Duties

17.2.1. The Subcontractor must, in carrying out the Activity, comply with (and ensure any Personnel comply with):

- a. all relevant WHS Rules including providing identification to householders; and
- b. all applicable WHS policies and procedures that produce the highest level of health and safety.

17.2.2. Without limiting the obligations in clause 17.2.1 the Subcontractor must, in carrying out this Agreement:

- a. take reasonable care for the health and safety of its Personnel;
- b. take reasonable care that its acts or omissions do not adversely affect the health and safety of other persons;
- c. comply, so far as it is reasonably able, with any reasonable instruction given by NCC in relation to health and safety; and
- d. actively cooperate with the NCC to assist the NCC to meet its WHS obligations.

17.3. Consultation and Notification Requirements

17.3.1. The Subcontractor will actively consult with the NCC to assist the NCC to meet its WHS obligations.

17.3.2. The Subcontractor must notify the NCC immediately if it becomes aware that a notifiable incident has occurred. Incident reporting should follow the NCC's processes and requirements. This notification requirement operates in addition to, and is not a replacement for, the Subcontractor's notification requirements under the WHS Rules.

17.3.3. If a WHS inspection, assessment or audit is conducted in relation to any action performed by the Subcontractor in connection with this Agreement, the Subcontractor must:

- a. provide the NCC with a written statement detailing what that inspection, assessment or audit involved; and

b. provide the NCC with a copy of any materials subsequently received from the inspector, assessor or auditor.

17.3.4. The Subcontractor must notify the NCC immediately if it becomes aware that legal proceedings have been brought against it under the WHS Rules. This clause 17.3.4 applies even where the legal proceedings do not relate to work performed by the Subcontractor in connection with this Agreement.

18 General Provisions

18.1. Audit and Access

18.1.1. The Subcontractor must:

- a. give DOI, or any persons authorised in writing by the Department, access to their premises where obligations under this Agreement are being carried out; and
- b. permit those persons to inspect and take copies of any Material relevant to this Agreement.

18.1.2. The rights referred to in clause 18.1.1. are subject to:

- a. the Department (via the NCC) providing reasonable prior notice;
- b. the reasonable security procedures in place at the premises; and
- c. if appropriate, execution of a deed of confidentiality by the persons to whom access is given.

18.1.3. The Auditor-General and the Privacy Commissioner are persons authorised for the purposes of clause 18.1.1.

18.1.4. This clause 18.1 does not detract from the statutory powers of the Auditor-General or the Privacy Commissioner.

18.2. Compliance with Legislation and Policies

Energy Assessor Subcontractors must be appropriately accredited in accordance with relevant NSW requirements, and must comply with the AS/ANZ 3598 standard when undertaking energy audits/assessments.

The Subcontractor must ensure that they comply with any provision of a statute or subordinate legislation of the Commonwealth, or of a State, Territory or local authority applicable to its performance of this Agreement.

The Subcontractor must, in carrying out its obligations under this Agreement, comply with any of the Commonwealth or Department's policies as notified, referred or made available by NCC to the Subcontractor (including by reference to an internet site).

18.3. Variation and waiver

A provision of this Agreement or a right created under it may not be waived or varied except by mutual

agreement in writing and signed by both parties.

18.4. Reduction in scope

In the event that DOI reduces the scope of the Funding Agreement:

- a. NCC may propose variations to this Agreement, to the extent necessary, to reflect the reduction in the scope of the Funding Agreement;
- b. the Parties must endeavor to reach agreement on variations arising from the reduction in scope of the Funding Agreement; and
- c. in the event that the Parties are not able to reach agreement, the dispute resolution procedures set out may be applied by the parties.

18.5. Notices

A notice, approval, consent or other communication in connection with this Agreement must be:

- a. in writing, signed by the sender (if an individual) or an Authorised Officer of the sender; and marked for the attention of the person identified in the Details or, if the Subcontractor has notified otherwise, then marked for attention in the way last notified; and
- b. left at the address set out or referred to in the Details, sent by prepaid ordinary post (airmail if appropriate) to the address referred to in the Details; or sent by fax to the fax number referred to in the Details.
- c. presumed to take effect from the time it is received unless a later time is specified in it.

18.6. Inconsistent law

To the extent permitted by law, this Agreement prevails to the extent it is inconsistent with any law.

18.7. Counterparts

This Agreement may be executed in counterparts. All counterparts when taken together are to be taken to constitute one instrument.

18.8. Insurance

Where required by law, the Parties will separately maintain insurance policies with respect to performance of their obligations under this Agreement.

18.9. Governing law

This Agreement is governed by the law in force in the place specified in the Details.

18.10. Costs

Each Party is responsible for its own costs in connection with the negotiation and preparation of this Agreement and completion of the Transaction.

18.11. Entire agreement

This Agreement constitutes the entire agreement of the Parties about its subject matter and supersedes all previous agreements, understandings and negotiations on that subject matter.

18.12. GST

Unless otherwise indicated, all consideration provided for a supply under this Agreement is exclusive of any GST imposed on the supply.

18.13. Severability

If any provision or part provision of this Agreement is invalid or unenforceable, other provisions of this Agreement shall remain in full force and effect.

18.14. Negation of employment and agency

The Subcontractor will not represent itself, and will ensure that its employees do not represent themselves, as being employees or agents of NCC.

The Subcontractor will not by virtue of this Contract be, or for any purpose be deemed to be an employee or agent of NCC.

18.15. Force Majeure

Both Parties will not be liable for the consequences of any delays or failure to carry out any aspect of the program where such delay or failure is due to any event beyond their reasonable control, including, without limitation, acts of God, fire, flood, accident, terrorism, strike and riot.

19 Definitions

These meanings apply unless the contrary intention appears:

Activity means the activities described in this Agreement and Schedule 1.

Authorised Officer means a person appointed by a Party to act as an Authorised Officer for the purposes of this Agreement.

Business Day means a day other than a Saturday, Sunday or public holiday in the place or places set out in the Details under "Business Day place(s)".

Confidential Information means all confidential, non-public or proprietary information regardless of how the information is stored or delivered, exchanged between the parties before, on or after the date of this Agreement relating to the business, technology or other affairs of the any Party.

Consortium means the Nature Conservation Council of NSW, United Voice, The University of Technology, Sydney as represented by the Institute for Sustainable Futures and Solahart Industries.

Consortium Members means the parties named as comprising the Consortium. The terms **Consortium Member** and **Party** have the same meaning in this Agreement.

Corporations Act means the Corporations Act 2001 (Cwlth).

Details means the section of this Agreement headed "Details".

Dispute includes any dispute, controversy, difference or claim arising out of or in connection with this Agreement or the subject matter of this Agreement, including any question concerning its formation, validity, interpretation, performance, breach and termination.

DOI (or 'the Department') is the Australian Government Department of Industry, which has replaced the Australian Government Department of Resources, Energy and Tourism.

DRET is the Australian Government Department of Resources, Energy and Tourism.

Funding Agreement means the **Funding Agreement in relation to the Low Income Energy Efficiency Program** entered into between NCC and the Commonwealth of Australia represented by the Department of Industry.

Government Agency means any governmental, semi-governmental, administrative, fiscal, judicial or quasi-judicial body, department, commission, authority, tribunal, agency or entity.

GST has the meaning it has in the GST Act.

GST Act means the A New Tax System (Goods and Services Tax) Act 1999 (Cth).

Headings (including those in brackets at the beginning of paragraphs) are for convenience only and do not affect the interpretation of this Agreement.

Receiver includes a receiver or receiver and manager.

Holding Company has the meaning it has in the Corporations Act.

Infringement Claim means a claim by a third party that a member of the Consortium's use of the Owner's intellectual property in accordance with clause 14 of this Agreement infringes that party's intellectual property rights.

A person is **Insolvent** if:

- a. it is (or states that it is) an insolvent under administration or insolvent (each as defined in the Corporations Act); or
- b. it has had a Controller appointed or is in liquidation, in provisional liquidation, under administration or wound up or has had a Receiver appointed to any part of its property; or
- c. it is subject to any arrangement, assignment, moratorium or composition, protected from creditors under any statute or dissolved (in each case, other than to carry out a reconstruction or amalgamation while solvent on terms approved by the other parties to this Agreement); or
- d. an application or order has been made (and in the case of an application, it is not stayed, withdrawn or dismissed within 30 days), resolution passed, proposal put forward, or any other action taken, in each case in connection with that person, which is preparatory to or could result in any of (a), (b) or (c) above; or
- e. it is taken (under section 459F(1) of the Corporations Act) to have failed to comply with a statutory demand; or

- f. it is the subject of an event described in section 459C(2)(b) or section 585 of the Corporations Act (or it makes a statement from which another party to this Agreement reasonably deduces it is so subject); or
- g. it is otherwise unable to pay its debts when they fall due; or
- h. something having a substantially similar effect to (a) to (g) happens in connection with that person under the law of any jurisdiction.

Intellectual Property means all copyright (including rights in relation to phonograms and broadcasts); all rights in relation to inventions, plant varieties, trademarks (including service marks), designs, circuit layouts, and all other rights resulting from intellectual activity in the industrial, scientific, literary or artistic fields, but does not include: moral rights; the rights of performers; or rights in relation to Confidential Information.

Lead Partner means the Nature Conservation Council of NSW (NCC) who holds the responsibilities of Subcontractor as defined in the Funding Agreement.

Next day

If an act under this Agreement to be done by a party on or by a given day is done after 5.30pm on that day, it is taken to be done on the next day.

Next Business Day

If an event under this Agreement must occur on a stipulated day which is not a Business Day then the stipulated day will be taken to be the next Business Day.

Related Body Corporate has the meaning it has in the Corporations Act.

Related Entity has the meaning it has in the Corporations Act 2001 (Cwlth).

Representative of a party includes an employee, agent, officer, director, auditor, advisor, partner, consultant, contractor or sub- contractor of that party.

Start date means the date the Agreement was signed.

Subsidiary of an entity means another entity which is a subsidiary of the first within the meaning of part 1.2 division 6 of the Corporations Act or is a subsidiary or otherwise controlled by the first within the meaning of any approved accounting standard.

Tax Act means the Income Tax Assessment Act 1936 (Cth) or the Income Tax Assessment Act 1997 (Cth), as the context requires.

Tax Invoice has the meaning it has in the GST Act.

Term means the term of the Activity specified in Clause 2.1 of this Agreement.

19.1. References to certain general terms

Unless the contrary intention appears, a reference in this Agreement to:

(variations or replacement) a document (including this Agreement) includes any variation or replacement of it;

(clauses, annexures and schedules) a clause, annexure or schedule is a reference to a clause in or annexure or schedule to this Agreement;

(reference to statutes) except in the definitions of Related Entity and Subsidiary a statute, ordinance, code or other law includes regulations and other instruments under it and consolidations, amendments, re-enactments or replacements of any of them;

(law) law means common law, principles of equity, and laws made by parliament (and laws made by parliament include State, Territory and Commonwealth laws and regulations and other instruments under them, and consolidations, amendments, re-enactments or replacements of any of them);

(singular includes plural) the singular includes the plural and vice versa;

(person) the word “person” includes an individual, a firm, a body corporate, a partnership, a joint venture, an unincorporated body or association, or any Government Agency;

(executors, administrators, successors) a particular person includes a reference to the person’s executors, administrators, successors, substitutes (including persons taking by novation) and assigns;

(two or more persons) an agreement, representation or warranty in favour of two or more persons is for the benefit of them jointly and each of them individually;

(jointly and severally) an agreement, representation or warranty by two or more persons binds them jointly and each of them individually;

(reference to a group of persons) a group of persons or things is a reference to any two or more of them jointly and to each of them individually;

(dollars) dollars, A\$ or \$ is a reference to the lawful currency of Australia;

(calculation of time) if a period of time dates from a given day or the day of an act or event, it is to be calculated exclusive of that day;

(reference to a day) a day is to be interpreted as the period of time commencing at midnight and ending 24 hours later;

(accounting terms) an accounting term is a reference to that term as it is used in accounting standards under the Corporations Act, or, if not inconsistent with those standards, in accounting principles and practices generally accepted in Australia;

(meaning not limited) the words “include”, “including”, “for example” or “such as” when introducing an example, does not limit the meaning of the words to which the example relates to that example or examples of a similar kind;

(reference to anything) any thing (including any amount) is a reference to the whole and each part of it.

EXECUTED as an Agreement

This Agreement is made on the day of , 2014.

SIGNED on behalf of **Nature Conservation Council of NSW** (ABN 96 716 360 601):

.....
Mr Pepe Clarke
Chief Executive Officer

.....
Date

In the presence of:

.....
Name of witness

.....
Signature

SIGNED by / on behalf of **the Subcontractor**:

.....
Mr Ian Moxon

.....
Date

In the presence of:

.....
Name of witness

.....
Signature

SCHEDULE 1

Energy Assessor – Rounds 1 - 3

This Schedule sets out the key responsibilities, deliverables, remuneration, collateral and retrofit materials, processes and procedures, and supervisory details for the Subcontractor. This Schedule may be varied by mutual agreement between the NCC and the Subcontractor. The variation must be in writing and signed by both parties.

1. KEY RESPONSIBILITIES

- Test and provide feedback on the home energy assessment processes and survey tool which will be used in Rounds 1 - 3 of the *Power Savers Project* (PSP).
- Maintain the appropriate Aust/NSW accreditation as an energy auditor and deliver energy assessments as required at AS/NZ 3598 Standard and according to PSP processes.
- Install or provide guidance to householders on small-scale tailored energy savings retrofits as part of the energy assessments, as required.
- Undertake assessment administration activities as required, including managing the Subcontractors Google calendar, pre-assessment confirmation with householders, managing collateral and other materials, reporting of any workplace incidents, and timely delivery and quality assurance of assessment data.
- Report to both United Voice and NCC as required through the assessment, and feedback in relation to further refinement of the assessment processes and assessment tool.
- If necessary, assist NCC with advising new energy assessors to assist with the PSP, and induct the new assessors in line with the PSP, as and when they are appointed.

The Subcontractor will maintain their own email, telephone and other services adequate for the performance of the services and tasks delineated.

2. DELIVERABLES

The Subcontractor must carry out the deliverables to the satisfaction of the NCC on or before the due date, unless otherwise agreed with NCC. NCC & UV will conduct quality checks throughout the assessment process and provide feedback to the Subcontractor. Any changes to the agreed upon deliverables must be negotiated in writing as a formal variation to this Agreement, in collaboration with NCC's PSP Program Coordinator.

Deliverable	Completion Date	Rate	Unit
Test and provide feedback on the home energy assessment processes and survey tool. Includes: - Familiarisation with Fluid Surveys, the proposed assessment processes, and retrofit suite of items. - Review the energy assessment survey tool and provide feedback to NCC on its practical effectiveness from an Assessor perspective.	Jan 2014	\$50 per hour*	Likely to be one half-day.
Deliver Energy Assessments. Includes: - Provide in-home assessments for participants, strictly at scheduled times, as per Google booking calendar. - Submit quality assured assessment data to NCC within 72 hours of assessment completion. Through the survey tool: - Correctly identify households that may be suitable for the specified Solahart solar hot water product by providing a first pass site assessment. - Provide advice to NCC on recommended tailored retrofits for post-assessment. - Provide the necessary information for NCC to deliver an accurate Power Savers Action Plan (PSAP) to each household. - Identify households who show an interest in CuriousWorks film engagement. Install small-scale energy savings retrofits as part of the energy assessments, as required. Includes: - Guiding or assisting householders with installation and/or instructions on best use of tailored retrofit items.	As per bookings calendar	\$200 flat fee per assessment (includes administration, time at assessment, travel time, fuel, etc). See point 3 of this Schedule for further details of the rate of pay for assessments.	Per assessment.

Deliverable	Completion Date	Rate	Unit
Undertake assessment administration activities as required. Includes: • Maintain, monitor and manage an up-to-date Google Calendar for the project. • Liaise with United Voice staff to manage issues around booking processes, including changes to assessment times, completion/postponement/ cancellations. • Contact each householder 24-48 hours prior to each assessment to confirm the assessment date and time as well as their availability, and remind them of any basic preparations necessary (eg. WH&S; Last energy bill). • Ensure that adequate amounts of retrofits items are transported to each assessment (may include regular collection of items from storage). • Managing any other collateral and materials (eg. Ensuring a hard copy of the survey is at hand in case of computer failure, and taking to each assessment a billing data consent form and Reply Paid envelope in case the account holder is not present at the assessment) • Reporting of any workplace incidents, and timely delivery and quality assurance of assessment data. • Maintain any required paper and electronic records and provide to NCC as necessary. • Provide updates to NCC as required and report any WH&S issues within 24 hours including a completed incident report.			
Induction of new energy assessors. If required, may include: • Train / induct any new assessors to assessor-based PSP processes • If required, host a new assessor at an assessment	As required	\$50 per hour* for the training/ induction. Assessment to be charged at assessment rate.	
Further Refinement of Assessment Process and Assessment Tool. If required, includes: • Attend meetings and/or other reporting to provide feedback.	Ongoing	\$50 per hour*	

* A half day minimum applies to the \$50 hourly rate whenever the Subcontractor is required to make a separate trip to travel from home to NCC and back.

3. REMUNERATION

For a trial of two months from 18 February 2014 – 18 April 2014, the Subcontractor will be paid for a minimum of six assessments per week, at the rate specified in the deliverables table above, even if six assessments have not been performed by the Subcontractor that week due to cancellations, postponements, participants not being there when the Subcontractor attends the property or less assessments being scheduled that week. If the Subcontractor performs more than six assessments per week, the Subcontractor will be paid for each assessment performed at the rate specified in the deliverables table above.

During this trial, the Subcontractor will not be paid extra for late cancellations, postponements, participants not being there when the Subcontractor attends the property or travelling to an assessment a long distance from the Subcontractors house.

A week before the trial is due to end (11 April 2014), the Parties will meet (either on the phone or face to face) to discuss how the trial has gone, and whether variations need to be made to this Agreement. If variations do need to be made, variations will be made in accordance with this Agreement.

Payment to the Subcontractor will be made within 30 days on the basis of the submission of a correctly rendered tax invoice at the end of each fortnight. The invoices will detail the expenses incurred for specific components of the project. Payment will be made on the condition that all work is of a satisfactory standard to both UV and NCC.

Invoices are to be approved for payment by Ben Perkins at the Nature Conservation Council of NSW office, by email to bperkins@nccnsw.org.au or post to Level 2/5 Wilson Street, Newtown NSW 2042. Invoices sent to this address should be marked with the reference code “LIEEP Project”.

4.SUPERVISION

This position may require occasional travel to the Hunter, Illawarra and Sydney metropolitan regions, as well as weekend and evening work. The majority of the work will be unsupervised and remote from the office.

Day to day communication on the deliverables will be with Ben Perkins (Program Coordinator, PSP). Mr Pepe Clarke (CEO, NCC) and Rachel Mimmo (Sustainability Program Manager, NCC) will be responsible for issuing directions and any notifications under this Agreement.

5. PROCESSES AND PROCEDURES

The Subcontractor will be provided with ‘Guidance notes’ and ‘Instructions for Assessors’ which will set out the processes and procedures regarding the PSP. These manuals will also set out the process for what will happen if an Assessment is cancelled or postponed at late notice.

If the Subcontractor has a query or a question about an assessment which is due to take place in less than 24 hours, unless otherwise directed, the Subcontractor should telephone the main office of United Voice’s offices on 02 8204 7204 and speak with Antony Dale or Cherie Brandon.

6. MATERIALS

The Subcontractor is responsible for all Materials supplied by the NCC. These materials include, but are not limited to:

1. iPad 2 wifi + 3G (or other supplied computer)
2. Belkin carry case
3. Collateral and retrofit materials (please see point 7 below which details this further)

In signing this Agreement, the Subcontractor assumes responsibility for the abovementioned items. Unused collateral and the materials provided by the NCC to the Subcontractor must be returned to the NCC immediately on completion of Rounds 1 - 3 or at the termination of this Agreement in the same condition as they were in when provided, excepting reasonable wear and tear.

The Subcontractor must supply at their own cost all other equipment necessary to carry out the Contracted Task and must arrange transport in the form of a motor vehicle that must be:

- a) registered;
- b) insured; and
- c) kept in a good state of mechanical repair.

The Subcontractor must not allow Unauthorised Persons to accompany them when carrying out the Contracted works, unless approval has been granted from NCC.

7. Collateral and retrofit materials

All Collateral and retrofit materials provided to the Subcontractor will be detailed by NCC in a document. This document will be handed to the Subcontractor for the Subcontractor to check that all materials stated in the document are present. If the Subcontractor agrees with the document, two copies of the agreed document will be signed, one for each party.

If the Subcontractor does not agree with the document, they are to make manual amendments on the document and initial these amendments. Once both Parties are happy with the changes, two copies of the agreed document will be signed, one for each party.

In signing the document, the Subcontractor assumes responsibility for all items specified on the document. Unused collateral and retrofit materials provided by the NCC to the Subcontractor must be returned to the NCC immediately on completion of Rounds 1 - 3 or at the termination of this Agreement in the same condition as they were in when provided, excepting reasonable wear and tear.

The Subcontractor agrees to perform a regular stock take, and inform the NCC by email when there are 50 or less of any retrofit item in stock. In the email, please specify which item and how many there are left in stock.

8. Storage of collateral and retrofit materials

The NCC has booked a ground floor, drive in access, 3x3m self storage unit at Hawkesbury Self Storage for the Subcontractor to store safely the retrofit materials provided to him. The NCC will pay for this unit each month.

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UNIVERSITY OF
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Institute for
Sustainable
Futures

Evaluation Report of the pilot stage of the Power Savers Project (PSP)

For the Nature Conservation Council (NSW) and the PSP
Consortium

June 2014

AUTHORS

Samantha Sharpe and Fiona Berry

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Executive Summary

The pilot stage has provided a good test of the Power Savers Project (PSP) including how the PSP is meeting its objectives, how the evaluation and data collection mechanisms work, the type of data they provide, and early results of changes in participants from the PSP.

The demographic data provides us with a snapshot of the household characteristics that are likely to be represented in the wider PSP sample including:

- A mix of single, couple and family households;
- Mainly detached, and older dwellings;
- A large proportion of households using electricity for hot water, heating and cooling;
- A mix of owner occupied and rented homes
- A mix of participants from a range of different low-income employment industries
- Upwards of eight to ten consumer electronic appliances in the household.

The pilot stage has shown significant success in increasing households' levels of energy literacy and correspondingly their feelings of control over their electricity use. Significantly, there is also the perception from participants that this change has not come at any cost to comfort within the home. The PSP, through the pilot stage, has also contributed to a significant reduction in the self-reported barriers to energy efficiency, in some cases halving the proportion of participants that cite these barriers.

This pilot evaluation report highlights four areas for ongoing consideration into the main PSP rollout:

- Revisions to the post-intervention survey and participant contact protocols;
- The importance of the right person as the home assessor;
- The importance of follow-up communications;
- The continued inclusion of the in-home display as an option in the menu of energy solutions;
- Adequately addressing the needs of renters.

The pilot stage did not test all aspects of the full PSP, including the specific targeting of renters for the installation of solar hot water systems, and the billing data collection and analysis of actual energy consumption. The inclusion of these aspects in the full PSP will allow the stated objectives to be more fully tested, and give a more robust evaluation of success. However, early results from the pilot stage are positive.

1. About the Power Savers Project (PSP)

The Power Savers Project (PSP) is an energy efficiency project funded by the Commonwealth Government under the Low Income Energy Efficiency Program (LIEEP). The PSP aims to reduce household electricity use, and correspondingly electricity bills, in participant households through household electricity assessments, the installation of a customised suite of energy efficiency equipment and materials, and by providing ongoing support through a peer-to-peer engagement project that includes education and advice. A consortium led by the Nature Conservation Council (NCC) and including United Voice (UV), Solahart Industries (SH) and the Institute for Sustainable Futures at the University of Technology, Sydney (ISF) will implement the PSP.

The PSP will engage 1,000 low-income participants drawn from the United Voice NSW Union membership directly in energy efficiency education and household retrofits. In doing so, the PSP will also raise awareness and provide energy efficiency information to the 16,000 member base of United Voice NSW. The key features of the PSP are:

- Producing information resources for low-income households and catering for multiple languages;
- Providing energy assessments, tailored energy solutions and ongoing assistance for participants;
- Specifically including in the participant base renters as well as owner occupiers, and identifying retrofit activities that can be undertaken in rented properties;
- Recruiting and training interested participants to act as energy efficiency Champions in their community;
- Undertaking robust evaluation and data analysis to inform future energy efficiency policy and programs.

The innovation of the PSP delivery includes:

- Engaging the target audience through a trusted organisation – their Union;
- Reaching a new demographic of people previously not able to participate in government-funded energy efficiency programs (including low-income households not possessing a concession card, or being renters or both);
- Using peer-to-peer networks and storytelling to inspire and sustain energy-efficient behaviours;
- Engaging tenants and landlords to develop cost sharing arrangements for energy efficiency measures;
- Sharing inspiring success stories through media, social media and online communication.

The PSP has five objectives linked to expected outcomes for participants and stakeholders. The objectives and outcomes are detailed in Table 1. The objectives will be used to guide the evaluation process, although because of the structure and timing of the pilot stage, the fourth objective is not being evaluated within the pilot.

Table 1 - PSP objectives and outcomes

#	PSP Objectives	Outcomes (intended results for the low-income households)
1	Increase energy literacy among participants and therefore contribute to participants having a sense of control over their electricity use and electricity bills.	Participants have an increased understanding of the benefits of energy efficiency and increased energy literacy.
2	Reduce electricity use in participants' homes through the provision of one-to-one guidance (Energy Assessment and ongoing engagement with project staff), combined with the installation of energy efficient technology in participants' homes (energy efficiency solutions will be tailored to the needs of each individual home).	Participating low-income households reduce energy use by a median value of 10% with a comparable reduction in household energy costs. Further reductions are expected for households that receive solar hot water systems.
3	Generate persistent electricity use reductions through the provision of ongoing support and communication through participants' peer network(s).	Through peer-to-peer engagement, low-income households in the broader community learn about the benefits of energy efficiency and are inspired to take action to reduce energy use.
4	Develop and test methods to overcome split incentive barriers in a select number of participant households by developing a method for upgrades to solar hot water systems (with degrees of subsidy) in rented properties	Suggested approaches for overcoming split incentive barriers that could be replicated in future programs.
5	Develop, implement, evaluate and disseminate effective, replicable models for reducing energy use by low-income households.	Effective, replicable models for reducing energy use by low-income households are implemented, evaluated and disseminated.

2. The PSP Pilot Stage

Prior to full rollout, the PSP was tested through a pilot stage. The home assessment component (the primary physical intervention) of the pilot stage ran from September to October 2013, and was followed by a 4-month period for follow-up communications.

The target of 30 Pilot participants was recruited in a short time through phone calls to 60 UV members, with 2 recruited in face-to-face conversations. These members had indicated concerns with energy costs and/or the environment or energy efficiency in previous UV member surveys.

The Pilot project brochure with a registration form was mailed out to these 30 members followed by a phone call within two weeks. A total of 18 registration forms were received and 5 verbal confirmations that registration forms were returned. Of the remaining 7 members recruited to the Pilot, 2 dropped out and 5 opted to be included in later rounds of the PSP. One more dropped out at the point of booking the assessment. Thus, the pilot included a total of 20 participants from the 27 recruited, giving a drop-out rate of 26%.

Recruitment of participants was through direct contact with a United Voice Union Organiser over the phone (93%) or by onsite visit by an organiser (7%). At recruitment, brief demographic data was collected for each participant.

After recruitment, participants were booked in to receive an energy efficiency home assessment. The home assessor collected information on the building fabric and orientation of the home, key electrical appliances within the home, and administered the Pre-Intervention Participant Survey (PIPS). The survey included attitudinal questions on energy efficiency, understanding of electricity usage and bills within the household, current energy efficiency behaviours and uses of electrical appliances in the home. The assessor then selected and installed a set list of energy efficiency products up to a value of approximately \$70. Such items included a ValveCosy and lagging (hot water system insulation), an Ecoswitch, and an LED globe.

A licenced electrician installed an *Efergy* in-home display (IHD) in all participants' homes at an all-inclusive cost of approximately \$250 per household. One participant also received a free solar hot water system.

The assessor also provided personalised explanations and advice on energy efficiency activities. Following the assessment, participants were mailed a personalised Action Plan with a list of additional actions the household could undertake to reduce their electricity consumption. The participants then received follow-up telephone calls on a bi-monthly basis (October and December 2013, January and March/April 2014) from United Voice to see how the participants were adjusting to the installed items and IHD, answer any of their further questions, and provide motivation for continuing with the energy efficiency actions.

During the final of these follow-up calls, and approximately four months after the home assessment, participants were asked to complete the Post Intervention Participant Survey (POPS). This survey was administered by telephone and asked similar attitudinal and

behaviour questions to the Pre-Intervention survey in order to detect changes in the participant group in the intervening four months.

The pilot stage tested the first two of the four data collection mechanisms that will be used in the evaluation of the main PSP. The four data collection mechanisms are:

- Registration and participant group questionnaires (pre and post)
- Home assessments
- Livelihood workshops
- Billing data

The livelihoods workshop and billing data assessments were not used in the pilot due to the size of the sample and the timing of the pilot. All of the 20 participants completed the pre-intervention survey, however only 15 participants (75%) completed the post-intervention survey. This was due to difficulty in contacting the participants to complete the survey by telephone, as well as the length of the survey.

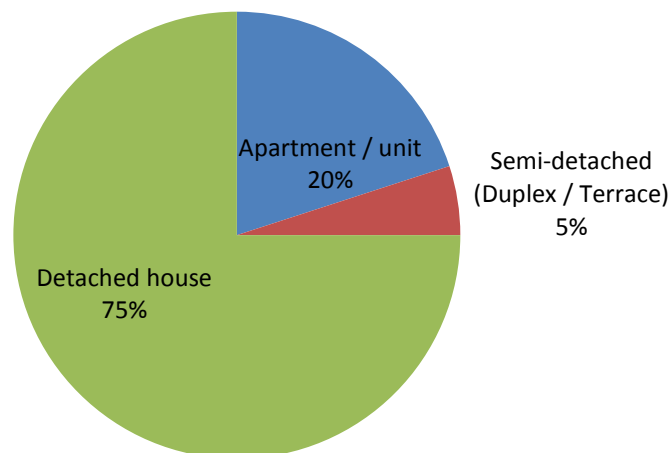
2.1 Summary of pilot participant demographics

At registration, participants were asked for some basic demographic information. The results of this information are presented in this section.

The pilot group was almost evenly split between participants that were owner-occupiers (50%) and renters (45%). The sector of employment of the main household participant was also spread across a range of industry sectors that make up the membership of United Voice, including:

- Homecare 40%
- Security 10%
- School Cleaner 25%
- Retail Cleaner 5%
- Early Childhood Education and Care – 15%
- Hospitality 5%

The pilot participants were also split between single person and couple households, and family households of four or more people. Dwelling types of participants was primarily detached houses (75%) with the remaining quarter of participants living in semi-detached houses or apartments (see Figure 1).

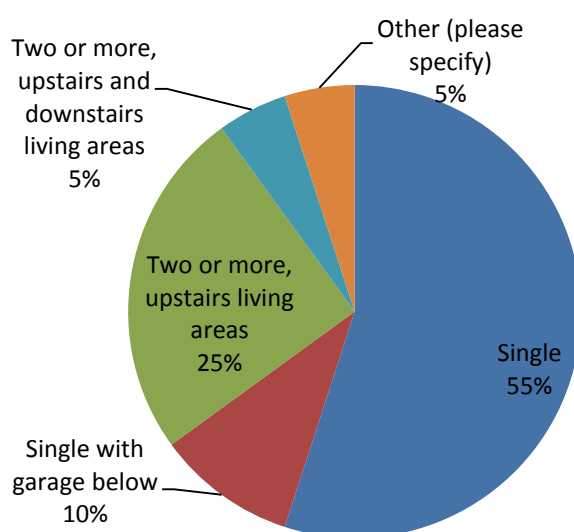
Figure 1 - Dwelling type of pilot households

N=20

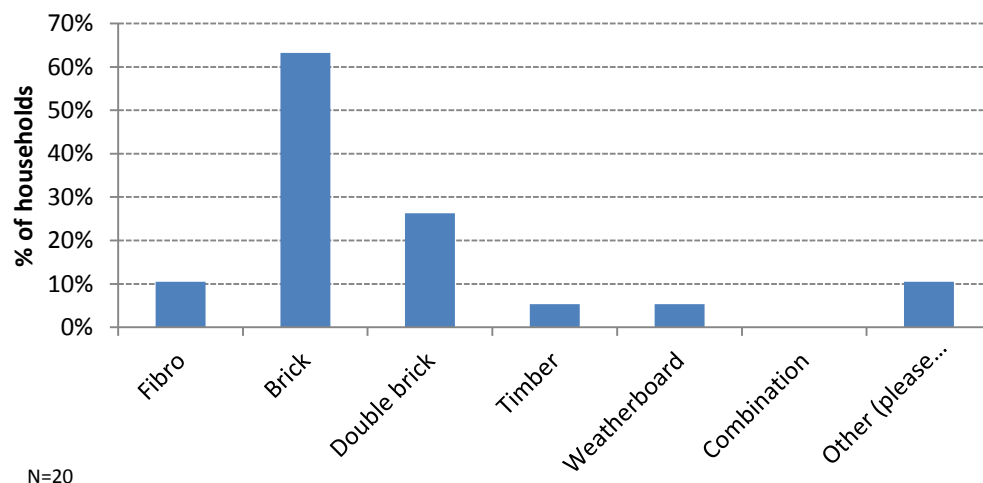
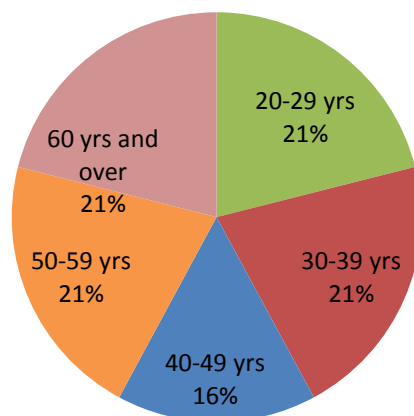
2.2 Characteristics of pilot participants' dwellings

The dominance of detached housing among the participants is also reflected in the number of storeys we see in the houses, with 65% of participants living in single storey, or single storey with garage below houses (see Figure 2). The building fabric of dwellings was mainly brick (63%) or double brick (26%) (see Figure 3). More than half of the participants' dwellings had ceiling insulation (55%) with only one household also having wall and floor insulation. This left a remaining 40% of dwelling with no insulation.

Participants' dwellings typically contained two to three bedrooms (95%) with one or two living areas (75%). The age of the dwellings for the pilot participants was reasonably old, with all participants' dwellings being built more than 20 years ago (see Figure 4).

Figure 2 - Number of storeys in dwelling of pilot households

N=20

Figure 3 - Building fabric of dwelling in pilot households**Figure 4 - Age of dwelling**

2.3 Current electricity use in the home

For 65% of pilot participants most of their electricity use occurred in the evening after they got home for work, but for the remaining 35% electricity use varied throughout the day and night depending on their shift work and family commitments.

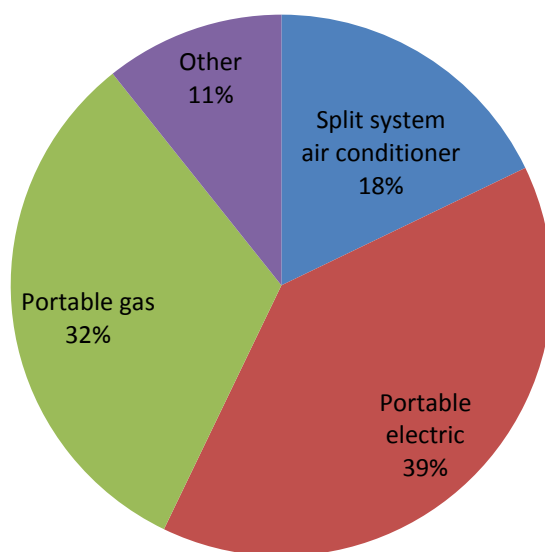
All of the participants were on a continuous tariff, with one third of participants also having access to an off peak tariff (for hot water). Two participants also had a rooftop solar photovoltaic (PV) system, which was connected on a gross tariff.

Temperature control within the home is one of the primary uses of energy and for the pilot participants in most cases heating and cooling appliances were electric. In the case of heating, 57% of households used either split system air-conditioners or electric heaters; with another third of households using portable gas heaters (see Figure 5). In terms of heating hot water for the home, there was also a similar split between electric and gas fuel

sources; 56% of households used electricity to heat their hot water (the majority using an off-peak tariff), with the remainder using gas.

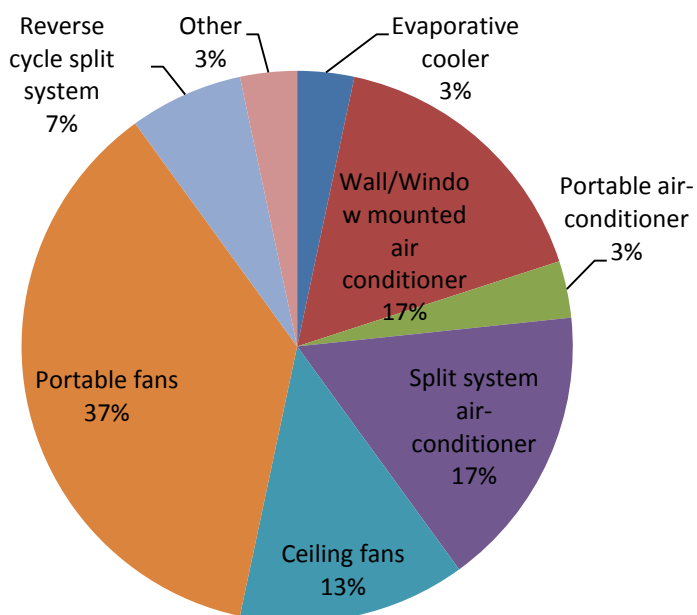
For cooling there was much more variety in the types of appliances, although all were electric; 44% of households used some form of air-conditioner, whether reverse cycle, split systems or portable and wall mounted systems. Half of the households used some form of fan, 13% ceiling fans and 37% portable fans (see Figure 6).

Figure 5 - Main form of heating within pilot households



N=20

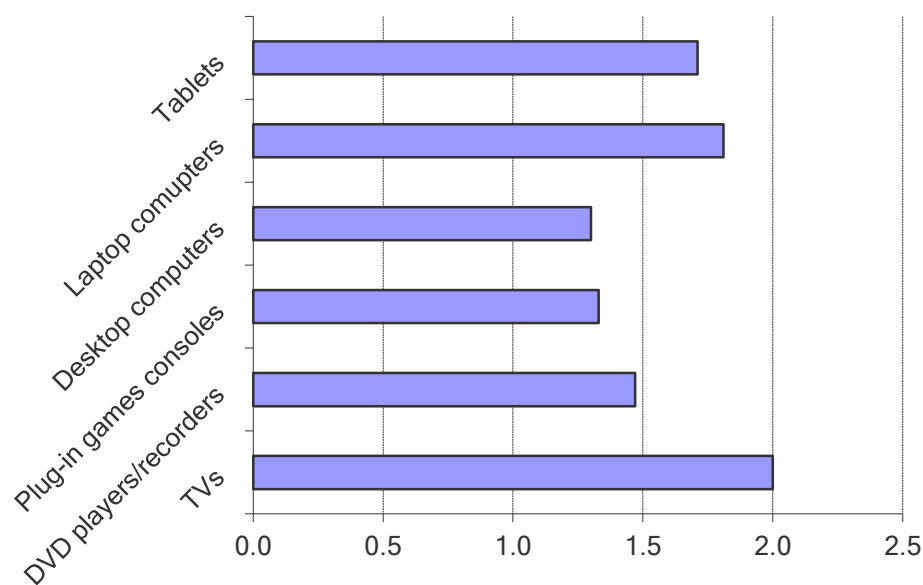
Figure 6 - Main form of cooling within pilot households



N=20

Another major and rapidly growing source of electrical appliances within the home is consumer electronics including televisions, DVD players, and various forms of computers including laptops and tablets. On average, the pilot households had one to two of these items within the home.

Figure 7 - Average number of consumer electronic appliances within pilot households



N=20

3. PSP Pilot stage evaluation results

3.1 Changes in energy literacy over the pilot stage

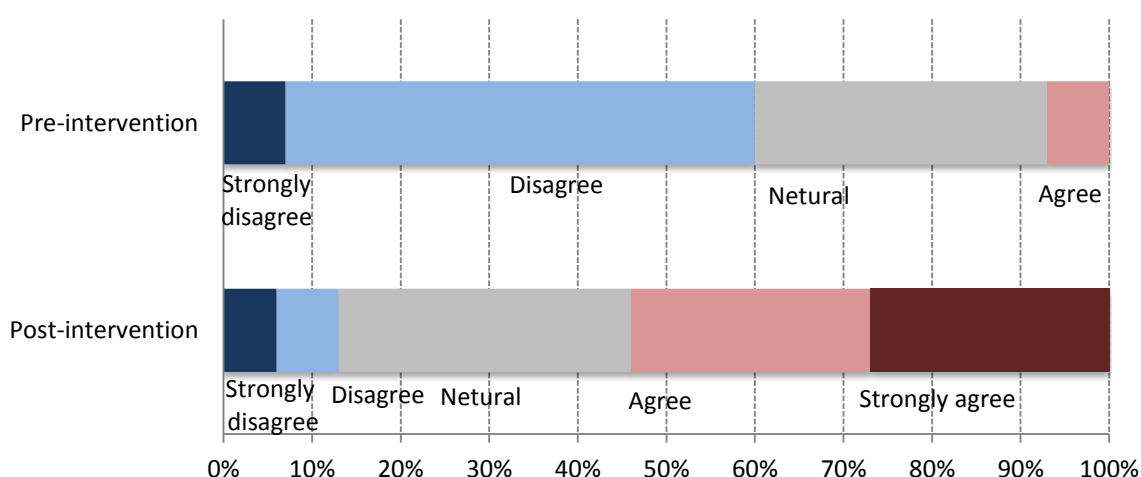
The first objective of the PSP was to increase energy literacy among participants and by doing so contribute to participants having a sense of control over their electricity use and electricity bills. In order to evaluate changes in energy literacy among the participants, the pre-intervention and post-intervention surveys asked a set of questions to elicit a self-assessment from the participants of their levels of energy literacy and sense of control over their electricity bills.

Understanding the electricity bill

In both surveys participants were read a statement: “When I receive my electricity bill, all the information makes sense,” and asked whether they strongly disagreed, disagreed, agreed, strongly agreed, or neither disagreed or agreed with the statement. Figure 8 shows participant responses from both the pre and post-intervention surveys. In the pre-intervention survey 60% of the participants disagreed with the statement, i.e. they found their electricity bills confusing to understand. A third were neutral with only 7% feeling they confidently understood their bills.

Analysing the post-intervention responses, there is a marked change in participant’s level of understanding of their electricity bill. In the post-intervention survey 54% of participants now agreed with the statement, and 27% of these were rated as “strongly agree”, suggesting a significant turnaround in participants perception of their knowledge of their electricity bill. Also, only 13% of participants now disagreed with the statement. Participants commented that with the help of the home assessor they were now able to “decode” their bills because the bill was explained to them.

Figure 8 – Before and after responses to statement: “When I receive my electricity bill, all the information makes sense”



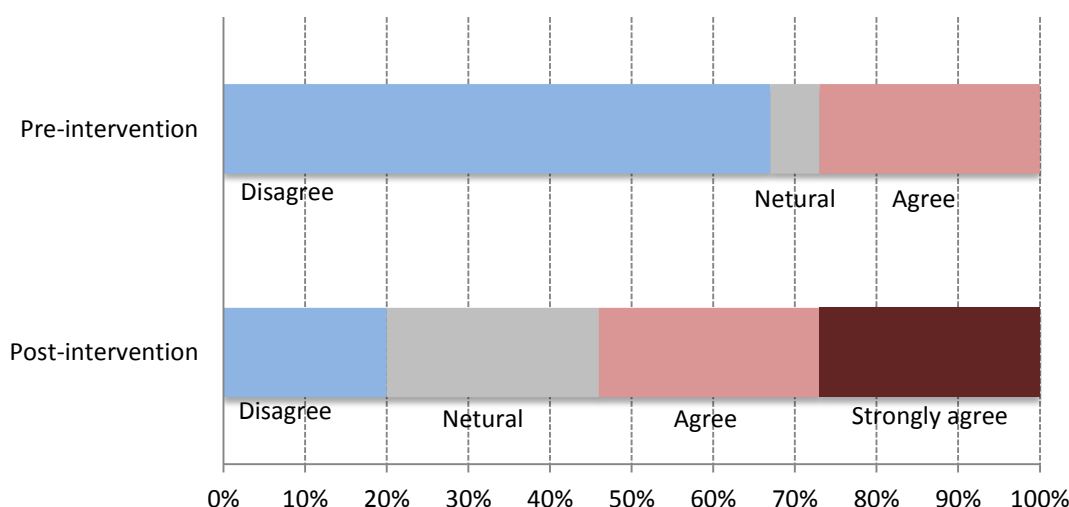
Pre-intervention n=20, post-intervention n=15

Sense of control over electricity use

Participants were asked in both pre and post-intervention surveys the following statement: “I feel in control of my electricity bills”, and then again given the same five available responses. Again we can see the same significant change in participants’ sense of control, as in their perception of increased bill literacy. In the pre-intervention survey 67% of participants disagreed with the statement, meaning they did not feel in control of their electricity bill, with only 27% agreeing (see Figure 9). Interestingly despite the large proportion disagreeing with the statement, none of the participants strongly disagreed, suggesting perhaps this is not a strongly held view, or participants did not like to highlight their lack of control.

In the post-intervention responses this had changed significantly with 54% of participants now agreeing with the statement, including 27% who strongly agreed. The neutral responses grew from 6% in the pre-intervention survey to 26% in the post-intervention survey, again potentially reinforcing the view that lack of control of electricity bills may not be a significant issue or an issue participants want to highlight. The percentage of participants that disagreed with the statement in the post-intervention survey dropped to 20%. One householder commented that they “feel more in control after Ian (the assessor) visited”.

Figure 9 - Before and after responses to statement ““I feel in control of my electricity bills”



Pre-intervention n=20, post-intervention n=15

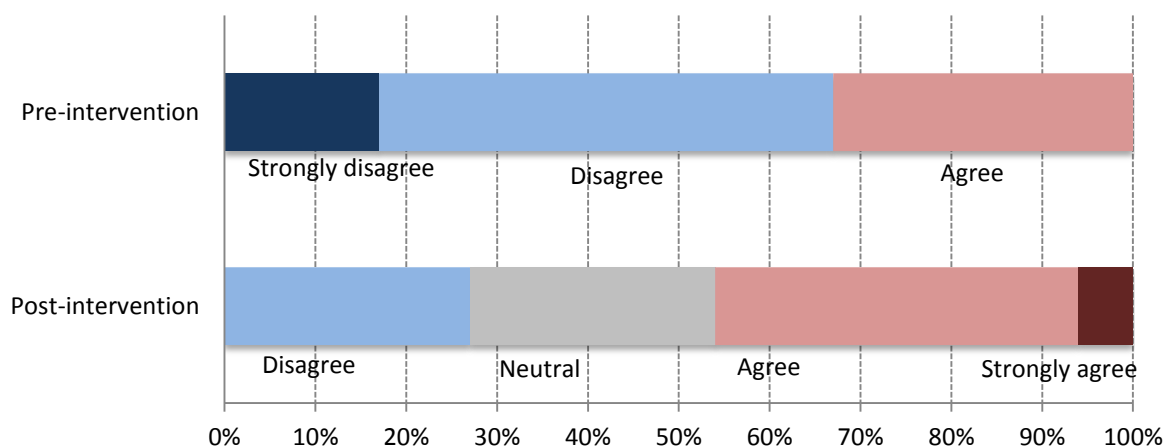
Energy efficiency and comfort within the home

A frequently cited fear of householders when considering energy efficiency changes within their home is that they will have to make sacrifices to their comfort levels in order to reduce their electricity use. In the pre and post-intervention surveys participants were asked about how comfortable they felt with their current levels of heating, cooling and lighting in their home. Again the participants had the five response categories of strongly disagreed, disagreed, agreed, strongly agreed, or neither disagreed or agreed with the statement for responses.

As the pilot stage took place over the summer months, only the cooling and lighting statements are reported. For cooling, 67% of participants disagreed with the following statement, “I feel comfortable in my home with regards to cooling”, 17% of participants strongly disagreed, and 33% agreed. By the post-intervention survey this had increased to 46%, with 6% strongly agreeing. The neutral category had also increased significantly from 0% in the pre-intervention survey to 27% in the post survey. By the post survey the participants that disagreed with the statement dropped to 27%, with none strongly disagreeing.

Participants noted that the use of blinds and curtains helped reduce the amount of heat let into the house and therefore the amount of cooling required; “...it still gets really hot in the house but pulling the blinds down and drapes across makes a difference”. Participants also adopted less electricity intensive cooling methods, such as ceiling fans, “...It was still very hot in my house during summer. The ceiling fans helped a bit.”

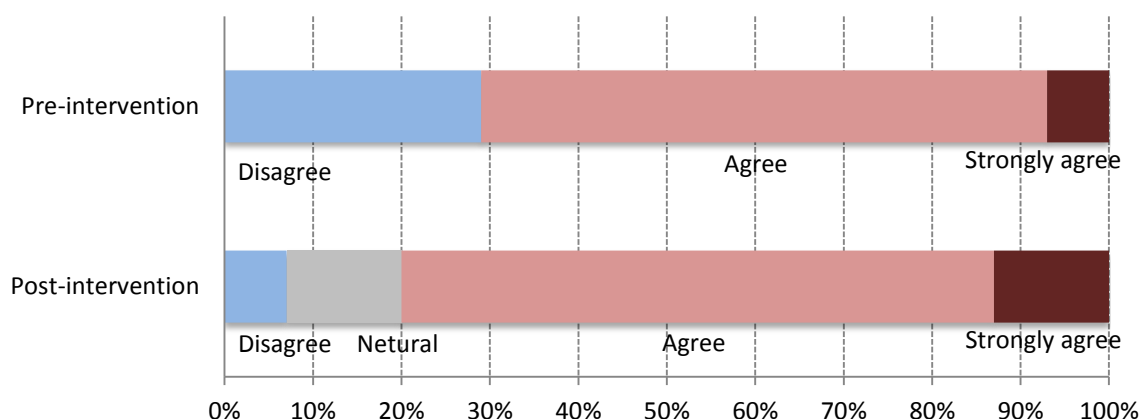
Figure 10 - Before and after responses to statement ““I feel comfortable in my home with regards to cooling”



Pre-intervention n=20, post-intervention n=15

Participants were asked the same statement but in regards to the lighting levels within their house. The pre-intervention survey showed that over two-thirds of households were happy with the levels of lighting within their home (see Figure 11). As the pilot stage took place over summer this could be a seasonal factor. However there were some small levels of improvement in comfort with lighting between the pre and post-intervention surveys, with the percentage of participants strongly agreeing with the statement, almost doubling over the pilot, and those disagreeing decreasing from 29% to 7%.

Figure 11 - Before and after responses to statement ““I feel comfortable in my home with regards to lighting”



Pre-intervention n=20, post-intervention n=15

3.2 Changes in energy efficiency behaviour and persistence of change

The second and third objective of the PSP is to reduce electricity use in participants' homes through the provision of one-to-one guidance (Home Assessment and ongoing engagement with project staff), combined with the installation of energy efficient technology in participants' homes (energy efficiency solutions will be tailored to the needs of each individual home) and also to ensure that these electricity use reductions are persistent. The evaluation of the pilot stage does not include actual electricity consumption analysis. This will occur in the evaluation of the main Power Savers project.

Assessment of reduced electricity use in the pilot stage is through participants self-reporting of changes in energy efficient practices within their home, and also their reporting of whether the PSP has helped remove some of the pre-existing barriers to adopting energy efficiency activities.

Energy efficiency behaviours before and after the PSP

The before and after survey results on current energy efficiency behaviours within the participant households did not provide the same conclusive evidence as the changes shown in energy literacy (see Figure 12). Pilot participants were asked about the types of energy efficiency behaviours they currently used in the pre-intervention survey. Most participants were already turning off unneeded lights (100%), selecting appliances using the star-ratings (95%) and using curtains and blinds to moderate electricity use for heating and cooling (90%). Less used behaviours were turning off appliances at the power point (55%) and setting thermostats to a lower temperature (50%).

There were some small changes in the use of different behaviours in the pre and post survey, including some circumstances where the use of these behaviours actually decreased over the pilot period. The largest positive change in these behaviours was in the 'review electricity bill' category, increasing from 55% in the pre survey to 67% in the post survey. The strong evidence already discussed on the increases in energy literacy in participants over the pilot stage supports this. The differences in other behaviours are small, and could

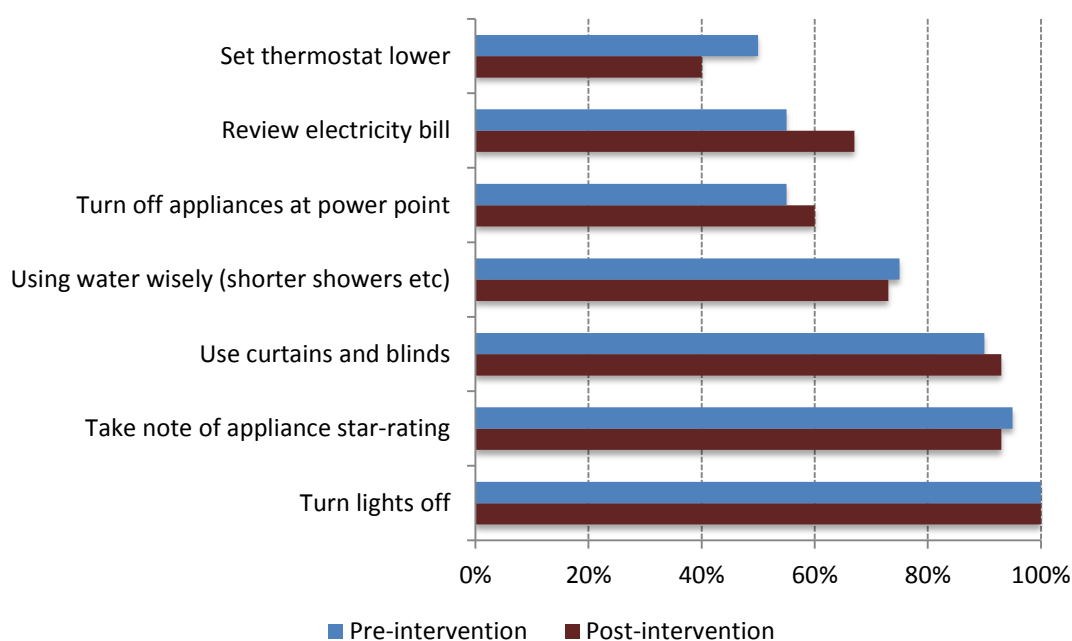
also be explained by the reduction of sample size between the pre (20 households) and post-intervention surveys (15 households). This emphasises the importance of adequate sample sizes in each of the surveys. The fact that the participants who signed up for the pilot were interested and engaged in exploring their home's energy efficiency may also explain small differences in other behaviour.

Participants comments also demonstrate changed behaviours, for example, "...since Ian (the home assessor), I am more vigilant about turning off things like washing machine and the printer and other things, things that don't have memory, plus things that have convenient power outlets where I can access them".

And, "...I've installed lagging on my hot water pipes under my house, which means hot water comes through the pipes faster. I also use the eco-switch, the thermometer you guys sent me, and the LED light globes you sent me... it's great".

And, "...I keep the fridge temperature a bit warmer now, so it's saving energy. I never used to do that before, I just used to keep it mid-way now it's on quarter power".

Figure 12 - Before and after energy efficiency behaviours in pilot households



Pre-intervention n=20, post-intervention n=15

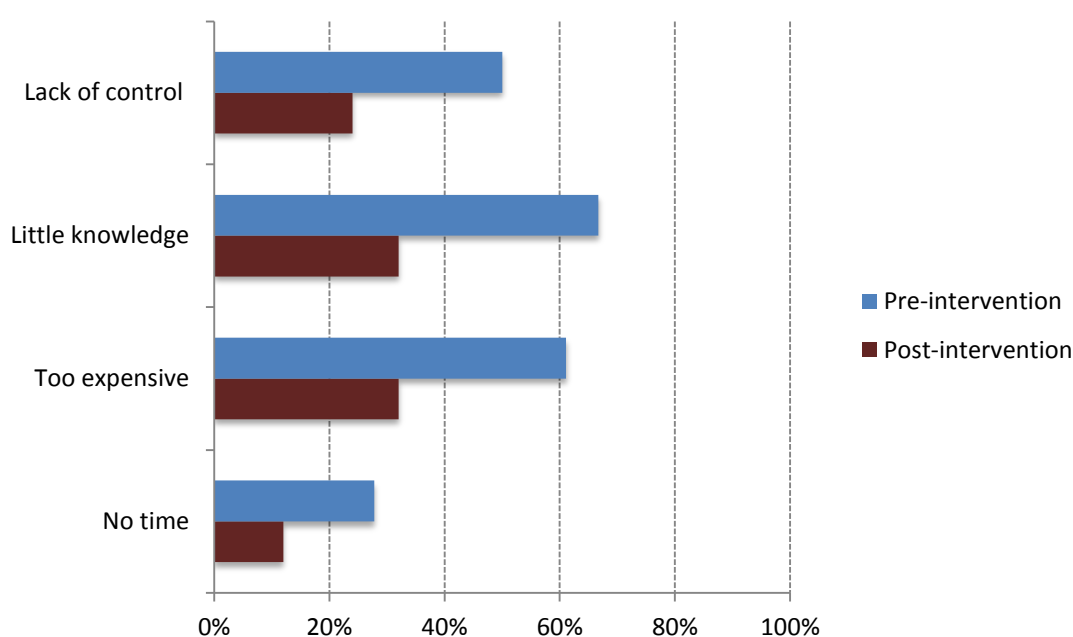
Barriers to energy efficiency activities

The surveys also asked participants about some of the barriers they faced when considering and implementing energy efficiency products and activities. Participation in the PSP seems to have resulted in a significant reduction of households facing these barriers (see Figure 13). From the pre-intervention survey the most mentioned barriers by householders were too little knowledge (67%), too expensive (61%) and lack of control to be able to implement changes (50%). The no time barrier was mentioned by 28% of participants. By the post-

intervention survey the knowledge barriers had reduced to 32%, half of the proportion recorded for the pre-intervention survey.

Similarly the financial cost barriers reduced to 32% and lack of control barrier to 24% - in both cases half or almost half of the previous figure. The no time barrier reduced further to 12%. These figures suggest that the PSP contributed to increasing participants' knowledge of energy efficiency and suggesting actions that could be implemented in individual household's circumstances. The provision of energy efficiency items could have addressed financial constraints, in combination with targeted advice.

Figure 13 - Before and after comments on the barriers to energy efficiency



Pre-intervention n=20, post-intervention n=15

Open-ended questions from the post-intervention survey also provide further qualitative evidence of the changes experienced by participants. The barriers to energy efficiency are often complex and inter-connected. The following comment demonstrates the link between knowledge and financial barriers, "... (we) have more knowledge but still using the same appliances, we will invest in new energy efficient products when they're cheaper or need replacing. Our last bill was lower and we are using the Ecoswitch everyday ...we turn off a lot more appliances than prior to the PSP."

Also "(the PSP) is helping us understand our electricity consumption via the wireless energy monitor (IHD) - electricity usage has dropped significantly since the home assessor visited and has saved us money on electricity, and we have a new understanding of our electricity use".

3.3 Developing a replicable model for household energy efficiency programs

The fifth objective of the PSP was to develop and test a replicable model for household energy efficiency programs, specifically a program that could be targeted at households at

the lower end of the income spectrum. From the pilot stage, 94% of participants said they would recommend the project to others, with the remaining 6% electing a neutral response.

PSP from the participants' viewpoint

Analysis of the qualitative comments from the open-ended questions in the post-intervention survey highlights that increased knowledge of energy efficiency has been the primary benefit achieved by participants. This knowledge is derived from the in-home assessment and learning how electricity is used in their home, but also through the installation of in-home displays for day-to-day electricity consumption monitoring.

For example, "...The family now has lot more information about energy use than prior to the PSP. This knowledge has lead to behaviour change around usage times of household appliances and reduced their energy consumption"

Also: "...In general I have found that being a 'powersaver' has given me more awareness of the cost of power. I haven't changed much behaviour as I was very conscious of energy usage prior to the PSP and didn't have high bills, (\$290 approx. per quarter). I have been turning lights off more and being very vigilant about making sure taps are turned off. I use the temperature setting with heating and cooling, it is a trade off between comfort and cost. I don't have gas and heating usually costs around \$10 per week in winter. I have only noticed a marginal reduction in our energy bill."

And "...I now have real time knowledge of my energy use and can see the energy use spike when I use different appliances. Overall my energy use has reduced since becoming a 'powersaver' and I have seen a minor cost reduction in our electricity bill."

PSP from the project managers' viewpoint

Part of a successful and replicable project is making the project delivery as efficient as possible. The purpose of the pilot stage was to test as many aspects of the project as possible and see how they worked in 'real life'.

Design and operation of project systems

For the project managers the pilot offered an opportunity to build and test recruitment, data collection (surveys and home assessments tools), and project and financial management systems.

There were elements of trial and error throughout this process, but this ultimately led to the creation of systems that will benefit the subsequent project roll out. For example two online survey tools were trialled; "...using Survey Monkey to collate and analyse the data gave us the idea of our requirements and meant we could more efficiently investigate other survey software that we could use an assessment tool. This led to the *Fluidsurveys* system down the track, which better served our needs, and meant we could create the action plans easily from the home assessment results".

In some cases limited allowances for the purchase or design of software systems was made in the budget. For example, "...there was no original budget allocation for a participant database and we were essentially unable to finalise database plans until we had certainty

around some aspects of the project as it developed, such as specific data points. Choosing the most suitable database at the best price was challenging. Eventually we found that *Salesforce* offers a charity / not-for-profit discount, but it would still prove costly to purchase. There was also no budget or provision of a home assessment tool for Assessors to use in the field to collect all of the data we needed to. We ended up developing our own tool in *Fluidsurveys*".

Existing assessment tools would have cost the project over \$45,000 for 1,000 assessments, and would still have needed further budget for customisation of the tool for LIEEP and the Data Schema. In future government programs, particularly those dealing with large participant groups and/ or data requirements it would be beneficial if guidance could be provided on budget allocation for these items. Bulk purchasing arrangements for suitable systems or software may also be worth investigating.

Project staff recruitment and staff skills

Recruitment of key project management staff was an essential first step in initiating the Power Savers project. However recruitment could not take place until the funding agreement was signed (delayed by five months) and this had the impact of compressing project timelines for all activities, significantly diminishing the scope and scale of the pilot stage and the ability to apply learnings from the pilot to the full project.

However once key staff were in place, project design progressed quickly. The importance of having the home assessor involved early in project activities was acknowledged, "...we recruited a very good, highly experienced energy assessor who received very positive feedback from participants. It was beneficial to have input from him quite early on in the project, and have his ongoing input to help refine assessment questions and format / process, as well as for the action plans and retrofit items".

The involvement of qualified and licensed tradespeople was also seen as critical to the success of the pilot stage. For example the project recruited a qualified electrician to install the in-home display systems. As evidenced in the following quote from the project managers, "...the IHD installs went well and seemed to be well received. Recruiting a qualified electrician was very beneficial for working the bugs out of our system".

The experience of other sub-contractors also led to early achievements for the project. One of the unique features of the Power Savers project is the use of participant-led communications materials, particularly short films created by participants that describe their stories. Feedback from both participants and project managers on this process has been positive. For example, "...*CuriousWorks* films were a success. I think it's because we were working with people who were very committed to the union movement and were already deeply engaged".

Data requirements for the project

The LIEEP has intensive data requirements from individual projects and their participants. The intensity of these requirements impacted on the timing and success of the pilot. The data schema for LIEEP was still being finalised when the pilot stage started, and as a result, data collection between the pilot and full project will vary slightly (and in some instances

may not be comparable). The delays in finalising the data schema also held up plans for the participant database.

The PSP uses three data collection mechanisms to gather information from all participants. These mechanisms, particularly the pre-intervention (PIPS) and post-intervention surveys (POPS) are extensive, and proved challenging in implementation. Additionally, assessment times were lengthy, some up to and beyond 2 hours.

Assessment bookings in the Pilot stage were managed by the assessor, but this proved time-consuming and administratively difficult. The target audience were largely unavailable when the Assessor called them, due to the fact that many are shift-workers. Assessment bookings are now being scheduled through the United Voice call centre.

The lower completion rate of the POPS from the pilot stage (75%) is in part attributed to the time taken to administer the survey over the phone. In response to difficulties in obtaining responses to the post-survey, the project managers developed processes for making appointments with participants to answer the survey. As shown, "...The process took on average half an hour to go through the survey and then a further half an hour to enter the data. This was because you had to have conversations with people, and the conversations could get quite involved. The time taken also depended on the person, if it was a younger person and English as a first language then it was quicker".

Communications

It was recognised early in the project that our audience would not be highly engaged online so a decision was made to reallocate a portion of funds from the proposed website to other neglected areas of the budget.

There was a reduction to translation requirements as all Pilots identified as English speaking. Going forward, it is recognised that translation of any materials should be necessary only on a case-by-case basis. It was thought wasteful of the Department's resources to have a blanket policy of translation of all materials prior to identifying our participant needs. The Pilot allowed the project to develop some visual aids and fact sheets to assist with participant understanding of energy efficiency.

Overall project thoughts

There was an acknowledgement that the PSP was still in its early stages; "...there is still a fair bit of work to do with the United Voice organisers and embedding PSP, information about the project hasn't permeated through to everyone in UV yet, it hasn't been adopted widely through the organisation as a tool so people don't have a great understanding of the project".

However the inclusion of additional structures such as the Advisory Panel are seen as strategies to overcome some of these challenges in the full project roll out, "...A significant challenge was that NCC had never run a project like this before. It would've been great to have the Advisory Committee support from the outset so they could provide early guidance about how to run the project, logistical issues to expect, how to best manage the assessment bookings, etc".

4. Conclusions for ongoing project design, operation and evaluation

The pilot stage has provided a good test of the Power Savers project, including how the project is meeting its objectives, how the evaluation data collection mechanism are performing, the type of data they provide, and the early results of changes from participants in response to the PSP.

The demographic data provides us with a snapshot of the household characteristics that are likely to be represented in the wider project sample including:

- A mix of single, couple and family households;
- Mainly detached, and older dwellings;
- A large proportion of households using electricity for hot water, heating and cooling;
- A mix of owner occupied and rented homes
- A mix of participants from a range of different low-income employment industries
- Upwards of eight to ten consumer electronic appliances in the household.

The pilot stage has shown significant success in increasing households' levels of energy literacy and correspondingly their feelings of control over their electricity use. Significantly, there is also the perception from participants that this change has not come at any cost to comfort within the home. The project has also contributed to a significant reduction in the self-reported barriers to energy efficiency, in some cases halving the proportion of participants that cite these barriers.

The pilot stage did not test all aspects of the full PSP, including the specific targeting of renters for the installation of solar hot water systems, and the billing data collection and analysis of actual energy consumption. The inclusion of these aspects in the full project will allow the PSP to be more fully tested against its stated objectives, and give a more robust evaluation of the success of the project. However, early results from the pilot stage are positive.

4.1 Areas of consideration for ongoing project design

Revisions to the post-intervention survey and participant contact protocols

The difficulties faced by the project managers and the lower response rate to the post-intervention survey means that revisions will be required to the post-intervention survey for the full PSP rollout. As this report has shown, the post-intervention data is very important in being able to demonstrate changes resulting from the project, particularly in areas such as increased energy literacy.

Options for revision include dedicating more resources to gather the post-intervention data, or investigating whether a sample of participants could be used to complete the survey, although this will create limitations in the evaluation analysis.

Importance of right person as the assessor

There was a lot of positive feedback on the home assessor for the pilot project, and the significant increases in energy literacy highlight the importance of the skills and personality

of the home assessor. Although, this has to be tempered with a realisation that the participants have limited time available for their home assessment, for example “...the energy assessor was very passionate, but he went on a bit (maybe a bit too passionate) and got a bit technical with me. Some of it went straight over my head, and I wanted him to move on at times”.

The roll out of the wider project will require the recruitment of a number of home assessors, and probably tighter scheduling of home assessments. Ensuring consistency of experience for participants in this circumstance will be something the project will need to address.

Follow-up communications important part of the process

The follow-up communications are an important component of the innovation of the PSP, and in generating the persistence of change that is one of the project objectives. The pilot stage has truncated the follow-up communications somewhat by operating a shorter timeline (4-months instead of the 12-months that will occur in the full project) and not having access to the video stories of pilot participants (four participants have recorded video stories of their experience of the PSP, which will be used in communications for the full PSP).

A variety of communications mediums will also be important in achieving persistence, as one pilot participant commented, “...I would have liked a brochure at the time of assessment that outlines all the general costs of using regular household appliances and maybe a fridge magnet with energy saving reminders on them”.

Positive feedback on the IHD

The increases in energy literacy of participants in the pilot stage have been impressive. From the qualitative comments of participants it is evident that part of this knowledge has developed from the installation and operation of In-home electricity monitors as part of the home assessment. For example, “...my wife is at home more but has really taken to using the IHD and monitoring all the electricity use around the home”. IHDs should continue to be included in the home assessment retrofits menu options.

Adequately addressing the needs of renters

As noted earlier in this report, the pilot stage did not include one of the main innovations of the PSP, which is the additional assistance to renters to enable the installation of more significant energy efficiency interventions, such as solar hot water systems. Both participants and project managers have identified the need for the PSP to adequately include renters and address their specific energy efficiency needs, as one participant noted, “...one of the biggest obstacles to changing some behaviours is lack of control over the property as a renter”. If the PSP can address what has been an ongoing challenge for government-funded energy efficiency programs (addressing the need of renters, whilst managing equity concerns in terms of subsidising investment properties) then it will have made a major contribution to energy efficiency policy.



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Appendix 4

Power Savers Challenge program

Proposed Eligibility Criteria for DRET approval

Households

An eligible participant in the Power Savers Challenge is a household who accrues 100 points, or greater, based on the following criteria:

- With a gross annual household income of up to \$68,540* (100 points)
- Where the household dwelling is rented (40 points)
- Where the participant is from a non-English speaking background and/or culturally and linguistically diverse (40 points)

To ensure equity for low paid workers and to enable recruitment of the target 1,010 participating households through United Voice, an eligible participant may also be:

- An international student with part time employment (100 points)
- A participant renting (40 points) in shared accommodation with an annual income up to \$68,540, (30 points) who also has one of the following criteria:
 - The participant is NESB/CALD (40 points)
 - Housing stress indicator – paying more than 30% of household income on housing (30 points)
 - Energy stress indicator – the participant has been unable to pay one or more of their energy bills on time in the last 12 months (30 points)
- A household with a combined annual income of up to \$80,000 (30 points); who has at least two of the following criteria:
 - The dwelling is rented (40 points)
 - The participant is NESB/CALD (40 points)
 - Housing stress indicator – paying more than 30% of household income on housing (30 points)
 - Energy stress indicator – the participant has been unable to pay one or more of their energy bills on time in the last 12 months (30 points)

Location

All participating households must be located within the Sydney, Central Coast[^], Hunter or Illawarra geographical regions of NSW.

[^]NB: Central Coast is not currently listed in the Funding Agreement Schedule 1.4 geographic areas. If DRET defines it as a separate region to Sydney or Hunter, the Consortium must negotiate to include it as a separate geographic target.

*Calculation used to determine ceiling of second quintile

The figure of \$68,540 is a calculation based on the direction of Schedule 1.4 of the Funding Agreement which says: “The Activity will recruit 1,010 households, specifically targeting renters, non-English speaking backgrounds and households who fall within the two lowest income quintiles of the Australian population as indicated in ABS 6530 Household Expenditure Survey 2009-10.”

The relevant section of ABS 6530 is Table 6: Equivalised Disposable Income Quintile, Household Characteristics, which gives the Mean figures for the Second Quintile as \$980 per week. The correct calculation for the “P40” or 40th percentile figure, i.e. top of Second Quintile, is obtained by adding the mean for the Second Quintile (\$980) to the mean of the Third Quintile (\$1476) = \$2456, then dividing by 2 = \$1228 or \$63,856 annual. Incorporating CPI, calculated with the ABS CPI Inflation Calculator, \$63,856 in June 2010 is equivalent to \$68,540 in June 2013.

Basis for second tier eligibility criteria

International students who are members of United Voice work in the commercial cleaning sector, are low waged, are restricted to working a maximum of 20 hours per week, are NESB/CALD, and typically rent in shared accommodation.

‘Household income’ does not capture participants who are renting in shared accommodation and are within the bottom two income quintiles. A separate eligibility criteria is required here to capture low waged full-time workers who are renting in shared accommodation.

A typical family household, with one or more UV members, where two people work as cleaners and live in Sydney will earn an approximate combined income of \$78,000/yr and experience household cost of living stresses.

As indicated in ABS 6530 Household Expenditure Survey 2009-10 Table 23, in NSW housing costs take the highest percentage of household income compared to other states, and overall household expenditure is highest compared to other states.

Housing stress indicator – as stated by Department of Housing NSW. www.housing.nsw.gov.au, Centre for Affordable Housing, Assessing Trends, Housing Affordability:

- Households in the two lowest income quintiles paying more than 30% of their income in rent.

Energy stress indicator – as stated in ABS 6530 Household Expenditure Survey, Table 30, a percentage of households in the lowest two income quintiles could not pay their energy bills on time:

- 17.9% of households in the lowest quintile
- 14.9% of households in the second quintile

Appendix 5

Recruitment Phone Script

Hi, My name is _____ from United Voice, your union. How are you today?

I'm calling to let you know about a new benefit of being a United Voice member – do you have a few minutes?

We're running a free program to help you use less energy and save some money on your bills. Did you receive our Power Savers brochures in the mail?

What do you think about the cost of your energy bills?

Would you like to be able to reduce the cost?

We have some government funding to provide FREE home energy support for eligible members. Lots of members are already in the program and reporting really good savings on their bills.

How it works is – an Energy Assessor comes to your home and works out with you the best and simplest ways you can reduce your use and cost. The assessor will have a budget to give you free energy saving products and will also help you to better understand your bills. Some households could also get a free solar hot water system! There's lots of opportunity to make good savings and it won't cost you anything!

Do you mind if I ask you a couple of questions to see if you're eligible?

IF NO – No problem, thanks for your time. END CONVERSATION

IF YES – *Continue with Script*

Do you live in a Department of Housing Home?

IF YES – Unfortunately you are not eligible to participate in the program. There are other energy efficiency programs which you may be eligible to participate in:

The 'Home Power Savers Program' (for government housing tenants) Please call 1300 662 416 or visit www.savepower.nsw.gov.au to find out more

The NSW Government Energy Accounts Payment Assistance (EAPA) scheme. Visit <http://www.energy.nsw.gov.au/customers/help>

IF NO - *Continue with Script*

Do you live in a....?

- Flat or Apartment
- Free Standing
- Townhouse
- Other

Do you rent or own your home?

Options to be eligible. If one is met, move onto the end of the conversation

1. Is your household's combined gross income below \$68,540 per year?
2. Are you an international student, working a maximum of 20 hours per week?
3. Are you renting in shared accommodation with an individual gross income below \$68,540 per year? And do you meet one or more of the following
 - a. You are from a non-English speaking, or culturally diverse background
 - b. You have been unable to pay your energy bills on time in the last 12 months
 - c. You pay more than 30% of your income on rent/mortgage
4. Are there two or more adults in your household with a combined income below \$80,000 per year? And do you meet two or more of the following
 - a. You rent your home
 - b. You are from a non-English speaking, or culturally diverse background
 - c. You have been unable to pay your energy bills on time in the last 12 months
 - d. You pay more than 30% of your income on rent/mortgage

IF NOT ELIGIBLE

Unfortunately you are not eligible to participate in the program. There are other energy efficiency programs which you may be eligible to participate in:

The NSW Government Energy Accounts Payment Assistance (EAPA) scheme.
Visit <http://www.energy.nsw.gov.au/customers/help>

IF ELIGIBLE

Congratulations, you are eligible to participate in Power Savers. We just have a few more questions to complete your registration to participate in Power Savers.

1. What is the best number to call you on?
2. What is your preferred time to be contacted?
3. NESB – Is English your second language?
4. IF YES – What is your primary language?
5. If ENGLISH IS SECOND LANGUAGE – Would an interpreter be helpful during the program? (Interpreters are available for the energy assessment and other activities that the program offers.)

6. If ENGLISH IS SECOND LANGUAGE – Do you need written materials provided in your primary language?

Great – As a member you can also offer a spot in the program to eligible friends and family. Do you know others who would also benefit from saving money on their bills?

Great. The next step is to book in your home energy assessment. Would you like to do that now?

IF YES – transition to Trifecta script

IF NO – No problem. We'll send out a welcome letter with more information about the program, and give you a call over the coming weeks to book in your energy assessment. Thanks, have a nice day/night.

Appendix 6

Trifecta Script

Follows on from 'Recruitment Script'

Great, you're now registered for the Power Savers Program.

The next step from now is booking in your free in-home energy assessment. Would you like to do that now?

IF NO - No problem, we'll mail you a welcome letter, and get in contact with you soon to book it in. *Check address and best time to contact*

IF YES - Great.

Firstly – can I check your home address is _____?

Great, what days and time suit you best?

So you're booked in for (Date) and (Time). The assessor will call you ahead of then to confirm.

The assessment will take 1-2 hours, the assessor will ask to see your electricity bill and will also ask you to sign a form so we can collect billing information over the life of the program. This is so we can see if the program has been successful in saving members money. Your information is anonymous so you won't be identified personally. Is that OK?

IF NO - *Work through problems, remind them that none of their information will be shared and that it is so that we can judge the benefits of the program*

IF YES - Thanks.

Finally, we have a few quick questions to run through. We ask people to do this before having their assessment. It helps us to monitor how the program is working for our members. Do you have 5 minutes to do it now?

IF NO - Ok, what's the best day and time to call you back to complete (make a note in chatter and tag Erin)

IF YES - *(Do *PIPS) *You may get good information about what the member wants to achieve from the program which you can include in the assessors booking notes (e.g.; member uses reverse cycle air con all year round & is eager to be more efficient)*

So you're booked on (Date) (Time) with (Assessor). (Assessor) will call you a day or 2 ahead of your booking.

We look forward to catching up with you in a month or two and hearing about your experience and what saving you've made.

Good bye.

Appendix 7

Pre-Intervention Phone Survey

1. Why are you interested in taking part in the Power Savers program?
2. Which of the following things stops you from reducing energy use in your home?
 - a. No time
 - b. Too expensive
 - c. Not sure how to
 - d. Lack of control to make improvements to the property
 - e. None of the above
3. In the past 12 months, have you contacted your electricity provider for more time to pay bills or sought financial assistance to help pay your energy bills?
 - a. Yes
 - b. No
 - c. Unsure

The next few questions have the responses 'Strongly disagree, disagree, strongly agree, or unsure. Please answer with how strongly you agree or disagree with each statement, and if you're not sure how you feel, let us know.

4. I am aware of how my household electricity use compares to my neighbours, friends and family
 - a. Strongly disagree
 - b. Disagree
 - c. Agree
 - d. Strongly agree
 - e. Unsure
5. If feel in control of my electricity bills
 - a. Strongly disagree
 - b. Disagree
 - c. Agree
 - d. Strongly agree
 - e. Unsure
6. I feel in control of my electricity use
 - a. Strongly disagree
 - b. Disagree
 - c. Agree
 - d. Strongly agree
 - e. Unsure

The responses change for the next few questions. I'll read out the questions and the responses, and you choose the response that best suits you.

7. How much pressure do electricity bills put on your household budget?
 - a. A great deal of financial pressure
 - b. Some financial pressure
 - c. Not very much financial pressure
 - d. No financial pressure
 - e. Unsure
8. How important is it for you to use less electricity in your home?
 - a. Very important
 - b. Somewhat important
 - c. Not very important
 - d. Not important at all
 - e. Unsure
9. How motivated are you to reduce your electricity use?
 - a. Very motivated
 - b. Somewhat motivated
 - c. Not very motivated
 - d. Not motivated at all
 - e. Unsure
10. When you receive your electricity bill, how clear and easy is it to understand?
 - a. Not at all clear
 - b. Not very clear
 - c. Somewhat clear and understandable
 - d. Very clear and easy to understand
 - e. Unsure
11. How were you encouraged to participate in the Power Savers program?
 - a. Organiser
 - b. Workmate
 - c. Friend
 - d. Flyer sent in the mail
 - e. Phone call from United Voice
 - f. Other

Appendix 8

HEA Booking Script

Hi, my name is _____ and I'm calling from your Union, United Voice. How are you today?

You've joined up to our program to save money on your power bills. The program has been really popular and I apologise if you've been waiting a while to move onto the next step.

The good news is lots of members have already been through and are reporting really good savings on their bills.

The next step for you is to book a time for the assessor to come to your home. In case it's been a while since you first joined would you like me to remind you of what you'll get in the program?

If Yes

We received some government funding to provide FREE home energy support for our members.

How it works is; an Energy Assessor comes to your home and works out with you the best and simplest ways you can reduce your use and cost. The assessor will have a budget to give you free energy savings products and will also help you to better understand your bills. Some households could also get a free solar hot water system! There are lots of opportunity to make good savings and, as a United Voice member, it's all fully funded.

Great we can book you in for your assessment now.

Firstly – can I check your home address is _____?

Great, what days and time suit you best?

So you're booked in for (Date) and (Time). The assessor will call you ahead of then to confirm.

The assessment will take 1-2 hours, the assessor will ask to see your electricity bill and will also ask you to sign a form so we can collect billing information over the life of the program. This is so we can see if the program has been successful in saving members money. Your information is anonymous so you won't be identified personally. Is that OK?

If No – please ask about the members concern and work through it.

If you wouldn't mind we have a short survey, it takes about 5 minutes, we ask people to do this before having their assessment. It helps us to monitor how the program is working for our members. Do you have 5 minutes to do it now?

If yes (Do *PIPS) *You may get good information about what the member wants to achieve from the program which you can include in the assessors booking

notes (e.g.; member uses reverse cycle air con all year round & is eager to be more efficient)

If No (Ok, what's the best day and time to call you back to complete)

So you're booked on (Date) (Time) with (Assessor). (Assessor) will call you a day or 2 ahead of your booking. We look forward to catching up with you in a month or two and hearing about your experience and what saving you've made.
Good bye.

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Page 1

Initial notes

Assessor: Complete this section before entering household.

*Assessment Date and Time

Date

YYYY/MM/DD



Time

HH:MM AM/PM



*Assessor ID

☐ IM1

☐ CW1

☐ CLS1

☐ WE1

☐ DA1

*Participant First Name

Type here

*Participant Last Name

Type here

*United Voice Member Number

Type here

Preferred first name (if different to first name)

Type here

Assessor: Take a photo of the front of the house.

Assessor: You can use the comments field below to take notes about the home before you go in.

e.g. North facing, wall material, roof pitch, vegetation / shading, external window coverings, driveway access, and any other notable information.

Initial comments

Type here

Assessor: Greet householder and at an appropriate time give them their thermometer and ask to place it in the fridge to check later on in the assessment.

Privacy Statement

*Householder agrees to the Department of Industry's Privacy Statement

☐ Yes

☐ No

Assessor: Show and explain 'Privacy Notice' to householder. Householder must agree to statement before assessment proceeds.

Billing Data Consent

Assessor: It is important/ compulsory that assessors answer the Question – Billing Data Consent form signed by account holder (either 'Yes' or 'No') Note: If participant does not sign BDC, the assessment can still proceed as normal, but they will not be eligible to take up the post-assessment retrofit items, i.e. additional free energy-saving items valued up to \$250

***Billing Data Consent' form signed by account holder.**

☐ Yes

☐ No

***Reason form not signed at assessment.**

☐ Refused outright

☐ Wants more time to consider it

☐ Account holder not present

☐ Translation required (identify language)

☐ Other

Further comments if Billing Data Consent form unsigned.

e.g. reason for refusal outright, language for translation required, comments additional to

'other'

Type here

ELECTRICITY ACCOUNT DETAILS

*Does the householder have a recent energy bill?

☐ Yes

☐ No

Assessor: If a bill can be viewed, just note the below details and have householder sign their consent for access to their billing data. The energy bill can soon be discussed in detail in the 'Energy Bill' section of the assessment.

*SUPPLIER

Your electricity supplier (e.g. AGL)

Type here

*NAME ON THE ACCOUNT

Type here

*ACCOUNT NUMBER

Type here

*NATIONAL METER IDENTIFIER NUMBER (NMI)

Type here

***I give permission for home photos taken today to be used for Power Savers communications and reporting purposes. I understand that photos will be de-identified.**

In order to create an accurate report, we will need to take photos of appliances, your meter box and other items in your house.

☐ Yes

☐ No

Assessor: Electricity account holder to sign on hard copy Billing Data Consent Form.

Personal Information

Country of birth of participant

Prefer not to disclose country of birth

☐ Yes

*Indigenous status of participant

- ☐ Prefer not to disclose
- ☐ Non-indigenous
- ☐ Aboriginal
- ☐ Torres-Strait Islander
- ☐ Both Aboriginal and Torres-Strait Islander

*Education status of participant

- ☐ Prefer not to disclose
- ☐ Primary school
- ☐ High school - Year 10

- ☐ High school - Year 12
- ☐ TAFE
- ☐ Tertiary
- ☐ Unknown

*Employment status of participant

- ☐ Employed full time
- ☐ Employed part time
- ☐ Employed away from work
- ☐ Unemployed looking for full-time work
- ☐ Unemployed looking for part-time work
- ☐ Retired
- ☐ Conducting unpaid work (carer/home duties)
- ☐ Unable to work
- ☐ Studying
- ☐ Prefer not to disclose
- ☐ Other

*How long have you lived in your current home?

- ☐ 6 months
- ☐ 12 months
- ☐ 18 months
- ☐ 24 months or longer

If occupied less than 2 years, when did you move into your current home?

You must enter a date value below, however a best estimate of date would be sufficient (e.g. closest month and year)

Date

YYYY/MM/DD

***Tenure status**

- ☐ Owned outright
- ☐ Owned with a mortgage
- ☐ Being purchased under a rent / buy scheme
- ☐ Rented - Private Landlord
- ☐ Being occupied rent-free
- ☐ Being occupied under a life tenure scheme
- ☐ Rented - Real Estate Agent

Other tenure status (please specify)...

Type here

*How many people live in your home and what age are they?

Leave blank if there are no people in that age group.

0-9 years

☐ 1

☐ 2

☐ 3

☐ 4

☐ 5

☐ 6

☐ 7

☐ 8

☐ 9

☐ 10

10-19 years

☐ 1

☐ 2

☐ 3

☐ 4

☐ 5

☐ 6

☐ 7

☐ 8

☐ 9

☐ 10

20-29 years

☐ 1

☐ 2

☐ 3

☐ 4

☐ 5

☐ 6

☐ 7

☐ 8

☐ 9

☐ 10

30-39 years

☐ 1

☐ 2

☐ 3

☐ 4

☐ 5

☐ 6

☐ 7

☐ 8

☐ 9

☐ 10

40-49 years

☐ 1

☐ 2

☐ 3

☐ 4

☐ 5

☐ 6

☐ 7

☐ 8

☐ 9

☐ 10

50-59 years

☐ 1

☐ 2

☐ 3

☐ 4

☐ 5

☐ 6

☐ 7

☐ 8

☐ 9

☐ 10

60-69 years

☐ 1

☐ 2

☐ 3

☐ 4

☐ 5

☐ 6

☐ 7

☐ 8

☐ 9

☐ 10

70-79 years

☐ 1

☐ 2

☐ 3

☐ 4

☐ 5

☐ 6

☐ 7

☐ 8

☐ 9

☐ 10

80-89 years

☐ 1

☐ 2

☐ 3

☐ 4

☐ 5

☐ 6

☐ 7

☐ 8

☐ 9

☐ 10

90-99 years

☐ 1

☐ 2

☐ 3

☐ 4

☐ 5

☐ 6

☐ 7

☐ 8

☐ 9

☐ 10

100 years and over

- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ 7
- ☐ 8
- ☐ 9
- ☐ 10

Prefer not to disclose age details

☐ Yes

*In the last 12 months has...

Someone moved in?

☐ Yes

Someone moved out?

☐ Yes

Someone started spending much more time at home?

☐ Yes

Someone started spending much less time at home? ☐ Yes

None of the above ☐ Yes

*How would you rate your household energy efficiency?

☐ 5 - Very energy efficient

☐ 4 - Energy efficient

☐ 3 - Adequate

☐ 2 - Inefficient

☐ 1 - Not energy efficient

*Have you changed your behaviour in the past 12 months to use less energy in your home? For example, switching off lights more often.

☐ Yes (comments)

Type here

☐ No

☐ Unsure

*Have any of the following prevented you from reducing electricity in your home?

Didn't know what to do ☐ Yes

Never thought about it

☐ Yes

RENTERS: Landlord refused to pay for retrofits

☐ Yes

RENTERS: I offered to pay for changes but my landlord wouldn't allow it

☐ Yes

RENTERS: Asked my real estate agent but never heard back

☐ Yes

RENTERS: Real estate agent wouldn't allow it

☐ Yes

RENTERS: On a short lease

☐ Yes

Additional comments regarding personal data?

Type here

Energy Bill

*Connection type

Electricity

☐ Yes

Natural gas

☐ Yes

LPG

☐ Yes

*Is PV installed in the home?

☐ Yes

☐ No

How many kW is the PV system?

Type here

*Billing period start date

Date

YYYY/MM/DD

*Billing period end date

Date

YYYY/MM/DD

*Number of days in billing period

Type here

*Number of tariffs on energy bill

- ☐ 0
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ Unsure

Tariff (1)

- ☐ Stepped - Low
- ☐ Stepped - High
- ☐ Stepped - Off-peak
- ☐ TOU - Off-peak
- ☐ TOU - Shoulder

☐ TOU - Peak

Cents per unit (1)

Format e.g. 0.2466. If unsure, leave blank

Type here

Date when tariff comes into effect (1)

Date

YYYY/MM/DD

Date when tariff ceases (1)

Date

YYYY/MM/DD

Tariff (2)

- ☐ Stepped - Low
- ☐ Stepped - High
- ☐ Stepped - Off-peak
- ☐ TOU - Off-peak
- ☐ TOU - Shoulder
- ☐ TOU - Peak

Cents per unit (2)

Format e.g. 0.2466. If unsure, leave blank

Type here

Date when tariff comes into effect (2)

Date

YYYY/MM/DD

Date when tariff ceases (2)

Date

YYYY/MM/DD

Tariff (3)

- ☐ Stepped - Low
- ☐ Stepped - High
- ☐ Stepped - Off-peak
- ☐ TOU - Off-peak
- ☐ TOU - Shoulder
- ☐ TOU - Peak

Cents per unit (3)

Format e.g. 0.2466. If unsure, leave blank

Type here

Date when tariff comes into effect (3)

Date

YYYY/MM/DD

Date when tariff ceases (3)

Date

YYYY/MM/DD

*Would you consider shifting use of the following activities to particular hours of the day to save money?

Washing clothes

☐ Yes

Washing dishes

☐ Yes

Showering

☐ Yes

Cooling or heating the home

☐ Yes

Using television or video consoles

☐ Yes

None of the above

☐ Yes

Other? (please specify)

Type here

Additional comments regarding energy bill?

Type here

Dwelling Characteristics

*Dwelling structure

- ☐ Separate house
- ☐ Semi-detached
- ☐ Flat / apartment - one or two storey
- ☐ Flat / apartment - three storey
- ☐ Flat / apartment - four storeys +
- ☐ Granny Flat
- ☐ Caravan
- ☐ Tent
- ☐ House/ flat attached to a shop

*Major outside wall material

Fibro	☐ Yes
Brick Veneer	☐ Yes
Double brick	☐ Yes

- Timber ☐ Yes
- Weatherboard ☐ Yes
- Mixture ☐ Yes
- Concrete ☐ Yes
- Concrete block ☐ Yes
- Mudbrick ☐ Yes

Other (please specify)

Type here

***Approximate age of dwelling (years)**

Based on occupant's knowledge/ assessor's best estimate.

- ☐ 0-5 years (2009 - 2014)
- ☐ 5-9 years (2004 +)
- ☐ 10-19 years (1995 +)
- ☐ 20-29 years (1985 +)
- ☐ 30-39 years (1985 +)

- ☐ 40-49 years (1975 +)
- ☐ 50-59 years (1965 +)
- ☐ 60 and over (1955 +)

*Number of living rooms (including sun-room, study etc)

- ☐ 0
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6 or more

*Number of bedrooms

- ☐ 0
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4

- ☐ 5
- ☐ 6 or more

*Number of bathrooms

- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4 or more

*What modifications have you made to your home in the last 12 months that may have changed your energy efficiency? *What season did you do this?*

Replaced heater/cooler/air conditioner with a more energy efficient model

- ☐ Spring
- ☐ Summer
- ☐ Autumn
- ☐ Winter

Replaced electric hot water system with a more energy efficient model

- ☐ Spring
- ☐ Summer
- ☐ Autumn
- ☐ Winter

Installed solar electricity

- ☐ Spring
- ☐ Summer
- ☐ Autumn
- ☐ Winter

Installed insulation

- ☐ Spring
- ☐ Summer
- ☐ Autumn
- ☐ Winter

Installed curtains / blinds

- ☐ Spring
- ☐ Summer
- ☐ Autumn
- ☐ Winter

Replaced major whitegood with a more energy efficient model

- ☐ Spring
- ☐ Summer
- ☐ Autumn
- ☐ Winter

Installed solar hot water system

- ☐ Spring
- ☐ Summer
- ☐ Autumn
- ☐ Winter

Installed ceiling fans

- ☐ Spring
- ☐ Summer
- ☐ Autumn
- ☐ Winter

Installed double glazed windows

- ☐ Spring
- ☐ Summer
- ☐ Autumn
- ☐ Winter

Installed louvre windows

- ☐ Spring
- ☐ Summer
- ☐ Autumn
- ☐ Winter

Installed tinted glass or solar guarding

- ☐ Spring
- ☐ Summer
- ☐ Autumn
- ☐ Winter

Installed outside awnings/shutters that improved energy efficiency

- ☐ Spring
- ☐ Summer
- ☐ Autumn
- ☐ Winter

Other

- ☐ Spring
- ☐ Summer
- ☐ Autumn
- ☐ Winter

N.A

- ☐ Spring
- ☐ Summer
- ☐ Autumn
- ☐ Winter

Other modifications? (please specify)

Type here

Additional comments regarding dwelling data?

Type here

Hot Water

*What is the time length of the average showers taken by residents of the household?

- ☐ 4 minutes or less
- ☐ 4-8 minutes
- ☐ 8 minutes +

Assessor: If required, give shower timer.

*Does this household have a water efficient showerhead?

- ☐ Yes
- ☐ No
- ☐ Unsure

Water efficient shower head comments?

Assessor: Any further comments on showerhead efficiency? Remember, water efficient showerheads are a post-assessment retrofit (PAR) option.

Type here

*What type of hot water system(s) do you have?

Electric Instantaneous ☐ Yes

Electric Storage ☐ Yes

Gas Instantaneous ☐ Yes

Gas Storage ☐ Yes

Solar Electric Boosted ☐ Yes

Solar Gas Boosted ☐ Yes

*Where is the hot water system located?

☐ Internal laundry

☐ Internal kitchen

☐ Under house

☐ In roof

- ☐ On roof
- ☐ External E
- ☐ External S
- ☐ External W
- ☐ External N

*Age of hot water system

- ☐ Less than 1 year
- ☐ 1 - 2 years
- ☐ 3 - 5 years
- ☐ 6 - 10 years
- ☐ 11 or more

*Tank condition - is corrosion or leaking visible?

- ☐ Yes
- ☐ No

*Tank size

- ☐ <160L (small)

☐ 160-320L (medium)

☐ 320L + (large)

Are you able to adjust the temperature on your hot water system? (e.g. between summer and winter)

☐ Yes

☐ No

Assessor: Check insulation. LAGGING: Only install if householder can't OR leave enough lagging & zipties for householder to DIY. An online video is available regarding lagging installation. VALVECOSY: If required, have the householder clip this on.

Assessor: Take a photo of the tank and tank compliance label.

*Is the dwelling managed by a strata corporation?

☐ Yes

☐ No

☐ Unsure

*Does the strata complex allow installation of solar hot water?

(Note to assessor: Look around, see if neighbours have any evidence of installation).

- ☐ Yes
- ☐ No
- ☐ Unsure

Strata management comments

If strata, please provide further comments where relevant about potential for SHW system in this dwelling.

Type here

What's the roof type (for SHW system)?

Slate: no further assessment required. Note that Cliplock could also exclude.

- ☐ Tiles
- ☐ Metal sheeting
- ☐ Slate
- ☐ Fibro cement sheeting

Other roof type (please specify)

Type here

Orientation of roof (for potential SHW system)

NE	☐ Yes
N	☐ Yes
NW	☐ Yes
W	☐ Yes
SW	☐ Yes
SE	☐ Yes
S	☐ Yes

Pitch of roof (for SHW potential)

10-35 degrees is optimal. Above 35 degrees: no further assessment required

- ☐ Flat
- ☐ <25 deg
- ☐ <35 deg
- ☐ >35 deg

Are there any shading issues on the roof that may affect SHW installation?

Estimated (visual assessment) as a percentage <20%. Beyond 20%: no further assessment

required

☐ Yes

☐ No

Is the driveway adjacent to the roof?

☐ Yes

☐ No

Comments on driveway

Type here

Solahart hot water not recommended.

*Solahart site assessment recommended?

☐ Yes

☐ No

Solahart site assessment comments

Assessors: Please detail any further information that may be useful in approaching this participant for solar hot water (e.g. do you think they should be prioritised for any reason? If they live in a unit, but you still recommend for solar hot water, why?)

Type here

The next section is for **renters only**.

*Would you be interested in receiving a Solahart solar hot water system for your home?

- ☐ Yes
- ☐ No
- ☐ Maybe

Assessor: please explain that there is a set of criteria that we will use to review their property against others

*How is your relationship with your landlord / real estate agent?

- ☐ Excellent
- ☐ Good
- ☐ OK
- ☐ Not very good

- ☐ Terrible
- ☐ Unsure
- ☐ Chose not to respond

*Would you be OK with us getting in contact with your landlord/real estate agent to see if they are interested in receiving a solar hot water system?

- ☐ Yes
- ☐ No
- ☐ Maybe

Full name of Real estate OR Landlord (e.g Mr John Smith).

(if known)

Email address of Real estate OR Landlord

(if known)

Phone number for Real estate OR landlord.

(if known)

Postal address for Real estate OR landlord.

(if known)

Type here

Further comments which could assist split incentives project.

Type here

Additional comments regarding hot water (general)?

Any last comments? Field applies to both renters and owners.

Type here

Hot Water Actions

Already Doing

- ☐ Keeping shower times to 4 minutes or less (with shower timer!).
- ☐ Ensuring your hot water system is set at 60 degrees Celsius.
- ☐ Using a water efficient showerhead.

Already Doing - Long Term

- ☐ Upgraded to a more efficient hot water system.

Recommended

- ☐ Keep shower times to 4 minutes or less (with shower timer!).
- ☐ Ensure your hot water system is set at 60 degrees Celsius.
- ☐ Use a water efficient showerhead.

Recommended - Long Term

☐ Upgrade to a more efficient hot water system.

Additional comments regarding hot water actions?

Type here

Swimming Pool

*Do you have any of the following in your home?

Pool ☐ Yes

Spa ☐ Yes

None ☐ Yes

Type of pool/ spa heating?

☐ Unheated

☐ Gas heated

☐ Solar heated

☐ Electric heated

☐ N/A

Do you use a pool/ spa cover?

☐ Yes

☐ No

Additional comments regarding swimming?

Type here

Swimming Actions

Already Doing

- ☐ Using a pool / spa cover to reduce evaporation in summer, and to retain heat in winter.
- ☐ Using the pool pump only as required in different seasons.

Already Doing - Long Term

- ☐ You use a solar hot water heater to heat your pool.

Recommended

- ☐ Use a pool / spa cover to reduce evaporation in summer, and to retain heat in winter.
- ☐ Use the pool pump only as required in different seasons.

Recommended - Long Term

☐ Use a solar hot water heater to heat your pool.

Additional comments regarding swimming actions?

Type here

Heating

*Solar exposure of living (main living area)

N ☐ Yes

NE ☐ Yes

E ☐ Yes

SE ☐ Yes

S ☐ Yes

SW ☐ Yes

W ☐ Yes

NW ☐ Yes

*Does your house get very cold in the cooler months of the year?

☐ Yes

☐ No

*How comfortable do you feel in your home during the cooler months of the year?

- ☐ Very comfortable
- ☐ Comfortable
- ☐ Not very comfortable
- ☐ Very uncomfortable
- ☐ Unsure

*What are the main forms of heating in the home?

	☐ 1
Bar Heater (e.g. radiator)	☐ 2
	☐ 3+
	☐ 1
Column Oil	☐ 2
	☐ 3+

Direct Electric

☐ 1

☐ 2

☐ 3+

Gas

☐ 1

☐ 2

☐ 3+

Reverse cycle

☐ 1

☐ 2

☐ 3+

Wood

☐ 1

☐ 2

☐ 3+

Other? (please specify)

Type here

Does your heater have a temperature setting control? (e.g. thermostat)

☐ Yes

☐ No

*Type of window coverings?

Blinds

☐ Yes

☐ No

Curtains

☐ Yes

☐ No

Other, please specify...

☐ Yes

☐ No

*Other types of window coverings (please specify)

Type here

Do you close off areas of your home to heat them more effectively?

☐ Yes

☐ No

Are the following sealed for draughts?

External and internal doors

☐ Yes

☐ No

Windows

☐ Yes

☐ No

Skirting boards

☐ Yes

☐ No

Assessor: Might like to give out door snake(s) at this time.

Are air vents sealed when not in use?

☐ Yes

☐ No

☐ N/A

Is there vegetation blocking the sun from entering the east, north and west side of the house?

☐ Yes

☐ No

☐ N/A

Additional comments regarding heating?

Type here

Heating Actions

Already Doing

- ☐ Your heating is energy efficient.
- ☐ You are setting your air conditioner to between 18-21 degrees Celsius during winter.
- ☐ Covering fixed air vents to stop unwanted draughts.
- ☐ You have draught-proofed your home to stop cold air entering and heat being lost.
- ☐ Your curtains, combined with pelmets, help keep you comfortable in winter.

Already Doing - Long Term

- ☐ Insulated your roof to reduce heat gain during summer and heat loss during winter.

Recommended

- ☐ Ensure your heating is energy efficient, and only use when required.
- ☐ Set your air conditioner between 18-21 degrees Celsius during winter.
- ☐ Cover fixed air vents to stop unwanted draughts.
- ☐ Draught-proof your home to stop cold air entering and heat being lost. Use products such as door snakes, caulking and door seals.
- ☐ Add pelmets to your curtains to further improve winter warmth.

Recommended - Long Term

- ☐ Insulate your roof to reduce heat gain during summer and heat loss during winter.

Additional comments regarding heating actions?

Type here

Cooling

*Does your house get very warm in the hotter months of the year?

☐ Yes

☐ No

*How comfortable do you feel in your home during the warmer months of the year?

☐ Very comfortable

☐ Comfortable

☐ Not very comfortable

☐ Very uncomfortable

☐ Unsure

*Is the ceiling insulated?

☐ Yes

☐ No

☐ N/A

☐ Unsure

*What are the main forms of cooling in the home?

Please specify the number of units next to each item. Leave blank if there are none.

Ceiling fans

☐ 1

☐ 2

☐ 3+

Pedestal fans

☐ 1

☐ 2

☐ 3+

Air Conditioner - Ducted - Evaporative

☐ 1

☐ 2

☐ 3+

Air Conditioner - Ducted - Refrigerative

☐ 1

☐ 2

☐ 3+

☐ 1

Air Conditioner - Ducted - Refrigerative 3 Phase

☐ 2

☐ 3+

☐ 1

Air Conditioner - Small/Portable - Evaporative

☐ 2

☐ 3+

☐ 1

Air Conditioner - Small/Portable - Refrigerative

☐ 2

☐ 3+

☐ 1

Air Conditioner - Wall Mounted - Split System

☐ 2

☐ 3+

☐ 1

Air Conditioner - Wall Mounted - Split System - Cooling Only

☐ 2

☐ 3+

☐ 1

Air Conditioner - Wall Mounted - Split System - Reverse Cycle

☐ 2

☐ 3+

☐ 1

Air Conditioner - Wall Mounted - Cooling Only Air Conditioner

☐ 2

☐ 3+

Other? (Please specify)

Type here

Do you open your home to allow cross-ventilation?

☐ Yes

☐ No

☐ N/A

Do you use window tinting?

☐ Yes

☐ No

☐ N/A

Do you use shutters?

☐ Yes

☐ No

☐ N/A

Do you have vegetation shading your home in summer?

☐ Yes

☐ No

☐ N/A

Assessor: If necessary, mention Renshade, and measure and cut appropriate length off Renshade roll for the participant to install with hook and loop strips (after you leave). An online video regarding Renshade installation is available.

Additional comments regarding cooling?

Type here

Cooling Actions

Already Doing

- ☐ Using fans and natural air flow through the house for cooling, instead of your air conditioner.
- ☐ You are setting your air conditioner to between 23-26 degrees Celsius during summer.
- ☐ Using a removable reflective foil in summer (e.g. Renshade®) on east and west-facing windows.
- ☐ Using curtains or blinds with reflective backings to keep out summer heat.

Already Doing - Long Term

- ☐ Planted deciduous trees (trees that lose their leaves in winter) to shade your home.
- ☐ You are using external shutters to keep the summer heat out of your home.
- ☐ You have installed a "Whirly Bird" that can be adjusted with the seasons, to remove heat from your roof space.

Recommended

- ☐ Use fans and natural air flow through the house for cooling, instead of your air conditioner.
- ☐ Set your air conditioner between 23-26 degrees Celsius during summer.
- ☐ Use a removable reflective foil in summer (e.g. Renshade®) on east and west-facing windows.
- ☐ Use curtains or blinds with reflective backings to keep out summer heat.

Recommended - Long Term

- ☐ Plant deciduous trees (trees that lose their leaves in winter) to shade your home.
- ☐ Use external shutters to keep the summer heat out of your home.
- ☐ Install a "Whirly Bird" that can be adjusted with the seasons, to remove heat from your roof space.

Additional comments regarding cooling actions?

Type here

Lighting

*How do you rate the level of lighting in your home during daylight hours?

- ☐ Excellent
- ☐ Good
- ☐ Neutral
- ☐ Not good
- ☐ Terrible
- ☐ Unsure

*Lighting types and number

Incandescent bulbs

- ☐ 0
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ 7
- ☐ 8
- ☐ 9
- ☐ 10
- ☐ 11 or more

CFL's

- ☐ 0
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ 7
- ☐ 8
- ☐ 9
- ☐ 10
- ☐ 11 or more

LED's

- ☐ 0
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ 7
- ☐ 8
- ☐ 9
- ☐ 10
- ☐ 11 or more

Halogen downlights

- ☐ 0
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ 7
- ☐ 8
- ☐ 9
- ☐ 10
- ☐ 11 or more

T8 fluorescent tubes

- ☐ 0
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ 7
- ☐ 8
- ☐ 9
- ☐ 10
- ☐ 11 or more

Skylights

- ☐ 0
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ 7
- ☐ 8
- ☐ 9
- ☐ 10
- ☐ 11 or more

Assessor: If required, give householder LED light globe.

Additional comments regarding lighting?

Type here

Lighting Actions

Already Doing

- ☐ Turning lights off when not in use.
- ☐ Replacing incandescent globes or halogen downlights with LEDs.
- ☐ Using LED or solar powered external floodlights.
- ☐ Installed a sensor or timer to your external floodlights.

Already Doing - Long Term

- ☐ You have installed a skylight that can be adjusted with the seasons, to control natural light entering your home.

Recommended

- ☐ Turn lights off when not in use.

- ☐ Replace incandescent globes or halogen downlights with LEDs.
- ☐ Use LED or solar powered external floodlights.
- ☐ Install a sensor or timer to your external floodlights.

Recommended - Long Term

- ☐ Install a skylight that can be adjusted with the seasons, to control natural light entering your home.

Additional comments regarding lighting actions?

Type here

Appliances

Assessor: This section involves a bit of engagement with appliances around the home. Move from room to room, e.g. kitchen to living room to laundry.

1. KITCHEN

*Kitchen appliances and type.

	Number
Microwave	☐ 1
	☐ 2
	☐ 3
	☐ 4
	☐ 5
	☐ 6
	☐ 7
	☐ 8
	☐ 9
	☐ 10
	☐ 11 or more

	11 or more Number
	1
	2
	3
	4
	5
Electric Stove	6
	7
	8
	9
	10
	11 or more
	1
	2
	3
	4
	5
Electric Oven	6
	7
	8

Number

- ☐ 9
- ☐ 10
- ☐ 11 or more

☐ 1

☐ 2

☐ 3

☐ 4

☐ 5

Gas Stove

☐ 6

☐ 7

☐ 8

☐ 9

☐ 10

☐ 11 or more

☐ 1

☐ 2

☐ 3

☐ 4

☐ 5

Gas Oven

Number

☐ 6

☐ 7

☐ 8

☐ 9

☐ 10

☐ 11 or more

☐ 1

☐ 2

☐ 3

☐ 4

☐ 5

Fridge-freezer

☐ 6

☐ 7

☐ 8

☐ 9

☐ 10

☐ 11 or more

☐ 1

☐ 2

Number

Fridge (stand-alone)

☐ 3

☐ 4

☐ 5

☐ 6

☐ 7

☐ 8

☐ 9

☐ 10

☐ 11 or more

☐ 1

☐ 2

☐ 3

☐ 4

☐ 5

Freezer (stand-alone)

☐ 6

☐ 7

☐ 8

☐ 9

☐ 10

☐ 11 or more

Number

Dishwasher

- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ 7
- ☐ 8
- ☐ 9
- ☐ 10
- ☐ 11 or more

Assessor: Check thermometer temperature in fridge.

Is your fridge / freezer over 10 years old?

- ☐ Yes
- ☐ No

Do you hear the fridge / freezer running a lot of the time?

- ☐ Yes
- ☐ No

Are your fridge / freezer seals old and not working properly?

☐ Yes

☐ No

Is your dishwasher over 10 years old?

☐ Yes

☐ No

Is the dishwasher full when you turn it on?

☐ Yes

☐ No

Do you regularly clean the filter in your dishwasher?

☐ Yes

☐ No

2. ENTERTAINMENT

*Entertainment appliances number and type. Are they left on stand-by?

	Number	Left on standby
	☐ 1	
	☐ 2	
	☐ 3	
	☐ 4	
	☐ 5	

LCD Television	☐ 5 Number ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 ☐ 11 or more	Left on standby ☐ Yes
Plasma Television	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 ☐ 11 or more	☐ Yes
	☐ 1 ☐ 2	

CRT Television	Number	Left on standby
	☐ 3	☐ Yes
	☐ 4	
	☐ 5	
	☐ 6	
	☐ 7	
	☐ 8	
	☐ 9	
	☐ 10	
	☐ 11 or more	
LED Television	☐ 1	
	☐ 2	
	☐ 3	
	☐ 4	
	☐ 5	
	☐ 6	
	☐ 7	
	☐ 8	
	☐ 9	
	☐ 10	

	Number	Left on standby
Desktop Computer	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 ☐ 11 or more	☐ Yes
Laptop Computer	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8	☐ Yes

- ☐ 8 Number
- ☐ 9
- ☐ 10
- ☐ 11 or more

Left on standby

Assessor: If required, recommend location for EcoSwitch. Do not install. Householder to DIY.

3. LAUNDRY

*Laundry appliances number and type. Are they left on stand-by?

	Number	Left on standby
Front loading washing machine	☐ 0	☐ Yes
	☐ 1	
	☐ 2	
	☐ 3	
	☐ 4	
	☐ 5	
	☐ 6	
	☐ 7	
	☐ 8	
	☐ 9	

	Number ☐ 10 ☐ 11 or more	Left on standby
Top loading washing machine	☐ 0	☐ Yes
	☐ 1	
	☐ 2	
	☐ 3	
	☐ 4	
	☐ 5	
	☐ 6	
	☐ 7	
	☐ 8	
	☐ 9	
	☐ 10	
	☐ 11 or more	
	☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4	

Clothes Dryer	☐ 5	Number	Left on standby	
	☐ 6		☐ Yes	
	☐ 7			
	☐ 8			
	☐ 9			
	☐ 10			
	☐ 11 or more			

Do you wash your clothes only in large batches?

☐ Yes

☐ No

Do you wash your clothes using the coldest available cycle?

☐ Yes

☐ No

Do you spin dry / air dry your clothes before using the dryer?

☐ Yes

☐ No

Do you regularly clean the lint filter of your dryer?

☐ Yes

☐ No

Any other significant appliances in the home?

Type here

*Is energy efficiency a consideration when purchasing appliances?

☐ Yes

☐ No

Additional comments regarding appliances.

Type here

Appliances Actions

Already Doing

- ☐ Switching off unused appliances at the wall to reduce standby power usage.
- ☐ Ensuring your fridge and freezer are set at +4 degrees Celsius (fridge) and -18 degrees Celsius (freezer).
- ☐ You have placed your fridge / freezer in a cool, well ventilated area.
- ☐ Turning off your spare fridge / freezer when it is not needed.
- ☐ Replaced fridge, freezer or oven door seals.
- ☐ Kept your dishwasher's filter clean so that it runs efficiently.
- ☐ Washing your clothes in cold wash cycle to reduce energy usage.
- ☐ Avoided using your dryer whenever possible.
- ☐ Cleaning the lint filter of your dryer regularly.

Already Doing - Long Term

- ☐ You regularly upgrade your old appliances / whitegoods to modern energy efficient

models.

Recommended

- ☐ Switch off unused appliances at the wall to reduce standby power usage.
- ☐ Ensure your fridge and freezer are set at +4 degrees Celsius (fridge) and -18 degrees Celsius (freezer).
- ☐ Place the fridge / freezer in a cool, well ventilated area.
- ☐ Turn off your spare fridge / freezer when it is not needed.
- ☐ Replace fridge, freezer or oven door seals if needed.
- ☐ Keep your dishwasher filter clean so that it runs efficiently.
- ☐ Wash your clothes using a cold wash cycle.
- ☐ Avoid using your dryer whenever possible.
- ☐ Regularly clean the lint filter of your dryer.

Recommended - Long Term

- ☐ Upgrade your old appliances / whitegoods to modern energy efficient models.

Additional comments regarding appliances actions?

Type here

Assessor: Total amount for Part 1 "At Assessment Retrofits" and Part 2 "Post Assessment Retrofits" should be \$200 - \$300 maximum.

At Assessment Retrofits (Part 1)

	☐ 1
Shower Timer [\$2]	☐ 2
	☐ 3
	☐ 1
Door Snake [\$3]	☐ 2
	☐ 3
	☐ 1
Thermometer [\$3]	☐ 2
	☐ 3
	☐ 1
Valvecosy [\$13]	☐ 2
	☐ 3

LED Globe [\$13]

☐ 1

☐ 2

☐ 3

EcoSwitch [\$13]

☐ 1

☐ 2

☐ 3

Plug in timer [No longer available - do not offer]

☐ 1

☐ 2

☐ 3

Door Seal (RP17)

☐ 1

☐ 2

☐ 3

Window and door seal (RP14)

☐ 1

☐ 2

☐ 3

☐ 1

Tap Aerator

☐ 2

☐ 3

Lagging (insulation)?

☐ Yes

Lagging - how many metres?

[\$4/m]

Type here

Renshade®?

☐ Yes

Renshade® - how many metres (lengthwise)?

[\$16/m]

Type here

Post Assessment Retrofits (Part 2)

Assessor's recommendations

Heating / cooling product options

Pedestal Fan [\$110 each]

☐ 1

☐ 2

☐ 3

☐ 4

☐ 5

Ceramic Fan Heater [\$100 each]

☐ 1

☐ 2

☐ 3

☐ 4

☐ 5

Lighting product options

LED (Bayonet) [\$13 each]

☐ 1

☐ 2

☐ 3

☐ 4

☐ 5

☐ 6

☐ 7

☐ 8

☐ 9

☐ 10

☐ 11

☐ 12

☐ 13

☐ 14

Par 30's [\$30 each]

☐ 1

☐ 2

☐ 3

☐ 4

☐ 5

☐ 6

☐ 7

☐ 8

☐ 9

☐ 10

☐ 11

☐ 12

☐ 13

☐ 14

LED (Screw) [\$13 each]

☐ 1

☐ 2

☐ 3

☐ 4

☐ 5

☐ 6

☐ 7

☐ 8

☐ 9

☐ 10

☐ 11

☐ 12

☐ 13

☐ 14

Water efficiency upgrade options

Washer [\$5 each]

☐ 1

☐ 2

☐ 3

☐ 4

☐ 5

Tap Aerator

☐ 1

☐ 2

☐ 3

☐ 4

☐ 5

Shower Head

☐ 1

☐ 2

☐ 3

☐ 4

☐ 5

Showerhead recommendation notes

Should you recommend we supply a free showerhead under 'Water efficiency upgrade options', there are 2 possibilities: 1. Householder DIY (we can send a video link on 'How to install'). OR 2. We could arrange install by a handyman/plumber (Renters may require Landlord approval). Please make relevant notes below...

Type here

Draught proofing options

- 1
- 2
- 3
- 4
- 5

Caulking Tube [\$10 each]

- 1
- 2
- 3
- 4
- 5

DraftStoppa [\$37 each]

Additional Services

- 1

Handyperson [\$80]

☐ 1

OR

Efergy E2 In-Home Display (IHD). *Assessor: Please confirm that this is their preference i.e. that they are open to receiving this as opposed to other PAR options. There is also a prompt soon for you to take a photo of the meter box, upon exiting the home, if IHD is recommended.*

Efergy E2 IHD is recommended for HOME OWNERS only.

IHD [\$100]

☐ 1

Electrician Service [\$120]

☐ 1

OR

Rebate options

Only select one of these \$250 rebates on upgrading / installing specific energy efficiency solutions.

Fridge upgrade

☐ Yes

Washing machine upgrade

☐ Yes

Insulation (Ceiling)	☐ Yes
Outdoor shutters	☐ Yes
Curtains	☐ Yes
Pelmets	☐ Yes
Whirlybird	☐ Yes
Freezer upgrade	☐ Yes
Halogen downlight replacement	☐ Yes
Draughtproofing	☐ Yes

Rebate options - OTHER

Are there any other energy saving options not listed above, that the householder would like to use the \$250 rebate towards?

Additional comments regarding retrofits?

Type here

Assessor: Total amount for Part 1 "At Assessment Retrofits" and Part 2 "Post Assessment Retrofits" should be \$200 - \$300 maximum.

Power Champions

Power Savers is looking to develop 'Power Champions' who would act like 'delegates' of the Power Savers program.

Hopefully you've found today useful, and will see some significant reductions in your energy use and electricity bills in the future and would like others to share in this experience as well.

Power Champions will take action to share what they have learnt through the program with their friends, community and workplace; as well as learning more about energy use and efficiency.

Some of the things you could be involved in include signing up colleagues to the program, sharing what you've learnt with the community, or starting a team to take action in your workplace or community.

Would you like to hear more about how you could get involved?

☐ Yes

☐ No

☐ Maybe

Comments / questions related to Power Champions.

Type here

Do you have any friends or family that you think would be interested in getting involved in the Power Savers program?

☐ Yes

☐ No

Contact details of friends or family who would be interested.

Type here

*A key element of this program is about developing communities. We hope to create some documentaries which will profile participant's journeys through the program. Would you be interested in sharing your story on film to help promote the Power Savers project?

☐ Yes

☐ No

☐ Maybe

Comments / questions related to filming and storytelling.

Type here

Assessor: Don't forget to take photo of meter box when exiting if IHD is recommended.

Post-assessment reflection

Optional. It would be helpful for project staff if assessors could take time to reflect upon the assessment and communicate back to staff any relevant / meaningful experiences. Any notable information? An estimate of their level of engagement? Whether you feel they will take note of further advice in the PSAP / PARs ? A summary of the main findings would be useful in preparation for our PAR phone calls.

Type here

Assessors: United Voice does not commonly contact members regarding financial or social hardship. If you come across a situation that needs to be raised with the union, please refer members to the Member Support centre number (which is on their member card); 1800 805 027.

Assessor: Please upload all offline data to the online mode BEFORE uploading relevant photos in this section, using the 'Choose File' tool.

NOTE: You must be connected to the internet to upload offline data and photos.

Photo of front of house

Choose a file to upload

Choose File

No file selected

Photo of HWS tank

Choose a file to upload

Choose File

No file selected

Photo of HWS tank compliance label

Choose a file to upload

Choose File

No file selected

Photo 4 (IHD or other)

Choose a file to upload

Choose File

No file selected

Photo 5 (optional)

Choose a file to upload

Choose File

No file selected

Photo 6 (optional)

Choose a file to upload

Choose File

No file selected

Photo 7 (optional)

Choose a file to upload

Choose File

No file selected

Photo 8 (optional)

Choose a file to upload

Choose File

No file selected

Photo 9 (optional)

Choose a file to upload

Choose File

No file selected

Photo 10 (optional)

Choose a file to upload

Choose File

No file selected



United Voice NSW
1/187 Thomas St
Haymarket NSW 2000

E: powersavers@unitedvoice.org.au
W: www.powersavers.org.au

Appendix 10

Billing Data Consent Form

Permission to Obtain and Use my Electricity Bill Data

To my electricity retailer and my distribution network service provider,

I, the electricity account holder for this household, give permission for you to advise the Power Savers Project (PSP) Consortium, comprising United Voice, the Nature Conservation Council of NSW and the Institute for Sustainable Futures at the University of Technology Sydney, about the amount of electricity consumed on the account shown below for the two years before and two years after the date of signature shown below.

If I close the account or change energy provider during the two years following the date of signature, I authorise you to notify the PSP Consortium that the account has been closed.

I understand that this information:

- ☐ Will be used to measure the electricity savings achieved through the Power Savers Project.
- ☐ Is provided voluntarily and will be not disclosed to third parties by the PSP Consortium unless it is in a form that does not identify my name or address.
- ☐ Will be treated confidentially and in accordance with the Privacy and Personal Information Act 1998 (NSW).

The PSP Consortium will store this data for the life of the project only. Please contact United Voice's Power Savers staff on (02) 8204 7249 to discuss access to this information.

PLEASE TURN OVER AND COMPLETE DETAILS



United Voice NSW
1/187 Thomas St
Haymarket NSW 2000

E: powersavers@unitedvoice.org.au
W: www.powersavers.org.au

ELECTRICITY ACCOUNT DETAILS

UNITED VOICE MEMBER NAME	
ADDRESS	
NAME OF ELECTRICITY SUPPLIER (e.g. AGL)	
ELECTRICITY ACCOUNT NUMBER (if available)	
METER IDENTIFIER NUMBER (NMI) (as shown on the account)	

Signature of account holder: _____

Account holder full name: _____

Signature date: _____



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PLEASE TURN OVER AND COMPLETE DETAILS



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ELECTRICITY ACCOUNT DETAILS

UNITED VOICE MEMBER NAME	
ADDRESS	
NAME OF ELECTRICITY SUPPLIER (e.g. AGL)	
ELECTRICITY ACCOUNT NUMBER (if available)	
METER IDENTIFIER NUMBER (NMI) (as shown on the account)	

Signature of account holder: _____

Account holder full name: _____

Signature date: _____



New South Wales Branch

President Kath Hadden

Secretary Mark Boyd

Appendix 11

First Name Last Name
Street Address,
Suburb, NSW Postcode

24 January 2017

Dear First Name,

We need your help!

Congratulations on being part of our free Power Savers Program and having taken part in a home energy assessment.

At this point, we need your help.

Enclosed is a simple form that we ask the Account holder of the energy bills (the person's name on the energy bill) to sign and return as soon as possible in the Reply Paid envelope.

In order for United Voice to tell if the program has been successful in saving you energy and money, access to your billing data (from your meter readings) is needed.

The billing data collected is anonymous, so you won't be identified or linked to the meter readings personally in any way.

It is very important that the Account holder signs this form (and sends it back using the enclosed Reply Paid envelope); **otherwise you will not be eligible to receive your free post assessment retrofits valued up to \$250.**

The Power Savers Program will benefit the households of one thousand United Voice members and their families to assist them to save energy and save money.

Thank you for your involvement.

Yours sincerely,

Mark Boyd
Secretary, United Voice



Actions you are doing

Here is a list of actions you are already doing in your home to save power. Continue these actions to keep making savings.

Using Hot Water

- ✓ Use a water efficient showerhead.

Heating your home

- ✓ Work towards achieving your short-term heating actions.

Lighting your home

- ✓ Turn lights off when not in use.

Cooling your home

- ✓ Use fans and natural air flow through the house for cooling, instead of your air conditioner.
- ✓ Use external shutters to prevent summer heat from entering

Home appliances

- ✓ Wash your clothes using a cold wash cycle to reduce hot water / power usage.

Your long-term power saving goals

These actions will make a big difference in your home.

- \$ Upgrade to a more efficient hot water system

- \$ Utilise deciduous trees and vines to allow the winter sun in and keep the summer sun out

- \$ Insulate your roof to reduce heat gain during summer and heat loss during winter

- \$ Upgrade your old appliances / whitegoods with modern energy efficient models



Your home Power Savers Action Plan



The views expressed herein are not necessarily the views of the Commonwealth of Australia, and the Commonwealth does not accept responsibility for any information or advice contained herein

This activity received funding from the Department of Industry as part of the Low Income Energy Efficiency Program

For more information, contact United Voice
E powersavers@unitedvoice.org.au
P (02) 8204 7249
W www.powersavers.org.au





Action Plan – Your short-term power saving goals!

Here's a list of easy-to-do actions as recommended by your home energy assessor. Start them today to increase your comfort and decrease your power bills.

Using Hot Water

- ☐ Keep shower times to 4 minutes or less (with shower timer!).
- ☐ Regularly check your hot water system is no higher than 60 degrees Celsius.



Heating your home

- ☐ Wear extra clothes to warm up instead of turning on a heater.
- ☐ Use an energy efficient heater when necessary.
- ☐ Use door snakes and / or weather strips to prevent cold air entering and heat being lost.
- ☐ Cover fixed air vents to stop unwanted draughts.
- ☐ Ensure your windows and doors are sealed properly (e.g. use caulking).
- ☐ Use enclosed pelmets on your windows to contain your winter warmth.



Lighting your home

- ☐ Replace incandescent or halogen lights with CFLs or LEDs.
- ☐ Use LED or solar powered external floodlights.



Cooling your home

- ☐ When using your air conditioner in summer, have it set to a minimum of 24 degrees Celsius and use fans to push the cool air around.



Home appliances

- ☐ Switch off all unused appliances at the wall as they use standby power.
- ☐ Set your fridge to +4 and your freezer to -18 (degrees Celsius).
- ☐ Ensure fridge / freezer seals work well.
- ☐ Replace oven door seals if there are signs of wear and tear.
- ☐ Dry or partly dry your clothes using a drying rack or clothes line before considering using a dryer.
- ☐ Regularly clean the lint filter of your dryer.



Appendix 13

Aspects of retrofit delivery for AARs

AAR storage

NCC was able to stock a limited number of items in its office in Newtown. However, for the purposes of the PSP, safe and insured storage facilities were required in order for EAs to easily access AAR stocks, as and when required:

- Sydney: All three Sydney EAs homes were located between Penrith and Blaxlands Ridge, so a storage facility was hired in South Windsor, with EAs keeping minimal weekly stock at their homes.
- Hunter: As the EA chosen for the Newcastle and Hunter regions was an established environmental assessment business (Footprint Energy), we had the advantage of being able to utilise their storage facilities for free.
- Central Coast: Some HEAs were conducted by Footprint Energy and some by Sydney EAs, so storage arrangements were as above.
- Illawarra: The EA chosen for the Illawarra region (Illawarra Basix Solutions) was only expected to conduct around 80 assessments, in 2 separate batches (Oct-Nov 2014; Feb-Apr 2015), thus it was felt that storage would be best placed at the EAs home.

Appendix 14

Aspects of retrofit delivery for PARs

Deployment of PARs

The deployment of PARs in the PSP could be quite time-consuming logistically, but it did ensure that the retrofits provided were specifically tailored to each HH, and agreed to by the occupants of the home.

At the end of the HEA, EAs would discuss with each HH what they believe would be the best PAR option(s) for the home and its occupants, considering the results of the assessment. Once an 'agreement' was reached, the chosen PAR option(s) were entered by EAs into the FluidSurveys tool. This recommendation was then available immediately to the team at NCC.

In the weeks following the HEA, the NCC project team would review this recommendation in the context of the whole assessment before calling the HH to discuss and confirm the PARs to be provided, or confirm an alternative PAR if the HH had changed their mind.

It was important for EAs to have a clear conversation with HHs so that they understood and agreed with the PAR recommendation. This did not lock them in to that PAR should circumstances change, but it did make the PAR calls by NCC much more efficient.

Once PARs were confirmed with the HH, they were then deployed to the home with:

- a covering letter confirming the products being deployed or rebate offered
- the PSP brochure, in order to encourage HHs to recruit others to the project
- a copy of the PSAP (unless it had already been confirmed as received)
- a reply-paid envelope when the HH needed to return a copy of tradesperson quotes and/or appliance receipts.

The confirmation of actual 'installation' or receipt of PAR items by the HH occurred at QR1/2/3/POPS via United Voice's OCC, or by NCC. The status of each PAR was tracked in the Salesforce database shared between NCC and UV, e.g. when a PAR moved from 'Deployed' to 'Installed'.

These calls also allowed for identification and resolution of any outstanding issues that may have arisen through the PAR process. A few examples of this include:

- people not receiving their items (lost in the post or failed orders);
- people not understanding how to use their items (e.g. the IHD or how to claim rebates);
- enquiries about rebate expiry dates;
- people wanting to change their PAR offer (e.g. from a rebate to a retrofit);
- households seeking further advice on issues such as faulty air conditioning units, solar PV failures, tenancy disputes, and why their bill may have increased.

These issues along with other issues arising were referred back to NCC from the UV OCC team via Salesforce's 'Chatter' feature. Exact figures are not available for these referrals but are estimated at 100 or more in total. This was an important feature to ensure all PARs were properly deployed and utilised to their full potential.

LED light-globes and downlights

For a number of HHs, replacing their standard lights (incandescents or CFLs) was the best PAR option. This involved the PSP posting the HH the appropriate number of Screw (E27) and/or Bayonet (B22) LEDs. These LEDs were the Osram 9W (60W equivalent) in warm white, the same light provided as an AAR at the HEA. Some HHs specifically requested daylight globes, but the vast majority were in warm white. These LEDs were purchased and collected from Bunnings using a 5% trade discount card.

For other HHs, the lighting efficiency improvement was recommended in regards to replacing halogen downlights with LEDs, in the form of MR16s and GU10s. NCC developed an arrangement with the Ezy-as LED company (EAL), which enabled a more-efficient deployment of PARs. In some situations, HHs were willing to coordinate their own purchase and installation of LED downlights. In other situations, NCC organised with EAL to post an appropriate number of downlights direct to the HH.

The EAL arrangement was able to provide a number of benefits, including:

- most Ezy-as LED globes are fully dimmable, have a 30 year lifespan (40,000 hours), a 30-day money back guarantee, and they work with 99% of light fittings
- a discount of 20% for direct purchases by PSP HHs
- a discount of 20% for purchases by NCC
- free delivery within 2 business days

Other LED lighting options were also explored and provided to HHs, such as “candlelight” globes.

Pedestal Fan

Previous studies indicated that our target audiences were avoiding using air-conditioning in an attempt to manage their increasing electricity bills. The pedestal fan was chosen as an option for households who either didn’t have an efficient air-conditioning unit, or for those that did, to assist them to reduce the use of their air-conditioner. Fans were high quality and purchased and deployed via AOL, who agreed to supply the fans to the PSP at a slightly reduced cost. Later in the PSP, our chosen fan was no longer available, so we started to purchase them from another local supplier, Stan Cash.

Heater

There was some hesitation by the PSP team in providing a heater as an option for PARs. However, it was clear that some HHs were using highly inefficient or inadequate heating in their homes, and our PAR heater could offer a suitable solution to assist in reducing energy use and/or a much-needed improvement to HH comfort. This would be alongside EAs advice during the HEA, fact sheets relating to heating and draught-proofing, as well as provision of AAR and PAR items, in attempting to address the many homes in the PSP region which have less than adequate passive heating or draught-proofing.

The heater chosen for PARs was based on the most suitable option from a review by Choice.com.au website, short-listed by NCC to 7 models based on a balance of price and energy efficiency. The Sunbeam Electric Ceramic Heater (HE2125) chosen for the PSP ranked as the one of the more energy efficient heaters (overall score of 70/100) compared to 30 other models.

Other heaters cost between \$299 to \$649, and still had an overall score lower than that of the Sunbeam heater, which was priced at around \$100.

In-Home Displays

The Efergy E2 In-Home Display (IHD) was chosen based on a cost of less than \$80 per unit (not including installation), high penetration in the Australian market, national support, and ease of use.

IHDs were only provided to home owners, not tenants, due to the fact that additional consent may be required by landlords before installation at the power meter, such as a hole possibly needing to be cut in the meter box. We did not want to risk the security of any tenancies. In addition, the IHD is not an item that can be easily transferred upon a HH relocating home, as it would require an additional fee for an electrician to re-service.

For the majority of the project, the PSP was able to develop an arrangement with a local electrician to install the IHDs at a very competitive \$55/install. These cost-savings allowed us to address issues that arose with some HHs, such as sending the electrician back to the home on some occasions to troubleshoot issues.

Rebates

A wide range of rebates were available to HHs, from new appliances to tradesperson services to home fixture upgrades.

An initial 3-month expiry was placed on all rebates in order to encourage HHs to replace old inefficient appliances ASAP and for the PSP to evaluate the benefits within the LIEEP program period. In certain circumstances, an extension up to 6, 9 and/or 12 months or more was allowed to enable some HHs to save up the extra contribution and/or finalise a decision. Some participants were extremely busy, working long hours, sometimes 2 or more jobs, doing shift work, and with a large family. Additionally, as expected, households meeting the eligibility of the program are likely to find it difficult to make large purchases without a long lead time.

The final date accepted for all rebates and return of receipts was set at October 31, 2015. This allowed the month of November 2015 to offer to provide any remaining HHs with other PAR products instead of their rebate. Unfortunately due to the truncated participant journey of Round 3 participants they did not have as long as other participants to take up this offer. Some participants were unable to take up the offer in time and where possible alternative PARs were provided.

Appliance rebates

NCC developed an arrangement with Appliances Online's (AOL) Commercial Division which enabled the following benefits:

- an efficient website that enabled HHs to easily narrow their search for the right appliance to suit their circumstances (eg. by Litre size, dimensions, price, star rating, colour, style)
- free delivery and removal of old appliances, free installation, and price matching
- AOL would automatically reduce the cost for the HH by \$250. Monthly, AOL would invoice NCC and provide appliance purchase details

- AOL staff were aware of the PSP's minimum star rating requirements, so purchases did not have to be pre-approved nor did a copy of the receipt need to be provided by HHs.

HHs did not have to purchase through AOL, but it was a simpler logistical process if they did. Unfortunately, on occasions the AOL staff did not recall the PSP offer and some participants were wary of buying appliances over the phone and preferred to do it in person. This may have reduced the effectiveness and rate of uptake through this method.

For those HHs that purchased outside of AOL, United Voice processed their rebate upon receiving a receipt of proof of purchase. All records of receipts were attached to each participant's account in Salesforce. Rebate processing was undertaken by PSP staff and the accounts team at United Voice. Initially this was costed at 0.25 hours per rebate. However, after reflection on the time spent on rebates by the UV team, this was increased to 0.5 hours per rebate.

The key requirements that the PSP placed around the fridge/freezer purchases by HHs was that the appliance must be new (or "as new") and have a minimum 3 star energy-efficiency rating. In some cases, a purchase of a 2 or 2.5 star appliance was allowed. This was the case in situations such as:

- the HH had 5 or more people living in the home so required a larger size fridge (eg. 600L or above) meaning that there were less options at 3 stars or above in a reasonable price range
- exceptional circumstances, such as the HH currently having a 20 year old fridge and/or simply being unable to afford a more expensive (higher star-rated) fridge

In such instances, in the PAR discussion with the HH, NCC ensured the HH was aware of the reasoning behind star rating requirements. That is, the fridge is on 24-7, can contribute about 10-15%+ to the overall energy bill, and that every extra star can reduce running costs by about 20%.

Such situations were handled case by case and the PSP was prepared to be a bit flexible in such circumstances considering the target audience.

The key requirements that the PSP placed around dishwasher and washing machine purchases by HHs was that the appliance have a minimum 3.5 star energy-efficiency rating as well as a 4 star water-efficiency rating. Again, in exceptional circumstances, allowances were made for reduced star-rating (less expensive) appliances.

Reverse Cycle Air Conditioning (RCAC)

A minimum 3 star rating was decided on after a review of air conditioners, including:

- Reviewing Choice.com.au
- Feedback from another LIEEP project ('Beat the Heat')
- Feedback from an early HH in the PSP

The 'Beat the Heat' LIEEP project advised:

- they were working in the range of a 3 to 3.5 star rating for their RCAC installations
- in the current Australian appliance star rating register for 3.5kW cooling capacity and 4kW heating, there are 102 models, with only 2 models having a rating over 3.5 stars

- out of the 2 models with 4 or more star rating, one is no longer available, and the other has a unit price of \$3,000, not including the electrical and refrigeration work

Such RCACs were only recommended for HHs to upgrade from an old, inefficient heating/cooling appliance, as per EA recommendations. Supplementary information was provided to HHs (eg. PSP fact sheets) to encourage best practice use / maintenance of RCACs, e.g. rooms should be appropriately sealed / draught-proofed first.

Rebates involving tradespersons

For any rebates requiring a HH to engage a tradesperson(s) for installation (eg. installation of a ceiling fan), processes were put in place to ensure NCC first approved a formal written quote before any work was carried out. This was to ensure that installation was done by people who were qualified, licensed and insured. The process varied slightly depending on the PAR deployed. For example, there were additional requirements and pre-approvals for tradespersons installing insulation, as per DIIS requests (see below).

Ceiling insulation rebates

The Department (DIIS) had additional pre-approval requirements for any rebates involving the installation of ceiling insulation. NCC staff sought approval from DIIS, before HHs engaged any insulation tradespeople for formal works, by providing the following confirmations:

- installation would be consistent with Australian Standards and relevant building codes
- conformation to safety and quality standards for installation
- public liability insurance of \$20 million or more
- history and experience in the industry

Appendix 15

QR1 Script

Hi, my name is _____ and I'm calling from your Union, United Voice. How are you today?

I'm calling you about your involvement in our program to save money on your power bills, Power Savers.

1. How was your free in-home energy assessment?
2. Did you get your Power Savers Action Plan? Are you using it?
[If a participant has not received their PSAP Sorry about that, we'll resend one in the mail. Can we just check the address we have here for you?]

CHECK WHAT THEY RECEIVED AS A PAR -

3. Did you get a delivery of extra items? Are you using them? How are they?
OR - Did you get a rebate voucher to buy a more energy efficient appliance? What did you buy? How is it?

[If a participant has an outstanding BDC In order to measure the savings we're bringing to members as part of the program United Voice is collecting billing information from all participants of the program. Your information is completely anonymous so you won't be identified personally. We haven't received a form from you yet, do you need us to resend the form?]

*[If a participant has not received their PAR items Sorry you haven't received your free items. Did you get a call about us sending them out to you?
If not – No problem, we'll follow that up for you and get back to you as soon as possible.
If yes – OK, Can we just check the address we have here for you?]*

4. Have you received a power bill since your assessment?
5. Is there anything we can do to help you in reducing energy use?
6. Would you recommend the assessment to others? Do you have anyone you would like to recommend or pass information on to?
7. *For participants particularly interested the conversation will continue into a Champion conversation*
 - a. Have you talked to anyone else about the program and your assessment?
 - b. Do you know anyone else who would benefit from the program? *For example work colleagues, friends or family. Let them know they can recommend the program to their friends and family.*
8. Is there anything we could do to improve the program in the future?

Thanks so much for your time, We're looking forward to see how much money you can save on your bills!

Appendix 16

QR2 Script

Hi, is that ____? Hi ____ it's _____. I'm calling from your (industry) union, United Voice? How are you?

That's great XX. The reason I'm calling is because you are part of the Power Savers program, and had your home and power bills assessed by an assessor about six months ago.

Are you still living in the same place that you had your assessment?

If not – mark the box 'moved home mid-way' and 'do not complete POP'; then update the details

1. We just wanted to check in to see how you're travelling in the program?

PROMPTING QUESTIONS

- *Do you remember much about the assessment you had?*
- *How did it go?*
- *What was one of the main things you learned during your assessment?*

That's good to hear! It's good because there are over 500 members taking part in the Power Savers program and we're hearing some good stories about members cutting down on their power costs.

2. So the million dollar question is: are you saving money?

PROMPTING QUESTIONS

- *How does your most recent bill compare to one at the same time last year? Are you seeing a difference. (* Usage tends to be higher in Winter.)*
- *Have you been comparing your KWh (kilo-watt hours) usage? Over the last year there have been a few pricing changes, as you may have talked to the energy assessor about, so it's good to track your changes along the KWhs too*

IF THEY ARE SEEING GOOD CHANGES

Great! So good to hear! *Potential lead into Champions discussion (see Champions script)*

IF THEY AREN'T SEEING GOOD CHANGES

Well it might be too soon to tell, our energy use tends to fluctuate with the different seasons. Are you using the advice in your energy plan? *Lead into the fact sheets and that we are currently working to fill in any gaps in knowledge*

FACT SHEETS

(ALTER BASED ON SEASONS)

You've been a part of the Power Savers program for around 6 months, and we hope to continue to support you to save. Summer's just around the corner. What's the summer heat like at your place? How did you manage with cooling your home last year?

(If cooling/heating is an issue recommend relevant fact sheets)

We've put together some facts sheets on simple ways you can keep your home cooler/warmer this summer/winter and save on your power. I think they could help, would you like me to send (a, b c)

If cooling/heating isn't an issue – That's great sounds like you've got summer/winter sorted.

Are there other things related to your power use which you'd like more information about?

If yes

And we WE HAVE FACT SHEETS ON THOSE

Great! We already have some fact sheets put together on that/those issues. We'll send them out to you!

and WE DON'T HAVE FACT SHEETS ON THOSE

That sounds like a really good idea! We don't currently have any fact sheets on that topic, but we will try to put something together.

If no to more information (prompt)

Other members have found xx fact sheet helpful...

The last thing XX is as a member of United Voice, you can sign up any family, friends or colleagues to the program. Is there anyone that you can think of that would benefit from the program ? *if Yes - recommend that the member recruits their friends directly, send out registration forms and reply-paid envelopes. Talk to them about how they might talk to their friends about it.*

Great XX. Thanks for that. Well, it's been good checking in with you. Hope you (continue to save / start to see some savings) in the coming months. We'll give you a call in about three months to see if this has helped!

Thanks and we'll talk to you then XX. Have a good one.

Appendix 17

QR3 (pilot)

Hi, is that ____? Hi ____ it's _____. I'm calling from your (industry) union, United Voice? How are you?

That's great XX. I'm calling to check in about the Power Savers program that you are involved in.

First off – can I just check is your address still XX? [If moved – record in Salesforce, check moved home mid-way and find out when they have moved, notify Erin via chatter].

[Story development]

1. How's it all going? *(early rapport building and reminder of the program e.g. How did your energy assessment go? How are you coping with energy use this Summer/Winter? Are you seeing reductions in your bills? etc)*
2. How do you think your approach to energy use has changed after being involved in Power Savers? *(Some people have said they've done X, Y ,X...).*
3. What changes have you made around your home? Have you bought extra items other than those you got out of Power Savers?
4. What would you say the number one tip you learnt from Power Savers was?

[Champions follow up if discussed in QR2 and not already followed up]

Great to hear how well the program is going for you!

There are lots of United Voice members just like you, who are having the same experience as you. Only 1,000 people across NSW can go through the program, but Power Savers has a Champions program where Power Savers can work together to share the knowledge from Power Savers into the broader community.

5. Would you like to join a local team of Power Savers? *(Teams would be getting together to discuss their involvement in Power Savers and opportunities to spread their knowledge further in the community – potential activities could include workshops, table talks, working with local community groups etc).*
 - a. YES – Fantastic! We'll be in contact with you soon with a date and time! Did you have any ideas for things you would like to do
 - b. NO – No problem at all, remember you can recommend a place in the program to friends and family, but be quick because the program will finish in April next year.

Thanks for talking with me today, we'll be giving you another call in a few months to do a final survey to see what has changes 12 months after you're energy assessment. Looking forward to speaking with you then!

Have a Good day/night

Appendix 18

United Voice Champions Project Plan

Power Savers Program

Updated by United Voice, December 2014

Overview

This document provides an outline of the plan to run the 'Champions' program within the LIEEP program – 'Power Savers Program' (PSP).

The PSP intends to increase energy literacy among participants, as well as encourage and generate persistent electricity use reductions. One of the ways the program hopes to do this is through the development of effective peer-to-peer engagement leads. It is hoped that by doing so the benefits of the program can live beyond the participants involved, and the life of the program.

The Funding Agreement

Based on the funding agreement with the Nature Conservation Council (NCC) and the Department of Industry (DoI) these are the following requirements:

Task	Milestone 7	Milestone 8	Overall
Select and Train Energy Champions	40	20	60
Form Power Savers Teams	2	1	3

Aims

Aims of the 'Champions' project include:

- Development of the Power Savers 'model';
- Leadership development;
- Member- to-member engagement;
- Relationships between members and organisation is strengthened;
- Relationships between members are strengthened;
- Participants become politicised;
- Participants are able to take action.

Background

The Champions project was developed as a way to both spread the benefits of the Power Savers project beyond the participant group, as well as to engage participants in peer-to-peer interactions and personal development. The project is expected to bring additional benefits through providing feedback on the development of the program, and increasing connections between participants and the project.

Champions

A 'Power Savers Champion' is someone who takes activities beyond the core or the program, or who takes action to spread the learning of the 'Power Savers' project beyond themselves – be that within their family, workplace or community.

Taking action can be defined on a range of levels – from talking to family about ideas to reduce energy use, to encouraging a workplace to be more energy efficient, or running energy efficiency workshops in a local community.

Examples of potential 'actions' which would define someone as a 'Champion' include:

- Encouraging others to join the 'Power Savers' project;
- Speaking to family, friends, workplace or community about ways to save energy;
- Engage in media, or agrees to be part of other initiatives e.g. videos;
- Consulting with the Power Savers Project team on the program roll-out;
- Skilling up around energy efficiency;
- Set up a Power Savers team.

Power Savers teams

A 'Power Savers team' would be a group of champions who act together to take action in the same way an individual champion does, though on a greater scale.

Examples of potential 'actions' which would define a 'power savers team' include:

- Supporting one another in energy saving efforts, sharing ideas and tips;
- Act as a collective, or a consultative group, around the shape and the development of the 'Champions' program;
- Running a workshop in their community;
- Acting in their workplace to reduce energy use.

Objectives

Objective	Strategy
Select and train 60 champions to the program	Throughout various interactions with participants of the program – from recruitment, PAR and quarterly follow ups.
Form a minimum of 3 power savers teams in one or more of the Sydney, Hunter and Illawarra regions	By both encouraging champions to build their own teams within their networks and developing teams through asking participants to be part of 'local power savers teams'.
Increase recruitment to the program	By encouraging champions to tell their story to others who would be eligible for the program
Spread knowledge gained through the PSP to the broader community and increase energy literacy of the broader community.	By encouraging champions and participants to share their knowledge in their personal circles, and to engage in broader sharing through other mediums such as media or videos.
Increase skill set of participants	By inviting champions to engage in a range of new opportunities such as creating a video to promote the program or share their story for media.

	Through 1:1 training with champions for all parts of the champion program, and encouraging champions to take initiative.
Build peer-to-peer interaction	By encouraging champions to share the PSP and its learnings with their communities, and engage in specific communities created within the PSP. Encouraging participants to recruit others to the PSP
Build a peer-to-peer network	By inviting participants and champions to be part of 'local Power Savers teams'
Identify opportunities for the program to grow and develop.	Consult with champions about the roll-out of the program and ideas for the champions program.

Measurement and Evaluation

Disclaimer

In order to properly measure and evaluate the champions program all PSP staff – project staff, assessors and the OCC – are recording as much detail as possible on the actions taken by participants, interactions and training.

Due to the organic nature in which participants are expected to engage in sharing the knowledge of the PSP with their friends, family and colleagues, we cannot expect to have extensive knowledge of all interactions.

Additionally, due to the trial nature of the PSP, reporting and evaluation requests have developed over time, meaning that at some stages information has not been recorded as extensively as would have been liked in retrospect.

Champions

Where possible the PSP has recorded details based on the following areas:

- Identified Champion;
- Why the person was selected to be a Champion;
- What training the Champion has received;
- What this person has done to become a Champion; and
- How these results were gained.

Teams

Where possible the PSP has recorded details based on the following areas:

- Identification of people involved in the team;
- Geographic location of the team;
- Who is leading the team;
- What the team is going;
- What training they have received;
- Results of the team; and
- How these results were gained.

Plan

Organising Plan

Due to the intensity of the program, and the spread of participants through the various industries and geographical areas, the main development of champions will occur through direct points of engagement with the PSP project staff and the OCC, as outlined below.

Outside of that, the PSP team will work with Organiser across industries to develop potential champions. As we know, United Voice members, and specifically those involved in this program, are low-income and often have little 'disposable' time to spend outside of work, family and community commitments, thus the majority of organising will be structured either through 1:1 engagement the PSP project staff or through industry/workplace.

Direct Points of Engagement

Through all points of the PSP project staff are advised to be looking for potential champions and engaging with participants about potential ways they can step up and engage on a level higher than the core of the PSP.

This is highest in the QR2 and QR3 calls, where the OCC are specifically looking for leadership qualities and putting the 'hard ask' on participants to take further actions.

Below the various stages of engagement are outlined.

Stage	Engagement Strategy
Recruitment	At recruitment OCC staff look out for potential leaders and put an 'ask' to recruits if there are other people they would like to recruit to the program. If identified, OCC encourages participants to either take some brochures and talk to these people directly, or pass on their details to the PSP.
Assessment	Assessors ask participants if they would be willing to engage in the Champions program, and whether they would be interested in sharing their story on film or in the media.
Post-Assessment Retrofit (PAR)	PSP project staff listen for potential champions, and where suitable discuss the program with participants and record any relevant information for further interactions.
QR1	In the first quarterly follow up the OCC do an initial analysis from the conversation as to whether the participant is a likely champion. They ask the participant if they would recommend the program to others, and if the participant answers yes, ask them whether they would be interested to engage with the champions program.
QR2	In the second quarterly follow up the OCC actively scopes whether the participant could be a potential leader. If identified as a potential leader, or interested in doing more, the OCC put a strong ask on them as to whether they would like to be a Champion, and task them to encourage someone else to join the program.

	Throughout this process the OCC provides over-the-phone training as to strategies for running this conversation, inoculate them against potential ways the conversations might go, and develop strategies for dealing with objections (as required).
QR3	In the third quarterly follow up the OCC engages in a wide conversation with participants in attempt to develop the participants 'story'. From this, if the participant is deemed as engaged in the program and motivated by it, the OCC ask if they would like to be part of a local Power Savers team, or if they have other ideas as to how they would like to be engaged.
1:1 with Project Staff	PSP Project Staff conduct 1:1s with strong champions, either over the phone or face-to-face, for a range of reasons. Particularly these 1:1s occur for 3 main reasons: 1. Training to step up 2. Scoping of where the champion would be willing to take their engagement, and developing a plan to do so 3. Consultation about the broader program roll-out
Local Teams	The PSP will work with champions to put together local team meetings across the geographical area of Power Savers. The first meeting will be formed as a 'table talk' (where a group of people get together to discuss an issue and what to do with it) where different participants can get to know each other and put forward a plan for working together in the future.
Other	Through all communications (particularly written communications such as welcome letters, PAR letters and newsletters) participants are encouraged to talk to their personal circle about getting engaged in the program, and encouraged to get more involved.

Teams

Industry teams

As outlined earlier, industry teams are likely to be the most effective way to organise Power Savers teams – specifically because it is where United Voice members are most engaged in their community, and it is the most effective way to bring a group of PSP participants together.

Teams are likely to take one of two forms, either a group acting within their workplace to make it more energy efficient, or using the workplace as a springboard to create a team whose actions are outside of the workplace (e.g. this is likely to occur in Home Care).

Potential industry teams could include:

- Early Childhood Centres or Out of School Hours care undertaking an energy assessment of their centre, and engaging in energy efficiency projects with their kids.

- School Cleaners working with their school to run workshops with the school community around energy efficiency.
- Home Care workers getting together outside of work to discuss energy efficiency.

Outside organisations

Additionally in the development of teams the PSP plans to engage with external organisations – either participant lead or sourced as a potential area of further recruitment/benefit.

When this is participant lead, this is expected to be where participants would take the PSP to their broader community to encourage others to join, share the knowledge they learned through the program and/or engage in a higher-level activity such as running a workshop or table talks session in their community.

When this is based on external organisations, the PSP team will engage with an external body such as a community centre or advocacy group to work together to assist other low-income communities with energy efficiency. This will be done through similar activities to participant lead teams.

Timeline

The bulk of the Power Savers Champions and Teams development is proposed to be done in 2015. Due to the spread of resources throughout the program, the United Voice team has the resources to do this extensive organising work after recruitment is complete.

Additionally, in reflection on the Champions developed over the program so far, those most willing to be engaged are those who went through first, and have had nearly a year to experience the real benefits of the program.

Task	Timeline
<i>Primary Tasks</i>	
Recruit a minimum of 60 Power Savers Champions	September 2014 – December 2015
Form a minimum of 3 Power Savers teams	2015
<i>Secondary Tasks</i>	
Train the OCC on leadership identification and training, and the Champions Program	October 2014
Consult with high-level champions on the program	November 2014 – April 2015
Facilitate relationships with external organisations	November 2014 – April 2015
Conduct 1:1s with Champions and PSP Project Staff	2015
Hold Local Teams meetings and table-talks	2015
Develop potential Power Savers Teams	2015
Hold Champions Celebration Event (s)	December 2015 – January 2016

Please see the Champions Progress report for Milestone 7 for a full update of the current progress.

Appendix 19

Champions Script

Throughout your conversation, you need to make the assessment of whether this member would make a good ambassador (Power Savers Champion) for the program.

Qualities of a person who would fit this description:

- ***General enthusiasm for being more eco conscious and cutting down on carbon footprint***
- ***Has a compelling personal story about their struggles with paying for power. I.e. Gone without light for a couple of months because can't afford to put food on table for family of five and has no heating during winter.***
- ***Speaks positively of the program and sees it as a real positive benefit***
- ***Someone who's had a transformation or learned a lot or has had their mind significantly changed by participating in the program***
- ***Has actually saved some money by participating in the program (although not a must)***
- ***Generally articulate and is able to explain the program to others and shift others to join***

If at any point during your conversation, you've identified any of the above points, encourage them to become a Power Savers Champion.

Wow, it sounds like you've had a really great outcome...

- It sounds like you've benefited greatly by being in the program...
- It sounds like you've learned a lot by being in the program and that your mind has shifted greatly on the issue of efficient energy...

It would be great for you to be an ambassador for the program. Members would learn a lot from you firsthand and you can speak directly from your experience.

Prompting questions:

- Do you reckon Power Savers is a program that every United Voice member should participate in? Why so?
- Why aren't your colleagues signing up to the program?

The Power Savers program is looking for passionate members like yourself to step up and Champion the program and what you've learnt as part of it. Champions will be sharing their experience with the program, and talking about their troubles with electricity bills and the current difficulty with energy prices.

Would you be willing to take the first step and talk to your colleagues about being part of the program?

- YES – Great! I'll send you out some registration forms and reply paid envelopes so you can send them back! Also I'm going to give our Power Savers organiser, your number and she'll get in contact with you soon to see how it went!
 - ***If needed talk about how they would have the conversation. E.g. get them to talk about their experience in the program, what they felt like during and after the assessment, what they've learnt, what they've saved etc.***

- NO, I don't have any colleagues I could talk to about the program, but I'd like to be involved:
 - o That's OK there are other ways that you can get involved. I'm going to give our Power Savers organiser, Erin, your number and she'll get in contact with you soon to work out what else you could do.
- *NO, I don't want to be involved:* Dig deeper into the objection – Affirm , Answer, Redirect.
 - o *Deal with the objection* e.g. I don't have a lot of time.
 - o *Answer* – it actually won't take a lot of time, just a few minutes to have a chat with people you see every day at work.
 - o *Redirect* Isn't it important that your colleagues at work get the chance to be involved in the program too, and start saving on their energy bills?

Thanks, have a good day/night



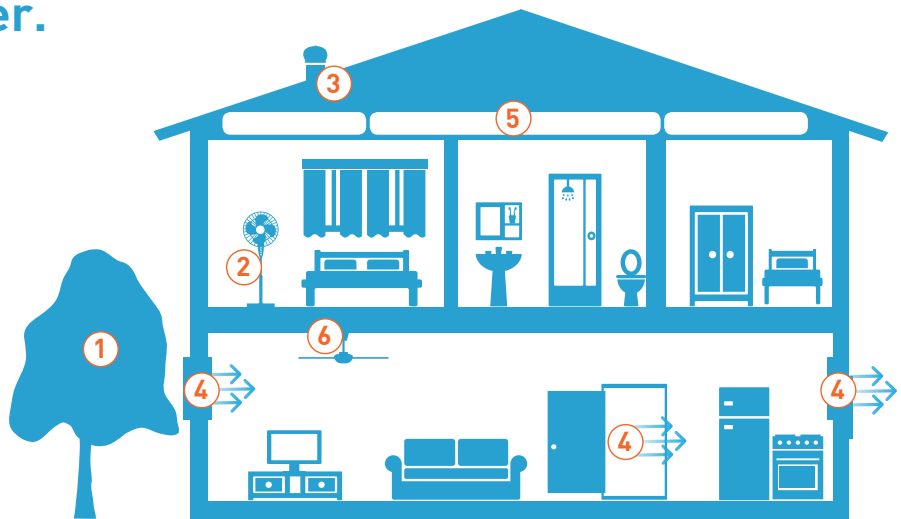
Save power and stay cool

A guide to keeping your home cool and saving money.

There are several ways to stay cool in your home without using an air conditioner.

1 Shading

Block the sun by shading your home, especially your windows. Outdoor shutters and deciduous trees (trees that lose their leaves in winter) can shade your windows and walls.



2 Pedestal fan

Fans are cheaper to buy and run compared to an air conditioner. Using a fan can make the temperature feel 3°C cooler.

5 Ceiling insulation

Ceiling insulation is one of the more cost effective ways to improve energy efficiency in your home. During summer it keeps the cool in and the heat out.

3 Whirlybird

Whirlybirds are designed to suck warm air out of your roof space, cooling down your home. There are a few types available. If possible, find one that can be 'turned off' in winter, e.g. an electric one.

6 Ceiling fan

Ceiling fans are very cheap to run and help circulate the air in your home. The larger the room, the bigger the ceiling fan needs to be. The cooling effect of using 4 pedestal or ceiling fans is similar to 1 air conditioner

4 Ventilation

Open up your windows and doors to allow for warm air in your home to be replaced by cooler air outside. This is most effective on cool summer nights.



When necessary, we strongly advise using a licensed and insured tradesperson (e.g. plumber, electrician, certified installer), with an ABN number and good references. This applies to any major renovations or electrical work.



Renting?

If you make any changes to your home, we recommend getting written approval from your landlord or real estate agent before doing so. You could also ask if the landlord would be willing to split the cost of the work with you - it is always worth a try!



Strata title?

If your home is managed by a strata authority, you will need to seek their written permission before making any major alterations e.g. ceiling insulation.

More tips to cool your home



- 1 If you are building new, choose a lighter coloured roof - it will reflect the heat.



- 3 If buying a new skylight, choose one that is adjustable and well insulated. Skylights that can open let the heat out and let natural light into your home.



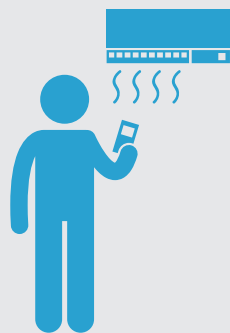
- 2 Seal around windows, doors and other cracks and gaps to stop the hot outside air from entering the house.



- 4 Pools, ponds and water features immediately outside windows or in courtyards can pre-cool the air entering the house. These features also look great around your home!

Air Conditioner Checklist

Do you use an air conditioner? Follow these simple tips to run it efficiently



- ☐ In summer, set the thermostat between 23°C and 26°C for cooling. For every degree you lower the system, you increase running costs by around 10%.
- ☐ Close windows and doors to areas being cooled when the air conditioner is running.
- ☐ Close curtains and external blinds during the day to keep the sun's heat out.
- ☐ Use the 'eco' setting if your air conditioner has one.
- ☐ Do maintenance checks on your air conditioner regularly, such as cleaning the filter.

For more information

Your Home <http://bit.ly/home-cooling>

Your Home <http://bit.ly/passive-cooling>

Power Savers also has a range of other useful fact sheets available on topics such as heating, draught-proofing, insulating windows, efficient lighting and appliances. Contact us if you'd like any other fact sheets to help make your home more energy efficient - and more livable.

Contact us: Phone: (02) 8204 7249 email: powersavers@unitedvoice.org.au



Nature
Conservation
Council



Australian Government
Department of Industry

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The views expressed herein are not necessarily the views of the Commonwealth of Australia, and the Commonwealth does not accept responsibility for any information or advice contained herein



Save power and stay warm

A guide to keeping your home comfortable and warm while keeping heating costs down.

There are several ways to stay warm during the cooler months.

① Door snakes and door seals

Use these to close off (zone) the rooms in your home that you are heating. You only need to heat the areas you use.

② Seal gaps and cracks

Seal off air vents, gaps between and around windows, gaps around doors and gaps between floor boards. (Request our draught-proofing factsheet for more information).

③ Windows

Open up your curtains to let the sun's heat warm your house during the day. Close your curtains at night.



④ Ceiling insulation

Installing ceiling insulation will act to keep your home like a thermos – warm inside and cool outside.

⑤ Curtains and pelmets

Good curtains, combined with pelmets, will stop up to 40% of heat escaping from your home! Curtains should be heavy and potentially have multiple layers. They should be backed with white or light-coloured material. Pelmets can be added to curtains for extra warmth (a pelmet is a box on the wall that covers the curtain rod and stops warm air from escaping through the window).

Other tips to cut your heating bill

- Before switching on your heater, put on extra layers of clothes, use a hot water bottle, and grab a blanket.
- Place an extra rug or two on the floor.
- Use a programmable thermostat to turn your heater down while you are asleep or away.
- Reverse the direction of your ceiling fan to circulate warm air that collects at the ceiling.
- If you have a chimney, seal it off with a damper or chimney balloon to stop hot air escaping.



When necessary, we strongly advise using a licensed and insured tradesperson (e.g. plumber, electrician, certified installer), with an ABN number and good references. This applies to any major renovations or electrical work.



Renting?

If you make any changes to your home, we recommend getting written approval from your landlord or real estate agent before doing so. You could also ask if the landlord would be willing to split the cost of the work with you - it is always worth a try!



Strata title?

If your home is managed by a strata authority, you will need to seek their written permission before making any major alterations e.g. ceiling insulation.

The best heater for your needs

The two most important things to think about when using a heater are:

- 1 Make your home cosy and comfortable. Insulate the ceiling, and seal up gaps and cracks. Close your windows, put door snakes in place, and pull the curtains shut during the evening; and
- 2 Match the heater to the space you are using.

Use this table to choose the right heater for the right space in your home.

Space	Heater Options
1 or 2 people in small room	Electric heat rug or electric blanket or a small ceramic fan heater (use sparingly).
Small room (12m ²)	Small reverse cycle air conditioner, set at 18-21°C.
Large room (12m ² – 20m ²)	Reverse cycle air conditioner, set at 18-21°C.
Whole house (200m ²)	Zoned ducted reverse cycle air conditioner, set at 18-21°C.

For more information

South Australian Government <http://bit.ly/energy-heating>

Environment Victoria <http://bit.ly/warm-house>

Power Savers also has a range of other useful fact sheets available on topics such as cooling, draught-proofing, insulating windows, efficient lighting and appliances. Contact us if you'd like any other fact sheets to help make your home more energy efficient - and more livable.

Contact us: Phone: (02) 8204 7249 **email:** powersavers@unitedvoice.org.au



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Save power on appliances

A guide to saving power and money on the main appliances in your home.

Tips for running your appliances efficiently

Up to 1/3 of the average NSW home energy bill is spent on appliances. Is this you? Save money on your bills by choosing energy efficient appliances and using them correctly. This fact sheet explains how.



Fridge/Freezer

- Help your fridge breathe! Allow a gap of 20cm at the back and 10cm each side.
- Are the fridge seals working? Check by putting a piece of paper between the seals - if the paper doesn't grip, it might be time to replace those seals.
- If your fridge is more than 10 years old, maybe it is time to replace it. Choose one that is 3 stars or higher.
- If you have a second fridge or freezer, consider getting rid of it. Call your local council or see fridgebuyback.com.au.
- Set your fridge at 3-4°C and freezer at 18°C to keep food fresh. Any lower, and you're paying for wasted power.



Air conditioner

- Set the temperature correctly: 18-21°C in winter and 23-26°C in summer.
- Set a timer so that it turns off when it is not needed.
- Ensure your home is sealed for gaps and cracks and that you have good curtains.
- Make sure your air conditioning is turned off whenever you leave your home.
- Clean the filtration system regularly and do regular maintenance checks.
- If buying a new air conditioner, choose one that is 3 stars or more.



Dishwasher

- Try to only use the dishwasher when it is full.
- If you must use it half-full, select the half-load or 'eco' cycle.
- If buying a brand new dishwasher, we recommend a minimum of 3.5 energy stars and 4.5 water stars



Clothes dryer

- Dryers use a lot of energy. Use a clothesline instead if you can.
- Clean the filter every time you use it. Otherwise, the dryer will get too hot.
- If buying a new dryer, look for the highest energy star rating possible.



Washing machine

- Wash in cold water and select the 'eco' cycle if it has one.
- Spin dry clothes on 'fast cycle' where possible, before hanging them on the line.
- If buying a new washing machine, choose 3.5 energy stars and 4 water stars. Buy a front loader if possible - they use about half as much energy as top loaders.



Television

- Turn it off at the wall when not in use to reduce standby power. You can buy gadgets such as remote control powerboards or an 'eco-switch' to help you.
- If buying a new television, choose an LED screen. They are very efficient and long-lasting. Avoid plasma screens as they use a lot of energy.

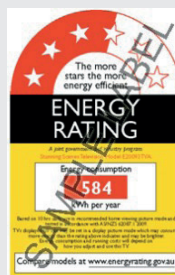
What are energy rating labels?

Energy rating labels can help us understand how efficient an appliance is and what the running costs might be over time. The more stars on the label, the more energy efficient the product. Appliances such as air conditioners will have up to 10 stars, while other appliances, such as fridges, washing machines and dishwashers, have up to 6 stars.

We recommend the Energy Rating website, energyrating.gov.au, to help you calculate how much an appliance will cost you over time and how much you can save. You can also download their convenient mobile app.

There are 2 types of energy rating labels

A higher number of stars mean the appliance is more energy efficient and will cost less to run.



Standard 6-star labels



Highly efficient labels with 7 to 10 stars

Frequently Asked Questions

I can't find the energy rating label on my appliance. Does it have one?

Imported or old appliances may not have energy rating labels. If your product is older than 10 years, consider replacing it with a new, more efficient model. You can visit the Energy Rating website to compare the energy star ratings of similar appliances. www.energyrating.gov.au

What star rating should I choose when I'm buying new appliances?

If your product is older than 10 years it might be time to replace it. Buy the highest star rating you can to reduce the costs for you and the costs on the environment.

Are appliances with a higher star rating more expensive than those with a lower star rating?

Higher-star appliances can cost more up-front, but, over time, they will cost you less money to run, so you will save more.

For more information

Choice

<http://bit.ly/choice-appliances>

Energy Rating – Compare Appliances

<http://bit.ly/compare-appliances>

Sustainability Victoria

<http://bit.ly/household-appliances>

Energy Made Easy

<http://bit.ly/energy-ratings>

Power Savers also has a range of other useful fact sheets available on topics such as cooling, heating, draught-proofing, insulating windows and efficient lighting. Contact us if you'd like any other fact sheets to help make your home more energy efficient - and more livable.

Contact us: Phone: (02) 8204 7249 email: powersavers@unitedvoice.org.au



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Save power and light your home

A guide to making your home lighting as energy efficient as possible.

Why upgrade to LEDs?

LED lights are designed to be as efficient as possible. LED lights are safe and more durable than other types of light bulbs available. LEDs:

- Last on average 30 years or more;
- Are 85% more efficient than incandescent lights;
- Do not contain toxic chemicals such as mercury; and
- Are dimmable and provide 'instant' light.



What to consider when buying an LED light

1 Type of light fitting

LED globes are now available in any fitting. The most common light fittings include:

Regular fittings



Bayonet (BC)

They 'clip in' to the fitting. On the two sides of the base are two pins. Available in a range of sizes.



Edison Screw (ES)

They 'screw in' to the fitting. Suitable for lamps or chandeliers. Available in a range of sizes.

Downlights



GU10

They have a circle base and two pins with 'feet'.

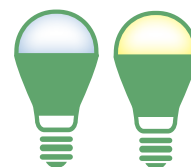


MR16

Two straight pins at the base. MR16 LED requires a transformer to convert from 240V to 12V. *

2 Choose a 'warm' or 'cool' light

Warm light is slightly orange in colour and makes rooms feel cosy and inviting. 'Cool' light, sometimes called 'daylight' is brighter and whiter, making them good for kitchens, bathrooms and other functional areas.



3 Light output

Is the strength of the light the same as the lamp being replaced?



4 Is it dimmable?

Check the packaging before you buy.



What are the differences between LED, CFL and Incandescent lights?

Type of light	Yearly running Costs (\$/year)* (equivalent light)	Life Span (Hours) / Years
LED: Light Emitting Diode 	\$2.50 (9W)	40 000 (30+ years)
CFL: Compact Fluorescent Lamp 	\$3.30 (12W)	8 000 (5 - 10 years)
Incandescent 	\$16 (60W)	5 000 (3 - 5 years)

*Some companies, for example Ezy-as LED, offer a light that doesn't need the transformer changed. If the transformer needs to be changed, you should get a licensed electrician to do the job.

*assuming 2.7 hours per day, 365 days per year (average use in Australia), at 28c per kWh.



Renting?

If you have bought LED lights, save the original lights so that when you move out, you can put the original lights back and take the LED lights with you to your next home. If you replace downlights, you may need written permission from your landlord or real estate agent.



Safety note!

If rewiring is involved (i.e. not just a simple lightbulb change), you must employ an electrician to do the work. It is against the law to do electrical work yourself. The electrician should be licensed, insured and have an ABN.

Frequently Asked Questions (FAQ)

I have energy efficient CFLs. Should I replace my CFLs with LEDs?’

LEDs are only slightly more energy efficient than CFLs, so we recommend that you wait until your CFLs expire, and then replace them with LEDs. Be careful when disposing of CFLs as they contain toxic chemicals. Don't throw them in the bin - take them to 'E-waste' collections. Contact your local council for details.

Where can I buy LED lights?

- LEDs are available from supermarkets, hardware stores and other major retailers.
- Power Savers participants are eligible for up to 20% off on Ezy-as LED products. Visit their website for information about the products available, www.ezyasled.com.au, or call the Power Savers team on our contact details at the bottom of this sheet to find out more.

I have halogen downlights. How do I replace them?

Halogen downlights are a potential fire hazard and also reduce the effectiveness of ceiling insulation – they are literally a hole in your ceiling. Most halogen downlights can be replaced quite easily with LEDs. LED downlight globes are available in MR16 and GU10. In rare cases, for example, if re-wiring is involved, you will have to hire an electrician to do the work.

For more information

Sustainability Victoria: bit.ly/energy-efficient-lighting

Choice online – LEDs: bit.ly/choice-lighting

Power Savers also has a range of other useful fact sheets available on topics such as cooling, heating, draughtproofing, insulating windows and appliances. Contact us if you'd like any other fact sheets to help make your home more energy efficient - and more livable.

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Save power and draught proof

A guide to sealing gaps and cracks in your home.

Why seal up gaps and cracks?

Most homes are 'draughty' in some way. There are lots of gaps and cracks where cold or warm air can enter or escape. Sealing up those gaps is called 'draught-proofing' and is recommended if:

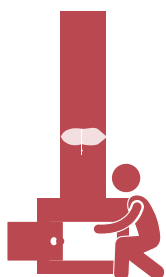
- your home gets cold in winter and hot in summer;
- you use an air conditioner; and / or
- you are spending a lot of money heating or cooling your home.



Seal it up! Reduce your power bills by sealing up these areas in your home.

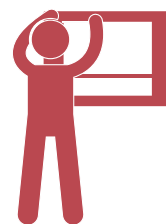
1 Chimneys

Product: Chimney balloon. Chimney balloons are easy to install and shrink instead of burning if a fire is lit underneath.



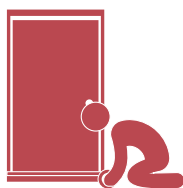
3 Gaps around windows

Product: Use draught sealing tape/ weather strips. Make sure you get the right size for your gap. Wipe down the surface with alcohol before applying.



2 Gaps under doors

Product: Door strips for external doors. These are used to stop air and rain from entering your home.



Product: Door snakes for internal doors. These are great for 'closing off' or zoning different areas of your home to heat or cool different rooms in your house. They can be handmade cheaply or bought for \$5 to \$20.



4 Exhaust fan vent holes

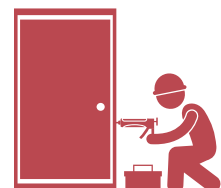
Product: Draftstoppas. Seal the hole (vent) in ceiling exhaust fans. They cost around \$35, plus installation from a qualified tradesperson.



5 Small gaps and cracks

e.g. skirting boards where walls meet floors and around skylights.

Product: Gap-filler / caulking (clear-drying) + caulking gun to apply. This creates a water-proof seal that stops air flow leaks around your home. Use a water-based product so it's easy to clean up. Caulking products cost less than \$10 per tube.





Renting?

If you make any changes to your home, we recommend getting written approval from your landlord or real estate agent before doing so. You could also ask if the landlord would be willing to split the cost of the work with you - it is always worth a try!



Strata title?

If your home is managed by a strata authority, you will need to seek their written permission before making any major alterations e.g. ceiling insulation.

Frequently Asked Questions (FAQ)

How much will sealing gaps and cracks (draught-proofing) save on my power bills?

Savings are different for every household. Air leakage can be reduced by up to 25% if your whole house is draught-proofed because you'll use your heater or air conditioner less often.

Can I do it myself?

Window and door seals, door snakes and caulking are all DIY jobs - you can do them yourself. For any work in your ceiling, e.g. installing a draftstopper, you should hire a qualified tradesperson. Qualified tradespeople will have a trade license number, be insured and have an ABN number.

Where can I purchase these draught-proofing products?

Most or all of these products can be purchased at your local hardware store.

For more information

Green It Yourself: bit.ly/draught-proofing – a video on do-it-yourself (DIY) draught-proofing.

Sustainability Victoria: bit.ly/draught-proofing1 – a video overview explaining some of the products mentioned in this fact sheet.

Your Energy Savings: bit.ly/draught-proofing2 – an educational site about saving energy in your home

Power Savers also has a range of other useful fact sheets available on topics such as cooling, heating, insulating windows, efficient lighting and appliances. Contact us if you'd like any other fact sheets to help make your home more energy efficient - and more livable.

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Save power with windows

A guide to using windows to keep your home temperature stable all year round.

Ways to work with your windows

There are lots of ways you can work the windows in your home to save on heating and cooling costs, such as:

- Shading outside your windows using shutters, awnings or deciduous trees; and
- Using curtains, pelmets and blinds.



The main aim is to work your windows with the seasons.

Summer			Winter
Plant deciduous trees (trees that lose their leaves in winter) to shade your windows.			Any deciduous trees you've planted will lose their leaves and let the sunshine in.
Use curtains, blinds or even a blanket to stop the sun entering the room.			Open curtains during the day and close them at night. Add a 'pelmet' to your curtains; it will keep the heat in the room for longer.
Use shutters or awnings to shade your window from the outside.			Open your shutters during the day, and remove or reposition your awnings if you can, to let more sunlight in.

Cheap and easy ways to work your windows

Do you rent, live in an apartment, or simply want to feel more comfortable without spending too much money? Here are some quick and easy ways to stop heat and cold transferring through your window. Use Blu-Tac or velcro tabs to stick these items directly onto your window:



Summer

- Put up some Renshade. This is a type of foil that has little holes (perforations) cut in it, letting some light in, but reflecting 85% of it back out the window. It really will help you stay cool in summer. For more information, see <http://bit.ly/renshade>
- Place dark-coloured material onto windows you're not using, to stop heat coming in.

Winter

- Stick bubble wrap to your windows. It is an amazing insulator. Be careful to take down regularly to prevent mould. Reuse if possible.



Renting?

If you make any changes to your home, we recommend getting written approval from your landlord or real estate agent before doing so. You could also ask if the landlord would be willing to split the cost of the work with you - it is always worth a try!



Strata title?

If your home is managed by a strata authority, you will need to seek their written permission before making any major alterations e.g. ceiling insulation.

Choosing the right window fixtures for your home.

Window fittings such as curtains not only save energy, but they can also be great design features. Below are a few tips and suggestions for making sure you purchase the right type of window fixture for your home. We recommend getting these custom-made, if possible.



Shutters and Awnings

- Shutters and awnings are fixed on the outside of your window and shade your home from the sun. They stop 90% of radiant heat from hitting your window.
- The best types of shutters and awnings are the ones that can be opened or removed altogether.



Curtains

- Aim for your curtains to fully block out the light when closed. They should go down to the floor and have no gaps.
- Make sure your curtains are backed (lined) with thick, light-coloured, UV resistant material.
- It is important that you get the style right, so make sure you shop around and test out with a few samples before you buy.



Pelmets

- Pelmets sit on top of the window to help stop air escaping or entering through the window out of the window behind the curtain.
- Pelmets are a great addition to curtains especially if you spend a lot of money on your winter heating or use an air conditioner.



Other curtain types

- Pleated blinds are great insulators - they trap air in the pleats of the fabric.
- Roller blinds are also great for high-use areas such as kitchens.
- We do not recommend purchasing vertical blinds. They have too many gaps and don't insulate well.

Power Savers also has a range of other useful fact sheets available on topics such as cooling, heating, draught-proofing, efficient lighting and appliances. Contact us if you'd like any other fact sheets to help make your home more energy efficient - and more livable.

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Power Savers News

Summer 2014

You're one of 600!

That's right - Over 600 United Voice members, friends and family members have joined Power Savers.

Together, Power Savers across Sydney, Illawarra, Hunter and the Central Coast are using collective power to reduce energy use, take ownership of bills to stand up for a fairer electricity system.

How are you preparing your home for summer?

Australia is a 'sunburnt country,' and summer can get very hot! As Power Savers, we know we can stay cool - while also keeping our power bills low.

Here are our three top tips to beat the heat and save power this summer:

1. Use a pedestal or ceiling fan instead of an air conditioner. If you use an air conditioner, set the temperature to 23 – 26°C, and keep the room sealed by using door snakes and keeping windows shut.
2. Close your windows, curtains and blinds during the day. Then open everything at night to get rid of the hot air.
3. Cook outdoors on a BBQ. Cooking inside heats up your home and means you use more energy to keep cool.



Why we're working together to save power

In 2011, thousands of United Voice members came together, through the Real Voices survey, to voice the issues that affect us every day - at the workplace, but also at home. The message was clear: rising energy bills are creating pressure on household budgets, and it's difficult to find information and time to make changes to reduce energy use.

United Voice members knew that something needed to be done to help take power over their bills. So United Voice successfully received funding from the Federal Government to run the Power Savers program, in partnership with the Nature Conservation Council of NSW, the University of Technology Sydney and Solahart. United Voice members are now standing together to take action on their energy bills and usage!



Interview with Winton Evers, Energy Assessor, Power Savers

Winton is one of five qualified energy assessors working with the Power Savers program. Here are his tips for beating the heat this summer!



Winton Evers
Energy Assessor, Power Savers

What is your top tip for preparing for summer?

My top tip for summer is to try to 'passively' cool your house as best as possible.

That means keeping your home cool without electricity – insulating your ceiling, shading your windows from the outside and having block out curtains made from insulating fabric. And keep your home ventilated – let the cool morning or afternoon breeze in to get rid of the heat.

What's been your favourite part of working on Power Savers program?

Giving knowledge to help people to reduce the cost of their energy bills is the number one thing! It's been great to work with so many people who are so interested about learning more about how their bills and electricity work.

Why is energy efficiency important to you?

I used to be an accountant. Then I realised that energy efficiency can help an organisations' triple bottom line. So I took off my 'accounting' hat, and here I am today, working to mitigate climate change through energy efficiency.

What are you doing to get ready for Summer?

I recently moved house, and the first thing we're focusing on is stopping the heat from getting in. Our roof insulation goes in next week, and we're sealing and caulking all the doors and windows. We're working to stop the direct sunlight that comes in from our west-facing windows.

That's why we're putting up some thick block-out curtains and pelmets, with the added bonus that they also keep the warm air inside in winter! We planted some deciduous trees that will eventually grow to shade our home. They will lose their leaves in winter to let the sunshine in.

Saving money through power from the sun

- John – Security Guard

“ I'm getting close to retirement. I know I need to start preparing for it. Power bills can be really high, and once I retire, I'll be in my home more often, but I won't be able to afford high bills on a pension. A few years ago, I decided to install a 3 KW Solar panel system and a solar hot water system. When I looked at the cost of electricity, it just made sense. Before I installed my solar panels and hot water system, my bills were getting close to \$700 per quarter. But, because I made the move to solar, the last bill I got was only \$200! Installing solar has allowed me to keep using energy in my home without having to worry about the bills. By running on the power from the sun, I've even saved enough money so that I can start upgrading some of the appliances in my home to more energy efficient models! ”



Help friends save on their energy bills

Over 600 people have already taken part in the Power Savers program and taken action to reduce their energy use and electricity bills. Because you've taken part in the program, you can recommend the program to friends, family and colleagues to spread the knowledge and savings!

There are still spots available for people in Sydney, Illawarra, Central Coast and the Hunter regions. If someone you know might be interested in the program, call 02 8204 7249 or e-mail powersavers@unitedvoice.org.au to get more information.

Using an air conditioner this summer?

If buying a new air conditioner:

1. Choose one that is 3 stars or more. The more stars, the more efficient. You'll waste less energy and save more on your bills over time.
2. Purchase an inverter if you can – they are quieter.
3. Seek professional advice to make sure you get the right air conditioner for your space.
4. Get it installed by a professional who has an ABN and appropriate insurance.

When using your air conditioner

1. Set the temperature to between 23-26°C in summer.
2. Combine using it with a pedestal or ceiling fan. The air conditioner won't have to work as hard, and you will feel cooler.
3. Set a timer so that it turns off when it is not needed.
4. Ensure your home is sealed for gaps and cracks and that you have good curtains.
5. Turn it off whenever you leave your home
6. Regularly clean the filtration system and do maintenance checks.



Looking forward to a cooler summer this year

- Diane, retired

“Because of the tips I've learned in the Power Savers program, I've been able to change my comfort at home. Leading into summer, I'm going to avoid using my air conditioner by opening up my home in the morning to let the cool in and then closing things off when it gets hot!

Since I've been part of the Power Savers program, I feel like I've taken back control of my bills. Electricity is so expensive, but, because of the knowledge I've gained in Power Savers, I've been able to take responsibility over my bills and make a change!”



Huge savings through my new Solar Hot Water system

“Power bills come along in one big hit, and they are such a big pressure. I did my Energy Assessment in March with Ian. He gave me some really great ideas for how to save energy in both summer and winter! The best tip is to put your air conditioner or heater on only for around 20-30 minutes before you go to bed, which is enough to keep us comfortable all night.

I was able to get a free Solar Hot Water System from being in Power Savers. My kids have moved back home, and it's so hard to convince them to change their energy use. But now that we have a solar hot water system, I don't need to stress as much. We just got our first bill since having the system, and we saved \$300!

It's so great to get this information and get some help in saving energy. I've got a big family and this has taken so much stress away!”

-David, Home Care

Free Solar Hot Water for Renters!

If you are renting, and particularly if you have a hot water system more than 6 years old, Power Savers can work with you and your landlord to arrange installation of a new solar hot water system at no cost to you. Landlords or agents will be offered a subsidised system. **This will help to decrease your energy bills.** If you are interested, call the Power Savers Solar Hot Water team on (02) 9516 0135, or email powersavers@unitedvoice.org.au.



Power Savers Champions program

Join the Power Savers Champions program today!

United Voice is running a Power Savers Champions program. This is your chance to take action and share what you have learnt through the Power Savers project. There are a range of levels at which you can be involved, from getting your friends and family on board to taking part in our regular Power Savers workshops.

For more information on how you can become a Champion, call the Power Savers line on (02) 8204 7249 or e-mail powersavers@unitedvoice.org.au



Frequently Asked Questions

Who can take part in Power Savers?

The program is available to all members of United Voice who meet the eligibility criteria. You can also recommend it to family and friends who might benefit from the program. If you'd like to get more information, call the Power Savers line on (02) 8204 7249 or e-mail powersavers@unitedvoice.org.au

How long does the program go for?

1000 free home energy assessments will be completed by the end of April 2015. Over half of these positions have already been taken.

Once you've completed your free home energy assessment, Power Savers will provide ongoing support and advice to help you keep reducing your energy use and electricity bills. After 12 months, you'll be asked to complete a phone survey to see how things have changed.

Why do I have to allow access to my billing data?

This will help us evaluate if the program has been successful in saving you money. Your billing data is anonymous, so you won't be identified personally, and will be used purely for research purposes.



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For more information, contact United Voice
E powersavers@unitedvoice.org.au
P (02) 8204 7249
W www.powersavers.org.au



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Power \$avers News

Winter 2015

Power Savers program update

You're one of over 1000!



Great news – you are now part of a community of over 1,000 households made up of United Voice members, friends and family from Sydney, the Hunter, Illawarra and Central Coast who are part of the Power Savers program. Using our collective knowledge, we are reducing our energy use, taking ownership of our bills and feeling more comfortable in our homes in summer and winter.

Unfortunately, Power Savers is no longer able to take new applicants. However, together we can spread the benefits by talking to friends, family and the broader community about what we've learnt in the program. Check out the Champions section on page 4 to learn more.

“The Power Savers program made me more aware about the importance of saving power, both environmentally and economically. We've set better temperature for our air-conditioning, and now turn off appliances at the power point so we don't use standby power. I was blind to these new power saving ideas until the energy assessor came out and explained them.”

- Margaret, Power Savers participant 2013.

Our top 5 tips to stay warm this winter

- 1. Insulate:** Add carpets or rugs to the floors. Make sure your ceiling is insulated. Ceiling insulation also keeps heat out during summer, so it's worth every cent. If getting your ceiling insulated, make sure you choose an insured, licensed installer with an ABN.
- 2. Keep out draughts:** Seal gaps and cracks between the floor and in walls. Use silicon / caulking, door snakes, and door or window seals. Make sure there is a weatherproof strip on external doors. Seal off air vents, block off chimneys and other gaps in the roof.
- 3. Heat only the rooms you need:** Use door snakes and door seals to close off the rooms in your home that you are heating.
- 4. Keep yourself warm:** Put on extra layers of clothes, use a hot water bottle or grab a blanket or electric blanket before turning on a heater.
- 5. Use window coverings:** Keep curtains or shutters open during the day and close them in the evening. Add pelmets (boxes which sit over the top of the curtain rod) for extra insulation, or put a thick scarf or blanket over the curtain rod.

\$200 a year savings for Sydney resident Kamariah Abdul Razak

By making a few smart changes, Sydney resident Kamariah Abdul Razak is now saving \$200 a year on her bills - without compromising on comfort!

"Through the Power Savers program, I've gained new knowledge and am using energy in a smarter way. I've saved a fair bit as a result."

Kamariah is using an Energy Display (IHD) to keep track of the cost and energy consumption of her

appliances and is changing her energy consumption behaviour accordingly.

Kamariah's top tip: Curtain installation:

To make Kamariah's home warmer and cosier during the cold winter, she's recently put up some curtains. "I made them myself, using fabric purchased in Cabramatta. They should make a bit of a difference in keeping me warmer in winter. We'll see!"

How to purchase the right heater this winter

A truly energy efficient home is a comfortable home that doesn't have high power bills. By operating heaters in a smart and efficient way, you can stay comfortable, cosy and happy in your home without getting big bills!

As a general rule, **electric heaters cost 60 - 70c / per hour to run***. By being mindful of how often you use the heater, you shouldn't be too surprised at the cost of your next bill. We recommend using a timer so that you have better control over how long the heater will be on for. Never leave heaters unattended, and don't leave them on overnight.

Some heaters are more effective than others, so they don't need to be turned on for as long. These heaters generally cost more to purchase but are better in

quality and will probably last you longer. You really do get what you pay for. Avoid buying radiators, as they consume a lot of energy and can be a fire hazard.

**assuming they're 2000 - 2400 watts, or use 2kW of energy per hour, at a tariff of 32c per kW.*



Type of heater		Retail price	Designed for?	Pros	Cons
Reverse cycle air conditioner or ducted system.		\$800 - \$2500	Large spaces.	Heats rooms quickly, effectively and efficiently.	Expensive upfront cost, expensive to run in summer.
Dyson hot-cold heaters / tower fans.		\$400 - \$700	Small to medium sized rooms.	Heat rooms quickly and effectively.	Older models are noisy, newer models are a bit quieter.
Panel heaters (convective).		\$200 - \$450	Small to medium rooms for short periods.	Heat rooms quickly and effectively.	Can be noisy.
Ceramic fan heaters (convective).		\$60 - \$200	Heat very small to small rooms very quickly for short periods.	Instant heat. Cheap to purchase.	Expensive to run. Use sparingly.
Oil column heaters.		\$150 - \$300	Heat a small, well-insulated room for a longer period of time.	Generally safe to touch.	Take a longer time to heat up so can be expensive to run.



Interview with Chris Lockhart-Smith, Energy Assessor, Power Savers

Many of you would be familiar with Chris, one of five qualified energy assessors who worked with the Power Savers program. We talked to Chris recently about the steps he's taken in his home to prepare for the colder months.

What's your top tip for staying warm this winter?

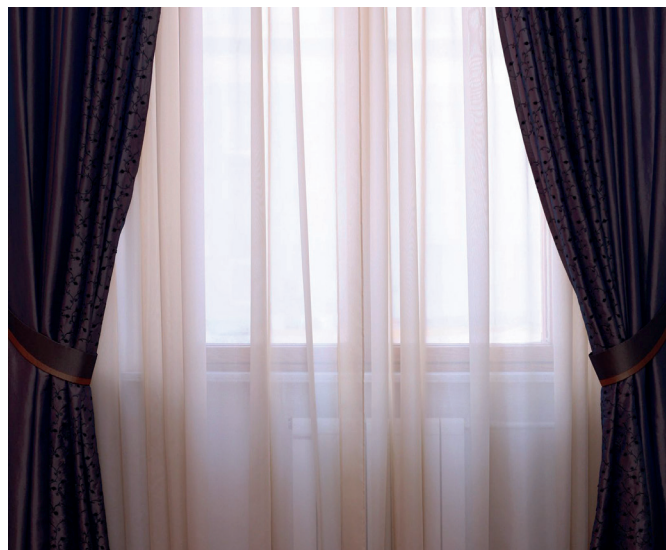
Work out where you will be losing heat. Seal the house up so that you control when to ventilate not when the cold air outside decides to. If your ceiling isn't insulated, now would be a great time to do it, and while you're at it, cover the down lights with down light covers (definitely not with the insulation though!).

What's been your favourite part of working on Power Savers program?

Without a doubt, it's been the people. I met so many people from different and diverse backgrounds, who were both welcoming and interested. I met so many lovely people from Nepal, and I personally felt strongly for them when the recent disaster struck.

Why is energy efficiency important to you?

Like everyone else, saving money is important, but it goes much further than that for me. It is an ethical decision that we all have to make regarding the future. Are we going to leave this planet in a much worse state than when we arrived, or do we start doing something to reduce the impact that we are having? Energy efficiency is just one thing that we can do, but it is one thing that can also directly benefit us individually.



“Windows are not only great for looking through but also great for heat to escape through. Curtains with linings, right to the floor, are best, topped off with a pelmet. It's also a great place for kids artwork or photos of distant relatives!”

- Chris Lockhart-Smith

The \$250 home retrofit offer

As part of Power Savers, you are entitled to \$250 value in energy efficiency retrofits. These can be one of three options:

- 1. Products:** One or more energy-efficient products valued up to \$250, delivered to your doorstep. Products include door and window seals, LED light bulbs, AAA rated showerheads, ceramic fan heaters and pedestal fans.
- 2. Rebates*:** Choose and install your own products, based on the recommendations of your energy assessor, and claim back up to \$250. There have been a wide range of rebates provided, from fridge and washing machine rebates, through to curtains and shutters.
- 3. In-home display:** This is a display screen that links up with your energy meter and shows how much electricity you are using at any given time of day.

DON'T MISS OUT!

If you:

- have not received a phone call about your \$250 home retrofit offer;
- have any questions about the retrofit offer; or
- know that your rebate has expired or is about to expire;

...then please call (02) 9516 0135 as soon as possible so that you don't miss out on your home retrofit.

*Please note that all rebates must be claimed by 31 October 2015.

Frequently Asked Questions

I'm not seeing any savings on my bills. Is this normal?

Make sure you are looking at energy consumption (kWh), not price. There may be service charges and other charges, as well as discounts specific to your contract with your energy retailer.

With energy use - as a general rule you should compare your bills season to season. The highest bills will be in winter, the lowest in Spring and Autumn. If you can compare bills over a number of years, you can start to see trends over time.

There are a few reasons why you could still be getting high bills, from being on the wrong energy plan or tariff with your energy retailer through to faulty or inefficient appliances.

Power Savers is committed to helping you transform the way you use energy in your home, to achieve a more comfortable and affordable lifestyle. Should you have any further enquiries about energy efficiency in your home, please call the Power Savers Hotline on (02) 9516 0135. The team is available 10am – 4pm Monday to Friday. If calling outside of hours, please leave a clear message with your name and number, and we will call you back.

Are you with the right energy provider?

Energy retail is a competitive market, and it is always worth calling your provider to check that you are on the best possible offer. In addition to this, there have recently been a few new retailers emerging in the NSW energy market, many of them backed by renewable energy companies, so you know that by signing up with them, you are investing in a fossil-free future.

The federal government provides a free tool to help you compare energy providers.

www.energymadeeasy.gov.au

You can also take action to reduce the environmental impact of your energy use by purchasing Green Power:

www.greenpower.gov.au/Homes/Find-a-Provider

My rebate voucher has expired. What should I do? Can I still get my rebate?

If your rebate voucher has expired, please call the Power Savers hotline on (02) 9516 0135 as soon as possible. We may be able to extend your voucher expiry date or find an alternative product to help save energy in your home. However, please note that all rebates must be claimed by 31 October 2015.

Are the Solahart solar hot water systems still available?

The Power Savers Program has successfully installed 52 fully funded solar hot water systems for homeowners as of mid June 2015. Many of these homeowners have reported savings in their energy bills since the systems have been installed.

As the trial split-incentive renter program has come to a close, and due to the reduction in cost of solar hot water systems over the life of the program, Power Savers is now able to install some additional fully funded systems.

Recipients will be determined based upon a point system developed to select those who can benefit most from the system. Recipients will be individually contacted to discuss this, and all systems will be installed by the end of September 2015.

Want to do more? Become a Power Savers Champion

Members are getting together to share what they have learnt through the program and make sure everyone can reduce their energy use, take ownership over their bills and be more comfortable in their homes.

There are a range of ways you can get involved from sharing your knowledge with your friends and family, to engaging your local community about energy efficiency, or attending a workshop to learn more.

If you've got some ideas or would like to hear more please call the Power Savers hotline on (02) 8204 7249 or e-mail powersavers@unitedvoice.org.au



The views expressed herein are not necessarily the views of the Commonwealth of Australia, and the Commonwealth does not accept responsibility for any information or advice contained herein

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For more information, contact United Voice
E powersavers@unitedvoice.org.au
P (02) 8204 7249
W www.powersavers.org.au



Appendix 23

LIEEP Power Savers ‘Post-Intervention Phone Survey’ (POPs)

To ‘complete’ a participant’s journey in the program and appropriately evaluate impact of the program, participants were surveyed via phone call at the end of their respective journeys, to effectively ‘complete’ their journey with Power Savers.

Survey Question / Format	Noteworthy points / Survey Logic	Enumeration Constants
Hello, this is XXX from United Voice your union, how are you? I'm giving you a call about the Power Savers program you have been involved in! It's been about a year since you first started in the program and completed your energy assessment. We're now calling everyone to ask about your experience in the program. Can you run through a survey with me now to help us see how the program has gone?		
First off, I just need to ask a few quick questions to check to see if anything has changed in your living arrangements over the past year.		
Survey Date/Time [Autopopulates]		
1 - Change of Address		
1a. Have you changed address / moved home in the past 12 months?	If they have moved home after 6 months of assessment, no POPs needed. If ‘yes’, another question pops up: 1b. What month? (Picklist: March 2014 –	Yes,No

Survey Question / Format	Noteworthy points / Survey Logic	Enumeration Constants
	Dec 2015). After selecting the month, another question shows, with assessment date / time autopopulated : 1c. Is this within 6 months of having the assessment? ☐ [5/09/2014 1:00 PM]	
Demographic Questions		
Declined to answer demographic questions No v Declined to answer Comments v	If 'Yes' is selected, Q2 – 4 are hidden. NB: This question was added after the pilot of POPs as some participants were unwilling to answer these questions over the phone.	Yes,No
2 - Tenure at POPs Status		
2a. Do you rent or own your own home? v 2b. Tenure Status v	To ascertain current tenure status at time of survey. This field used to be named 'Tenure Status' and was recently renamed as 'Tenure at POPs Status' (on 17/12/2015).	Rent,Own Owned outright,Owned with a mortgage,Being purchased under a rent/buy scheme,Rented - Private Landlord,Being occupied rent-free,Being occupied under a life tenure scheme,Rented - Real Estate Agent

Survey Question / Format	Noteworthy points / Survey Logic	Enumeration Constants
Tenure Comments 		
3 - In the last 12 months has...		
Someone moved in? ☐	Multi-checklist. The purpose of this question is to determine if any changes in energy use are attributed to additional people or changes to household makeup. It can be flagged to the participant in an introductory statement saying as much.	True,False NB: The same values apply to all checkbox responses.
Someone moved out? ☐		
Someone started spending much more time at home? ☐		
Someone started spending much less time at home? ☐		
None of the above ☐		
Comments 		
4 - How many people live in your home and what age are they?		
0-9 Years 	Demographic analysis	1,2,3,4,5,6,7,8,9,10

Survey Question / Format	Noteworthy points / Survey Logic	Enumeration Constants
10-19 Years		
20-29 Years		
30-39 Years		
40-49 Years		
50-59 Years		
60-69 Years		
70-79 Years		
80-89 Years		
90-99 Years		
100 Years and over		
Comments		
5 - How would you rate your household energy efficiency?		
How would you rate your household energy	Self-assessment of energy efficiency. Compare against same question from when assessor asked this during energy assessment.	5 - Very efficient,4 - Energy efficient,3 – Adequate,2 – Inefficient,1 - Not energy efficient

Survey Question / Format	Noteworthy points / Survey Logic	Enumeration Constants
efficiency? Comments 		
6 - Have you, or other members in your house actively taken steps in the past 12 months (since signing up to the program) to use less energy at home?		
<i>Prompt them with examples of energy saving behaviours only if they are struggling to answer: e.g. Turning lights off when not required, buying more efficient appliances, upgrading your lights to LEDs, shorter showers, checking your bills more regularly.</i> Have you, or other members in your house actively taken steps in the past 12 months (since signing up to the program) to use less energy at home? 	If yes / unsure, show question 7. If no, hide question 7.	Yes,No,Unsure
7 - What changes have you made to your home or energy use in the past 12 months that might have changed your home energy efficiency? When did you do this (specify month)?		
Shifted time that I did something 	NB: This question is hidden if Q6 is 'No'	Mar 2014,Apr 2014,May 2014,Jun 2014,Jul 2014,Aug 2014,Sep 2014,Oct 2014,Nov 2014,Dec 2014,Jan 2015,Feb 2015,Mar 2015,Apr 2015,May 2015,Jun

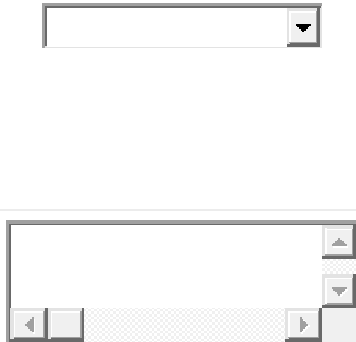
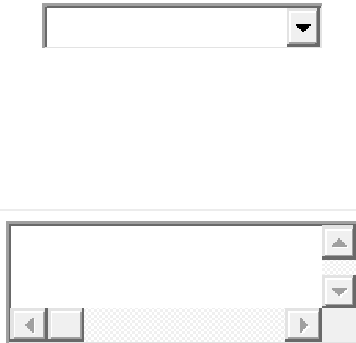
Survey Question / Format	Noteworthy points / Survey Logic	Enumeration Constants
Replaced heater/cooler/air conditioner with a more energy efficient model		2015,Jul 2015,Aug 2015,Sep 2015,Oct 2015,Nov 2015,Dec 2015 NB: the same values apply to all drop-down responses.
Replaced electric hot water system with a more energy efficient model		
Installed solar electricity		
Installed Insulation		
Installed curtains / blinds		
Replaced major whitegood with a more energy efficient model		
Installed solar hot water system		
Installed ceiling fans		

Survey Question / Format	Noteworthy points / Survey Logic	Enumeration Constants
Installed double glazed windows		
Installed louvre windows		
Installed tinted glass or solar guarding		
Installed outside awnings / shutters that improved energy efficiency		
Comments		
8 - Have any of the following prevented you from reducing electricity in your home?		
Not sure how to do ☐	Multi-checklist (more than one option can be selected)	True,False NB: The same values apply to all checkbox responses
Never thought about it ☐	NOTE: This question Integrates a related question from the Energy Assessment (PSAT) and question from PIP.	
RENTERS: Landlord refused to pay for retrofits ☐		

Survey Question / Format	Noteworthy points / Survey Logic	Enumeration Constants
RENTERS: I offered to pay for changes but my landlord wouldn't allow it ☐		
RENTERS: Asked my real estate agent but never heard back ☐		
RENTERS: Real estate agent wouldn't allow it ☐		
RENTERS: On a short lease ☐		
Too expensive ☐		
No time ☐		
Lack of control to make improvements to the property ☐		
Other ☐		
None of the above ☐		

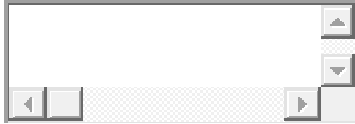
Survey Question / Format	Noteworthy points / Survey Logic	Enumeration Constants
Comments 		
9 - How strongly do you agree or disagree with the following statement: 'I am aware of how my household electricity use compares to my neighbours, friends and family.'		
How strongly do you agree or disagree with the following statement: 'I am aware of how my household electricity use compares to my neighbours, friends and family.' 	Scaled options	Strongly disagree,Disagree,Agree,Strongly agree,Unsure
Comments 		
10 - How much pressure do electricity bills put on your household budget?		
How much pressure do electricity bills 	Scaled options	A great deal of financial pressure, some financial pressure, not very much financial pressure, no financial pressure, unsure

Survey Question / Format	Noteworthy points / Survey Logic	Enumeration Constants
put on your household budget? Comments 		
11 - Since having your home assessed by Power Savers (i.e. in the past 12 months), have you contacted your energy provider for more time to pay bills or sought financial assistance to help pay your energy bills?		
Since having your home assessed by Power Savers, have you contacted your energy power provider for more time to pay bills or sought financial assistance to help pay your energy bills? Comments 	Scaled options To determine if there is any residual bill stress on the household We can correlate this to different types of behaviours and actions as well as energy savings.	Yes,No,Unsure

Survey Question / Format	Noteworthy points / Survey Logic	Enumeration Constants
12 - How strongly do you agree / disagree? 'I feel in control of my electricity bills.'		
How strongly do you agree / disagree? 'I feel in control of my electricity bills.' 	Scaled options This question is about financial control. Direct comparison with PIPs (baseline) question will be possible. OCC surveyors were asked to mimic the same 'way of asking' as used the PIPs (referred to instructions / scripting from PIPs)	Strongly disagree,Disagree,Agree,Strongly agree,Unsure
13 - How strongly do you agree / disagree? 'I feel in control of my electricity use.'		
How strongly do you agree / disagree? 'I feel in control of my electricity use.' 	Scaled options. Direct comparison with PIPs (baseline) question will be possible. OCC surveyors were asked to mimic the same 'way of asking' as used the PIPs (referred to instructions / scripting from PIPs) Will be used to compare if the program intervention increased their sense of control or not. Not entirely sure if we will be able to do before and after comparisons for individuals, but on aggregate at least we will be able link their sense of control before and after the program which is an important qualitative	Strongly disagree,Disagree,Agree,Strongly agree,Unsure

Survey Question / Format	Noteworthy points / Survey Logic	Enumeration Constants
	finding. Also whether that sense of control led to reductions in energy use or not.	
14 - How comfortable do you feel in your home during the cooler months of the year?		
How comfortable do you feel in your home during the cooler months of the year? Comments	Scaled options. Perceived ability to warm the home during winter.	Very comfortable, Comfortable, Not very comfortable, Very uncomfortable, Unsure
15 - How comfortable do you feel in your home during the warmer months of the year?		
How comfortable do you feel in your home during the warmer months of the year? Comments	Scaled options Perceived ability to cool the home during summer.	Very comfortable, Comfortable, Not very comfortable, Very uncomfortable, Unsure
16 - How important is it for you to use less electricity in your		

Survey Question / Format	Noteworthy points / Survey Logic	Enumeration Constants
home?		
How important is it for you to use less electricity in your home? Comments	Scaled options	Very important,Somewhat important,Not very important,Not important at all,Unsure
17 - How motivated are you to reduce your electricity use?		
How motivated are you to reduce your electricity use? Comments	Scaled options	Very motivated, Somewhat motivated,Not very motivated,Not motivated at all,Unsure
18 - When you receive your electricity bill, how clear and easy is it to understand?		
When you receive your electricity bill, how clear and easy is it to understand? Comments	Scaled options	Not at all clear,Not very clear, Somewhat clear and understandable,Very clear and easy to understand, Unsure

Survey Question / Format	Noteworthy points / Survey Logic	Enumeration Constants
19 - What have you seen as the benefits of participating in the Power Savers program?		
What have you seen as the benefits of participating in the Power Savers program? 	Open question	N/A
20 - Hypothetically, would you recommend others to participate in the Power Savers program?		
Hypothetically, would you recommend others to participate in the Power Savers program? 		Yes,No,Unsure
Comments 		
Great! That's the end of the survey, thanks so much for your time. Do you have any final comments or questions? Ideas for how we could improve the program?		
Great! That's the end of the survey, thanks so much for your time. Do you have any final comments or questions? Ideas for how we could improve the program? 		N/A
Thanks for your time. Have a good night.		



UNIVERSITY OF
TECHNOLOGY SYDNEY

INSTITUTE FOR SUSTAINABLE FUTURES

LIEEP POWER SAVERS CHALLENGE: BACKGROUND RESEARCH REPORT

Prepared for the Nature Conservation Council of NSW



2013

ABOUT THE AUTHORS

The Institute for Sustainable Futures (ISF) was established by the University of Technology, Sydney in 1996 to work with industry, government and the community to develop sustainable futures through research and consultancy. Our mission is to create change toward sustainable futures that protect and enhance the environment, human well-being and social equity. We seek to adopt an inter-disciplinary approach to our work and engage our partner organisations in a collaborative process that emphasises strategic decision-making.

For further information visit:

www.isf.uts.edu.au

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Power Savers Challenge Background Research Report

Prepared for: NSW Nature Conservation Council
For the Low Income Energy Efficiency Program (LIEEP)

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1 EXECUTIVE SUMMARY

Purpose of report

This report provides background evidence to inform and support design and delivery of the Low-Income Energy Efficiency Program (LIEEP) Power Savers Challenge (PSC). A consortium led by the Nature Conservation Council of NSW (NCC), and including United Voice, Solahart and the Institute for Sustainable Futures at UTS will deliver the PSC. The PSC is targeted at household in the lower two household income quintiles and also explicitly targets renting households.

The report introduces theories of behaviour change and social practice, perceptions of energy efficiency and highlights useful approaches to program design. The report also examines barriers and program implementation challenges in engaging with these two household groups (low income and renters) and provides analysis and conclusions from past energy efficiency program experience.

Consortium members are the main audience for this report, although it provides relevant information for contractors and other parties associated with the program, and other interested organisations operating in the energy efficiency policy and programs space.

Low income households and energy efficiency

Low-income households are defined as “households whose income is in the bottom two quintiles of the Australian population” (Commonwealth of Australia, 2012). Recent research has found low-income households can pay up to 10% of their income in electricity costs compared with higher income households who pay on average 2-4% (IPART, 2011).

Low-income households are usually already very energy efficient, with lower levels of electricity usage than high-income households. Low-income households with high levels of energy use are usually the result of poor building fabric, and/ or households with larger families. Within the low-income household segment, there is a recognised gap in energy efficiency programs that address households in rented accommodation.

Behaviour change theories

An understanding of behaviour change theory is useful in shaping the PSC program design because these theories offer an insight into how people’s behaviours are conceived and acted out and how they may be available to change in the future. There are a number of behaviour change theories available to consider and no single theory can be described as ‘perfect’ or ‘right’.

Behaviour change theories consistently highlight that individual’s behaviours are influenced by both their perceptions of themselves within their environment, and the signals they receive about their behaviour from this environment. However, social practice theory takes the attention away from individuals as agents and focuses on how both individuals and structures participate in everyday practices (Hargreaves, 2011).

Social practice theory

Social practice theory may go one step further, however, by defining the key elements of practices of the PSC through the following categories:

1. Materials – ‘including things, technologies, tangible physical entities, and the stuff of which objects are made’;
2. Competences – ‘skill, know-how and technique’; and
3. Meanings – ‘symbolic meanings, ideas and aspirations’ (Shove, Pantzar and Watson, 2012).



A social practice framework makes everyday practices the central unit of analysis. In doing this, the theory draws attention to the mutability of practices and highlights the importance of inconspicuous, everyday practice (Shove, 2004).

Considering behaviour change theories in PSC program design

A deep understanding of biases and limitations of the end user need to be identified as precursor to successful changes in behaviour. Some key observations include:

- It has been observed that people are more likely to select a default option, even if that is not the economically rational option.
- People are more strongly motivated by avoiding losses than achieving gains.
- Finding a balance of intrinsic (centred on more inherently rewarding pursuits) and extrinsic values (centred on external approval or rewards) is a key success factor. The PSC could draw upon pro-social motivation to target both the internally focused desire for approval and externally focused desire to help others.

It is worth considering current perceptions of low-income households regarding energy and greenhouse emissions when undertaking program design. This report provides further detail on the understanding of current perceptions of energy efficiency and greenhouse gas emissions, including responses to the recent United Voice Real Voices member survey. A key finding of the survey was that UV members see electricity as an essential service which everyone should be able to afford. They do not accept that they should bear the risk for providing this for themselves and their families, especially if this leads to a decline in quality of life and an inability to plan for the future.

The use of a variety of learning techniques is critical for the program, as is positive social support and reinforcement of the program to withstand cognitive biases that may impinge renters undertaking the installation energy efficiency equipment.

A segmentation technique based on attitudes and actions or audience values, as opposed to other demographic information, may be appropriate for the PSC. These types of segmentation provide a stronger basis for developing multiple messages designed to motivate people with different perspectives. Development of the communications, during the Livelihoods workshop and also during the pre- and post-intervention questionnaires proposed for the PSC are ideal parts of the program to consider the values and attitudes approach.

Barriers to energy efficiency uptake

A number of barriers to energy efficiency in households, across price and non-price (behaviour) categories, are identified from the literature in this report. To summarise:

- Most people choose not to invest in energy efficiency measures with payback periods of more than a few years.
- Landlords are not always aware of the requirements to maintain a property, seeing it purely as an investment, rather than an opportunity to increase the efficiency of the building stock.
- Split incentives, where the required investor in energy-efficiency improvements is the landlord, while the beneficiary (the energy bill payer) is the tenant. Split incentives only apply to certain types of energy efficiency actions; generally those that involve the purchase and installation of products or appliances into the home.

While price barriers act as a major driver in preventing low-income households accessing energy-efficient household appliances, a range of other factors may also play a significant role. These include reduced rates of financial or other literacy, language barriers, recent migrant or refugee status, reluctance to trust or engage with government agencies, illness or other health related concerns and transient employment, and for renters, uncertain



length of tenancy in buildings. Other, less tangible, barriers identified include behaviour of others, habit, comfort and health and hygiene.

Opportunities to overcome barriers

Opportunities to overcome such barriers include installation of a broad range of energy efficiency technologies to assist low-income and disadvantaged households. These technologies need to be introduced within wider educational and communications programs that help embed the technology with supportive household behaviours.

Understanding that improving household energy efficiency may not always result in decreasing electricity bills for the household is important. Households could elect to realise non-energy or lifestyle benefits such as increased comfort of the home during cold or hot weather events.

Targeting of incentives to influence the behaviour of the landlord can help to overcome the split incentive barrier. In addition, contractual arrangements between the tenant and landlord may be rewritten in a way that ensures the incentives for both landlord and tenant are aligned.

Some of these opportunities are built into the PSC design but could be further investigated to ensure effective, efficient and persistent energy savings for low-income households.

Review of other programs

In recent years there have been multiple energy efficiency programs targeting low-income households. These programs have ranged from large-scale government programs and smaller programs for specific communities and geographies delivered by third sector service providers. Analysis of recent energy efficiency program activity highlights a number of findings:

- The ability to tailor interventions to the needs and wants of the households is key to program success – there is no single program offering that would be suitable for all households.
- The primary objectives of many energy efficiency programs are to improve households' electricity efficiency, lower householder electricity bills and provide households with more thermal comfort and energy literacy. This is different from programs of 3-5 years ago where focus was on greenhouse gas emissions reductions.
- Low-income energy efficiency programs have typically used government concession cards as an eligibility requirement, and this has often been an inadequate mechanism for identifying the most vulnerable and in need households.
- The focus for previous programs has been on owner-occupiers or people living in public and social housing.
- The predominant model for energy efficiency programs has been the provision of educational materials, combined with some form of in-home energy assessment and the installation of basic energy efficiency items into the home.
- The installation of solar hot water systems should consider maintenance costs, suitability of location, maximise quality of installations via contractors and provide communication to the homeowner on operation, tariffs and expected performance
- Careful consideration also needs to be given to the selecting the households to receive solar hot water systems and of the usage of gas-boosted solar hot water systems. The selection process needs to consider the size of the household, how they use hot water, gas availability and connections and climate zones.
- Newer programs are applying greater levels of customisation to household contact and kits, and using technologies that provide the householders with an ability to influence the type of information they receive and energy savings they can make. These programs are showing higher levels of success in meeting program objectives.



2 INTRODUCTION

2.1 PURPOSE

This report provides background research to inform and support design and delivery of the Low-Income Energy Efficiency Program Power Savers Challenge (PSC). It provides specific analysis and information in the following areas:

- Theories of behaviour change and social practice theory;
- Current perceptions of energy efficiency, approaches to population segmentation and persistence of energy efficiency behaviours;
- Barriers to the implementation of energy efficiency in households—with a specific focus on low-income renters; and
- Challenges and opportunities from past residential energy efficiency programs.

2.2 AUDIENCE

2.2.1 LIEEP Power Savers Challenge Consortium

The primary audience for this report is the consortium members the Nature Conservation Council of NSW or NCC (consortium lead), United Voice and Solahart. The secondary audience for this report are the engaged contractors employed by the Program lead, NCC to deliver energy efficiency education materials and equipment to the participants of the PSC. This report may also help inform the production of these education materials.

2.3 PROGRAM PARTICIPANTS

2.3.1 Characteristics of Low-Income Households

The PSC provides energy efficiency support to low-income households. For the purpose of this program, and also this report, low-income households are defined as “households whose income is in the bottom two quintiles of the Australian population” (Commonwealth of Australia, 2012).

ACOSS (2011) reports that low-income households in particular are at risk due to the pressure of rising energy prices, due to a range of factors including low disposable incomes, high numbers of dependents, and the fact that many of them live in high electricity cost areas (regional and country areas). Rental housing comprises 27% of housing in Australia, is currently poorly adapted to climate change, incorporates the lowest quality housing which is over represented by low income earners and is the most vulnerable to climate change (Instone et al, 2013).

2.3.1.1 Housing Tenure

Low-income households are not a homogenous group. Evidence shows that low-income households have some of the highest rates of full home ownership of any household groups (KPMG, 2011). This is largely a consequence of demographic trends and older retired households on pensions owning their own home. As illustrated in **Figure 1**, almost a third of low-income households live in publicly- or privately-owned rental accommodation. In 2009-10, 25.5 per cent of low-income households lived in private rental properties and 7.2 per cent households lived in state or territory government operated accommodation services (KPMG, 2011).



Figure 1 - Household Income and Tenure

Tenure type	Percentage low-income households	Housing costs as a proportion of gross income
Owner without a mortgage	45%	5%
Owner with a mortgage	19.6%	29%
Renter		
State and territory housing authority	7.6%	18%
Private landlord	22.5%	32%
<i>Total renters</i>	<i>31.8%</i>	<i>28%</i>

Source: KPMG, 2008

The diversity in ownership tenure and employment status results in a range of different options for these households in terms of approaching energy efficiency.

For owner-occupiers, structural changes and installations of energy efficiency equipment are possible. The up-front financial costs associated with these changes may preclude some low-income households from undertaking them, but those with high levels of asset ownership can take up financial products that allow these costs to be spread over longer time periods.

In recent years, low-income households have been offered public subsidies to encourage energy efficiency and renewable energy generation. The eligibility threshold for these programs is often possession of a concession card.

Within the low-income household segment, there is a recognised gap in energy efficiency programs that address households in rented accommodation. In their 2008 report *“Enabling low-income households in the private rental market to respond to climate change”*, the Brotherhood of St Lawrence (2008) stated: “A flexible suite of programs is needed to support low-income renters to be more energy-efficient” and “specific attention should be paid to whether the programs provide sufficient incentives to enable low-income private renters to benefit” (Brotherhood of St Lawrence, 2008).

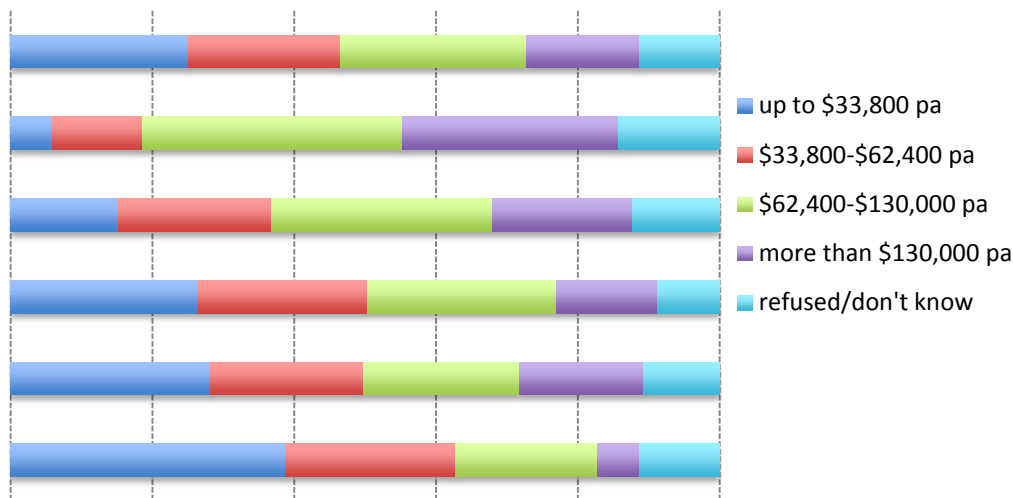
In addition, the IPART survey noted that “for low-income owners and renters, retrofit programs or other policy measures to replace old and inefficient electric hot water systems could have a significant impact on power bills” (IPART, 2011).

2.3.1.2 Electricity Use in Low-Income Households

Low-income household typically have lower levels of electricity usage than other households. An analysis of the Residential Energy and Water Use survey in Sydney, Blue Mountains and the Illawarra, shows low-income households are over-represented in the lower electricity use categories (IPART 2011).

As illustrated in Figure 2, of the households using the lowest amounts of energy, 39% were households with income up to \$33,800. Households in this income category make up 25% of the sample. In the next category of use, 4-6 megawatt hours (MWh) 28% of these households were in the lowest income category. For comparison, the average household electricity usage is 7MWh per annum.



Figure 2 - Annual Electricity Consumption by Income Category

Source: IPART (2011) Residential energy and water use in Sydney, the Blue Mountains and Illawarra.

Electricity usage is dependent on a number of factors including household characteristics such as size and age profile, but also physical and locational factors such as building materials and fabrication of the home, availability of other fuel sources and climatic zones of the home.

The IPART (Independent Pricing and Regulatory Tribunal) survey identified opportunities for reduced energy use in these households including installing efficient showerheads, removing old second fridges and providing information to householders about the energy cost of prolonged use electrical equipment including air-conditioners, clothes dryers and dishwashers (IPART, 2011).

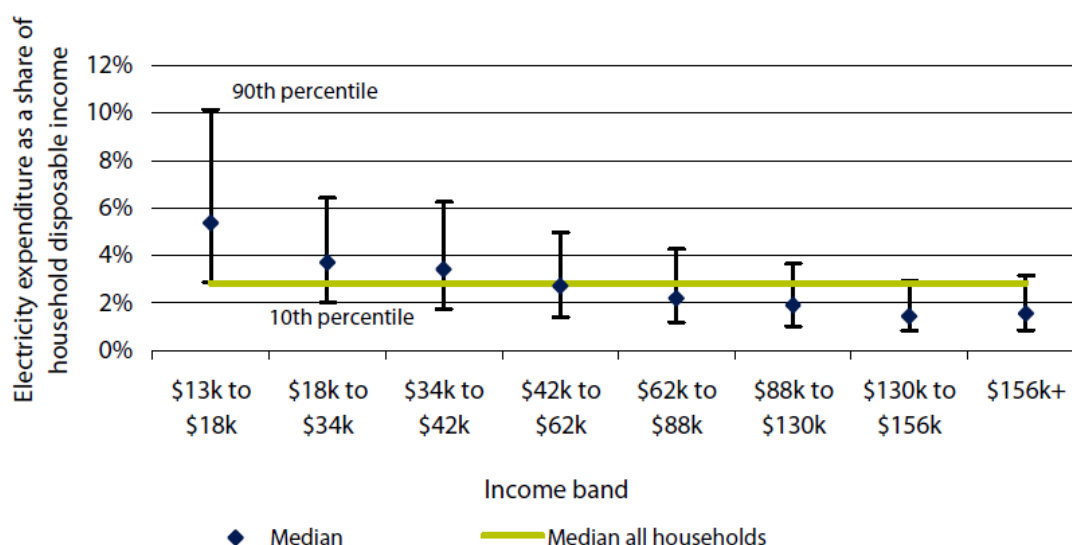
2.3.1.3 Impact of Recent Electricity Bill Increases

The recent rapid increases in electricity bills have had a regressive impact on low-income households, in that they affect households on lower incomes more than those of higher incomes (IPART 2011). As illustrated in Figure 3, IPART's analysis of the impact of electricity price rises on households of different income levels has found low-income households are paying up to 10% of their income in electricity costs compared with higher income households who pay on average 2-4%.

The ACOSS Energy and Equity report (2009) notes that, in real dollar terms, low-income households spend half as much on electricity and gas as the wealthiest households. However, as a proportion of household spending, low-income households spend almost twice as much as wealthier households. More recent research by ACOSS in the *Australian Community Sector Survey* (2013) found that energy affordability is one of the top ten priority issues for clients of the community sector.



Figure 3 - Electricity Bills as Share of Disposable Income, Sydney & Surrounds 2011/12



Note: The income bands are before tax income in 2010. The income for the middle of each band is used to calculate disposable income. Disposable income as a share of household income is derived from ABS household income distribution data for 2007/08. Incomes for all bands are presumed to rise by 3.9% in 2011/12, in line with the average increase that has occurred over the past 5 years. Distributions are presented without weighting survey responses. A **percentile** is the value below which a certain percentage of observations fall. For example, the 10th percentile is the value below which 10% of the observations may be found. In the above diagram, 10% of customers in each income band would fall below the bottom of the vertical line (paying less than that amount) and 10% of customers would pay more than the top of the vertical line.

Data source: IPART Household Surveys, 2010 and 2008.

Source: IPART, 2011

2.3.2 United Voice Membership

United Voice conducted a survey of members in 2012 through the Real Voices survey. Over 20,000 members responded in phone conversations, 2000 online, and 4000 via mail. In NSW 4,193 members responded identifying the cost of living as the top issue (21%) followed by retirement and superannuation (12%), healthcare (12%) and housing (10%).

The survey asked the following question “thinking about yourself and your family, what are the big issues that most concern you?”

Members commented that increases in electricity prices were affecting how they lived on a day-to-day basis, but also their ambitions for the longer terms, such as goals for home ownership. United Voice conducted a qualitative analysis of these responses and identified key narratives underlying responses. The analysis found that United Voice members (United Voice, 2013):

- think that the risks of utility provision should be borne by government and corporations
- are often seen to articulate their problems with electricity prices as class problems
- quantified the jumps in their electricity bills from quarter to quarter indicating that electricity price rises have been experienced as an unanticipated financial burden



- often use collective language when talking about electricity prices, describing them as a big issue that affects everyone, before elaborating on their own experiences
- feel that they are going without basics, like food and leisure, in order to pay the bills
- feeling increasingly vulnerable to other costs and uncertainties in their lives as there is very little 'wriggle room' in their household budgets
- noted that electricity prices are increasing at a much higher rate than their wages
- feel it is a huge financial strain simply to provide 'basic' and 'essential' services for themselves and their families
- Basic quality of life is sacrificed as members are forced to juggle the costs of essentials such as food, leisure and other utilities
- Felt that increases in the cost of living, specifically electricity and other utilities, would compromise their retirement plans, meaning that they would have to work for longer than they had planned or risk an uncomfortable retirement
- Many members attributed recent rises in electricity prices to the Carbon Tax
- linked the rising price of electricity and other utilities to the privatisation of once publicly owned services and infrastructure
- would like to see more government assistance for people struggling with high electricity costs (some suggestions included means tested welfare payments or free provision to young people and low income earners)
- called for more direct government intervention, including regulation of service providers, price freezes, re-nationalisation of service and infrastructure and direct sanctions or fines for corporations
- called for monitoring systems and increased transparency when it comes electricity price setting
- (small number of responses) noted that the weakening of feed in tariff schemes made it unaffordable for low income earners to install solar and called for government assistance for low income workers to get solar
- who highlighted electricity prices as their main concern suggested that government funds should be removed from various groups and people figured as 'undeserving' (refugees, Aboriginal people and Newstart recipients) and spent instead on alleviating cost of living pressures for those who 'work hard' or who are Australian
- emphasised that money needed to be spent on Australians, rather than being sent overseas
- feel that politicians are undeserving of their wages because they are not listening to them and not taking the challenges they face seriously
- convey feelings of anger, frustration and hopelessness

The general conclusion made by United Voice to the survey responses was that members already see electricity costs as an issue affecting other like them and do not tend to blame themselves which means that members are already primed for narratives that articulate 'cost of living' pressures, especially electricity prices, as a class issue (United Voice 2013).

Some examples of member responses that illustrated concerns with comfort and electricity costs include (United Voice, 2013):

"I'd like to have more money to live comfortably"



“aged care and disability services, they’ve taken money out of aged care as well as everything else. a big concern for our young people and the old people. I have clients that go to bed at 7:30 because they can’t afford the electricity for the lights.”

“Bills are going through the roof. Mainly electricity and gas. Both of mine were nearly \$900 each last time.”

“Carbon tax is a concern for me. I have more careful with my electricity usage.”

“Cost of living going up, especially electricity prices which are going up dramatically. But prices of all other goods are going up too including water, food, etc.”

“cost of living issues are important.. I’ve got 6 kids, and rising electricity prices are making it tough.”

“Cost of living pressures, electricity is increasing up and you can’t get in front of it. It means we can’t go out to dinner or take holidays because you have to get the bills paid.”

“electricity bills are going up and up, affecting lots of people. we’re a double income household, your power bill is \$800 every 3 months. It makes me frustrated”

“Economy is another issue with electricity prices going higher than wages. One wage families suffer.”

“I’m concerned with the environment concerned with electricity and cost of living”

“As my all my children have grown up and left, my worries and concerns have changed. My wife and I were originally concerned about rising electricity prices however now that we have installed solar panels that is no longer an issue”

“I’m mainly concerned about the cost of living. Bills keep going up. The price of electricity is high. I’d like to get solar panels but I can’t afford it”

“Money seems to be a problem for everyone so I would try and find ways to make it easier for people. I guess things like solar power and water tank rebates would be good again”

“Increase in utilities and wages not increasing at same rate. People buy solar panels to reduce power bills but go into debt for the panels”

These responses show a clear trend in the target audience with concerns about cost of electricity and being unable to pay electricity bills. The PSC program will likely need to identify how to frame the solution and materials to, as United Voice has identified, provide class-based narratives which explain participants’ situations (United Voice, 2013).



3 THEORIES OF BEHAVIOUR CHANGE AND SOCIAL PRACTICE

This section provides an overview of theories of behaviour change, and the more recent, but less widely studied social practice theory. These theoretical perspectives contribute to the evidence base and rationale for program activity such as proposed for the PSC.

'Behaviour change interventions' can be defined as coordinated sets of activities designed to change specified behaviour patterns. In general, these behaviour patterns are measured in terms of the prevalence or incidence of particular behaviours in specified populations (Michie et al, 2011).

3.1 OVERVIEW OF THEORIES

3.1.1 Behaviour Change Theory

There are a plethora of behaviour change theories available to consider. Theories of behaviour provide an integrated summary of constructs, procedures and methods for understanding behaviour, and present an explicit account of the hypothesised relationships or causal pathways that influence behaviour (BehaviourWorks, 2012). An understanding of behaviour change theory can assist in shaping the development of the PSC.

3.1.1.1 Categories of Behaviour Change

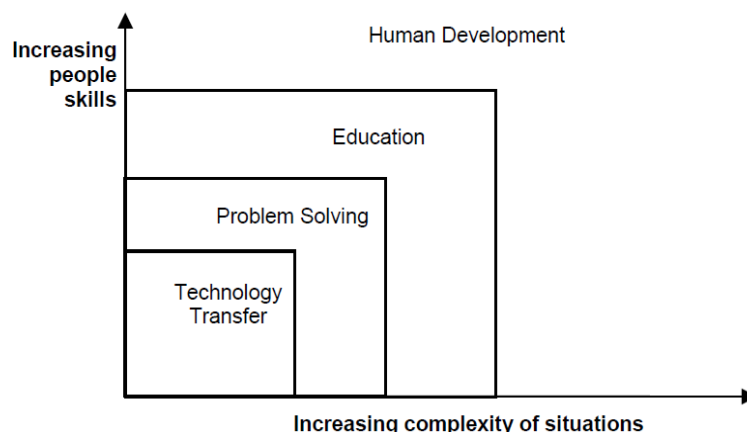
Many behaviour change theories are focused on understanding individuals in an effort to identify opportunities to change their behaviours. This section describes some of the different categorisations used to describe behaviour change.

In his theory on the diffusion of innovation, Rogers (2003) argues that people vary in their willingness to adopt innovations. Rogers classifies people along this spectrum as early to late adopters along a continuum of responses. Understanding where different people sit along the spectrum can help understand their likely level of resistance or acceptance of change.

Coutts' Paradigms of Extension (Coutts, 1994) has a similar categorical framework to that used by Rogers, but focuses on the intersection of skills/knowledge and the object/activity. The concept as illustrated in Figure 4 shows four progressive paradigms of increasing skills and increasing complexity of situations.

In Coutts' paradigm of extension, 'technology transfer' refers to a means of proactively changing voluntary behaviour using the adoption of a new technology or management practice through information, opportunity and persuasion. 'Problem solving' refers to a means of assisting individuals to find solutions to technological or management programs. His 'Education' category refers to proactive information education, which seeks to assist individuals to better understand their situation and make informed choices and take action. 'Human development' is a means to facilitate and stimulate individuals and communities to take the initiative in problem definition.



Figure 4 – Coutts Paradigm of Extension

Source: Coutts (1994)

By considering these categories and how the PSC interventions are applied, it can be possible to understand whether the program design touches only on 'technology transfer' solutions, or whether it extends into the 'problem solving' or 'education' categories.

3.1.1.2 Drivers of Behaviour

Many theories exist which describe the different drivers of behaviour and behaviour change.

Gifford (2008) uses a resource-based view to understand the drivers of behaviour and identifies individuals and groups by the resources they use, and places them along a continuum ranging from pure community/environmental-interest to pure self-interest. In these circumstances, individuals will face social dilemmas when interests appear to come into conflict with each other.

Ajzen's (1985) theory of planned behaviour suggests three factors that drive behaviour; an individual's belief about the likely consequences of an action (favourable or unfavourable); their perception of social pressure; and their perceived control over an action.

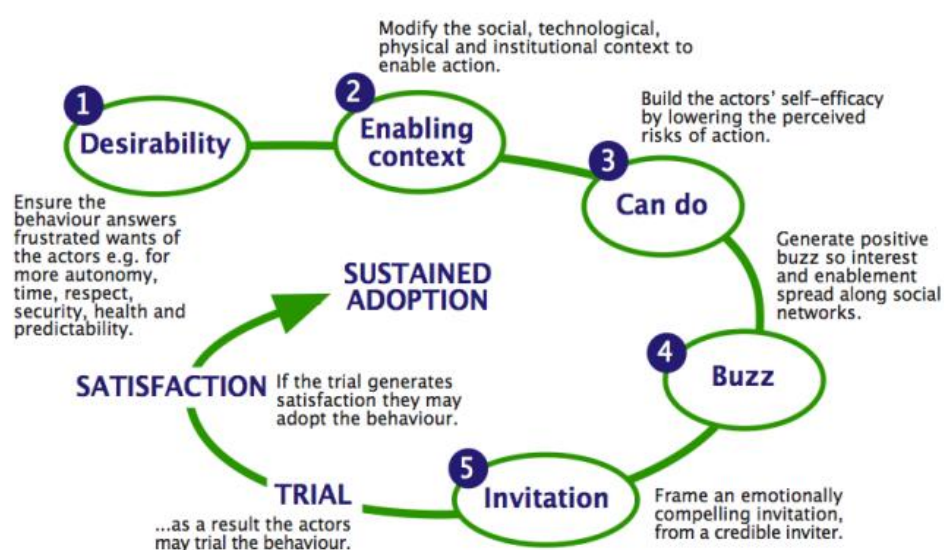
Stern (2000) argues that individual choice about pro-environmental actions can be driven by personal norms - an internalized sense of obligation to act in a certain way. Norms are activated when an individual believes that violating them would have adverse effects on things they value and that by taking action, they would bear significant responsibility for those consequences.

Robinson (2011) presents a guide for research questions and evaluation integrating a number of stages in his Five Doors Theory, as illustrated in Figure 5. The Five Doors include:

- 1) Desirability, addressing frustrations (which are often how people express desires);
- 2) Enabling Context, altering the environment by creating social connections;
- 3) Can Do, lowering the perceived risks of change;
- 4) Buzz, using stories with emotion to generate positive thinking; and
- 5) Invitation, delivering the change through a passionate, similar and connected "inviter".

These five stages provide a useful framework for program design.



Figure 5 - Five Stages of Behaviour Change

Source: Robinson (2011)

Moezzi and Lutzenhiser (2010) also provide further guidance for program design, through the identification of general perspectives on understanding household energy use in categories such as technology, economics, psychology and sociology. These categories are then used to break down behaviours and apply policy strategies to the different elements. Table 1 provides an example of this for energy efficiency.

The results suggest a focus on appealing to new or innovative technologies, low cost energy-using goods, influencing perceptions about using energy and to target specific social patterns, groups or cultures (Moezzi and Lutzenhiser, 2010).

Table 1 - Policy Approach Used in Three Core Domains in Energy Efficiency Industry

Perspective	Basic Explanation	Objective	Policy Strategy
Technology	Characteristics of buildings and technology determine energy use	Understand and increase device and thermal efficiency	Promote technological innovation and dissemination via regulation or appeals to market
Economics	Consumer as price influenced utility maximizer	Understand and use price signals to influence consumer action	Change or communicate prices of energy or energy using goods
Psychology	Individual expression through choices: mental processes affect conservation behavior	Understand /influence individual perceptions about and actions related to energy use	Convince people that they will be better off using less energy or more efficient products
Sociology	Socially negotiated patterns of consumption: focus on groups, cultures, and larger social systems	Understand variability and patterns of consumption and the social origins of these patterns	Target people's life circumstances, identify winners and losers, look for sources of constraint and outside influences

Source: Moezzi and Lutzenhiser (2010)

Despite the differences in behaviour change theories they consistently highlight that individual's behaviours are influenced by their perceptions of both themselves within their environment, and the signals they receive about their behaviour from this environment.



3.1.2 Social Practice Theory

A number of authors highlight significant limitations with behaviour change theory, particularly that most behaviour change initiatives fail to take into account the full range of influences on behaviour (Moloney et al., 2010). Social practice theory has developed from this basis, to better account for all the influences that impact of individuals' behaviour.

Social practice theorists argue there is a greater range of influences on individuals and their behaviour than behaviour change theories allow for. Authors investigating social practice theory also seek to explore how and why patterns of resource consumption endured and changed (Bulkely 2012).

According to Giddens (1986, p. 2), 'the basic domain of study of the social sciences...is neither the experience of the individual actor, nor the existence of any form of social totality, but social practices ordered across space and time'. Reckwitz (2002, p. 249) adds to this further, stating that a 'practice' is a routinized type of behaviour which consists of several elements, interconnected to one another: forms of bodily activities, forms of mental activities, 'things' and their use, a background knowledge in the form of understanding, know-how, states of emotion and motivational knowledge.

A social practice framework, therefore, makes everyday practices the central unit of analysis. In doing this, the theory draws attention to the mutability of practices and highlights the importance of inconspicuous, everyday practice (Shove, 2004).

When using social practice theory as an analytical tool, the concept of 'elements' of a social practice is valuable (Reckwitz, 2002). There have been a number of attempts to categorise the elements of a social practice. For example, Strengers (2010) identifies four 'components' of social practices:

- practical knowledge;
- common social understandings;
- rules; and
- material infrastructure.

Alternatively, Shove et al (2012) in their exploration of the dynamics of social practices identifying a triangle of three types of elements of a practice:

- Materials – 'including things, technologies, tangible physical entities, and the stuff of which objects are made'
- Competences – 'which encompasses skill, know-how and technique'
- Meanings – 'in which we include symbolic meanings, ideas and aspirations'.

They argue that 'practices emerge, persist, shift and disappear when connections between elements of these three types are made, sustained or broken'.

Stephenson et al (2010) developed a conceptual framework reflective of Shove's triangulated approach to describe 'energy cultures'. This approach focuses on the interactions between norms (beliefs and understandings about energy), material culture (appliances and energy technology) and energy practices (behaviours and habits) as a basis for understanding energy consumers and their resistance to or acceptance of change.

Utilising the frameworks identified by Shove and Stephenson could provide useful insight into the way cultures and practices relating to energy are developed and entrenched, and thus give indications of potential methods for influencing behaviour change.

The main distinction between behaviour change theory and social practice theory is that a social practice approach takes the attention off individuals as agents and focuses on how both individuals and structures participate in everyday practices (Hargreaves, 2011). Instead of being the central unit of analysis, individuals become 'carriers or hosts of a



practice' (Shove et al., 2012, p. 7). This is illustrated in **Error! Reference source not found.** which compares the theories showing that theories of practice consider shared actions rather than individual choice, support emergent processes of change rather than causal, and are embedded in systems rather than driven by external influences.

Table 2 - Differences between Theories of Behaviour and Practice

Category	Theories of behaviour	Theories of practice
Basis of action	Individual choice	Shared, social convention
Processes of change	Causal	Emergent
Positioning policy	External influence on the factors and drivers of behaviour	Embedded in the systems of practice it seeks to influence
Transferable lessons	Clear: based on universal laws	Limited by historical, cultural specificity

Source: Shove, Pantzar and Watson (2012)

In terms of what these behaviour change theories mean for program and project design, there is also numerous perspectives. The following section investigates potential application of these theories for program and policy design.

3.1.3 Theory Informing Program Design

Behaviour change and social practice theory can be used to inform the PSC design. Robinson's behaviour change theory provides a useful framework for designing the participant engagement within the program. Ensuring that each of Robinson's five steps is included could help ensure some rigour and a logical progression throughout the various stages of engagement. As it is currently designed, the PSC addresses some of these steps, however the development of the participant journey could benefit from considered application of this framework.

Social practice theories suggest that the success of interventions is dependent on the extent to which the new 'things' (such as information in leaflets or energy bills, or new technology such meters and solar panels) can be appropriated, normalised or domesticated within existing practice (Bulkely, 2012). In other words, the extent to which new interventions 'fit in' with existing practices is important for influencing uptake of new practice.

For this reason, the framing of options within the program will have a profound impact on determining the choice that is actually made. Possible questions that can be considered in order to frame program design to focus on practices rather than behaviours include:

- What is the desired practice of the PSC? What are its elements (across the three categories – Materials, Competences and Meanings as described by Shove)?
- Does design of the PSC create implicit or unanticipated elements and what impact will these have on the practice?
- What existing practices are related? What are the elements of these related practices?
- Is it possible to integrate elements of existing practices into the desired practice while still meeting the social change objective? For example, can dispersed elements be integrated to form a new practice? Or can a novel element be introduced into an established practice to change its character?



- Is it possible and desirable to link or bundle the desired practice with established practices to improve its attractiveness to potential participants?
- Is it necessary to disrupt existing practices, or disintegrate their elements, to create space for the new practice? and
- If new elements are necessary, what will make these elements attractive to potential participants?

Ashraf (2013) suggests that rather than changing habits (one-time behaviour change); effective programs create new habits, replacing an undesirable behaviour with a beneficial one. Key to this is a deep understanding of biases and limitations of the end user. Suggested approaches include:

- **Commitment devices:** contracts or arrangements that formalise a person's pledge to achieve an objective, that introduce principles to overcome present bias e.g. users pay a bond (or prepay) prior to treatment, and receive payment at the end of treatment¹;
- **Material incentives:** incentives that counterbalance a present cost, neutralising it and making a future reward seem more compelling² (providing free food to those who would bring children in for vaccinations), monetary incentives can have powerful effects even after being discontinued (e.g. NSW solar feed-in tariff) and these incentives can lead to the formation of new habits; and
- **Defaults:** defaults address limited attention and cognitive overload by simplifying and guiding decision making the desired option easier to choose and an alternative more difficult to choose.

Ashraf (2013) also suggests stages of developing an effective behaviour change program:

1. **Diagnose:** define and frame the problem as a question, and create a hypothesis to identify cognitive and behavioural barriers, and seek to uncover true motivations through focus groups or interviews. The Livelihoods workshops, a part of the PSC program, offer the ability to do this.
2. **Design:** conduct experiments to address your hypothesis, using trials and control/experiment groups. The control groups in rounds 1 and 2 will allow the PSC to do this.
3. **Deliver:** review and pursue the implementation iteratively as results give rise to new or more refined questions. Each iteration will lead to better delivery (Ashraf, 2013). The development of a pilot and interim evaluation report provides the opportunity for learning and iterations of program design.

Ashraf (2013) also discusses the concept of “present bias” – the tendency to overvalue the present and discount the future, where a benefit is more valuable in the present than we imagine it will be in the future and a cost seems greater today than we imagine it will be tomorrow. Ashraf (2013) also notes that most individuals in affluent countries already have the necessities of daily life (such as running water and sewerage) secured, freeing up individual's limited mental processing power to consider other information (such as how to use water more efficiently).

Pro-social motivation draws upon internally focused desire for approval and externally focused desire to help others. Altruistic capital can be depleted but desire to replenish is strong. Programs that appeal to people's desire to do good, and to be seen doing good is more powerful than a financial reward.

¹ The practice of crowd funding, asking for pledges which are only cashed once a target fundraising amount is achieved, may be an example of a commitment device.

² Rockcorps may provide an example: offering free concert tickets in exchange of a day's volunteering



In addition, a recent study conducted on household sustainability for the NSW Office of Environment and Heritage (Riedy et al, 2012) found that people are more likely to select the default option, even when it is not the economically rational one. It also found that people are also 'loss averse', which means they are more strongly motivated by avoiding losses than achieving gains. Dawney and Shah (2005, p.10) note that if one choice is presented as a loss, and the other as neutral or as a gain, then 'we will avoid the apparent loss – even when the two outcomes are mathematically identical'.

The following section discusses in more detail current community perceptions to sustainability, how they change over time, and how they provide context for the PSC.

3.2 CURRENT COMMUNITY PERCEPTIONS TOWARDS SUSTAINABILITY

This section provides a summary of recent survey findings on the current beliefs, attitudes and preferences of Australians to sustainability, climate change and energy efficiency.

A recent study (Riedy et al, 2012) found that NSW householders are most likely to trust environment and conservation organisations for sustainability information. These organisations are perceived to provide the most reliable environmental information. This implies that environmental groups within the local community are well positioned in the perception of the audience to deliver these types of programs.

However, the "Who Cares About the Environment 2012" survey conducted by the NSW Government showed that since 2009, 'energy and greenhouse' has become a much lower priority for householders than other issues such as biodiversity, education and mining (NSW Government, 2012). The survey is a social research series undertaken triennially in NSW since 1994. The series measures the current status of environmental knowledge, attitudes and behaviour and how these have changed over time. In 2012, a quantitative telephone survey of 2,006 people aged 15 years and over in NSW, along with qualitative research through nine group discussions in both Sydney and regional locations was undertaken, resulting in the "Who Cares about the Environment" report released in 2013 (NSW OEH, 2013).

It should also be noted that householders have a variety of learning styles; there is no single engagement technique that will motivate all individuals to take action. Instead, a suite of engagement techniques will be necessary to engage the majority of households (Riedy et al, 2012). Key factors that need to be considered in the creation of energy efficiency programs and associated engagement materials are:

- ease of access to the program;
- ease of implementation of activities within the program;
- perceived lower level of effort; and
- use of the most common and sought after channels for implementation e.g. smart phones, tablets, automated house systems and internet-based resources (Riedy et al, 2012). Although this needs to be adjusted specifically to the target audience, in this case low-income households.

A recent Australian Housing and Urban Research Institute report analysing trends in Australian household attitudes and practices to water and energy use and waste reduction (Fielding, 2010) found that differences existed in efficiency actions (i.e. installation of efficient technologies) in that home owners installed more energy-efficient appliances than renters. Interestingly, it identified that there were no significant differences between owners and renters in terms of their reported energy curtailment (behaviour change) actions. Positive attitudes and perceived social support for these actions were important determinants of current practices.



Cognitive biases around sustainability should also be considered during design of the PSC, including:

- **Anchoring bias:** the tendency to gravitate towards a predefined standard regardless of its relevance. When we do not have a pre-set value associated with something, the first value we connect strongly to that something will be the value we anchor on when making future comparisons (Ariely, 2008);
- **Status Quo bias:** the tendency to stay with the default option and reluctance to select and implement an alternative option; and
- **Single Action bias:** the tendency to believe that when one action is completed, a change has occurred, such as residents feeling that a home audit alone achieves energy efficiency goals.

Demographics can also be a powerful explanatory factor in understanding sustainability perceptions. The NSW “Who Cares about the Environment” survey found the following key trends with respect to demographics:

- **Gender:** Men show greater knowledge of environmental issues, but women are more likely to be concerned, believe they can make a difference, and take actions.
- **Age:** The degree of concern, knowledge and action tends to rise with age up to 65 years, where it levels off or declines.
- **Education:** The degree of concern, knowledge and action tends to rise with higher levels of education. Those with university qualifications are more likely to see environment as priority for NSW Government, be more critical over environmental regulations, and see less recent improvement in environment.
- **Location:** Fewer people in South Western Sydney are concerned a great deal about environmental problems (13% vs. 23% state-wide). People who live outside Sydney have slightly higher knowledge than those within Sydney, and engage in more activities often (5.9 vs 5.4). They are also more likely to have bought an energy-efficiency appliance (74% vs 68%) - particularly those from the Hunter (79%).
- **Language/culture:** People from non-English speaking backgrounds have lower levels of knowledge but are more likely to have tried to get information. They are also less likely to be undertaking actions and to have bought an energy-efficient appliance.
- **Household characteristics:**
 - People with children are more likely than those without children to be greatly concerned about environmental issues (25% vs 20%) and to take more actions, and do actions more often
 - On average, low-income households undertake more actions/behaviours (6.1) than medium-income (5.8) and high-income (5.5) households.

This highlights the need for design of the PSC to consider current perceptions to energy and greenhouse emissions, the use of a variety of learning techniques, overcoming the low penetration of renters who install appliances potentially through positive social support and reinforcing the program to withstand cognitive biases.

These important aspects can inform approaches to how energy efficiency actions, such as the solar hot water installations and energy efficiency kits proposed for the PSC, are delivered. It can also inform approaches to segmenting the audience discussed in the following section.



3.3 AUDIENCE SEGMENTATION

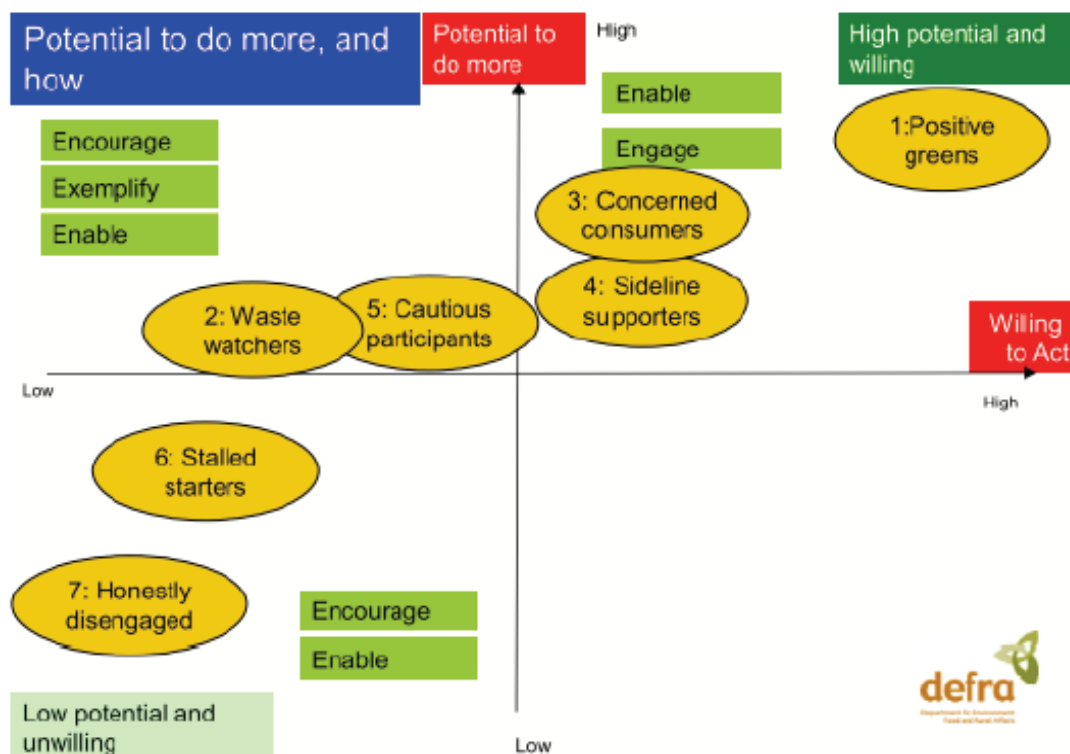
A common form of segmentation of target audiences is by demographics. An alternative to segmenting an audience by demographic characteristics is to instead segment the audience into different categories based on their views on environmental issues (either in general or in relation to specific issues) or the degree to which they engage in environmentally focused behaviours (Riedy et al, 2012).

One example of this type of segmentation is drawn from research conducted in the United Kingdom by the Department of Environment, Food and Rural Affairs (DEFRA). DEFRA has developed seven attitudinal segments within the population. They include:

1. Positive greens;
2. Waste watchers;
3. Concerned consumers;
4. Sideline supporters;
5. Cautious participants;
6. Stalled starters;
7. Honestly disengaged.

Each of these audience segments will demonstrate a different propensity to participate in sustainability related behaviour changes. **Error! Reference source not found.** illustrates how these groups are divided across the spectrum of likely responses.

Figure 6 - Audience Segmentation



Source: DEFRA, 2011

From the analysis segments 1, 3 and 4 are described as relatively engaged with a relatively high potential for doing more. A program design approach for these groups would be to remove external barriers stopping people taking action and engaging through communications and community action.



Segment 2 is already taking quite a lot of action and is not motivated to take more. Segment 5 is easily encouraged into environmental behaviours unless they perceive it as not normal. For this group providing incentives and governments leading by example are important.

Segments 6 and 7 are relatively disengaged and unlikely to voluntarily take action, for these groups regulations aimed at improving the sustainability of products may be important

Another example comes from Ashworth et al. (2011), who applied a cluster analysis to the results of survey questions to cluster the community into groups based on their attitudes to environmental issues and climate change. The report found two dimensions (concern about climate change and knowledge of climate change) that were sufficient to distinguish between segments of the community. Using this method the report identified the following four groups:

1. **Engaged:** People with high levels of concern about climate change and moderate to high levels of knowledge about climate change. This group contained 27% of the respondents.
2. **Concerned and confused:** This group contained members with moderate to high levels of concern about climate change and moderate levels of knowledge. This group represented 36% of respondents.
3. **Disengaged:** this group had a low level of knowledge of climate change issues and a low to moderate level of concern. This group represented 15% of respondents.
4. **Doubtful:** This group had a moderate level of understanding about climate change but the lowest level of concern. Their knowledge in many cases correlated with arguments from the climate denial movement. This group represented 23% of respondents (Riedy et al, 2012).

Common Cause (Crompton, 2010) proponents argue that messages should be tailored to use the language and metaphors appropriate to a particular audience segment but only to the degree that this helps strengthen helpful frames such as the 'common interest' frame.

Demographic information about an audience is the easiest to obtain and if it is clear that an audience contains a large proportion of a single demographic grouping (e.g. a specific CALD group or young people) then the message can be tailored for that group. However, demographics are generally a poor predictor of behaviours or attitudes so they provide little guidance in how to motivate new practices.

When a communications campaign is being directed at a larger and more demographically diverse grouping a segmentation technique based on either attitudes and actions or audience values may be more appropriate. Both of these types of segmentation provide a stronger basis for developing multiple messages designed to motivate people with different perspectives. The use of a values approach may be most appropriate for a large-scale and/or broad communications campaign (whereas segmenting by actions could be useful when targeting a specific behaviour). There may be a need to communicate across multiple mediums and the message can be tailored to the value groups that are most likely to be accessing that medium.

For the PCS there are several opportunities in the program to be considering the values and attitudes approach, firstly during the Livelihoods workshop and also during the pre- and post-intervention questionnaires that will be delivered to the program participants in each round.



3.4 PERSISTENCE

A key factor affecting persistence of energy efficiency behaviour changes is motivation toward the environment and underlying values. Extrinsic values are centred on external approval or rewards. Extrinsic values include wealth, material success, concern about image, social status, prestige, social power and authority. Appeals to extrinsic values may deliver short-term gains for sustainability but will ultimately undermine the long-term potential for sustainable lifestyles (Crompton, 2010)

Intrinsic values are centred on more inherently rewarding pursuits. Intrinsic values include affiliation to friends and family, connection with nature, concern for others, self-acceptance, social justice and creativity. Appeals to intrinsic values may results in increased willingness to engage in 'tough' behaviours and persistence of behavioural changes.

Drawing from the Common Cause framework (Crompton, 2010):

Of course, extrinsic values can motivate helpful behaviour, but this will only happen where extrinsic goals can be pursued through particular helpful behaviours: for example, buying a hybrid car because it looks 'cool'. The problem is that, in many cases, it is very difficult to motivate helpful behaviours through appeals to extrinsic values, and – even when successful – subsequent behaviour tends to relapse into that which is more consistent with unhelpful extrinsic values. Moreover, such strategies are likely to create collateral damage, because they will also serve to reinforce the perceived importance of extrinsic values, diminishing the importance of intrinsic values and undermining the basis for systemic concern about bigger-than-self problems.

Goodwin (2011) drew distinctions between traditional and behavioural energy efficiency programs in the U.S in terms of the measurement of cost-effectiveness and persistence. She argued that while the unknown life of behavioural measures can be a risk for supply-side planning, the focus on measuring persistence may overlook the benefits of customer engagement and program uptake. The research found that traditional energy efficiency programs – aimed at the installation of new, more energy efficient technologies alone are likely to result in a small fraction of potential behaviour-related residential energy savings. Whereas people centred programs that start with a focus on needs, and seek to empower consumers to become better energy managers, and view energy efficient technologies as one set of tools in a larger toolbox (conservation, curtailment and efficiency) are more likely to achieve lasting behaviour change.

It will be important for the PCS program to consider how the program's participants are empowered (through appeals to intrinsic values) and hence how well the program is achieving persistence of energy-efficient practices.



4 BARRIERS AND OPPORTUNITIES TO ENERGY EFFICIENCY UPTAKE

This section revisits well-established literature on barriers to the uptake of energy efficiency activities. The discussions in this section make a distinction between barriers to the uptake of behavioural aspects of energy efficiency, and barriers as interpreted as market failures, and therefore used as rationale for public policy activity. The former, have psychological aspects where the theoretical discussions of the previous section can contribute. Market failures also need to be understood within the current policy and regulatory context, which is discussed in further detail in the following section.

4.1 TYPES OF BARRIERS

4.1.1 Behavioural Barriers

At the behavioural/ practice level, AHURI has identified a number of barriers to environmental sustainability in their research (AHURI, 2010). These include:

- **Behaviour of others** – children and spouses presented a significant barrier to curtailment behaviours.
- **Habit** – While for many householders turning off lights was something they had been doing for a very long time, turning off appliances had not become a habitual behaviour in the same way turning off lights had become, it was something they needed to 'train' themselves to do better or to be 'reminded' to do.
- **Comfort** – Householders made their own choices about comfort and utility that often overrode household sustainability intentions
- **Health and hygiene** - Householders sometimes prioritised health and hygiene over household sustainability intentions, particularly in the case of using warm or hot water rather than cold water washing. In these instances householders believed warm or hot water improved hygiene or increased cleaning power

4.1.2 Energy Literacy

'Energy literacy' is another key theme in the literature about behaviour change relating to energy consumption. Energy literacy refers to consumers' understanding of various concepts relating to energy. This includes relevant units, including differentiating 'power' (kW) from 'energy' (kWh), and understanding how much a unit of energy costs, as well as how much power various appliances consume.

Darby (2006) notes that most people have only a vague idea of how much energy they are using and for what purposes, and what sort of impact various energy efficiency measures could have upon their consumption. A recent article on news.com.au (2013) reports that very few Australians have a high level of energy literacy, with most unable to identify large energy users or effective energy saving measures.

Darby (2006) attributes much of the blame for this ignorance about energy consumption to traditional billing methods. She argues that the 'energy analysis environment' provide by traditional billing is inadequate for decision making, as it lacks the detail that would allow consumers to make sense of their bills and allow them to experiment to reduce costs. Further, she argues that clear feedback about energy use has measurable effects upon consumption. Feedback about energy becomes a learning tool which allows users to learn about their consumption through experimentation.



In designing an energy efficiency program, it is important to consider the average energy literacy of participants, and to identify actions which may assist to improve participants' understanding of fundamental energy concepts.

4.1.3 Market Failures

At market failure level a number of non-price barriers are outlined in Table 3 below (Prime Minister's Task Group on Energy Efficiency, 2011). In different circumstances for different households one or more of these factors prevents the uptake of otherwise rationale energy efficiency activities. The barriers are non-price as "no matter the price involved demand for or conduct of the activity remains fixed" (Prime Minister's Task Group on Energy Efficiency, 2011).

Within the energy efficiency market a number of price barriers also exist and these are consistent with the emerging nature of many energy efficiency products and services, and the strong regulatory incentives that can counteract market activity.

Table 3 - Common Market Failures and Non-Price Barriers to Energy Efficiency

Barrier	Description
Imperfect and asymmetric information	Energy-efficient technologies and services are not taken up because individuals or decision makers do not have access to sufficient or accurate information about their options; appropriate skills are not available; or the transaction costs involved in researching and understanding their options are too high.
Split incentives (principal/agent problems)	Energy-efficient technologies and services are not taken up because the person purchasing an energy-using technology is not the same person who benefits from its use. For example, a landlord may purchase the technology used in a rented building, but it is the tenant that pays the energy bills associated with that technology. Or, one part of a company may be responsible for capital expenditure, but another area for operating expenditure.
Bounded rationality, behavioural norms and organisational barriers	Even where people have access to sufficient information, they may be overwhelmed by its size and complexity, or may not have the time to carefully process it. In these circumstances, people may fall back on 'satisfying' ('near enough is good enough') behaviour or 'rules of thumb' when making decisions about energy use. Organisational barriers occur where structural arrangements or internal incentives impede informed decision making (for example, operational engineers who manage energy use may not be engaged in energy or equipment purchasing).
Materiality barriers	The energy savings of many small-scale activities may yield substantial community benefits if adopted at scale. However, individuals may not consider the private energy savings of such activities to be sufficiently material for them to spend the time and effort acquiring and implementing them.
Access to capital and other financing barriers	Even where cost-effective energy-efficient options are identified, take-up can be impeded if upfront capital cannot be acquired (for example, due to competing priorities, credit limitations or lack of financial services).
Regulatory and planning	Regulations, programs and taxation rules can affect the take-up. Regulatory arrangements can impede activities or can distort their costs and benefits.
Inefficient pricing/ externalities.	Where the price of energy does not efficiently reflect the full real costs, rational private decisions may be inefficient in terms of wider public or shared benefits. Energy prices are very rarely perfectly efficient for a range of reasons such as the lack of time-of-use metering; cross subsidies to protect vulnerable consumers; or externalities such as pollution.



Source: Prime Minister's Task Group on Energy Efficiency, 2011

The transaction costs mentioned under “imperfect and asymmetric information” includes the hidden transaction costs for households, such as the burden of finding products and service providers. This is particularly an issue following the use of an energy efficiency audit, where the homeowner is handed a list of recommendations, but must then find and evaluate suppliers, negotiate deals and then install or supervise installation. This is one reason why “many building occupants who have audits performed fail to ever act on their recommendations, or do so only partially” (Centre on Wisconsin Strategy, 2009).

The recent electricity price rises have tested the limits of this price sensitivity, and the recorded falls in demand for electricity have demonstrated that there is some price sensitivity to electricity consumption in households. However other research has shown that households can make small investments in energy efficiency equipment and activities and obtain significant bill savings (Prime Minister's Task Group on Energy Efficiency, 2011).

4.1.4 Barriers Specific to Renters – Split Incentives

A significant barrier to the uptake of energy efficiency activities in households in rented dwellings is the split incentive; this is where the required investor in energy-efficiency improvements is the landlord, while the beneficiary (the energy bill payer) is the tenant.

Split incentives only apply to certain types of energy efficiency actions – generally those that involve the purchase and installation of products or appliances into the home. Research has found that, as opposed to installation of equipment, there are generally no significant differences between owners and renters in terms of their reported energy curtailment actions, or behaviour change (Fielding, 2010).

Most often the issue of split incentives arises when the landlord is required to make an investment or provide consent. In some cases however, a renter may be able to proceed.

Most people choose not to invest in energy efficiency measures unless they have a simple payback period of more than a few years. In addition, landlords are not always aware of the requirements to maintain a property, seeing it purely as an investment, rather than an opportunity to increase efficiency of the building stock.

There are some additional dimensions to the split incentive barriers in low-income households. These have been identified as

- **Consent:** issues of gaining consent for the installation of energy efficiency equipment, and deciding on the financing of this equipment (Carbon Trust Australia, 2010).
- **Power imbalances:** Low-income tenants interviewed noted that they were hesitant to initiate contact with their property manager or landlord regarding the possibility of a retrofit (AHURI, 2011). Power imbalance in the tenant/landlord relationship was exacerbated in circumstances where rental properties are in high demand, with low vacancy rates and high rental costs (QCOSS, 2009)
- **Return on Investment for owners:** The research also highlighted that owners were unlikely to make investments in energy efficiency without passing the costs onto the tenant, resulting in higher levels of financial stress for tenants (QCOSS, 2009). This is particularly a problem in the ‘residual end’ of the rental market occupied by low-income households where landlords are reticent to implement energy efficiency measures and if so are likely to increase rent as a result (Brotherhood of St Lawrence, 2008)
- **Investment wary renters:** The research also showed that in the absence of owners making energy efficiency investments, they as tenants were unlikely to



make these improvements themselves, as the average occupancy lengths are likely to be much shorter than average payback periods.

- **Gaining permission from strata:** A further issue that is relevant to both landlords and tenants is the ability to gain permission for any energy efficiency equipment for dwellings that are under strata titles, including solar hot water systems (AHURI, 2011)

4.1.5 Barriers Specific to Renters – other

A recent study (Instone et al, 2013) utilised focus groups to identify the adaptive capacity of rental housing, including potential adaptations by tenants, landlords and housing managers. The study identified that tenants:

- believed that their capacity to act in the home was inhibited by a lack of care from some landlords and property managers about the sustainability of rental housing
- found the current shortage of rental housing in many areas, including the Newcastle area, was a constraint on the ability to influence the market through preference for more adaptive and sustainable housing

The study (Instone et al, 2013) also identified barriers or constraints to private property managers' capacity to advocate or arrange for sustainability modifications to properties as:

- busyness
- lack of resources
- lack information and training in order to be able to advocate effectively to landlords and influence tenant practices

4.1.6 Barriers Affecting Low-Income and/or Renter Households

There is a growing body of evidence that demonstrates low-income households are more likely to experience both price and non-price barriers to improving household energy efficiency (KPMG, 2008).

In addition to the standard price barrier, is the notion of an 'opportunity cost' (Centre on Wisconsin Strategy, 2009). In energy efficiency terms, opportunity costs can be understood as "the amount of other products that must be foregone or sacrificed" to obtain the specific outcome. This notion shows why it is not enough to show how the savings from energy efficiency can outweigh the initial upfront costs, as energy efficiency must also be "more desirable than competing products on which the...household could spend". Beyond the issue of dollars, there are also opportunity costs inherent in many energy efficiency behaviours. These may be (perceived) comfort or convenience that must be sacrificed in order to achieve the reduction in energy use.

While price barriers act as a major driver in preventing low-income households accessing more efficient household appliances, a range of other factors may also play a significant role. These may include reduced rates of financial or other literacy (such as energy literacy discussed above), language barriers, recent migrant or refugee status, reluctance to trust or engage with government agencies, illness or other health related concerns and transient employment, and for renters, uncertain length of tenancy in buildings.

4.1.7 Solar Hot Water

The Clean Energy Council (2011) estimate that 10% of Australian homes had solar hot water heating installed in their homes in 2010. NSW reportedly has a low proportion of solar hot water heaters when compared to other states (5% in NSW compared to 21% and 42% in Western Australia and the Northern Territory respectively in 2008). This is likely to be explained by the high proportion of natural gas infrastructure in NSW when



compared with other states – the Clean Energy Council identifies an inverse relationship between natural gas infrastructure and solar hot water penetration.

A program to phase out energy intensive electric hot water systems was agreed to by all states and territories except Tasmania in 2010. However, each state is responsible for implementing the regulations in their jurisdiction. NSW has not adopted the program to phase out the energy intensive heaters. However, it sets standards for hot water systems under the BASIX Buildings Sustainability Index.

Potential barriers to energy use reductions with respect to the installation of solar hot water systems in households were found in a New Zealand study by Pollard & Zhao. These included:

- Quality of installations can be uneven, even for standard practices;
- Building consent may not be in place despite being a legal requirement;
- Safety requirements such as high temperature to avoid burns and reduce risk of disease may not be followed;
- An apparent bias towards the west aspect in orientation of installation;
- Few owners fully understood how to operate their system (lack of information); and
- Retrofitting items to the roof of a house may result in less durability of the system.

In the New Zealand study, a number of design and installation factors were identified that increases solar hot water system performance such as the angle of the installation, connection (piping arrangements), timers and inclusion of system displays for monitoring and post-installation checks/reviews. A key opportunity identified in the study was the need for better information for users to be aware of consumption and to readily identify maintenance issues. A conclusion of the study was that individual systems and their installation were more important to performance than the particular type of technology or than the region/climate (Pollard & Zhao, 2008).

In terms of attitudes and satisfaction, the New Zealand study found:

- Most households reported installing systems to save money;
- Over 40% were dissatisfied with the lack of independent information on claimed electricity savings, and on operating and maintaining the system;
- Over half were satisfied with the installation process;
- Most were not educated on operation and maintenance;
- The majority were satisfied with degree of control, despite most being passive managers of their system;
- Only 60% reported financial savings that had met expectations;
- Over 85% of households would recommend systems (Pollard & Zhao, 2008).

Australia is a more mature market in terms of solar hot water system installation and has higher levels of insolation. Furthermore many of the issues identified in this study are better regulated by Australian plumbing code requirements such as:

- Hot water systems must reach 60 degrees for disease control: and
- Mandatory connection to an electric boost (as per the systems specified for the PSC), typically off peak 1 or 2 in NSW (Solahart, 2013).

The recent Blacktown Solar City program involved the installation of 152 solar hot water heaters on homes in Western Sydney. The program found that people were more likely to be motivated to install such measures in response to the rising cost of electricity rather than by a desire to reduce greenhouse gas emissions.

The Sustainable Living Tasmania program (2013) installed 100 solar hot water systems in Tasmanian households, with varied impacts. Participants saved between \$55 and \$872 per year – a significant variation which can, at least in part, be explained by existing



differences in consumption and behaviour. Those participants who reported that they were unhappy with the installed system tended to have manually-boosted systems and found that their water was not hot enough. Other problems reported by participants included that there was not enough hot water or that they were not saving enough money. The report suggests that these problems may have been linked to behaviour changes after the installations – participants may have begun using more hot water once the new system was installed due to a perception that they now have very cheap hot water.

The following industry observations have been provided by Solahart (PSC consortium partner) that further inform the PSC:

- The average roof in NSW generally provides a location for solar hot water panels, although if the roof pitch is less than 10 degrees pitch, a frame is required;
- Complete systems are installed by Solahart (not retrofits to existing systems) as retrofits do not qualify for Small-Scale Technology Certificates (STCs);
- Open systems are suitable for coastal regions with minimal frosts whereas in inland areas where the risk of frosts are higher a closed system is recommended (insulation to piping required);
- Timers can be installed when a continuous tariff is the only option - off peak 1 and 2 and thermostat controls are generally the standard for solar hot water installations in Australia; and
- Solar hot water systems generally don't have an in-home display for the consumer although this is becoming more common for solar photovoltaic systems (Solahart, 2013).
- In NSW, Solahart has found a consumer may achieve up to 75% energy savings when switching from electric hot water to solar hot water. However, this does not relate directly to financial savings due to varying tariffs and charges throughout the state (Solahart, 2013).

Importantly, understanding behavioural requirements, such as need for better information for households as well as ensuring high quality installations will inform the PSC program design. The following section on program comparisons also provides further guidance on solar hot water systems as elements with energy efficiency programs.

4.2 OPPORTUNITIES

With respect to financial constraints, the Queensland Council of Social Services suggests to maximise the benefit to vulnerable households, energy audits be combined with retrofit and appliance replacement schemes beyond compact fluorescent tube lighting and low-flow shower heads and tap aerators. The installation of a broader range of technologies such as insulation, window coverings (both internal and external), sealing around windows and doors, hot water systems and energy-efficient appliances must be part of the suite of options available to assist low-income and disadvantaged households (QCOSS, 2009).

The Zero and Low Energy House (ZALEH) project in New Zealand aimed to capture, for the first time, a range of non-energy or lifestyle benefits for households of energy efficiency (Stoecklein et al, 2005).

The benefits and barriers were classified as:

- Appearance: changes in appearance of the home;
- Bill control: increased or decreased feeling of control over energy bill;
- Comfort: greater or lesser comfort in the home;
- Environmental: features highlight environmental benefits or problems;
- Features: energy efficiency equipment had better or worse features;
- Health: features made the home more or less safe/healthy to live in;



- Maintenance: features had higher or lower maintenance requirements;
- Moving: energy features enabled occupants to avoid moving;
- Noise: homes had higher or lower noise levels; and
- Notices: energy usage changes led to higher or lower bills, and therefore more or less payment notices or similar calls from utilities on bill-related issues.

The results suggest that most households place a higher value on the lifestyle benefits of the energy efficiency benefits of their homes than on the energy savings that accrue from them.

One example given was the benefit of installing insulation in low-income households. Though the insulation did not necessarily lead to significant energy savings, and therefore bill reductions, it did significantly increase quality of life (e.g. warmer floor temperatures means kids do not need to wear socks as much now).

4.2.1 Landlord Incentive Options

Tightening of standards and minimum performance levels is one way to address the split-incentive option. When these changes are applied across all products and services this removes the impetus of the incentive because the action is mandatory. Examples of these changes include minimum building performance standards and appliance specifications (such as compact fluorescent light bulbs and low flow rate showerheads).

The second approach includes the targeting of incentives to influence the behaviour of the landlord. A final approach includes contractual arrangements between the tenant and landlord rewritten in a way that the incentives of landlord and tenant are aligned (QCROSS, 2009).

While noting the significance barrier posed by split incentives in their 2005 report into the cost effectiveness of energy efficiency, the Productivity Commission concluded that was still possible for both parties to negotiate agreement to the extent that energy costs are important (QCROSS, 2009).

The Queensland Energy Management Plan includes a specific action around residential owner/tenant incentives for energy efficiency, specifically from July 2012, investigating ways to encourage energy efficiency in leased properties in the residential sector (QDEEDI, 2011).

While rebates will provide some incentive for some low-income households, the incentives will be stronger for transportable appliances rather than for fixed or non-transportable structural changes. For others, the upfront capital costs no matter how small will simply be too great. Rebates may also reduce the disincentive for owner/landlords to implement energy efficiency changes, but are more likely to be effective when connected to regulatory obligations (QCROSS, 2009, p5).

Inshone et al (2013) also identified opportunities to overcome adaptive capacity for renters to reduce energy use as tenants have strong visions of the future and understandings of what would make climate change adaptation more possible. Tenants are motivated by concern about the impact of human activity on the environment, and exercised this concern through everyday sustainable household practices, as well as through engagement with community or political organisations.

Property managers are crucial 'knowledge brokers' mediating between landlords and tenants. Property managers' believe possibilities exist with the tenant/landlord/property manager relationship, tenancy legislation and contracts, costing and procurement processes for maintenance and improvements to houses. Existing capacity was identified by Inshone et al (2013), on the part of both tenants and property managers, to act on adaptation through everyday practices, despite structural, material or resource limitations.



The research also highlighted neighbourhood, community and political networks for tenants and networks within institutions, professional training and information networks for property managers as key opportunities for overcoming barriers to energy efficiency.

Inshone et al (2013) identified the following as further opportunities to engage tenants in climate change adaptation behaviours:

- incentives and education for landlords to see investment properties as 'ethical investments' which provide opportunities for tenants to practice sustainability and adapt to climate change
- increased assets for tenants to enable investments of time and money in a secure 'home' through short-term lease of installations such as solar panels or water tanks
- changes to tenancy conditions and better communication with landlords to enable, rather than inhibit, adaptive modifications by tenants such as gardens and water tank
- government action on regulatory change to support the above changes but keeping in mind when regulatory impositions appear too onerous landlords may choose to sell rental properties.

4.2.2 Livelihood method for diagnosing behaviour frames

The sustainable livelihoods analysis (Ellis, 2000) provides a framework for understanding capacity. The framework aims not to present a model of reality but to help stakeholders, with their different perspectives, engage in structured and coherent debate of the many factors affecting livelihoods, their relative importance, and the way in which they interact.

The approach developed to assess capacity is based on the sustainable livelihoods framework as illustrated in Table 4 and uses the five capitals as a basis for discussion and assessment.

Table 4 - Sustainable Livelihoods Framework

Capital	Description
Human	Skills, health and education that contribute to the capacity to manage energy use in the home
Social	Family and community support available, and the networks through which ideas and opportunities for energy efficiency are accessed
Natural	Effect of the natural environment on the need and options available for household energy efficiency
Physical	Infrastructure to provide reliable electricity to the home and equipment that uses electricity in the home
Financial	The level, variability and sources of income and access to other financial resources such as credit and savings, that are available to support efficient use of energy in the home

Adapted from Ellis, 2000

Both the amount of each capital and the balance among capitals are important in building a livelihood.

- Assessing capacity allows understanding of what enables and constrains low income householders participation in managing their energy use



- How and why low income householder capacity may vary across demographics the links between broader policy and institutional issues and day-to-day decision-making by low income householders
- How these enabling and constraining factors may affect the results of investment in energy efficiency by government and other organisations
- How to build this knowledge into the development of future energy efficiency policy

The LIEEP Power Savers Challenge will conduct Livelihoods Workshops with 12 participants in Round 1 of the program. One workshop will be held prior to intervention and one post intervention.

In the workshop, low-income householders are brought together to work through a 'self-assessment' process based on the five capitals. The workshop is a monitoring and evaluation process that enables reporting on householder capacity. The workshop asks participants to:

- Identify indicators relevant to each capital
- Rate the degree to which the indicator enables or constrains household energy efficiency using a 0-5 scale

The results of the discussion are recorded as the workshop proceeds by using a specially designed template, including a spider-web plot, which enables the results to be displayed at the conclusion of the workshop. During the workshop, participants can, through the use of personal response system (PRS), vote on a topic anonymously and gauge the group's opinions on particular topics or questions in real time.

By repeating the workshop with the same (or similar) groups following the energy efficiency activities and solar hot water system installations, the self-assessment process can be used to monitor change in householder capacity and in particular using the indicators and enabling/constraining ratings as a qualitative measure of capacity.



5 ENERGY EFFICIENCY COMPARATIVE PROGRAM ANALYSIS

A wide range of macro-level policy environments, including energy policy, housing policy and social policy, influence energy efficiency policy and program activity. This section examines some past and current energy efficiency programs and their parameters and where possible, the performance assessments of these programs. This analysis provides guidance on the range of activities included in previous programs, and learning (positive and negative) from previous energy efficiency interventions.

5.1 EXISTING AND PAST ENERGY EFFICIENCY PROGRAMS

A summary of some prominent recent energy efficiency programs and their main characteristics are outlined in Table 5 and Table 6.



Table 5 - Existing and Past Energy Efficiency Programs

State	Program	Year implemented	Low-income focus?	Home owners or renters?	Home audits?
NSW	Blacktown Solar Cities challenge- L.E.S.S	2007-2013	No, however PV systems were installed on public housing building stock.	No details about restrictions for renters are provided, but participants purchase PV and this tends to appeal to owners. This project is aimed at both business and residential participants.	Home energy audits were trialled with 100 people and confirmed there is virtually no market for audits at any price above free.
VIC	Greenhouse Savers program 2010 run by City of Yarra	2009-2010	No	Homeowners	Yes. An initial audit and recommendations for draught proofing (the package includes \$600 worth of products including installation)
NSW	NSW Home Power Savings Program	2008	Yes. Possession of a concession card is one of the key eligibility criteria	Open to tenants in private rentals and social housing as well as owner-occupiers	Yes. In-home assessment and installation of standard energy efficiency kit (\$350 value) and personalised energy tips for the household.
TAS	Sustainable Living Tasmania 100 Energy Champions	2011	Yes - public housing is the focus of this program.	Tenants of public housing	Free face-to-face educational session and materials from the home energy assessor
VIC	Just Change	2010	Yes, eligibility was based on having a valid health care card	Tenants in private-rental properties	Free home assessments prior to the installation of energy saving devices



State	Program	Year implemented	Low-income focus?	Home owners or renters?	Home audits?
SA	Energy Efficiency Program for Low Income Households (EEPLIH)	2003-2005	Yes, eligibility was based on having a valid health care card		Yes. 10,000 home energy checks were undertaken
US	Opower Low Income Energy Outreach Solution	Ongoing	Yes	All energy users	No, information provided on bills
BC Hydro Canada	Power Smart for low-income households	Unknown	Yes	Provided for homeowners, renters, housing providers and aboriginal communities	Yes - personalised home energy evaluation



Table 6 - Household Programs with Energy Efficiency Elements

Program	Effectiveness (actual results of reductions e.g. kWh reduced or % reduced)	Comparative budgets (for EE kits/actions)	Definitions / mechanisms used to categorise / delineate activities	Energy use targets	Prizes used to improve outcomes
Blacktown Solar Cities	1.3 GWh of electricity annually. Greenhouse gas emissions reduced by more than 1300 tonnes each year.	Unknown			
Greenhouse Savers program 2010 (City of Yarra)	Across 55 homes participating households cut greenhouse emissions by an average of 25% per annum, gas usage by 33% (a saving of \$257) and electricity consumption by 27% (a saving of \$244)	Unknown	Greenhouse gas reduction program that recruits interested householders for an energy use assessment, a retrofit, public commitments to 3 behavioural changes, follow up visit 3 months after retrofit, and data entry for 12 months.	The target savings of greenhouse gas emissions for the project was 15%. In 2009 the results are noted as 25.2% reduction in GHG. 27% reduction in electricity -saving \$256.79 pa per household. 33% reduction in gas- saving \$243.78 pa per household	No. Quarterly high performers recognised within group communications on group forum.
NSW Home Power Savings Program	No details could be found on the total energy savings achieved by this program	Power Savings Kit worth \$350	Home power assessment by an energy expert, Power savings kit, Personal power savings action plan	Target savings were up to 20% of participating households' energy consumption	Prize draws of participants to encourage sign-ups, and as an incentive for recommending the program to others



Program	Effectiveness (actual results of reductions e.g. kWh reduced or % reduced)	Comparative budgets (for EE kits/actions)	Definitions / mechanisms used to categorise / delineate activities	Energy use targets	Prizes used to improve outcomes
Sustainable Living Tasmania 100 Energy Champions	Average energy reduction of 8.4kWh/day	Not known	Energy cost reduction program/audit, installation of equipment and monitoring/behaviour change through information provided pre and post intervention. Quarterly feedback and solicitation of information about how participants were changing their energy usage through behaviour change.	Not known	None
Energy Efficiency Program for Low-Income Households (EEPLIH)	Total estimated energy savings 221037 kWh across 1000 homes surveyed for the evaluation report. 221kWh/house/year	Not known	Home energy checks (or audits) and retrofits, buy-back scheme for inefficient fridges and freezers, interest-free loans to purchase energy efficient appliances and energy saving products.	Not known	None
Opower Low Income Energy Outreach Solution (U.S)	2.5% energy savings for the lowest two income groups. A total of 75 GWh was saved over 3 years by 100,000 households (however not all of these were low-income)	Not known	Targets, personalised home energy reports	Not known	None
Canada - BC Hydro	Not known	\$100/household	Energy savings kits	Not known	None



Energy efficiency programs and the energy efficiency market are well established in various jurisdictions in the United States. Figure 7 outlines a summary of energy efficiency or behaviour change programs in the United States, categorising the programs across information and assistance programs to those offering financial rewards.

Figure 7 - Energy Efficiency Programs in the United States

Category	Products/Services	Provider (Examples)
Energy Consumption Feedback	On-line In-home Mail (paper)	Efficiency 2.0, Google, etc. TED, Grounded Power, Intel OPower
Social Norms & Marketing	Self Comparisons Community Comparisons Competitions, Recognition	All of the Above OPower, Efficiency 2.0, Cape Light, BC Hydro BC Hydro, Smackdown
Customer Tips & Assistance	Advice Assistance	OPower, Efficiency 2.0, BC Hydro, Cape Light, etc. SMUD, BC Hydro
Energy Reduction Commitments	Personal goal/commitment Community goals	OPower, BC Hydro, etc. CUB, FortisBC
Financial Incentives	Fixed Reward Random Reward	BC Hydro, CUB Stanford project

Evaluation of energy efficiency savings from US programs is publicly available. The savings identified from a number of energy efficiency programs in the U.S. are highlighted in Figure 8. There is a wide range of reported energy savings achieved by jurisdictions, ranging from 1.5 to 9.3. The level of customisation, engagement and the wider appeal to behaviour in the holistic sense appear to underpin the more successful programs.

Figure 8 - Energy Savings Identified from United States Programs

Program	Energy Savings	Evaluation
Home Electricity Reports (OPower) - SMUD	1.9% reduction in electricity use, 1.4% excluding rebated measures	Participants compared to control group over 2 years
The Power Cost Monitor– A Treatment & Control Experiment - Wisconsin	1.5% reduction in electric usage 3.8% savings by active users (41% of participants)	Participants compared to control group over 1.25 years
Real-Time Monitoring Pilot – Hydro One	6.5% avg. reduction in electricity use	Comparison of participants with control group over 2.5 years
The Energy Detective Pilot – Florida Solar Energy Center	7% avg. reduction in energy use	Measured energy use, controlling for weather, comparison with control group
Energy Saver - Citizens Utility Board (Illinois)	8% net savings per participant 6.6% compared to control group	Normalized pre & post usage Control group with similar characteristics
Energy Monitoring Pilot – Cape Light Compact/Grounded Power	9.3% avg. reduction in energy use	Participants compared to a control group

5.2 LEARNINGS FROM PREVIOUS PROGRAMS

ISF undertook interviews with program managers from a range of previous and existing energy efficiency initiatives to understand the key challenges and opportunities identified throughout previous efforts. The following programs were discussed:



- Blacktown Solar Cities
- NSW Government Department of Housing Solar Hot Water retrofits
- Sustainable Living Tasmania 100 Energy Champions
- NSW Home Power Savings Program

The key points from these interviews are summarised below.

5.2.1 Solar Hot Water systems

Programs analysed primarily installed solar hot water systems in to government owned housing rather than private housing. Therefore access to facilities and the ability to retrofit such facilities as the owner or landlord less complicated than would be the case with private landlords.

One program found that the installation process lacked the time or ability to educate residents on the use and upkeep of the solar hot water system. As a result participants were unsure of how to deal with maintenance issues and instructions provided by solar hot water manufacturers were of low quality. The cost to maintain was also identified as a financial constraint on participants.

The solar hot water retrofits also found that system performance varied between dwellings. Solar hot water systems have more parts and components than traditional gas or electric hot water systems. This resulted in maintenance being required on some residences and multiple visits which was outside of the project scope. An important lesson was to understand the 'after sales service' and warranty specifications provided with the solar hot water technology. Some solar hot water providers are unable to warrant larger systems in colder climates without frost protection. It was advised that longer warranty periods should be negotiated where possible. In addition the warranty should cover parts and labour costs, which can often be an unexpected longer term hidden cost.

When installing solar hot water with gas booster, often the system was oversized (based on number of people living in the household), resulting in the gas booster working unnecessarily. One program experienced low quality installations, such as panels not being secured to the roof correctly, which may have been a result of a lack of training of installers.

Some contractors were unaware of metering and tariff issues, which resulted in tenants receiving an increased cost on their bill. This was due to the solar hot water product specifications suggesting a continuous tariff, which moved some participants off a more cost effective off-peak hot water tariff. Ensuring participants understand the different tariff structures was seen as an important criteria for future solar hot water retrofit programs.

In summary the discussions about the inclusion of solar hot water systems in energy efficiency programs, previous program managers raised four points for consideration.

- The installation and quality of the equipment was identified as important component of success in programs that included solar water heating. The quality of the equipment and its installation was essential in calculating the payback of the system as incorrectly installed systems or lower quality systems had much higher maintenance costs. When solar hot water systems are installed in rented properties, it is necessary set clear parameters about the maintenance requirements and schedule for these systems to ensure optimal operation. Program managers highlighted the need to carefully investigate warranties on both parts but also the labour costs associated with replacing parts when selected solar hot water systems.



- Careful consideration also needs to be given to the selecting the households to receive solar hot water systems and of the usage of gas-boosted solar hot water systems. The selection process needs to consider the size of the household, how they use hot water, gas availability and connections and climate zones. Previous programs found that the large storage systems necessary for gas-boosted system actually resulted in minimal energy savings for the householder.
- The importance of providing education and advice to participants in operating the solar hot water system. Previous program managers found there can be a perception among participants that solar hot water will result in the participant incurring no costs for hot water. These expectations need to be managed so that the likely outcomes of the installation are clear to the participant. Further, the installation of solar water heating needs to be coupled with advice on tariffs to ensure that households are not placed on a tariff that could result in higher electricity costs.

5.2.2 Smart meters/ In-home displays

Interviews with program managers revealed that in-home displays received positive feedback from participants and were identified as the most useful equipment for the householder in changing their behaviour. This was despite this device not leading directly to the largest proportion of energy savings; participants liked the device's ability to display information about household energy use in different formats (actual energy use vs traffic light system).

5.2.3 Program design

Program managers interviewed for this report were managing programs that ranged from large programs with high numbers of participants (but providing relatively generic offerings) to those with smaller numbers of participants but more specific and tailored offerings.

Identified advantages in large, generic programs included lower cost of delivery, the ability to reach large number of households. Reported disadvantages of such large programs are that the offerings are often inappropriate (either too much or too little) for many households as tend to have a one-size-fits-all approach and that effective engagement with households is difficult when conducted on this scale.

5.2.4 Low income households

A key challenge identified by previous programs with low-income households is that programs are dealing with people who have a lot going on in their life – and electricity use may not be the top of the list of things they are thinking about.

Participants are also likely to be suffering from information overload, as there have been so many programs in recent years that have targeted low-income households. This has created a lot of confusion among households and could lead to a reluctance to get involved. In particular, participants were reported to be reluctant to allow program representatives to come into their home. The language around home "assessment" made some people feel they were being judged for their lifestyle, and were therefore uncomfortable about the process.

5.2.5 Recruitment and attrition

Attrition rates of previous programs provide a good guide to the levels of attrition that should be planned for in the PSC. One program focused on public housing found



enrolment numbers were relatively high (70% of people contacted by the program agreeing to participate) however in another was only half (50%). Initial recruitment conversation rates are one thing, attrition rates when the program is operating also need to be considered. One program found after initial recruitment the attrition rate was 85% of those who had previously agreed to be part of the program. This included participants not answering the phone, declining to participate over the phone or being absent during the scheduled home visit.

A program focused on 800 private rental households (specifically those suffering financial hardship) found that in a multi-unit complex 'word of mouth' facilitated recruitment to the program. This program also experienced high enrolment and high attrition (50%) due to the 'stress of the residence financial circumstance'. It was also found that participants that proactively signed up for the program remained with the program for its duration. This program also found 4% of participants moved residence within the program delivery timeframe.

5.2.6 Addressing household diversity and communications challenges

Many of the programs analysed for this review worked with diverse populations. Each program approached these communities with specific resources, although the level of resourcing varied according to the size of the program.

Smaller programs offered printed materials in a number of different languages and also worked with community groups in those ethnic groups to develop and distribute these materials. Despite these efforts, programs found there was not a great uptake of that written material – most people who spoke a second language they did not use the printed material, but instead relied on family and friends for context. Larger, government-run programs were able to deliver the entire program (including the in-home assessments and follow-up communications) in a range of languages. This, in combination with working with community groups in these areas, did increase participation.

Cultural sensitivity can also require consideration of a gender dimension with some religious groups, particularly when an in-home visit is part of the program.

Low literacy and numeracy was often identified as a barrier with low-income households. It was also noted that participants took pride in convention in not being 'told what to do'. Culturally and Linguistically Diverse (CALD) communities were identified as being active and engaged participants (particularly Burmese & Vietnamese residents in this case). It was also identified as important to include pictures in education materials to create a prompt for verbal communication rather than more detailed reading materials.

Verbal communication during home visits was identified as a key success factor of several programs. An interesting finding was that younger people from these backgrounds were willing to help with translation, for their household but also for neighbouring households that required translation. This suggests that encouraging young people to be involved may benefit the program at multiple levels. Another program also found that family and friends were willing to assist with translation where required.

5.2.7 Renters vs. home owners

Some of the programs allowed renters to participate, but restricted the offerings that could be provided without landlord consent. Requiring landlord consent was identified as a major barrier to tenant involvement in such programs, with many programs reporting high levels of drop-out due to tenants being reluctant to seek permission from their landlord.



Tenants were reluctant to ask permission from their landlord as they did not want to be seen to make trouble, nor did they want to give a reason for the rent to be increased.

5.2.8 Behaviour change aspects

As we have consistently discussed in this report understanding behaviour is key for unlocking lasting adoption of energy efficient practices. This is well recognised within the wider energy efficiency community and each of the investigated programs shows an increasing sophistication to addressing behaviour change. One program trains all of their assessors in theories of behaviour, to provide them with the background knowledge to understand their actions within the households. The program found that the relationship the householder developed with the assessor was critical to whether they implemented the behavioural aspects of the program. Reflecting the importance of this relationship, all follow-on communication with the household comes addressed from the assessor, rather than from the program manager.

Finding a means of measuring the behaviour change that has occurred as a result of such programs is really difficult. It is generally not sufficient to simply measure energy savings, especially in low-income houses, because initial savings in energy consumption may simply present opportunities for households to increase their comfort by substituting different energy uses. For example, energy savings achieved by using certain appliances more efficiently may present an opportunity for households to use their home heating more often, thus increasing their comfort of their home.

It is important to give consideration to alternative ways to measure behaviour change in order to establish strong evaluation processes.

5.2.9 Programs delivered with partners

In all the investigated programs, participant identification and program implementation was done in partnership with several organisations, including electricity and gas distributors, local councils, state government agencies and third sector/ private sector providers.

Partnering with other organisations reportedly allowed programs to tailor their offerings more than they would have otherwise. Programs found that the tailored offerings were more successful both in terms of energy savings and participant.

5.2.10 Other key findings

A number of program managers commented that the ability to tailor interventions to the needs and wants of the households is key to program success – there is no single program offering that would be suitable for all households.

Finally, past programs have found that people are much more interested in the money-saving potential of such programs than they are in environmental benefits. Bill pressure sets a strong motivating context for participants, while fatigue and confusion around climate change mean that this is a decreasingly common motivator for action.



6 CONCLUSIONS

Drawing on behaviour change and social practice theory

This report provides analysis and discussion of behaviour change theories and their relevance to program design within the PSC. There are a number of behaviour change theories available to consider and no single theory can be described as 'perfect' or 'right'.

Behaviour change theories consistently highlight that individual's behaviours are influenced by both their perceptions of themselves within their environment, and the signals they receive about their behaviour from this environment. However, social practice theory takes the attention away from individuals as agents and focuses on how both individuals and structures participate in everyday practices (Hargreaves, 2011).

A deep understanding of biases and limitations of the end user need to be identified as precursor to successful changes in behaviour. Considering the United Voice Real Voices survey of its members as a key reference point to draw narratives for the PSC program is crucial for tapping into potential participants values to maximise effectiveness of the program's materials and activities. United Voice members already see electricity costs as an issue affecting other like them and do not tend to blame themselves which means that members are already primed for narratives that articulate 'cost of living' pressures, especially electricity prices, as a class issue (United Voice 2013).

The PSC may also want to consider defining the key elements of practices (drawn from social practice theory) associated with the program as a starting point such as materials, competences and meanings (Shove, Pantzar and Watson, 2012). Informing the design of the program's participant engagement using Robinson's 5 stages of behaviour change and Ashraf's approaches of using commitment devices, material incentives and defaults may also overcome barriers to participation. Drawing upon the five capitals (natural, physical, financial, social, and human) livelihood analysis proposed for the livelihood workshop will assist with identifying participant's adaptive capacity for the proposed measures. The participant/ control questionnaire proposed for the PSC program is another opportunity to identify the "norms" and "practices" of low-income populations. This should also be informed by previous planned surveys in other programs and literature such as the diagnosis phase of Ashraf's three stages of program design. During program evaluation through the evaluation plan, it will be important to identify how the program's participants are empowered (through appeals to intrinsic values) and hence how well the program is achieving persistence of energy-efficient practices.

The following conclusions are derived from this report to inform the communications and engagement strategies:

- The audience may have a variety of learning styles, which means that a range of engagement materials and mechanisms will be required to satisfactorily engage participants.
- Segmentation technique based on either attitudes and actions or audience values may be more appropriate than segmenting by demographic characteristics. The United Voice member survey may help in developing this segmentation.
- The use of a values approach may be most appropriate for a large-scale and/or broad communications campaign (whereas segmenting by actions could be useful when targeting a specific behaviour) – the qualitative surveys and livelihood workshops as part of the PSC will likely provide an opportunity for this.



- There may be a need to communicate across multiple mediums and the message can be tailored to the value groups that are most likely to be accessing that medium.

Barriers to energy efficiency uptake

A number of barriers to energy efficiency in households, across price and non-price (behaviour) categories, are identified from the literature in this report. Investment in energy efficiency measures with payback periods of more than a few years was identified as low. In addition, landlords are not always aware of the requirements to maintain a property, seeing it purely as an investment, rather than an opportunity to increase the efficiency of the building stock. Split incentives where the required investor in energy-efficiency improvements is the landlord, while the beneficiary (the energy bill payer) is the tenant also present a barrier. Split incentives, however, generally only apply to those energy efficiency actions that involve the purchase and installation of products or appliances. Property managers identified busyness and lack of training and information about energy efficiency as a barrier to engaging and enabling tenants and landlords to take up energy efficiency.

While price barriers act as a major driver in preventing low-income households accessing energy-efficient household appliances, a range of other factors may also play a significant role. These include reduced rates of financial or other literacy, language barriers, recent migrant or refugee status, reluctance to trust or engage with government agencies, illness or other health related concerns and transient employment, and for renters, uncertain length of tenancy in buildings. Other, less tangible, barriers identified include behaviour of others, habit, comfort and health and hygiene.

Opportunities to overcome barriers

Installation of a broad range of energy efficiency technologies to assist low-income and disadvantaged households is seen as a key opportunity. These technologies need to be introduced within wider educational and communications programs that help embed the technology with supportive household behaviours.

Understanding that improving household energy efficiency may not always result in decreasing electricity bills for the household is found to be important. This is because households could elect to realise non-energy or lifestyle benefits such as increased comfort of the home during cold or hot weather events.

Targeting of incentives to influence the behaviour of the landlord can help to overcome the split incentive barrier. Contractual arrangements between the tenant and landlord may also be rewritten in a way that ensures the incentives for both landlord and tenant are aligned. Utilising social networks within a tenant's community and within the professional environment of property managers can begin to overcome landlord/tenant barriers (Inshone, 2013). The research identified that rebates can reduce the disincentive for owners/landlords to implement energy efficiency changes but are more likely to be effective when connected to regulatory obligations (QCOSS, 2009).

Some of these opportunities are built into the PSC design but could be further investigated to ensure effective, efficient and persistent energy savings for low-income households.

Review of other programs

In recent years there have been multiple energy efficiency programs targeting low-income households. These programs have ranged from large-scale government programs and smaller programs for specific communities and geographies delivered by third sector service providers. Analysis of recent energy efficiency program activity highlights a number of findings:



- The ability to tailor interventions to the needs and wants of the households is key to program success – there is no single program offering that would be suitable for all households.
- The primary objectives of many energy efficiency programs are to improve households' electricity efficiency, lower householder electricity bills and provide households with more thermal comfort and energy literacy. This is different from programs of 3-5 years ago where the focus was on reductions in greenhouse gas emissions.
- Low-income energy efficiency programs have typically used government concession cards as an eligibility requirement, and this has often been an inadequate mechanism for identifying the most vulnerable and in need households.
- The focus for previous programs has been on owner-occupiers or people living in public and social housing.
- The predominant model for energy efficiency programs has been the provision of educational materials, combined with some form of in-home energy assessment and the installation of basic energy efficiency items into the home.
- When solar hot water systems are installed in rented properties, it is necessary set clear parameters about the maintenance requirements and schedule for these systems to ensure optimal operation. Program managers highlighted the need to carefully investigate warranties on both parts but also the labour costs associated with replacing parts when selected solar hot water systems.
- Careful consideration also needs to be given to the selecting the households to receive solar hot water systems and of the usage of gas-boosted solar hot water systems. The selection process needs to consider the size of the household, how they use hot water, gas availability and connections and climate zones.
- Providing education and advice to participants in operating the solar hot water system need to be managed so that the likely outcomes of the installation are clear to the participant. Further, the installation of solar water heating needs to be coupled with advice on tariffs to ensure that households are not placed on a tariff that could result in higher electricity costs.

Newer programs are applying greater levels of customisation to household contact and kits, and using technologies that provide the householders with an ability to influence the type of information they receive and energy savings they can make. These programs are showing higher levels of success in meeting program objectives.



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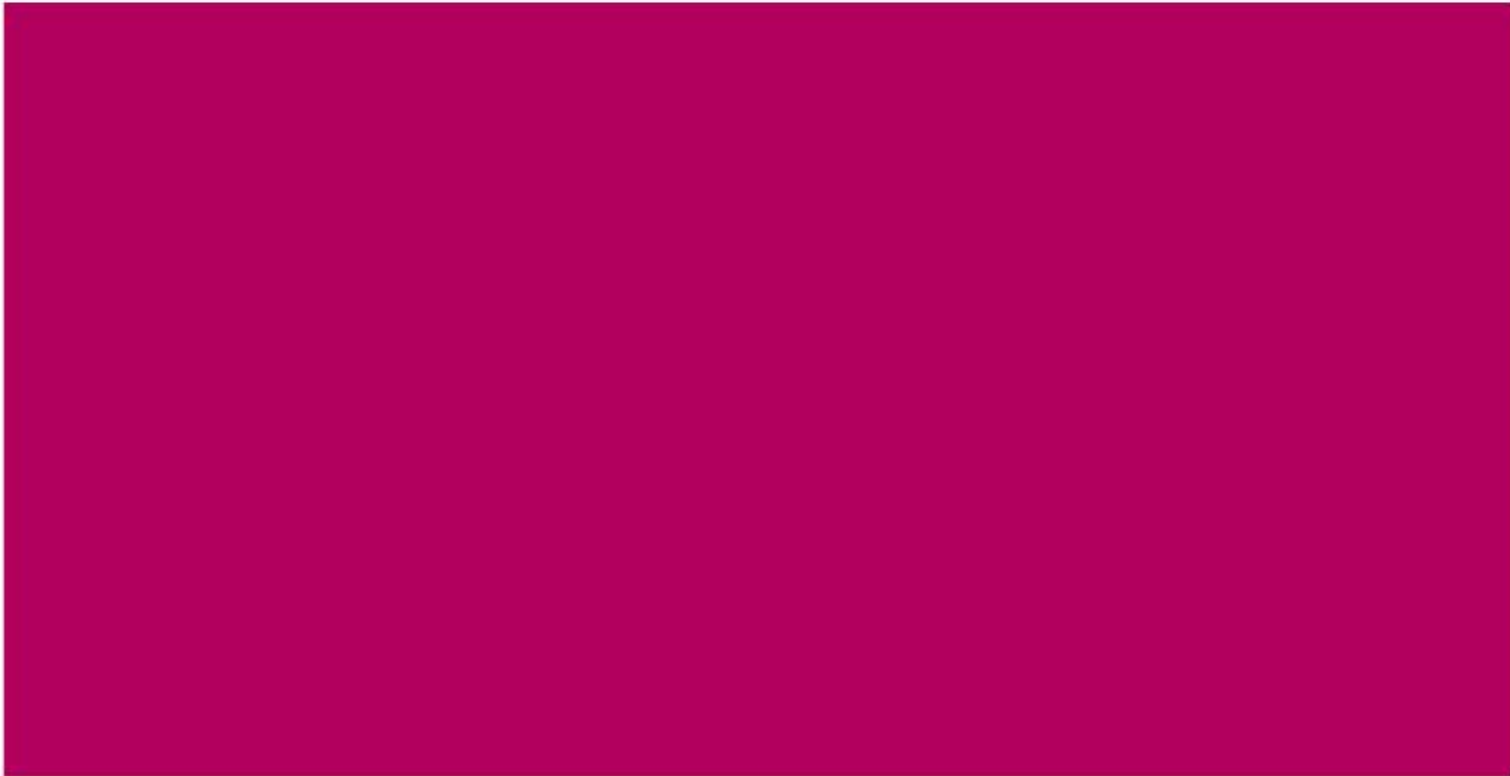
Institute for
**Sustainable
Futures**



Power Savers Challenge Evaluation Framework



Institute for Sustainable Futures



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About the Power Savers Challenge

The Power Savers Challenge (PSC) is one of a number of energy efficiency programs funded by the Commonwealth Government under its Low Income Energy Efficiency Pilot Program (LIEEP) and the Clean Energy Future Plan 2011 that also contains the Carbon Pricing Mechanism. The program will be implemented by a consortium led by the Nature Conservation Council (NCC) and includes United Voice (UV), Solarhart (SH) Industries and the Institute for Sustainable Futures (ISF).

The PSC aims to reduce household electricity use and correspondingly electricity bills in participant households through household electricity assessments and the installation of customized suite of energy efficiency equipment and ongoing support through a peer-to-peer engagement program that includes education and advice.

Program objectives and outcomes

#	Program Objectives	Outcomes (intended results for the low-income households)
1	Increase energy literacy among participants and therefore contribute to participants having a sense of control over their electricity use and electricity bills.	Participants have an increased understanding of the benefits of energy efficiency and increased energy literacy.
2	Reduce electricity use in participants' homes through the provision of one-to-one guidance (Energy Assessment and ongoing engagement with program staff), combined with the installation of energy efficient technology in participants' homes (energy efficiency solutions will be tailored to the needs of each individual home).	Participating low-income households reduce energy use by a median value of 10% with a comparable reduction in household energy costs. Further reductions are expected for households that receive tailored energy solutions and /or solar hot water systems.
3	Generate persistent electricity use reductions through the provision of ongoing support and communication through participants' peer network(s).	Through peer-to-peer engagement, low-income households in the broader community learn about the benefits of energy efficiency and are inspired to take action to reduce energy use.
4	Develop and test methods to overcome split incentive barriers in a select number of participant households by developing a method for upgrades to solar hot water systems (with degrees of subsidy) in rented properties	Suggested approaches for overcoming split incentive barriers that could be replicated in future programs.
6	Develop, implement, evaluate and disseminate effective, replicable models for reducing energy use by low-income households.	Effective, replicable models for reducing energy use by low-income households are implemented, evaluated and disseminated.

About the program participants

The program participants will be drawn from United Voice's membership. The geographical spread of program is Sydney, the Hunter and Illawarra Regions and UV has approximately 17,000 members in these areas.

UV represents workers in the hospitality, security, childcare, aged care and cleaning services occupations. These occupations are associated with irregular hours of work and low pay and many Member households are considered low-income, with household income in the two lowest quintiles. UV members also speak many languages other than English.

Participant recruitment

United Voice has a good and existing relationship with potential participants as well as knowledge of their members' attitudes, interests and the impacts of cost of living pressures on Member households. Participants will be recruited via mail, telephone or face-to-face conversations and will dovetail with other communications that United Voice already has planned for their membership.

About this evaluation plan

Evaluation is a systemic and objective review of the appropriateness, efficiency and/ or effectiveness of a program.

Definitions

Evaluation – attempts to explain why a particular outcome has occurred, how well a program or activity was undertaken, whether it was a good thing to do, and what should be done in the future in light of the evaluation findings.

Monitoring – addresses the valuation questions and describes what is occurring over the monitoring period. The information gathered may be a mix of qualitative and quantitative, generated from formal and informal collection processes.

Reporting – is the communication of the results and findings and facilitation of their use. Good reporting is essential to demonstrate accountability and inform adaptive management that improves methods of program delivery and the achievement of outcomes.

There are three types of Evaluation activities; each is described in further detail below.

Efficiency evaluation activities assess the inputs and processes used to produce the outputs of a program. The outcome of this type of evaluation identifies whether implementation is occurring appropriately, i.e. using the best available methods in priority locations with consideration of scale and recognising climatic and timing requirements.

Effectiveness evaluation examines the extent to which program objectives or desired outcomes have been achieved. It also establishes the factors that affect achievement and

the relationships between program implementation and measured outcomes. These evaluations are usually conducted when a program is well established, or concluding. Effectiveness evaluations can also be extended to examine cost effectiveness.

Appropriateness evaluation activities assist in deciding the need for, and nature of, a proposed new program. These activities typically take place in planning stages of a project, but are also highly relevant over the life of a longer-term program, particularly if the political, economic, environmental or social context changes.

Evaluation activities that determine the appropriateness, efficiency and/or effectiveness of the PSC are directly affected by social and organizational context. The following section contextualizes the PSC.

Context

This section identifies the main driving forces of context for the Power Savers Challenge.

Drivers of evaluation

External drivers

Requirements of the Commonwealth Government

The program is one of a number that are funded by the Commonwealth Government under the LIEEP. As such the Commonwealth have established monitoring and evaluation metrics that will enable the wider comparison and evaluation of all projects funded. The Commonwealth has set out a list of variables and variable descriptions to be used in the monitoring of all LIEEP programs. Annex A to this document includes the Data Collection and Reporting Plan with a table of these data variables that will be collected within the PSC, by whom and at what frequency, and details on the method of data and reporting.

Requirements of NCC in acquitting the funding agreement with Commonwealth

The collection and analysis of data by the consortium as outline in Annex A will provide the NCC (consortium leader) with the ability to acquit their reporting milestones within the funding agreement.

Internal drivers

Ability to learn and improve program over successive rounds

An internal driver for evaluation is the ability to learn and modify the program rollout through the pilot and four successive rounds of program delivery. The pilot phase will be a major learning opportunity; and as such a short report on the performance of the pilot will be delivered to the consortium members for consideration. This report will focus on program efficiency (i.e. the inputs and processes designed to achieve the program outputs) as it will not be possible to determine program effectiveness after such a short period. The Pilot Evaluation will also offer an opportunity to reflect on, and document the program context for appropriateness evaluation.

Record and demonstrate method for future use

As the program name highlights, Low Income Energy Efficiency *Pilot* Program a central element of LIEEP is the demonstration and evaluation of different techniques and approaches to providing energy efficiency activities to low-income households.

The PSC has two central hypotheses to test in the conduct of the program including:

1. Delivering energy efficiency activities embedded in an established trusted, peer group network (United Voice union to their members)
2. Delivering energy efficiency activities with promotional and educational materials designed and developed by “Champions” – United Voice members who have been trained to develop educational (storytelling materials) for distribution to other participants.

In addition, the PSC will also target ~~to~~ participant populations that have been under-represented in previous public policy energy efficiency programs. These populations are:

- Working people; earning income in the bottom two household income quintiles. Previous publicly funded energy efficiency programs have targeted program eligibility around Government payment concession cards.
- Renters; the program develops material and activities either specifically designed for, or applicable to, households in rented accommodation. Previous publicly funded Government energy efficiency programs have, due to ease, focused activities with infrastructure components (i.e. installation of equipment) on owner-occupier dwellings.

In order to test these two hypotheses and communicate the impacts of this program design, on previously under-represented household participants, two evaluation reports (mid-point and final evaluation reports) will be produced. In each of these reports the efficiency, effectiveness and appropriateness of the program design and activities will be assessed and reported. The data collection and analysis to support this evaluation will be consistent with the Commonwealth Data Guidelines as elaborated in the Data Collection and Reporting Plan in Annex A.

Electricity sector context

Rising electricity prices

Electricity prices have risen rapidly in recent years. Electricity bills for NSW households (where the Power Savers Program is located) have increased by more than 70% over the past five years¹.

As shown in Figure 1 the main drivers of the electricity bill increases have been electricity network charges; these are the fixed costs that pay for the poles and wires that distribute electricity to our homes and businesses. These network costs have doubled over the current distribution network determination period, and now make up 52% of the average residential electricity bill.²

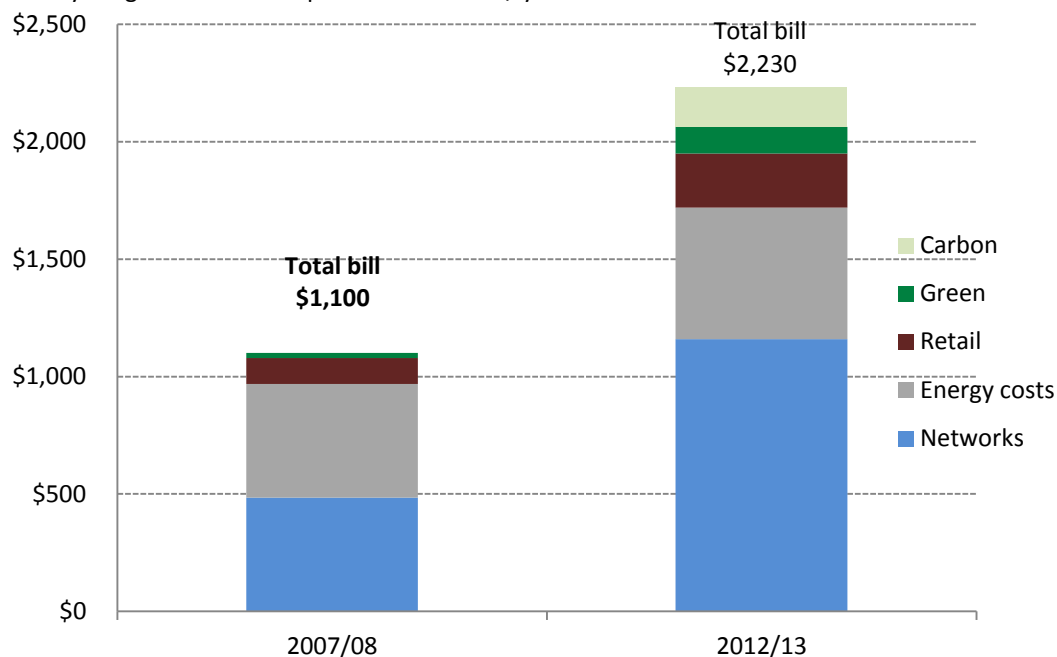
¹ Analysis of IPART Retail Electricity determinations 2008-09 – 2012/13

² DRET factsheet (2012) *Electricity Prices* <http://www.ret.gov.au/Department/Documents/clean-energy-future/ELECTRICITY-PRICES-FACTSHEET.pdf>, accessed 27th November 2012.

The rapid increase in electricity bills has a regressive impact – in that they affect households on lower incomes more than on higher incomes. The NSW Independent Pricing and Regulatory Tribunal (IPART) conducted research as part of their electricity pricing determination process on the impact of electricity price rises on households of different income levels. Households in the lowest quartile can pay up to 10% of their income in electricity costs compared with households in the top quartile who pay on average 2-4%³.

Figure 1 Electricity bill increases in NSW 2007/08 to 2012/13

This chart shows the average residential electricity bill for a household on a regulated electricity tariff in 2007/08 compared with the same bill for 2012/13. The composition of the bill is also displayed. The average electricity usage for both time periods was 7kWh/ year.



Source: IPART.

Government policy as part of the Carbon tax package

The LIEEP program is part of the Commonwealth Government's household assistance package aligned with the introduction of the Carbon Pricing Mechanism. There have been a number of previous energy efficiency programs targeting low-income households both at the Commonwealth and State level. These programs have had various levels of success in terms of energy saving, delivery of equipment and activities to households, education, and engagement with community and non-government organisations.

These programs are also in addition to activities taking place at the impetus of individual households to get control of electricity prices, electricity retailer activities around customer retention and fulfilling energy efficiency obligations, such as the Energy

³ IPART (2011) Changes in regulated electricity retail prices from 1 July 2011, Sydney: IPART

Efficiency Scheme in NSW⁴. The LIEEP programs, including the PSC are entering into a crowded market place, and previous programs have had mixed levels of success⁵. Both of which can diminish households' willingness to participate in the program.

Wider socio-technical changes

The PSC is also occurring at a time of increasing accessibility of energy efficient technologies such as standby power kits, reverse cycle air conditioners with phasing, LED lighting and variable speed pumps. The increasing availability of 'smart' energy monitoring devices and displays are allowing households to have real time information on their energy use, and (with variable tariffs) make decisions about their energy use in a way that affects their electricity bill. There has also been greater adoption of existing and well-known energy efficiency actions such as building insulation and double-glazing options for windows.

This market transformation has been driven by multiple factors including:

- Regulatory activity to increase minimum performance standards;
- Government policy and subsidies to support the adoption of equipment;
- Regulatory activity to enhance consumers access to and understanding of electricity bills and their composition;
- Consumer awareness of energy use and options and ability to share information (i.e. through forums such as Whirlpool, ATA forums, Energy Matters Forums).

In recent years there have been rapid electricity bill increases, and this has driven further action by both government (at all levels) and consumer and charity groups to provide information campaigns on energy efficiency to households.

Household electricity usage is also being driven by other macro-level trends including the increasing proliferation of consumer electronics including personal communications devices (smart phone and tablets), computing equipment (computers and laptops) and the increasing size and capability of display technology (televisions, screens and advertising boards). In Australia, the recent period of sustained currency appreciation has made many of these consumer electronic items much cheaper in real terms. This is positive in that it has made new energy efficiency equipment less expensive, but this impact has been more than outweighed by the overall increase in electrical items that are now present in most homes.

United Voice members' specific context

We would like to include here some specific context to the United Voice membership, as per the recent member survey. Specifically include analysis on

- Impacts of cost of living pressures
- Impacts on workplace situation, i.e. less secure work environment

⁴ The Energy Efficiency Scheme (EES) is a portfolio standard obligation placed on electricity retailers in NSW to meet annual energy efficiency target. The scheme runs through a secondary market with certificate trading. Scheme costs are covered through a levy on electricity customers, although the long-term costs of the scheme are outweighed by the benefits of avoiding electricity generation and infrastructure spending. The Scheme is administered by IPART. For further information see http://www.ess.nsw.gov.au/How_the_scheme_works

⁵ See the accompanying ISF research report for further details on other publicly funded energy efficiency activities in Australia.

Stakeholders

In addition to the context, stakeholders are another element that significantly impacts the evaluation activities. Stakeholders are the people and organisations that have a ‘stake’ in the performance of the Power Savers program. Stakeholders are both internal (within the consortium) and external. The main stakeholders for the Power Savers Program are listed below:

Internal

- Nature Conservation Council
- United Voice
- Solar Hart
- ISF

External

- Participants
- Commonwealth Government
- Energy Efficiency Policy Community
- Consumer and advocacy groups
- Other Unions

Each stakeholder will have different needs and audiences from and for the program monitoring and evaluation. The Evaluation Plan will need to be aware of, and designed in a way to meet these needs for each of the stakeholders. The below table summarizes the identified needs and uses of the evaluation for the above identified stakeholders.

Table 1: Stakeholder Evaluation needs and uses

Stakeholders	Who will use the findings?	How will they use the findings?	When and how will they want the findings?	Who will be affected by the findings and how?	Who will implement recommendations?
NCC	NCC Staff and Executive	Future Program design, development of similar programs.	At established points throughout the program (Milestone Reporting schedules)	Future programs seeking information on conducting energy efficiency programs with Low Income Households.	NCC Staff
United Voice	TBC upon employment of United Voice Program Officer	TBC	TBC	TBC	TBC
Solahart	Solahart Management Team	Future product development ongoing R&D	At the conclusion of the program, in a written format supported by data	Future customers	Solahart Management Team
ISF, UTS	• Researchers	• Evidence of effective energy efficiency program activities, • Testing and verification of evaluation methods	• At the conclusion of the program, in a written format supported by data	• Energy efficiency research and policy community – through verification of program design for effectiveness and appropriateness. • Evaluation and analysis research community on the testing and reporting of evaluation methods.	• Policy makers and program designers. • Evaluation experts and researchers in subsequent evaluations.
Participants	• Participating households • Friends and family of participating households	• To adjust how they use electricity in their homes • How they talk about electricity and electricity use at work and home	• Frequently to assess the effectiveness of their activities	• Participants • Friends and family of participants • LIEEP consortium	• LIEEP consortium • Future program managers
DRET, Commonwealth Government	• Department Officials • Policy Makers	• Policy design and implementations,	• Progress reporting to the DRET to acquit	• DRET – future program activity could be	• DRET • Energy Efficiency

	Ministers	- Template for future low-income household targeted activities. - Evidence of success (or otherwise) for constituents	responsibilities as per the funding agreement in the format prescribed by DRET - Final evaluation results again in a format prescribed by the DRET - Qualitative evidence from participants (likely in the format of stories) for media opportunities	informed by the evaluation findings Low-income households – if program activity changed as a result	Program operators Households
Energy Efficiency Policy Community	- Policy makers - Program design and implementation organisations	- Evidence of effective energy efficiency program activities - Template for future activities	Final evaluation reports, and associated publications	Current energy efficiency programs – depending whether it reflects positively or negatively could be used in future design, or subject to closer scrutiny.	Policy and program makers
Consumer and Advocacy Groups	- Staff in these groups - Stakeholders of these groups	- Future program design - Lobbying for (better) program design and activities from Government	Final evaluation reports, and associated publications	- Constituent communities and organisations. - Households and consumers	Policy and program makers
Other Unions	- Staff within Union - Delegates and members	For future program design	- Final evaluation reports, and associated publications - Related communications and messaging materials	Households and members who participate in future program activities	Other union staff in similar programs for their membership

Program Outcomes logic

The ultimate aim of evaluation activities is to find out if something changed and whether this was the result of the intervention as planned, or some other factor. Therefore in order to evaluate we must first define the outcomes the program is seeking to achieve (i.e. the thing we want to change). Then identify how the inputs into the program will translate into program outputs, and ultimately contribute to program outcomes.

The linkages between inputs, outputs and outcomes are assessed through success criteria, and performance against each of these success criteria is assessed through measurable variables. Program Outcomes Logic provides description on how this process occurs. The Program Outcomes logic for the Powers Savers program is presented in Table 2.

Table 2: Power Savers Program Outcomes logic

Results hierarchy	Outcome or planned results	Success factors	Performance measures ⁶	Basis for comparison	Assumptions and/or comments
High-level outcomes	1. Participants have increased sense of control over their electricity use and electricity bills. 2. Participants have persistent reductions in their electricity use 3. Increased electricity literacy among participants 4. Reduced electricity use in participants households, with significant reductions achieved for households receiving hot water systems	- Achieving deep engagement with participants - Clear messaging and appropriate kits for households to achieve energy savings - Challenge efficiently managed to meet targets with available fund	1.1 Self assessment based on pre and post program questionnaire 1.2 Livelihoods workshops pre and post program with identified Champions groups 3.1 Self assessment based on pre and post program questionnaire 4.1 Billing data analysis of electricity consumption pre and post intervention, and against control group	1.1 Compared with control group questionnaires 1.2 Post program results compared with pre-program results. 1.3 Compared with control group questionnaires 1.4 Compared with control group electricity use, and where available pre-intervention data	- Participants want to save energy - Participants may take energy savings as increased consumption, but have an awareness of this. - Participants value engagement and want to participate - Participants see their Union as a trusted adviser - Participants will use the energy efficiency kits and advice - Control group and/or previous energy use data is adequate to forecast future 'without intervention' energy use.
Intermediate outcomes					
Outputs	- Participants - Home visits of energy efficiency audits and installation of kits - Installation of solar hot water systems - Champion-created communications materials for the project		- Reaching recruitment targets - Program roll out on schedule - Energy efficiency kits and audits delivered - Hot water systems are negotiated and installed	- Progress against project plan - Project objectives and costs meet within funding envelope	
Inputs	- People - Communications materials - Energy Efficiency kits - Solar hot water systems - Project systems		- Recruitment of project staff - Tender completed for EE audits and kits - Project systems including record keeping, participant management systems etc created and implemented	- Progress against project plan - Project objectives and costs meet within funding envelope	

⁶ See Annex A for detailed list of variables that will be used to measure performance

Reporting and Communications

There will be three reporting outputs of the LIEEP Power Savers Challenge Evaluation Framework. The first will be a short report evaluating the efficiency of program design and processes during the pilot phase of the program. This is with the specific objective of making any final amendments to program design and processes prior to the start of Round 1 of the program.

Two further, and more extensive evaluation reports will be drafted. The first, the Mid-point Evaluation Report will be drafted once 12 months of post-intervention electricity use data is available from Rounds 1 and 2. The Final Evaluation Report will be drafted at the conclusion of the program and to meet the Commonwealth Government's reporting deadline in March 2016.

Each of the evaluation reports are described in further detail following.

1. Pilot phase evaluation report

Short report to the consortium on results from evaluation elements from the pilot phase including:

- Analysis of results of the pre and post program 'livelihoods' workshop with selected pilot participants;
- Analysis of the pre and post questionnaire and data collection;
- Recommendations for amendments to program design for the full roll out.

2. Mid-point evaluation report

The Mid-point Evaluation Report includes evaluation of the Challenge Rounds 1 and 2, including analysis of the pre and post questionnaire completed by participants and the control group and billing data analysis from the participant and control group. Rounds 1 and 2 include 500 program participants and 500-control group. The evaluation report will examine the effectiveness of the program to date (energy savings and an estimate for cost-effectiveness) and efficiency (outputs versus inputs).

3. Final Evaluation Report

The Final Evaluation Report covers evaluation of the entire project and will draw on the previous two reports. The Final Report will be prepared according to DCCEE's requirements⁷ and include analysis of pre and post questionnaire and billing data on the Challenge Rounds 3 and 4, presentation of cumulative analysis from all rounds, and commentary on program learnings across the multiple cohorts (pilot, Rounds 1,2, 3,4). The report will cover effectiveness of the whole program (including cost effectiveness estimates), efficiency evaluation and comments of appropriateness of intervention with reference to background research report.

⁷ As defined in the LIEEP Funding agreement

Annex A Data Collection and Reporting Plan⁸

Abbreviations reference

NCC = Nature Conservation Council

UV = United Voice

ISF = Institute for Sustainable Futures

Trial characteristics

#	Field name	Field description	Field values (where applicable)	Responsible for data collection and when?	Responsible for data analysis and how?
1.	Participant	Unique identifier for each participants	HH001-HH999	UV/ NCC At recruitment	UV/ NCC Counts, reported quarterly, or as required.
2.	Trial approach	Project approach /engagement method	Home visits Door knocking Previous contact Referral from other agency Other	NCC Program design	NCC Project plan, we are not varying the engagement method so this will be done once at the start.
3.	Barriers being addressed by trail	List the types of energy efficiency barriers being addressed by the project	Information Education Split incentive Financial Other	NCC Program design	NCC Project plan, we are not varying the targeted barriers so this will be done once at the start.
4.	Energy Efficiency Measure/Service	Type of measures or service undertaken:	Home Energy Assessment /Audit In-Home Display Education/Information /Workshop Other	NCC Program design	NCC Counts, records of services provided by energy assessors
5.	Date of Measure/Service	Date on which the service was completed.	01/01/2012 – 31/12/2016	NCC Program coordination	NCC Quarterly, or as required

⁸ These variables correspond to the Commonwealth Government LIEEP Data Collection items (Annexure C to Funding Agreement)

6.	Cost of service	The cost of service per household.	\$0-\$99,999 Product Installation	NCC/ Home Assessor/ Solarhart (as required) Program design	NCC Project plan, we are tendering for products up to a fixed price
7.	Anticipated saving of Measure/Service (per year)	The anticipated savings in dollars per year terms of the implemented Measure/Service.	\$0-\$99,999 \$ range may be required.	NCC/ Home Assessor/ Solarhart (as required) Program design	NCC Program design/ Home Assessor tender documents
8.	Compliance indicator	Conducted in the approved format/process by qualified/trained personnel.	Yes No	Home Assessor (NCC) / Solarhart (as required) Program design	NCC/ Solarhart Program design/ Home Assessor tender documents
9.	Item being replaced	Type of item being replaced, energy usage, etc	Item Type ~~Energy use~~	Home Assessor (NCC) Data collected at home assessment	Home Assessor (NCC) Counts, reported as required

Household characteristics

#	Field name	Field description	Field values (where applicable)	Responsible for data collection and when?	Responsible for data analysis and how?
10	Gender of people in household	Gender of participant	Female, Male.	NCC/ UV On recruitment	NCC Counts, as required
11	Number and age of people in household	Total number of individuals living in the household with the age of each individual	1-99 0-4 years 5-9 years 10-14 years 15-19 years 20-24 years 25-29 years 30-34 years 35-39 years 40-44 years 45-49 years 50-54 years 55-59 years 60-64 years 65-69 years 70-74 years 75-79 years 80-84 years 85 years and over	Home Assessor (NCC) Collected at home assessment	NCC/ ISF Counts, reported as required (NCC) Will also be used in program evaluation analysis in mid and final reports as a explanatory characteristic (ISF)

#	Field name	Field description	Field values (where applicable)	Responsible for data collection and when?	Responsible for data analysis and how?
12	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 Not provided Not known	Not collected	Not collected
13	Indigenous indicator	Are any individuals Indigenous or Torres strait islander	Non-Indigenous Aboriginal Torres Strait Islander Both Aboriginal and Torres Strait Islander Not provided	Home Assessor (NCC) Collected at home assessment	NCC/ ISF Counts, reported as required (NCC) Will also be used in program evaluation analysis in mid and final reports as a explanatory characteristic (ISF)
14	Birthplace Indicator	Were the individuals born in Australia or Overseas?	Born In Australia Born Overseas Overseas place of birth	Home Assessor Collected at home assessment	NCC/ ISF Counts, reported as required (NCC) Will also be used in program evaluation analysis in mid and final reports as a explanatory characteristic (ISF)
15	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	UV/ NCC On recruitment	NCC/ ISF Counts, reported as required (NCC) Will also be used in program evaluation analysis in mid and final reports as a explanatory characteristic (ISF)

#	Field name	Field description	Field values (where applicable)	Responsible for data collection and when?	Responsible for data analysis and how?
16	Main source of household income What was your predominant employment status for the last 12 months?	Identify the main source of household income, e.g. pension/benefits, full time employment, part-time employment. Employment status indicator	Worked full-time Worked part-time Away from work Unemployed	UV/ NCC On recruitment	NCC/ ISF Counts, reported as required (NCC) Will also be used in program evaluation analysis in mid and final reports as a explanatory characteristic (ISF)
17	Income level of household (Annual)	Approximate level of annual household income	Negative income Nil income Partial income stated All incomes not stated \$0-\$10,000 \$10,001-\$20,000 \$20,001-\$35,000 \$35,001-\$50,000 \$50,001-\$65,000 \$65,001-\$80,000 \$80,000- \$110,000 \$110,001 - more	Not collected	Not collected

#	Field name	Field description	Field values (where applicable)	Responsible for data collection and when?	Responsible for data analysis and how?
18	Target group of household		Low Income Household Senior Renters Indigenous CALD Financial hardship Refugees Single parents Other	NCC/ UV On recruitment	NCC/ISF Counts, reported as required (NCC) Will also be used in program evaluation analysis in mid and final reports as a explanatory characteristic (ISF)
19	Past behaviour	Previous energy efficiency activities undertaken by the participant/household. If yes, specific activities should be recorded.	Insert behaviour actions Turn lights off when not required More efficient use of hot water eg. shorter showers Effective use of curtains and blinds Turn appliances off at power point when not in use Take into account energy efficiency rating when purchasing appliances Set appropriate temperatures for heating/cooling Other	Home Assessor (NCC) Collected at home assessment	NCC/ ISF Counts, reported as required (NCC) Will also be used in program evaluation analysis in mid and final reports as a explanatory characteristic (ISF)
20	Level of energy efficiency interest	Gauges the participant's level of interest in energy efficiency. How interested are you, in conserving energy in the home?	Very interested Interested Neutral Not interested	Home Assessor (NCC) Collected at home assessment Also data collection on engagement within program (i.e. participation in events etc.)	NCC/ ISF Counts, reported as required (NCC) Will also be used in program evaluation analysis in mid and final reports as a explanatory characteristic (ISF)

#	Field name	Field description	Field values (where applicable)	Responsible for data collection and when?	Responsible for data analysis and how?
21	Household comfort status	How comfortable do the householders feel? (heating/cooling/lighting/etc)	Comfortable Sometimes comfortable Not comfortable	Home Assessor (NCC) Collected at home assessment	NCC/ ISF Counts, reported as required (NCC) Will also be used in program evaluation analysis in mid and final reports as a explanatory characteristic (ISF)
22	Empowerment status	How empowered do the householders feel in relation their energy consumption ?	Empowered Sometimes comfortable Not empowered	Home Assessor (NCC) Collected at home assessment, through questionnaire The ISF lead Livelihoods workshops will provide more nuanced qualitative data in response to this variable	NCC, ISF Counts, reported as required (NCC) Will also be used in program evaluation analysis in mid and final reports as a explanatory characteristic (ISF) Report on Livelihoods workshop as part of pilot evaluation
23	Finance control status	How in control of their finances do the householders feel ?	In control Sometimes in control Not in control	Not collected	Not collected
24	Behaviour change status	How much has the householder's behaviours changed over the last 2 years ?	More energy efficient Same level of energy efficiency Less energy efficient	Home Assessor (NCC) Collected at home assessment	NCC/ ISF Counts, reported as required (NCC) Will also be used in program evaluation analysis in mid and final reports as a explanatory characteristic (ISF)

Dwelling characteristics

#	Field name	Field description	Field values (where applicable)	Responsible for data collection and when?	Responsible for data analysis and how
25	State	The state/territory in which the project is taking place	List states and territories	Not collected – all NSW	Not collected all NSW
26	Climate zone	The climate zone in which the project is taking place, based on temperature and humidity (BOM 2003)		ISF Post-recruitment	NCC/ ISF Counts, reported as required (NCC) Will also be used in program evaluation analysis in mid and final reports as a explanatory characteristic (ISF)
27	Postcode	Postcode of the household.	0000-9999	NCC/ UV Pre-recruitment	NCC As required
28	Dwelling status	Whether the home is owned outright, mortgaged, property is rented or occupied without payment	Owned outright Mortgaged Rental property	Home Assessor (NCC) Collected at home assessment	NCC/ ISF Counts, reported as required (NCC) Will also be used in program evaluation analysis in mid and final reports as a explanatory characteristic (ISF)

#	Field name	Field description	Field values (where applicable)	Responsible for data collection and when?	Responsible for data analysis and how
29	Dwelling Structure	Type/structure of dwelling.	Separate house Semi-detached, row or terrace house, townhouse etc Flat, unit or apartment Other dwelling	Home Assessor (NCC) Collected at home assessment	NCC/ ISF Counts, reported as required (NCC) Will also be used in program evaluation analysis in mid and final reports as a explanatory characteristic (ISF)
30	Age of dwelling	The year the household was built.	1900-2012	Home Assessor (NCC) Collected at home assessment if possible	NCC/ ISF Counts, reported as required (NCC) Will also be used in program evaluation analysis in mid and final reports as a explanatory characteristic (ISF)
31	Wall construction	Major outside wall material	Fibro Brick Double Brick Timber Weatherboard Mixture	Home Assessor (NCC) Collected at home assessment	NCC/ ISF Counts, reported as required (NCC) Will also be used in program evaluation analysis in mid and final reports as a explanatory characteristic (ISF)

#	Field name	Field description	Field values (where applicable)	Responsible for data collection and when?	Responsible for data analysis and how
32	Roofing construction	Major roofing material	Metal Tiles Timber Concrete Mixed Roof colour – Light/Intermediate/Dark Other	Home Assessor (NCC) Collected at home assessment	NCC/ ISF Counts, reported as required (NCC) Will also be used in program evaluation analysis in mid and final reports as a explanatory characteristic (ISF)
33	Number of stories	Number of stories in dwelling	1-99	Home Assessor (NCC) Collected at home assessment	NCC/ ISF Counts, reported as required (NCC) Will also be used in program evaluation analysis in mid and final reports as a explanatory characteristic (ISF)
34	Number of bedrooms	Total number of bedrooms	1-19	Home Assessor (NCC) Collected at home assessment	NCC/ ISF Counts, reported as required (NCC) Will also be used in program evaluation analysis in mid and final reports as a explanatory characteristic (ISF)

#	Field name	Field description	Field values (where applicable)	Responsible for data collection and when?	Responsible for data analysis and how
35	Number of bathrooms	Total number of bathrooms	1-9	Home Assessor (NCC) Collected at home assessment	NCC/ ISF Counts, reported as required (NCC) Will also be used in program evaluation analysis in mid and final reports as a explanatory characteristic (ISF)
36	Number of living rooms	Total number of living rooms	1-9	Home Assessor (NCC) Collected at home assessment	NCC/ ISF Counts, reported as required (NCC) Will also be used in program evaluation analysis in mid and final reports as a explanatory characteristic (ISF)
37	Size m2	Total area of the household in m2 (excludes garage and outdoor areas)	1-999m2	Not collected	Not collected
38	Nationwide House Energy Rating Scheme (NatHERS) star rating or equivalent	NatHERS star rating of the household	1-10	Not collected	Not collected

#	Field name	Field description	Field values (where applicable)	Responsible for data collection and when?	Responsible for data analysis and how
39	Insulation	Indicates if the house is the house insulated e.g. none, ceiling or wall and ceiling. Also indicates type of insulation e.g. foil, etc	None Ceiling Wall Floor Type and Rating – Foil Wool Glass Other	Home Assessor (NCC) Collected at home assessment if possible	NCC/ ISF Counts, reported as required (NCC) Will also be used in program evaluation analysis in mid and final reports as a explanatory characteristic (ISF)
40	Window type	Type of glass in most windows	Single glaze Double glaze Tinted Other	Home Assessor (NCC) Collected at home assessment if possible	NCC/ ISF Counts, reported as required (NCC) Will also be used in program evaluation analysis in mid and final reports as a explanatory characteristic (ISF)
41	Window coverings	Type of window coverings on most windows	Blinds Curtains Type Backing Other	Home Assessor (NCC) Collected at home assessment	NCC/ ISF Counts, reported as required (NCC) Will also be used in program evaluation analysis in mid and final reports as a explanatory characteristic (ISF)
42	Smart Meter	Household has a Smart meter installed	Number of Smart Meters Attached to Mains/Off Peak/Solar PV Brand/model NMI Number	Not collected	Not collected

#	Field name	Field description	Field values (where applicable)	Responsible for data collection and when?	Responsible for data analysis and how
43	PV	Household has a PV installed	Yes/No Size (Kw)	Home Assessor (NCC) Collected at home assessment if possible	NCC/ ISF Counts, reported as required (NCC) Will also be used in program evaluation analysis in mid and final reports as a explanatory characteristic (ISF)
44	Modifications made to dwelling in last 12 months	Any changes or modifications made to dwelling in last 12 months.	Renovation Extension Installation of energy efficiency ... Upgrade to energy efficiency ... Installing new hot water system Identify type (solar, gas, heat pump, electric, lpg) Installing solar electricity (PV panels) Installing insulation Window treatments Replaced space heating or cooling equipment Replaced major whitegoods with new energy efficient models Draught proofing Double glazing Installed ceiling fans Added Pergola or external shading Changes to lighting systems (replaced all lights) Major renovation to improve energy efficiency design of dwelling Unable to (tenant) Other	Home Assessor (NCC) Collected at home assessment if possible	NCC/ ISF Counts, reported as required (NCC) Will also be used in program evaluation analysis in mid and final reports as a explanatory characteristic (ISF)

Energy characteristics

#	Field name	Field description	Field values (where applicable)	Responsible for data collection and when?	Responsible for data analysis and how
45	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)	Home Assessor (NCC) Collected at home assessment	NCC/ ISF Counts, reported as required (NCC) Will also be used in program evaluation analysis in mid and final reports as a explanatory characteristic (ISF)
46	Tariff type		Flat rate Time of use Net of PV Direct Load control Cents per hour Other	ISF (via electricity distributors) Collected at pre home assessment if possible	ISF Counts, reported as required Will also be used in program evaluation analysis in mid and final reports as a explanatory characteristic (ISF)
47	Heating	Type of space heating	Ducted gas Reverse-cycle air cond (heat pump) system Wall-mounted gas Wall-mounted electric Portable electric Portable gas Other – please specify	Home Assessor (NCC) Collected at home assessment if possible	NCC/ ISF Counts, reported as required (NCC) Will also be used in program evaluation analysis in mid and final reports as a explanatory characteristic (ISF)

#	Field name	Field description	Field values (where applicable)	Responsible for data collection and when?	Responsible for data analysis and how
48	Cooling	Type of space cooling	Reverse-cycle air cond (heat pump) system Evaporative cooler Wall/Window mounted air conditioner. Portable air-cond Ceiling fan Portable fan Other – please specify	Home Assessor (NCC) Collected at home assessment if possible	NCC/ ISF Counts, reported as required (NCC) Will also be used in program evaluation analysis in mid and final reports as a explanatory characteristic (ISF)
49	Water heating	Main method/fuel used for watering heating	Electric Gas Solar – gas boosted Solar – electric boosted Heat pump	Home Assessor (NCC) Collected at home assessment if possible	NCC/ ISF Counts, reported as required (NCC) Will also be used in program evaluation analysis in mid and final reports as a explanatory characteristic (ISF)
50	Lighting	Number and type of light globe used in household	Compact fluorescent lamps Halogen lights Light emitting diode (LED) Incandescent (GLS) Other globe (specify) Number in household	Home Assessor (NCC) Collected at home assessment if possible	NCC/ ISF Counts, reported as required (NCC) Will also be used in program evaluation analysis in mid and final reports as a explanatory characteristic (ISF)

#	Field name	Field description	Field values (where applicable)	Responsible for data collection and when?	Responsible for data analysis and how
51	Refrigeration	Type of refrigeration	Combined fridge/freezer Separate fridge Separate freezer Other (e.g. mini bar, wine/beer cooler, wine cabinets) Number and age in household	Home Assessor (NCC) Collected at home assessment if possible	NCC/ ISF Counts, reported as required (NCC) Will also be used in program evaluation analysis in mid and final reports as a explanatory characteristic (ISF)
52	Cooking - oven, stove, microwave	Type and method/fuel used for cooking eg. oven, stove, microwave	Electric Induction Gas Wood	Home Assessor (NCC) Collected at home assessment if possible	NCC/ ISF Counts, reported as required (NCC) Will also be used in program evaluation analysis in mid and final reports as a explanatory characteristic (ISF)
53	Computers	Number and type	Desktop Laptop Tablet Time used (hrs) Number in household	Home Assessor (NCC) Collected at home assessment if possible	NCC/ ISF Counts, reported as required (NCC) Will also be used in program evaluation analysis in mid and final reports as a explanatory characteristic (ISF)

#	Field name	Field description	Field values (where applicable)	Responsible for data collection and when?	Responsible for data analysis and how
54	Home entertainment appliances	Number and type of	TVs DVD players/recorders Games consoles Set top boxes VCRs Audio equipment - Sound systems Number in household & Time used (hrs)	Home Assessor (NCC) Collected at home assessment if possible	NCC, ISF Counts, reported as required (NCC) Will also be used in program evaluation analysis in mid and final reports as a explanatory characteristic (ISF)
55	Laundry appliances	Number and type	Front loader Top loader Dryer Washer/Dryer combo Number in household & Time used (hrs)	Home Assessor (NCC) Collected at home assessment if possible	NCC/ ISF Counts, reported as required (NCC) Will also be used in program evaluation analysis in mid and final reports as a explanatory characteristic (ISF)
56	Pool/Spa pumps	Number and type of pool or spa pumps	Pool pump Spa pump Other pump Time used (hrs) Size and time in use.	Home Assessor (NCC) Collected at home assessment if possible	NCC/ ISF Counts, reported as required (NCC) Will also be used in program evaluation analysis in mid and final reports as a explanatory characteristic (ISF)

#	Field name	Field description	Field values (where applicable)	Responsible for data collection and when?	Responsible for data analysis and how
57	Other appliances	Number and Type of Other appliances	Number in household & Time used (hrs)	Home Assessor (NCC) Collected at home assessment if possible	NCC/ ISF Counts, reported as required (NCC) Will also be used in program evaluation analysis in mid and final reports as a explanatory characteristic (ISF)
58	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	ISF Accessed by negotiation with energy distributors	ISF Billing data analysis
59	Post EE measure energy usage	Period/Quarterly energy usage in kWh for the period post the EE measure	NEM 12 data - Interval energy usage in kWh NEM 13 data - Accumulation energy usage in kWh	ISF Accessed by negotiation with energy distributors	ISF Billing data analysis



Summary Results of Livelihood Workshop 1 of the Power Savers Program - DRAFT

For the Nature Conservation Council (NSW) and the Low
Income Energy Efficiency Program (LIEEP) Power Savers
Consortium



AUTHORS

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About the Livelihoods Workshop Method

Assessing householder's perceptions about their capacity for change provides an understanding of the values, interests and priorities with respect to home energy efficiency. It also reveals the capacity of these stakeholders to adopt more energy efficient practices in the home and to understand capacity-building priorities.

The sustainable livelihoods analysis (Ellis 2000)¹ provides a framework for understanding capacity. The framework was initially developed to assess the capacity of natural resource managers to implement new practices in land management, but has since been used by numerous circumstances to assess individual and community capacity to change². This is the first time the method has been used to understanding household capacity in relation to the adoption of energy efficient behaviour in the home.

The framework aims not to present a model of reality but to help stakeholders, with their different perspectives, engage in structured and coherent debate of the many factors affecting livelihoods, their relative importance, and the way in which they interact. The approach developed to assess capacity is based on the sustainable livelihoods framework and uses the five capitals as a basis for discussion and assessment (see Table 1).

Table 1 Description of the Five Capitals

Capital	Description
Human	Skills, health and education that contribute to the capacity to manage energy use in the home
Social	Family and community support available, and the networks through which ideas and opportunities for energy efficiency are accessed
Natural	Effect of the natural environment on the need and options available for household energy efficiency
Physical	Infrastructure to provide reliable electricity to the home and equipment that uses electricity in the home
Financial	The level, variability and sources of income and access to other financial resources such as credit and savings, that are available to support efficient use of energy in the home

Both the amount of each capital and the balance among capitals are important in building a livelihood. Assessing capacity allows understanding of:

- what enables and constrains low income householders participation in managing their energy use
- how and why low income householder capacity may vary across demographics
- the links between broader policy and institutional issues and day-to-day decision-making by low income householders

¹ Ellis, F. (2000). *Rural Livelihoods and Diversity in Developing Countries*. Oxford University Press: Oxford, UK.

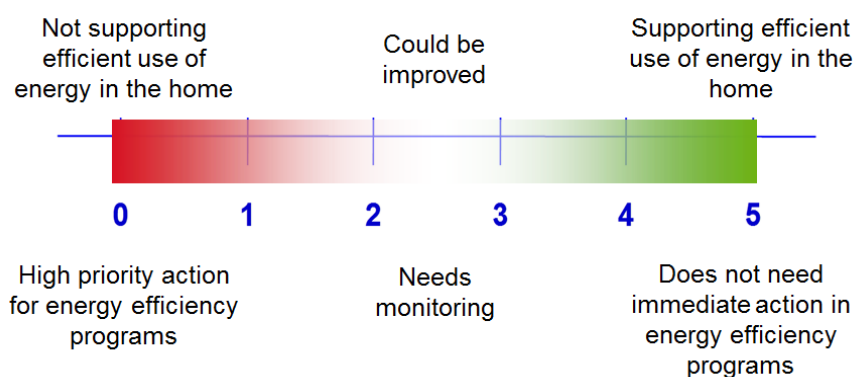
² The method has been used extensively in climate change adaptation assessment; see State of NSW, Office of Environment and Heritage (2013). *Guide to Integrated Regional Vulnerability Assessment (IRVA) for Climate Change*, OEH, Sydney

- how these enabling and constraining factors may affect the results of investment in energy efficiency by government and other organisations
- how to build this knowledge into the development of future energy efficiency policy

In the workshop, low income householders are brought together to work through a 'self-assessment' process based on the five capitals. The workshop is a monitoring and evaluation process that enables reporting on householder capacity. The workshop asks participants to:

- identify indicators relevant to each capital
- rate the degree to which the indicator enables or constrains household energy efficiency using a 0-5 scale (see figure 1 for a description of what the 0-5 scale means).

Figure 1 - Scale used by participants to provide a relative ranking of the degree of support or constraint provided by each indicator to effective energy efficiency in the home



The results of the discussion are recorded as the workshop proceeds by using a specially designed template, including a spider-web plot, which enables the results to be displayed at the conclusion of the workshop. During the workshop, participants can, through the use of personal response system (PRS), vote on a topic anonymously and gauge the group's opinions on particular topics or questions in real time.

About the Power Saver Program – Livelihoods Workshop 1 (Western Sydney)

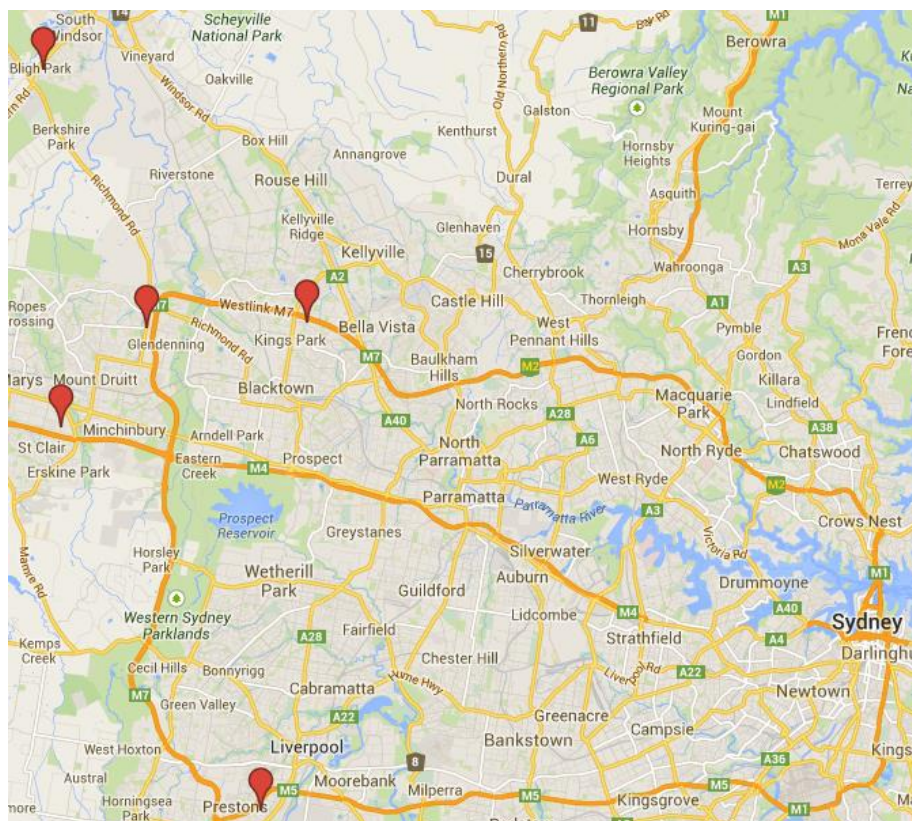
This workshop report provides a summary of the results of the first livelihoods workshop conducted with Power Saver program members. The workshop will be repeated with the same group of members in 12 months' time to detect changes, and the characteristics of changes in self-perceived capacity of program participants. By repeating the workshop with the same (or similar) groups following the energy efficiency activities and solar hot water system installations, the self-assessment process can be used to monitor change in householder capacity and in particular using the indicators and enabling/constraining ratings as a qualitative measure of capacity.

In February 2014 the Power Savers livelihood workshop was conducted at Parramatta with 5 participants representing residents who qualify under the Australian Department of Industry

(DOI) Low Income Energy Efficiency Program's (LIEEP) eligibility criteria as a 'low income household'. Participants had signed up to Round 1 of the Power Savers program being delivered under the LIEEP grants by the Nature Conservation Council, United Voice and the Institute for Sustainable Futures University of Technology, Sydney.

The participants were recruited through United Voice's membership base, and all were homeowners across a range of locations and occupations, as illustrated in Figure 2.

Figure 2 – Power Savers livelihood workshop participant locations and occupations



#	Occupation	Dwelling type	Suburb
1	Cleaner	Duplex	Bligh Park
2	Early Childhood Education and Care	House	Kings Langley
3	Cleaner	House	Colyton
4	Homecare worker	House	Casula
5	Hotel Worker	House	Oakhurst

Workshop Results

Assessing household capacity for energy efficiency

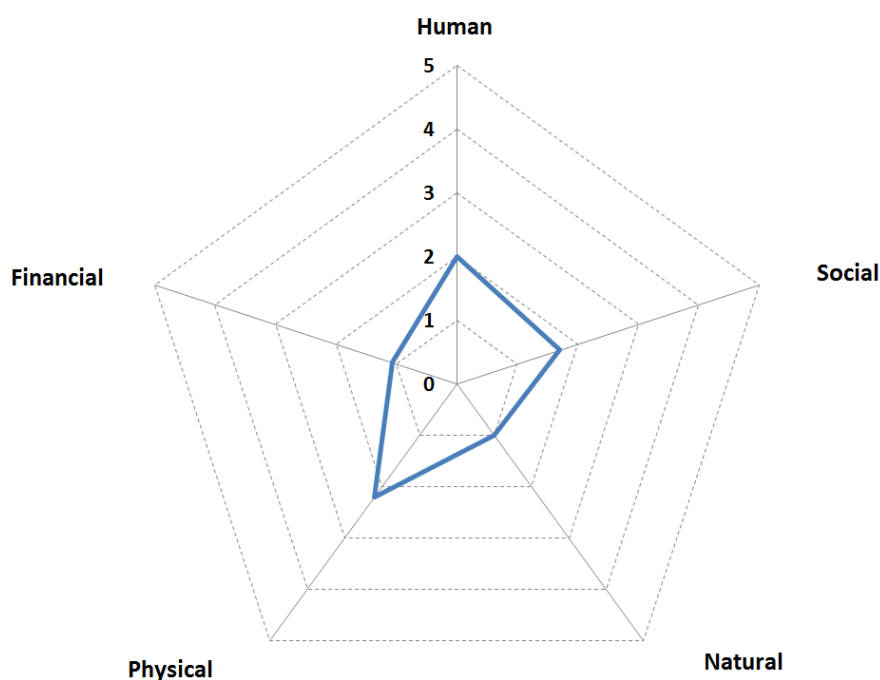
The workshop participants firstly identified three important indicators of Human, Social, Natural, Physical and Financial capital that enable or constrain energy efficiency in their home. Those indicators identified by the Power Savers participants are listed in Table 2.

Table 2 Indicators for each capital that constrain or enable energy efficiency in the home

Capital	Description
Human	1. Awareness of electricity bills and cost/ Understanding what you electricity bills means 2. Skills and knowledge on how to save energy 3. Attitudes and enthusiasm to save energy
Social	1. Support to identify energy efficient products 2. Support to install energy efficient products 3. Access to experts
Natural	1. Hot summers 2. Cold winters 3. Suburban locations
Physical	1. Appliances in the home 2. Heating and cooling of home 3. House construction/ orientation
Financial	1. Cost of retrofitting home to be more efficient 2. Availability of financial support to retrofit home to be more efficient 3. Cost of energy efficient products

Participants then rated each indicator (using audience response system technology) on a scale of 0 to 5 according to the degree to which the indicator was supporting energy efficiency. Figure 1 illustrates the rating scale used with participants in the workshop.

The averages of the indicators for each type of capital were then plotted on a livelihood pentagon, which is illustrated in **Error! Not a valid bookmark self-reference..** The average value of each capital provides a measure of condition for that capital.

Figure 3 – Average scores from indicators of each capital from Workshop 1 participants

As illustrated in

Participants then rated each indicator (using audience response system technology) on a scale of 0 to 5 according to the degree to which the indicator was supporting energy efficiency. Figure 1 illustrates the rating scale used with participants in the workshop.

The averages of the indicators for each type of capital were then plotted on a livelihood pentagon, which is illustrated in **Error! Not a valid bookmark self-reference..** The average value of each capital provides a measure of condition for that capital.

Figure 3, the overall capacity of households in Western Sydney to be energy efficient is quite constrained. Levels of human, social and physical capitals were low while those of financial and natural capitals were rated as not supporting efficient use of energy in the home. Participants rated none of the indicators above a score of 3, reflecting that in general households did not have strong capacity for energy efficiency changes within the home.

However, average scores should be treated with caution, and in the context of the participants' discussions about why they rated different indicators as constraining or enabling. This is discussed in the following section.

Constraints and enablers of household energy efficiency

HUMAN CAPITAL

For human capital, participants identified ***awareness of electricity bills and cost*** and ***skills and knowledge on how to save energy*** as the indicators most constraining to efficient use of energy in the home (and most constraining overall). Awareness was strongly associated with understanding the quarterly utility bill and matching this with energy use in the home. Many participants felt they "didn't have a choice" if the bill changed as there were not many other ways to save. Participants felt that understanding their energy use was very confusing and when they changed their behaviour in the home, this was not always reflected on the bill, or that behaviour was consistent but the cost was increasing.

Participants commented that they seldom discussed their electricity bill with neighbours, but did talk about the high cost of electricity. One participant noted that when they queried their electricity bill, they ended up being charged extra for a meter reading by the energy company. Participants expressed the view that they would not use the internet to find out about energy efficiency (e.g. via a website) as they use the internet for other purposes such as work or study.

Attitude and enthusiasm for saving energy was viewed as supporting effective use of energy in the home because of savings that can be accomplished when residents are proactive in saving energy. For example, the practice of pre-cooling the home on hot days; using the air conditioning for a set period of time rather than running constantly, and then using ceiling fans was common. The reverse (pre-warming in winter) was also common practice. Several participants identified that they air-dried clothing instead of using the clothes dryer. The motivation for this was saving money with a co-benefit of saving energy. Many participants found it difficult to engage the younger generations in saving energy, such as turning off lights.

SOCIAL CAPITAL

Social capital was heavily constrained by ***support to identify and install energy efficient products***. Some participants had proactively called their energy retailer to find ways to save on their energy bill through efficiency measures. While some were able to receive

discounts, energy efficiency advice provided by electricity retailers was at times in conflict with advice from the retailers of energy efficient products or solutions. Several participants had already installed solar PV on their home, using government rebates that supported feed-in-tariffs. However, the general consensus was that government support for energy efficiency was limited, or was provided to the unemployed rather than those employed.

Access to energy efficiency experts was considered to be slightly more supportive of energy efficiency in the home. Participants commented that information and resources were available to save energy (such as insulation from Bunnings or energy efficient light bulbs), however it was difficult to decide on which product was the most efficient. Participants commented on the fact that appliance star ratings were also confusing, but felt that a higher star rating was important when purchasing appliances, even if the cost was higher. Some participants had registered for time of use pricing (off-peak option) for hot water but were unsure if it saved them electricity. All participants felt that buyer's guides and advertising were not helpful.

NATURAL CAPITAL

Participants viewed the natural capital of the area as constraining energy efficiency due to the increasingly **hotter summers** and **cooler winters**. The changes in seasons were more pronounced, participants noted, with more extreme temperatures being experienced in the home, which created a need for heaters and air conditioners. This was closely linked to the **suburban location** in Western Sydney, which does not benefit from the cool ocean breezes of eastern suburbs. Most participants found their summer electricity bill to be higher than their winter bill.

PHYSICAL CAPITAL

Physical capital was providing some support for energy efficiency through the variety of energy efficiency **heating and cooling** solutions available. All participants owned a reverse cycle air conditioner, of varying ages. The air conditioner tended to be used in summer, but use was minimised where possible by complimenting with passive measures such as shades, blinds and insulation, which several participants had installed. Layering clothing and pre-heating beds with electric blankets also allowed energy savings from reduced heater use in winter.

However, some participants were shift workers with children at home therefore their need for heating and cooling off peak made it difficult to save electricity. **Construction, orientation and shading** of the homes was also seen as providing a low level of support for energy efficiency. Participants identified that orientation of the homes they occupied was not a consideration during construction with bedrooms upstairs and west facing living rooms, both very hot in summer. Participants did identify that it was possible to seek cooler downstairs areas in their two storey brick homes in summer and use ceiling fans and capture breezes through openable doors and windows. Shading of the homes using trees

was identified as challenging for new homes, which are constructed close together (compared to older homes with more outdoor space). In the home, **appliances** were identified as providing less support for energy efficiency as most participants found the need for appliances such as multiple TVs (2-4 per household) and laptops (1 per household member) was difficult to change.

FINANCIAL CAPITAL

In relation to financial capital, participants chose the **cost of retrofitting home to be more energy efficient** and the **cost of energy efficient products** as constraining to efficient use of the energy in the home. The capital required to retrofit the home to be more energy efficient with new infrastructure or products was highlighted as a significant financial barrier for all participants. Less constraining, however, was the **availability of financial support to retrofit home to be more efficient** as participants identified that some support was being provided for energy efficiency, for example through solar PV feed in tariffs, solar hot water rebates and insulation rebates. However this was still not rated as supportive as the upfront cost of installing these in the home was discussed amongst participants as being expensive.

Participants' views on solutions to constraints

Participants suggested a few actions that might remove constraints on efficient use of energy in the home. These actions included:

- Support from government (especially local government) to help reduce confusion about energy efficiency products and retrofits
- Interest free loans for energy efficiency retrofits such as solar hot water
- Smart appliances that turn off when you are not using them
- Engaging young people to understand energy efficiency

Next Steps

The next step for the Power Savers program will be to repeat the Livelihoods Workshop process with the same participants in March/April 2015 following their participation in the Power Savers program. Livelihoods Workshop 2 will seek to determine how capacity may have changed across the five capitals and each of their indicators.

APPENDIX 27

ABOUT THE AUTHORS

The Institute for Sustainable Futures (ISF) was established by the University of Technology Sydney in 1996 to work with industry, government and the community to develop sustainable futures through research and consultancy. Our mission is to create change toward sustainable futures that protect and enhance the environment, human well-being and social equity. We seek to adopt an inter-disciplinary approach to our work and engage our partner organisations in a collaborative process that emphasises strategic decision-making.

For further information visit: www.isf.uts.edu.au

Research team: Fiona Berry, Jenni Downes, Benjamin Madden, Chris Riedy.

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DISCLAIMER

The authors have used all due care and skill to ensure the material is accurate as at the date of this report. UTS and the authors do not accept any responsibility for any loss that may arise by anyone relying upon its contents.

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DATA EVALUATION REPORT OF THE LIEEP POWER SAVERS PROJECT (PSP) – FINAL

Prepared for: Nature Conservation Council of NSW
and the PSP Consortium



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ACRONYMS/ABBREVIATIONS

CALD	Culturally and Linguistically Diverse
DIIS	Department of Industry, Innovation and Science (the Department)
EA	Energy assessors (assessors)
HEA	Home energy assessment (home assessment)
HWS	Hot Water System
ISF	Institute for Sustainable Futures, University of Technology Sydney
LIEEP	Low Income Energy Efficiency Program
NCC	Nature Conservation Council of NSW
NESB	Non-English Speaking Background
OCC	Outbound Call Centre (United Voice)
PAR	Post-Assessment Retrofit
PSP	Power Savers Program
SHWS	Solar Hot Water System
UV	United Voice

A note on terminology

Throughout this report 'Program' refers to the Low Income Energy Efficiency Program (LIEEP), with the exception of the Program Evaluation conducted on the Power Savers Project (PSP), which will be referred to as 'the Project' or 'PSP'.

Executive Summary

EXECUTIVE SUMMARY

THE POWER SAVERS PROJECT (PSP)

This report provides a final evaluation of the Power Savers Project under the Commonwealth Government Low Income Energy Efficiency Program (LIEEP). LIEEP was announced in July 2011 as a competitive merit-based grant program to provide grants to consortia of government, business and community organisations to trial approaches to improve the energy efficiency of low income households. In early 2013, under LIEEP Round 1, the Nature Conservation Council of NSW was successful in its application for grant funding to conduct the Power Savers Project (PSP). The project reported to Department of Industry, Innovation and Science Department of Industry, Innovation and Science (the Department) and CSIRO was engaged to conduct a meta-evaluation of all LIEEP projects.

The PSP was a three-year, three-million dollar initiative which trialled an innovative approach to residential energy efficiency in 1,010 low-income households in the Sydney, Central Coast, Hunter and Illawarra regions of New South Wales. The PSP was delivered by a Consortium including lead organisation Nature Conservation Council (NCC), United Voice NSW (UV), Solahart (SH) and the Institute for Sustainable Futures (ISF) at the University of Technology in Sydney. The PSP included a focus on assisting low-income tenants and low-income people from non-English speaking backgrounds. United Voice (a union) was a consortium partner to facilitate strong engagement with their membership, who predominantly work in low-income industries. This demographic – i.e. low-income working households who do not access welfare or Centrelink services or have a health care card – had not generally been engaged previously by programs delivering energy efficiency benefits. PSP project objectives included:

- Increase energy literacy among participants and therefore contribute to participants having a sense of control over their electricity use and electricity bills.
- Reduce electricity use in participants' homes through the provision of one-to-one guidance (Energy Assessment and ongoing engagement with project staff), combined with the installation of energy-efficient technology in participants' homes.
- Generate persistent electricity use reductions through the provision of ongoing support and communication through participants' peer network(s).
- Develop and test methods to overcome split-incentive barriers in a select number of participant households by developing a method for upgrades to solar hot water systems (with degrees of subsidy) in rented properties.
- Develop, implement, evaluate and disseminate effective, replicable models for reducing energy use by low-income households.

PSP recruitment began with a pilot of the project for 20 participants in July 2013. The PSP was then implemented in three rounds between December 2013 and March 2015. The below table shows the PSP recruitment process and numbers of *leads* (those invited), *signed on recruits* (those eligible), *participants* (those offered all elements) and *completions* (those who received all elements).

Round	Recruitment timing	Leads	Recruits	Participants	Target	Completions
Pilot	Sept 2013 – Dec 2013	60	27	20	10-30	15
Round 1	Dec 2013 – Feb 2014	1,785	186	128	200	105
Round 2a	Mar 2014 – Jun 2014	2,665	501	295	500	452
Round 2b	Jul 2014 – Dec 2014	3,732	397	247		
Round 3	Jan 2015 – Mar 2015	2,732	483	320	300-320	276
TOTALS	Jul 2013 – Mar 2015	10,974	1,594	1,010	1,010	848

The participant journey for the PSP was designed to ensure a meaningful and enduring interaction with participants, encourage persistent behaviour change and meet the practical evaluation requirements of the project. The below table outlines the participant journey for the PSP.

Timing	Elements of journey	Key responsibility
Start	Recruitment Pre-intervention phone survey (PIPS) Scheduling of in-home energy assessment with a home assessor Welcome letter sent out after recruitment	United Voice
2 weeks	2-hour home energy assessment with PSP home assessor Support to household to install small scale tailored energy efficiency equipment e.g. hot water pipe insulation, Ecoswitch™ (At-Assessment Retrofits) – education about electricity use in the home and electricity bill	NCC / Energy Assessor
1 month	Tailor made Power Savers Action Plan, based on home energy assessment, posted to household.	NCC
2 months	Phone call to household to review energy assessors recommendations and provision of post-assessment retrofit(s) (PARs)	NCC
3 months	First quarterly phone call (QR1) to household.	United Voice
6 months	Second quarterly phone call (QR2) to household. Fact sheets distributed via post as required / requested.	United Voice
9 months	Third quarterly phone call (QR3) to household to: • check in, review progress; • ask about whether they would like to take the next step as a Project Champion; and	United Voice
12 months	Post-intervention phone survey (POPS) conducted with household. Conclusion of journey. “Champions” invited to final Conclusion Event.	United Voice

Other aspects of the journey for some households included a subset of:

- ‘Energy Champions’ recruited and trained to promote energy efficiency, network with peers and share successful energy performance improvement stories
 - a subset of the above ‘Energy Champions’ helped to form Power Savers Teams (community focus groups) in their communities of practice
 - these teams included additional United Voice members who were not otherwise involved in PSP
- Home owners receiving installation of a free solar hot water system
- Tenants and landlords receiving a subsidised solar hot water system through a cost-sharing arrangement

During each home assessment, assessors either provided or installed a suite of At-Assessment Retrofits:

- shower timer (4 minute)
- door snake
- thermometer (with recommended temperatures for freezer/ fridge/heating/cooling/hot water)
- ValveCosy™
- Lagging (insulation) for hot water pipes, plus zip ties
- LED globe (Osram 9W, 650lm, warm white, screw or bayonet)
- Door seal (Raven - RP17)
- Window and door seal (Raven - RP14)
- Tap aerator
- Ecoswitch™
- Renshade™

Following the assessment, the participants chose at least one Post-Assessment Retrofit (PAR):

- Energy efficiency equipment OR an In-Home Display up to a total value of \$250
- OR
- A rebate for energy efficiency appliances up to a total value of \$250.

These are listed in the below table.

Energy Efficiency Equipment	Rebate (valid for 3 months)
An In-Home Display for home owners OR A combination of the following items up to the value of \$250: • LED light-globes, LED downlights and PAR30 spotlight-globes • pedestal fan • ceramic fan heater • draught-proofing products (caulking tubes, door and window seals, draft-stoppers) • water-efficient showerheads • other extra At-Assessment Retrofit items	A rebate of up to \$250 to contribute to one or more of the following: • Fridge • Freezer • Fridge/freezer • Fridge seals • Washing machine • Dishwasher • Outdoor shutters • Whirlybird installation • Curtains/pelmets • Draughtproofing works • Insulation (ceiling or floor) • LED downlights • electric to gas HWS upgrade • storage to instant HWS • HWS temperature check • HWS size reduction • SHWS inspection/repair • Solar panels (photovoltaic) • Reverse-cycle air-conditioning • Air conditioner service • Ceiling fan / window fan / pedestal fan • Dyson Hot & Cool fan • Microwave • Rice cooker • Pressure cooker • Oven seals or hinges/stove repair • Clothes horse • Flyscreen • LED TV (to replace CRT or Plasma) • Skylight • Blankets (including electric)

A wide range of communication mechanisms and materials were created to engage and support participating households throughout the project. Communications occurred through three primary channels: the in-home energy assessment with an energy assessor; phone calls; and mail outs to supplement phone calls.

PURPOSE OF EVALUATION

Evaluation attempts to explain why a particular outcome has occurred, how well a project or activity was undertaken, whether it was a good thing to do, and what should be done in the future in light of the evaluation findings.

Key evaluation activities throughout the PSP were prepared according to the Department's requirements and included:

- Evaluation Framework (May 2013) which established the model for PSP data collection and analysis
- Background Research report (July 2013) which provided background evidence to inform and support design and delivery of the PSP
- Livelihoods Workshop (February 2014) and Summary report (May 2014) which sought to assess household capacity to understand the values, interests and priorities of PSP participants with respect to home energy efficiency
- Pilot Evaluation Report (June 2014) which evaluated the trial of a sub-set of PSP approaches that might be incorporated into the future roll-out of the PSP
- Data Evaluation Report (this report) which covers the final evaluation of the entire PSP and documents findings of the evaluation of a) overall implementation of the PSP and b) impact of the PSP on participants and their electricity use.

The PSP evaluation followed a 'project logic' which outlined key inputs, outputs and outcomes for the project. The logic was initially documented as a table in the Evaluation Framework and evolved into the 'final logic' which focuses on two parts:

Program Evaluation of the overall implementation of the project by the PSP consortium, specifically:

1. Participation (key output of the initial project logic, expanded and renamed)
2. Project Management (a key output of the initial project logic)

Impact Evaluation of the impact of the project on household energy efficiency, specifically:

3. Impact on Electricity Use
 - a. Reduced electricity use
 - b. Persistent electricity use reductions
4. Impact on Participants
 - a. Electricity Literacy
 - b. Sense of Control
 - c. Peer-to-peer networks.

These logic tables identify a range of performance measures and targets as well as suggested performance metrics against which the PSP has been evaluated. Some metrics have been introduced during the final evaluation process in order to more comprehensively evaluate the data available at this stage of the PSP.

DATA SOURCES

Data for the final evaluation was sourced from previous evaluation reports as well as the following data sources:

Program evaluation was completed through analysis of:

- Project delivery data exported from Salesforce by NCC and UV in order to evaluate participation in the PSP and project management of the PSP
- Home Energy Assessment data exported from FluidSurveys by NCC and UV and combined with Salesforce data in order to evaluate participation in the PSP (demographics and tenure)
- Personal communications from NCC and UV in order to understand lessons learned and challenges faced during PSP implementation

Impact evaluation was conducted through analysis of:

- Billing data from electricity distributors Endeavour Energy and Ausgrid in order to quantitatively estimate electricity, cost and emissions savings
- Participant self-reported workshop and survey data exported from Salesforce by NCC and UV in order to evaluate participant perceptions of their ability to make savings, persistence of electricity use and impacts on participant's energy literacy and sense of control
- Personal communications from UV in order to understand the peer-to-peer networks activities of the PSP (namely the Energy Champions and Power Savers Teams activities)

EVALUATION FINDINGS

The final evaluation of the Power Savers Project (PSP) under the Commonwealth Government Low Income Energy Efficiency Program (LIEEP) has found the project achieved a range of positive outcomes for low income household energy efficiency, despite several barriers faced during project implementation. Overall the PSP has successfully reached and assisted a new target demographic, namely 1,010 working, low income households in Sydney, Hunter, Illawarra and Central Coast regions, to better understand and be able to reduce their energy use in the home.

A pilot of the project provided a good test of PSP objectives, data collection mechanisms and impacts on participants. During the pilot 20 participants trialled the home assessment and behavioural pre and post-assessment surveys as well as installation of In-Home Displays. Key findings were that the methods used were effective and results were positive, but would require some adjustments for time and cost efficiencies. It was agreed that the remaining project methods (retrofits, communication with participants and solar hot water systems) were able to be trialled with this demographic. The Pilot Evaluation Report is contained in **Appendix D**. Evaluation findings of the remainder of the PSP participants (990) are contained in this report and summarised below.

Based on the final project logic and data available, a total of 18 metrics were evaluated across 14 performance measures and their associated targets. The findings of the evaluation were summarised by rating each metric against the target as follows:



The evaluation of the PSP found that:

- 17% of the metrics exceeded targets (3 metrics)
- 50% of the metrics fully achieved the targets (9 metrics)
- 17% of the metrics partially achieved the targets (3 metrics)
- 6% of the metrics did not achieve the target (1 metric)
- 11% of the metrics were unable to be evaluated (2 metrics).

The findings of the program evaluation and impact evaluation are summarised in the table over the page.

Category	Performance Measure	Metric	Target	Result	Rating
Program Evaluation					
Participation	Recruitment targets are reached	No. of households successfully recruited	990* households successfully recruited	990 households participated	Fully Achieved
	Energy efficiency retrofits and assessments delivered	No. of home energy assessments delivered to households	Assessments delivered to 990* households	990 Home Energy Assessments delivered	Fully Achieved
		No. of tailored energy solutions delivered to households	Tailored energy solutions delivered to 990* households	837 Post-Assessment Retrofits (PARs) delivered	Partially Achieved
	Solar hot water systems are negotiated and installed	No. of fully funded solar hot water systems (SHWS) installed in owner households	50 solar hot water systems installed in owner households - funded through grant funding	79 funded solar hot water systems installed	Exceeded
		No. of SHWS installed under landlord/tenant cost sharing agreements	50 solar hot water systems installed - funded under landlord/ tenant cost sharing agreements	0 solar hot water systems installed under cost sharing agreement	Not Achieved
		No. of landlords and tenants engaged to develop cost sharing arrangements for SHWS	50 landlords and their tenants engaged to develop up to 50 cost sharing arrangements for installation of solar hot water systems	63 renters and 22 landlords (or their real estate agents) engaged around cost sharing arrangements	Partially Achieved
Project Management	Project rolled out on schedule	% of milestones reached by due date	(No specific target set)	100% of milestones completed by agreed due dates	Fully Achieved
	Sufficient project staff recruited	No. of FTE staff dedicated to recruitment	100% recruitment of required UV and NCC project staff and volunteers	Recruitment was sufficient	Fully Achieved
	EOI completed for home assessors	No. of EOI's completed for home assessors	2-3 competitive EOIs completed for home assessors	2 EOIs completed (one direct and one competitive)	Fully Achieved
	Project systems created/implemented	No. of required systems, project documents and communications implemented	(No specific target set)	All required systems, project documents and communication materials implemented as per Funding Agreement	Fully Achieved
Impact Evaluation					
Impacts on Electricity Use					
Reduced Electricity Use	Decreased electricity consumption	% change in electricity use across all participating households during project	Electricity use reductions of 5-10% in participant households due to installation of retrofits	Overall average reductions of 3% with highest reductions in Illawarra region (9%)	Partially Achieved
	Increased capacity of participants	% of Livelihoods workshop indicators improved	30-50% of indicators identified in Livelihoods workshop demonstrate improvement and hence increased capacity to use energy more efficiently	Post-livelihood workshop not conducted	Unable to evaluate
	Perceived reduced electricity use	% improvement on measures of self-reported energy efficiency	Improvement on some measures of self-reported energy efficiency as measured on Likert scale in questionnaire**	Modest improvements (1%-4%) in self-reported measures of energy efficiency (due to high baseline)	Fully Achieved
Persistent Energy Reductions			NB: persistence of electricity reductions beyond the life of the PSP not able to be measured as part of this evaluation		Unable to evaluate
Impacts on Participants					
Electricity Literacy	Self-assessment via pre/post survey	% improvement on measures of self-reported energy efficiency	Improvement on some measures of self-reported energy efficiency as measured on Likert scale in questionnaire**	Awareness of relative electricity use and ability to understand bill improved by 24-32%	Fully Achieved
Sense of Control	Self-assessment via pre/post survey	% improvement on measures of self-reported energy efficiency	Improvement on some measures of self-reported energy efficiency as measured on Likert scale in questionnaire**	Proportion who strongly agreed they had control over their electricity use increased by 6 times and electricity bill increased by 5 times	Fully Achieved
Peer-to-peer networks	Champion outreach	No. of champion participants engaged	60 peer-to-peer champions recruited	224 champion participants recruited	Exceeded
		No. of Power Savers Teams formed	3 Power Savers Teams formed	5 Power Savers Teams formed	Exceeded

*Excludes Pilot participants

**This target was revised from the initial project logic as *100%* improvement on some measures in Likert scale would not be realistic, rather statistically significant *improvement* on some measures would be a more realistic target. The target was set prior to the development of the survey questions, and Likert scale responses and therefore it was necessary to revise this target. A Wilcoxon Signed-rank test was run on the survey results to determine statistical significance, more details are contained in Section 4.3.2

Performance against PSP Objectives

Objective 1: Reduce electricity use in participants' homes through the provision of one-to-one guidance (Energy Assessment and ongoing engagement with project staff), combined with the installation of energy efficient technology in participants' homes

Overall the PSP was successful in achieving average electricity use reductions (when compared to a control group) of 3% across all participants, and in the Illawarra region reductions were as high as 9%. A key success was the installation of 79 fully funded solar hot water systems in participant households, which far exceeded the target of 50 households. In addition, the PSP achieved its targets to recruit the full 990 participants and deliver home assessments to each of these participants. The PSP sought to measure the capacity of participants to save energy in the home through a Livelihoods method, however, it was unable to be completed and metric not able to be evaluated.

Objective 2: Generate persistent electricity use reductions through the provision of ongoing support and communication through participants' peer network(s).

Despite the evaluation of the peer-to-peer network having few metrics, the evidence provided demonstrates that the use of individuals as 'champions' and workplace/industry networks to share and disseminate knowledge of household energy efficiency was successful. 224 energy champions were identified compared to the target of 60 and contributed to the PSP reaching its recruitment targets. 11 of the champions went on to form a total of 5 'power savers teams' who spread knowledge of energy efficiency across peer networks in three Early Childhood Education centres, a homecare provider organisation, attendance at the United Voice Delegates conference and by connecting with energy efficiency activities offered by local Councils.

Objective 3: Increase energy literacy among participants and therefore contribute to participants having a sense of control over their electricity use and electricity bills.

Both metrics to measure participant's sense of control over their electricity use and bills were fully achieved by the PSP. Energy literacy of participants improved up to 32% across the questions asked in the pre and post intervention surveys. In addition, the proportion of PSP participants who strongly agreed they had control over their electricity use increased by 6 times and strongly agreed they had control over their electricity bill increased by 5 times.

Objective 4: Develop and test methods to overcome split incentive barriers in a select number of participant households by developing a method for upgrades to solar hot water systems (with degrees of subsidy) in rented properties.

Testing methods to overcome split incentive barriers through subsidised solar hot water systems was the least successful result across two metrics. A discounted system was offered to tenants and their landlords under a cost-sharing arrangement however no solar hot water systems were installed in PSP rental properties. The focus of the target was then shifted to *engaging* tenants and landlords. While attempts were made to engage renters, and subsequently their landlords or real estate agents, the target of engaging 50 combined was only partially achieved with 63 renters being engaged, but only 22 landlords or real estate agents continuing with engagement. The PSP experienced tenants who, when requested to participate and connect the PSP with landlords, were tentative and cautious. Landlords did not engage and real estate agents were not interested. It is likely that a discounted system and cost sharing arrangement was not attractive enough to result in uptake and more was needed to engage tenants and landlords in such an offering. Therefore discounted systems under cost sharing arrangements are not likely to overcome split incentive barriers in low income rented properties.

Objective 5: Develop, implement, evaluate and disseminate effective, replicable models for reducing energy use by low-income households.

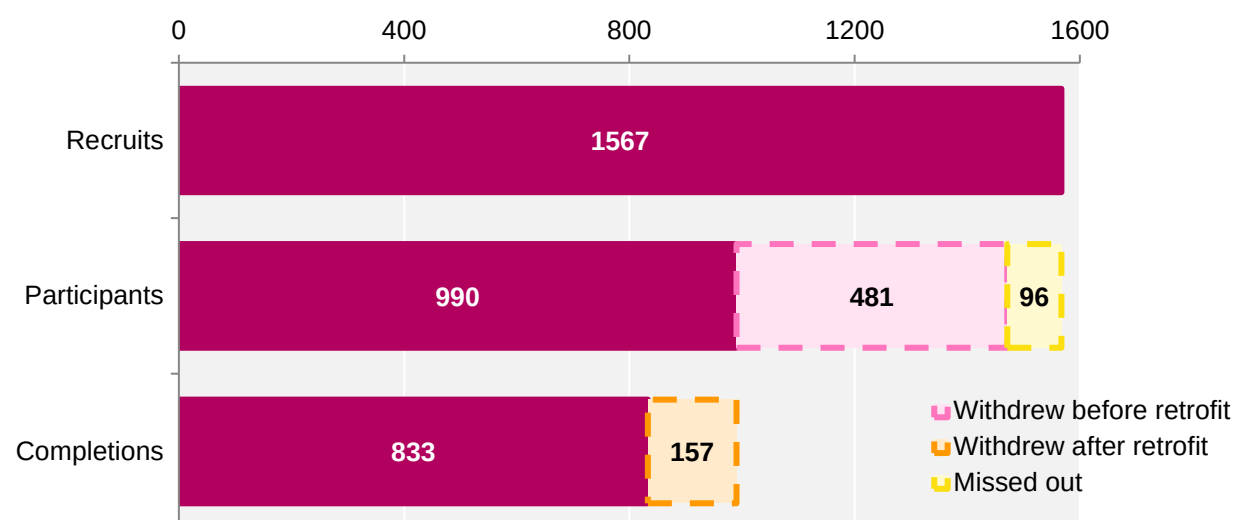
Despite being faced with challenges throughout the project, including milestone changes and project hurdles which required the PSP design to be revisited, the PSP consortium fully achieved all of the four of the metrics to develop and deliver an effective model for reducing energy use by low income households. The delivery of the project on time according to milestones (and despite changes) was successful. Despite underestimating the requirements for detailed project and data management systems, as well as no budget being available for these, the PSP fully achieved the successful implementation of systems, documents and materials. Recruitment for adequate staff for the PSP (4 FTE estimated and recruited) was fully achieved, however United Voice, Nature Conservation Council and the Institute for Sustainable Futures contributed in-kind staff time over and above the planned time for the PSP.

Program Evaluation

Participation

Recruitment

The project had a target of 990 participants, excluding the 20 PSP Pilots, and successfully reached this target. Early recruitment rounds did not meet targets (due to changes to the project to create a control group), however later recruitment rounds exceeded targets. The number of leads generated by United Voice from the membership base was significant, ten times more than the target for participants. It was understood that not all of these leads would be eligible for the project, and that the targeted group would need to be large as they would have limited available time (a potential contributor to attrition).

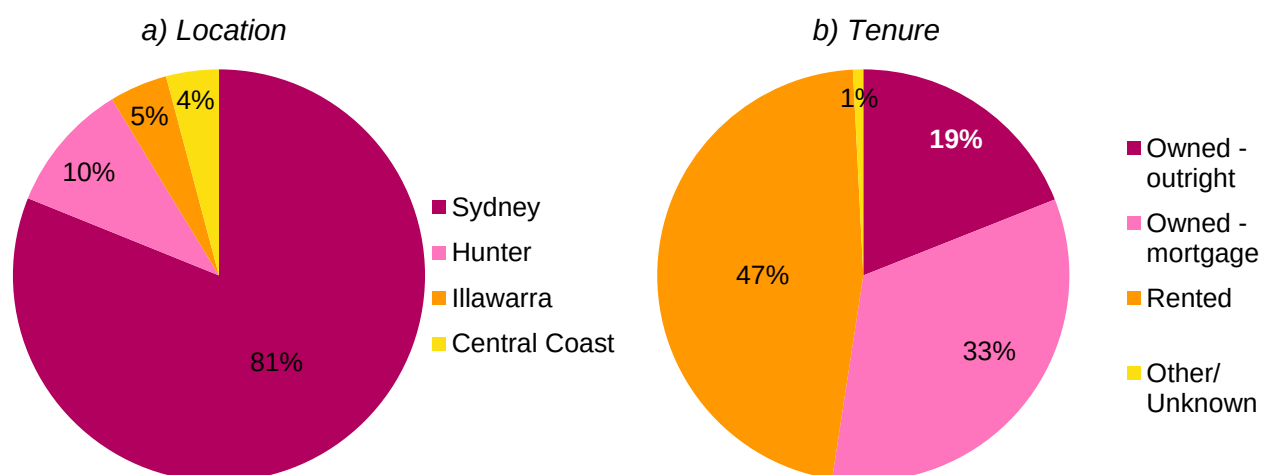


* Missed out refers to participants who were unable to successfully book a home energy assessment, but never explicitly withdrew from the project. This includes households who simply stopped responding to communications from the project, but also households whose busy lives made it difficult to schedule and attend an assessment in the timeframes of the project.

As illustrated in the above figure 63% of recruits were converted to participants, and undertook a home energy assessment. CSIRO had directed the PSP to anticipate for a 30-50% attrition rate between recruitment and participation. The PSP Pilot experienced an attrition rate of 27%, though this was expected to be on the low scale as participants engaged in the Pilot were identified as having an interest in the area, or extraordinarily strong connection with UV. The project resulted in a 37% rate of attrition between recruits and participants, which is in the lower range of estimates.

84% of participants went on to completion, that is, remained engaged throughout the whole project from assessment to the final self-assessment survey. Attrition occurred due to lost contact with participants and a choice by some participants to drop out of the project. The project had not anticipated a drop off rate after home assessment, and it is recommended this be factored into future programs.

As illustrated in the below graphs, the majority of households that participated in the PSP were in the Sydney region (81%) with the remainder from Hunter (10%), Illawarra (5%) and Central Coast (4%). It is not surprising that the area with the highest population density (Sydney) resulted in having the most PSP recruits. The PSP successfully recruited a balance of homeowners (52%) and renters (47% with the remainder unknown).



Compared to Sydney census data of households from all income levels, the PSP participants included more people who were renting their home than average. Within the home owner category less PSP participants owned their homes outright than the average (19% compared to 29%), and about the same proportion had a mortgage than the average (both 33%).

Assessments and Retrofits

To secure the target of 990 assessments, the result was a ratio of 1.24 appointments: 1 assessment. 24% of appointments were cancelled by households, however, attempts to rebook those households resulted in just under half of the 24% going on to rebook and successfully complete an assessment.

Following their assessment, the majority of participants (94%) received at least one type of energy efficiency retrofit: over half received energy efficiency equipment (up to the value of \$250), just under a third received a rebate for energy efficient appliances and/or services (up to a value of \$250) and about one-eighth of households received an In-Home Display (energy monitor device). Many rebates required participants to spend additional money of their own (which was likely already limited) on upgrading appliances and fixtures, whereas the equipment did not.

Solar Hot Water Systems

The PSP set an initial target to install 100 solar hot water systems in low income households: 50 for participants who owned their homes (by offering a free solar hot water system) and 50 for participants that rented (by offering a discounted solar hot water system to landlords under a cost-sharing arrangement with tenants). Under the LIEEP grant, funding was provided for solar hot water systems for home owners but no funding was allocated for the targeted rental households.

A total of 148 participants were approached regarding a solar hot water system, 85 of whom owned their own home, 63 whom rented.

Despite significant efforts, the PSP did not reach its target of the installation of 50 discounted solar hot water systems in renter households, as barriers were experienced. A number of stages had to be successfully navigated including obtaining permission from the landlord or real estate agent to participate in the PSP, a site inspection for suitability and the landlord agreeing to share the costs of the system. As barriers with the split incentive approach were faced during the PSP, a revised target was identified which focused on evaluating the process of engagement in the offering. This target was to *engage* 50 tenants and landlords. This target was partially achieved with 63 renters and subsequently, 22 landlords (and/or their Real Estate Agent) being engaged.

The PSP exceeded its target for installation of 50 fully funded solar hot water systems in owner households. In total 85 owner households were offered a system, with 79 installations (including 1 Pilot) successfully completed from the available funding.

Project Management

Project on schedule

The PSP was delivered according to eleven key Milestones, i.e. a series of deliverables due by a certain date in order to receive a segmented level of funding. The PSP successfully delivered 100% of Milestones (at the time of writing) on schedule.

Project staff

The PSP budgeted for recruiting 4 FTE staff for the PSP and hired 3 FTE staff on time and within budget; 2 at NCC and 1 at United Voice (which was spread across three staff members at varying full and part time capacities). Substantively more resources were required than initially planned for the 1 UV FTE staff member hired for the PSP. The initial role description for the UV Coordinator was to play an active role in the recruitment and community engagement (face to face participant interactions), however in practice, the UV Coordinator took on different roles than planned, from database management (in collaboration with NCC) through to champion development, call centre staff supervision and reporting. In addition, the existing staff and in-kind contributions by United Voice came in substantially over the allocated staff time, reflecting that more staff would be required to complete a project such as this in the future. It was realised early in the project that substantially more resources would be required by United Voice for the operations of the outbound call centre. NCC and UV reallocated funding within the budget to cover this need.

EOI for home assessors

A target was set for 2-3 competitive Expressions of Interest (or EOIs) for recruiting energy assessors to complete the home assessments for the PSP and a total of 2 EOIs were successfully completed (one direct hire and one competitive), resulting in 5 assessors being recruited. The first was the EOI for the energy assessor for the Pilot phase, a direct approach and successful hiring of 1 assessor in Sydney. The second was the EOI for the energy assessors for Rounds 1-3, which resulted in 10 responses and 4 home assessors recruited: 2 in Sydney, 1 in the Hunter region and 1 in Illawarra. The response rate to the second EOI was lower than expected. In addition, the Hunter region assessor's contract became untenable part way through delivery of the PSP and the assessor's contract was ceased. This resulted in some cancellations of participants in this region.

Project systems created and implemented

All required systems, project documents and communication materials were implemented for the PSP as per the Funding Agreement and 100% of required Milestone reports were delivered to the Department. The use of a cloud-based CRM (Salesforce) exceeded requirements as per the funding agreement, however, was instrumental to the delivery of this project which operated across multiple organisations. Salesforce was an additional feature which was not planned or budgeted for at project inception. In addition, a large number of communications materials and mechanisms were created and delivered successfully to PSP participants through three primary channels including the in-home energy assessment with an energy assessor, 7 key phone calls designed and executed with participants and 9 key mail outs to supplement the phone calls and provide additional information (letters, brochures, action plans, fact sheets and newsletters).

The PSP Project Manager reported that delivering project systems was initially difficult due to time pressure and lack of budget for these systems. However, once Salesforce was purchased (at a discounted non-profit rate), it proved to be a very effective and highly adaptable platform, becoming an essential system for tracking household interactions and journeys.

Other Findings

The PSP experienced some barriers to obtaining consent from households to obtain access to their electricity billing data via a consent form during the initial energy assessments. These included lack of understanding of the purpose of the form, some households confusing the form with switching energy providers and the official electricity account holder not being present at the energy assessment. As the PSP progressed, these barriers were addressed through better communication of the purpose of the consent form (via the outbound call centre phone call prior to the energy assessment), making the post assessment retrofits conditional on the return of the consent form, which proved to be effective and resulted in a substantial increase in the rate of return of the forms.

Barriers were also experienced when requesting billing data from the electricity distributors (Endeavour Energy and Ausgrid) during the final evaluation of the PSP. The project relied on an informal approach to obtaining billing data, based on relationships between the PSP consortium and the electricity distributors. In requesting the data from the electricity distributors, it was difficult to maintain engagement with the organisations due to the length of the multi-year project, staff turnover and changes to the project design. Changing expectations for consent and legal requirements of the distributors added complexity and delays to the delivery of billing data for evaluation and reduced the time for evaluation to a shorter period than expected. In addition, the lack of consistent records between the electricity retailer and distributor resulted in the validation process removing a significant portion of possible billing data records that could have been utilised in the evaluation.

The use of a control group was identified at the commencement of the PSP as important to measure electricity and cost savings. However, despite the best efforts of the consortium to create a control group from within the 1,010 participant group (the Round 3 recruitment round), the group was instead used as a participant group and de-identified data was sourced from electricity distributors to provide a control group.

Impact Evaluation

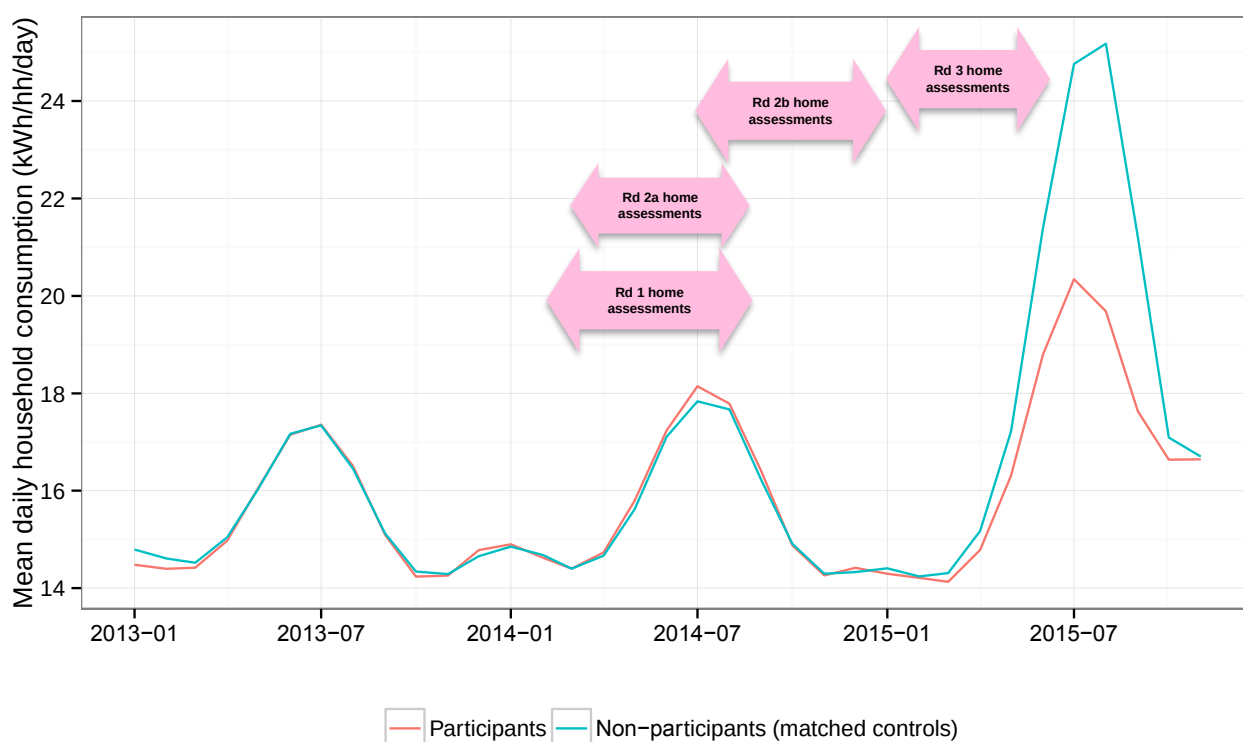
Impacts on Electricity Use

Reduced electricity use

In order to evaluate whether PSP participants electricity consumption had decreased due to the PSP treatments installed in their households, an analysis was conducted on 'participants' electricity billing data records when compared to a control group: those who had not received any treatments, or 'non-participants'.

The results of the mean electricity consumption over time revealed both participant and non-participant groups had similar peaks in consumption in each winter during the evaluation period, with the *winter of 2015 showing higher consumption than the winters of 2013 and 2014*. Mean daily consumption by participants was markedly *lower* than non-participants in winter 2015, showing that participants *saved the most energy when compared to non-participants during the coldest winter of the PSP* as illustrated in the figure over the page.

This may indicate that PARs which aimed to increase efficiency of electricity use during winter such as ceramic fan heaters, draught-proofing products, hot water system retrofits or upgrades, curtains/pellets, ceiling or floor insulation, reverse-cycle air conditioning and electric blankets may have contributed to this reduction in consumption. However, the reduction cannot be directly attributed to the above PSP treatments based on the available data.



When analysing the results across the four PSP regions of Sydney, Hunter, Central Coast and Illawarra, overall mean electricity consumption was lower in all regions compared to non-participants. PSP participants in the Central Coast and Hunter regions had the highest mean electricity consumption, followed by Sydney PSP participants and Illawarra PSP participants had the lowest mean consumption.

The evaluation was unable to analyse electricity savings for those PSP households with solar hot water systems installed. This was due to the processes of data validation reducing the sample size to only 19 households, rendering a savings analysis on these households inappropriate due to the small sample size.

With overall average reductions of 3% (with the highest reductions of 9% in the Illawarra region), the PSP partially achieved the target of electricity use reductions of 5-10% in participant households due to installation of retrofits. An average of \$12 ($\pm$ \$6) was saved per quarter per household and 0.5 kg ($\pm$ 0.2 kg) of carbon dioxide equivalent emissions avoided per household per day.

The highest savings were experienced by PSP participants in the Illawarra region and the lowest savings experienced by PSP participants in the Sydney region. This amounts to the highest average saving of \$30 ($\pm$ \$17) per household per quarter experienced by Illawarra participants and the lowest of \$10 ($\pm$ \$6) per household per quarter experienced by Sydney participants. The final evaluation results for electricity, cost and emissions savings is outlined in the below table, including the confidence intervals.

When comparing to mean electricity consumption by region, PSP participants in Illawarra had the lowest consumption, yet experienced the highest savings (but were the smallest region sample), which may illustrate the PSP treatments were more effective in the Illawarra region at saving electricity. Conversely Sydney PSP participants had the second highest mean electricity consumption, yet experienced the lowest savings (but were the largest region sample) which may illustrate the PSP treatments were less effective in the Sydney region at saving electricity.

	Total Participants (396)	Sydney Participants	Central Coast and Hunter Participants	Illawarra Participants	Renters	Owners
Avg. kWh electricity saved per day	0.477 ± 0.232 kWh	0.421 ± 0.259 kWh	0.563 ± 0.596 kWh *not signif at 95%	1.23 ± 0.681 kWh	0.548 ± 0.323 kWh	0.46 ± 0.31 kWh
Avg. kWh electricity saved per quarter	43.41 ± 21.11 kWh	38.31 ± 23.57 kWh	51.233 ± 54.24 kWh	111.93 ± 61.97 kWh	49.87 ± 29.39 kWh	44.59 ± 28.21 kWh
Avg. % electricity saved per day	2.92% ± 1.42%	2.63% ± 1.62%	3.34% ± 3.52%	9.01% ± 4.99%	3.76% ± 2.2%	2.6% ± 1.8%
Avg. kg CO₂-e emissions avoided per day	0.458 ± 0.222 kg	0.404 ± 0.249 kg	0.541 ± 0.572 kg	1.181 ± 0.654 kg	0.526 ± 0.31 kg	0.44 ± 0.298 kg
Avg. \$ saved per quarter	\$11.88 ± \$5.78	\$10.49 ± \$6.45	\$14.02 ± \$14.84	\$30.64 ± \$16.96	\$13.65 ± \$8.05	\$11.46 ± \$7.72

Renters saved on average 1.2% more electricity than owner occupiers but this does not take into account household characteristics such as renters occupying smaller dwellings than owner-occupiers.

Due to limitations in the data, PSP specific savings beyond regional location and tenure (including savings from individual treatments and the installation of Solar Hot Water systems) have not been possible.

The PSP resulted in modest improvements in participant motivation to reduce electricity use. However, participants' reporting of their motivation level for reducing electricity was very high at the start of the project (96%) providing little room for improvement. This high motivation at the commencement of the PSP may have been a result of selection bias, with only those believing that electricity reductions are important and who are motivated to act likely to agree to participate in the PSP. 94% of participants reported that they had actively taken steps to use less energy during the project but there was only a 4% increase in PSP participants who consider themselves energy efficient.

Persistence of electricity use reductions

While persistence can only be measured by looking at the energy consumption patterns beyond the life of the PSP, several activities have been put in place that would enable evaluation of this measure at a future date such as the successful peer-to-peer networks and comprehensive communication campaign implemented by the PSP.

Impacts on Participants – Literacy and Control

The PSP was successful in increasing participant's self-perception of their energy literacy. Participant perceptions of energy literacy were identified through three questions included in the pre- and post-intervention surveys, all of which showed a substantial improvement:

- The proportion of participants who stated their bill was very or somewhat clear and easy to understand increased from 47% to 79%
- The proportion of participants who agreed or strongly agreed they were aware of how their electricity use compared to others increased from 45% to 69%
- The proportion of participants who reported they were prevented from reducing their electricity use due to a lack of knowledge decreased from 48% to 0.4%.

An analysis of literacy before and after participation broken down by home tenure type revealed similar patterns across the measures reflecting that the PSP was equally successful in increasing the literacy of both owners and renters. This increase in electricity literacy could be attributed to the process of the home assessor stepping through the electricity bill with the participant in person and the formation of peer-to-peer networks which may have facilitated transfer of knowledge about efficiency use of electricity in the home.

The PSP was particularly successful in increasing participant's self-reported sense of control over electricity use and bills. The proportion of participants who strongly agreed they had control over their use increased by more than 6 times from the beginning to the end of the project, while the proportion who strongly agreed they had control over their bills increased by more than 5 times. This was likely due to the education provided to participants about their use of electricity in the home during the home assessment.

The development of peer-to-peer networks as a method to inspire and sustain energy-efficient behaviours was a key success of the PSP. The level of individual Energy Champion activity implemented in the PSP exceeded expectations, with 224 Champions being involved, compared to the target of 60. The recruitment of Champions occurred through a variety of communication channels. Individual leaders actively recruited others to the PSP via volunteering for storytelling videos (four pilot participants), one to one conversations with family, neighbours or work colleagues about their PSP experience or sharing information about the PSP using the recruitment brochure. Training was provided on digital storytelling and delivered to call centre staff to specifically recruit Champions and storytelling videos of pilot participants were screened at key United Voice meetings. Those wanting to lead in promoting energy efficiency, either within their workplace or amongst their extended community formed Power Savers Teams. The formation of Power Savers Teams was a successful outcome for the PSP with eleven (11) Energy Champions successfully facilitating the formation of a total of five (5) teams, across a variety of structures.

Three of the five Power Savers Team activities were successfully implemented with positive outcomes. Specifically the Early Childhood Centres and Liverpool Catholic Care Teams engaged a community which, through their employment, interacted daily with children and the elderly – identifying key channels for passing on knowledge about energy efficiency in the home to these demographics. The teams successfully inspired energy-efficient behaviours amongst peer networks, which could be the focus of a similar low income energy efficiency project in the future.

In addition, the conclusion event (the final PSP dinner), was successfully held in 2016 with forty-two attendees and a range of collective engagement goals were achieved and positive feedback received.

RECOMMENDATIONS

Low income working households could be targeted by future programs as this trial has shown that savings can be achieved through energy efficiency projects with this demographic. A project with a larger participant group, more clearly defined project length, treatment delivery at a point in time and with data collection that factors in attrition would enable the analysis of savings at a more detailed level, such as savings achieved by particular demographic groups and from particular energy saving measures.

One-to-one knowledge and education on household energy efficiency through the use of an in home assessment with a home assessor has proven effective in this trial and could be the focus of future energy efficiency programs. Directly engaging with householders through the home assessment (such as discussion of the electricity bill) and retrofits (such as an In-Home Display and an Ecoswitch™) has delivered increases in self-reported levels of electricity literacy and sense of control over electricity use for both owners and renters.

The use of personal (e.g. family and friend) and peer (e.g. workplace or membership organisation) networks was an effective method for engaging and recruiting low income households. In addition, recruiting champions across workplaces or existing community activities appeared to encourage participation in home energy efficiency by low income working households, although the evidence is anecdotal. This kind of approach also has strong support in the literature on behaviour change, so

programs that tap into the peer to peer method for empowering and engaging this audience in saving energy may achieve success in the future.

Future projects could build upon existing work of the PSP to expand this project to more UV members (e.g. PSP round 2). Government could also engage with other member-based organisations which represent low income households or community-based organisations where strong peer networks and a pre-existing level of trust with members exists. A focus could be on industries/sectors (e.g. childcare, aged/home care) as illustrated by the success of the PSP power savers teams, which could form the basis of a future energy efficiency program. In addition, accessing these householders in a workplace setting as part of other workplace activities may be more likely to increase participation in energy efficiency projects, as this demographic has limited time availability (shift working and long working hours).

There is still some way to go with tenants and landlords in terms of trust and engagement on energy efficiency and addressing barriers to split incentives. Tenants were cautious due to fears about changes in their tenancy. Landlords (and real estate agents) lacked interest in changes that provide benefits to the tenant through reduced electricity bills or increased comfort. Engaging landlords, property owners, real estate agents, strata management or body corporates in a different way (than via their tenants) could be the focus of energy efficiency schemes in the future that seek to address barriers to split incentives. Other ways to address split incentives could prove to be a more effective method e.g. energy efficiency equipment rental programs (Cluett et al, 2016).

The success of energy efficiency project evaluation, as with any large scale project delivered to a sample of participants across multiple years, relies on a clearly defined project design from the outset. Design should inform data collection, storage and analysis throughout the project delivery to ensure evaluation at the close of the project is comprehensive, useful and informative to future projects. Changes to project design and length have implications for evaluation across a wide range of metrics and directly affect data quality and quantity and consequently the ability to report in detail on the project's impact. The use of evaluation logic that can evolve with the project is also paramount – a logic which draws upon a systems approach to evaluation can ensure that evaluation meets the needs of the funding agency, implementation partners and subsequently participants themselves.

Key to project success is the necessary skills and experience of the organisations delivering the project. Careful consideration is required for the implementation of project administration, project management systems, data collection and storage and relationship management. The PSP trial has built the knowledge and capacity of consortium members to encourage long-term energy efficiency among their customers or clients. At the writing of this evaluation report, no data was yet available on the cost effectiveness of the PSP, however the results (to be reported in the final report) will identify if this knowledge and capacity building has occurred in a cost efficient manner.

More detailed recommendations are provided in Section 7.4 across the following areas:

- Evaluation approach
- Recruitment
- Home assessments and retrofits
- Solar hot water scheme
- Project management
- Impact on Electricity Use
- Impact on Participants
- Peer to peer networks.

1

About the Power Savers Project

1 ABOUT THE POWER SAVERS PROJECT

1.1 ABOUT THIS REPORT

This report provides a final evaluation of the Power Savers Project (PSP) under the Commonwealth Government Low Income Energy Efficiency Program (LIEEP). The evaluation has been conducted by the Institute for Sustainable Futures at the University of Technology Sydney on behalf of the Nature Conservation Council (NCC) of NSW. The report documents findings of the evaluation of a) overall implementation of the PSP and b) impact of the PSP on participants and their electricity use.

The main audience for this report is the PSP consortium – the Nature Conservation Council, United Voice NSW (UV) and Solahart – and the Australian Department of Industry, Innovation and Science (the Department). It seeks to provide the results of an evaluation of the PSP to inform future policies and programs for assisting low income households in Australia to become more energy efficient.

1.2 LOW INCOME ENERGY EFFICIENCY PROGRAM (LIEEP)

The Low Income Energy Efficiency Program (LIEEP) was part of a suite of Commonwealth Government measures announced in July 2011. LIEEP was a competitive merit-based grant program established by the Commonwealth Government to provide grants to consortia of government, business and community organisations to trial approaches to improve the energy efficiency of low income households and enable them to better manage their energy use (Australian Government Department of Industry, Innovation and Science, 2015). The LIEEP objectives and intended benefits are as follows:

1.2.1 Objectives

- Trial and evaluate a number of different approaches in various locations to assist low-income households to become more energy efficient.
- Capture and analyse data and information for future energy efficiency policy and program approaches.

1.2.2 Benefits

- Assist low-income households to implement sustainable energy efficiency practices to help manage the impacts of increasing energy prices and improve the health, social welfare and livelihood of low-income households.
- Build the knowledge and capacity of consortium members to encourage long-term energy efficiency among their customers or clients.
- Build capacity of Australia's energy efficiency technology and equipment companies by maximising the opportunities for Australian industries to participate in the projects.

1.3 POWER SAVERS PROJECT

In early 2013, the Nature Conservation Council of NSW (NCC) was successful in its application for grant funding to conduct the Power Savers Project (PSP) under Round 1 of LIEEP. This was one of 20 LIEEP trial projects throughout Australia, funded by the Department of Industry, Innovation and Science (the Department).

The PSP was a three-year, three-million dollar initiative which trialled an innovative approach to residential energy efficiency in 1,010 low-income households in the Sydney, Central Coast, Hunter and Illawarra Regions of New South Wales. The PSP was delivered by a Consortium including lead organisation (LIEEP Grant Recipient) Nature Conservation Council (NCC), United Voice NSW (UV), Solahart (SH) and the Institute for Sustainable Futures (ISF) at the University of Technology Sydney.

For the purposes of the PSP, low-income households were defined as households in the lower two household income quintiles¹. The PSP included a focus on assisting low-income tenants and low-income people from non-English speaking backgrounds.

1.3.1 Key Features

The key features of the project were:

- Providing detailed home energy assessments, tailored energy solutions, and ongoing contact and assistance for participants;
- Producing energy efficiency information and resources to cater for multiple languages;
- Recruiting and training interested participants to act as energy efficiency Champions in their community or workplace;
- Using peer-to-peer networks and storytelling to inspire and sustain energy-efficient behaviours;
- Including tenants (as well as owner occupiers) in the participant base, and identifying retrofit activities that could be undertaken in rented properties; and
- Undertaking robust evaluation and data analysis to inform future energy efficiency policy and programs.

1.3.2 Key Innovations

The approach of Power Savers to assist low-income households was new and innovative in terms of the recruitment and engagement methodology and also in relation to the specific subset of low-income households being targeted. Innovative aspects included:

- Recruiting and engaging the target audience through a trusted organisation, i.e. their Union, United Voice, which represents a range of low-income industries and workers in Australia;
- Reaching a new demographic of households who have not been directly targeted or eligible in energy efficiency programs previously, i.e. low-income working households who do not access welfare, Centrelink services or have a health care card;
- A large percentage of the targeted demographic were expected to be living in a rental property, the PSP made specific attempts in eligibility and program implementation to include participants from rental properties and make their engagement meaningful;
- Engaging tenants and landlords to develop cost-sharing arrangements for energy efficiency measures, i.e. installation of solar hot water systems; and
- Testing whether engagement of householders through the use of Champions, storytelling and peer-to-peer support networks leads to persistence of energy-efficient behaviours.

¹ as indicated in ABS 6530 Household Expenditure Survey 2009-10, specifically Table 6: Equivalised Disposable Income Quintile, Household Characteristics

The PSP represented an important opportunity to:

- reach and assist a new target demographic;
- highlight and attempt to address barriers to energy efficiency in the target audience; and
- demonstrate an effective, replicable model for inspiring sustained energy savings for low-income households.

1.3.3 Project objectives

Table 1 outlines the five key objectives of the PSP and planned outcomes.

Table 1: PSP Objectives and Planned Outcomes

#	Project Objectives	Planned Outcomes
1	Increase energy literacy among participants and therefore contribute to participants having a sense of control over their electricity use and electricity bills.	Participants have an increased understanding of the benefits of energy efficiency and increased energy literacy.
2	Reduce electricity use in participants' homes through the provision of one-to-one guidance (Energy Assessment and ongoing engagement with project staff), combined with the installation of energy-efficient technology in participants' homes (energy efficiency solutions will be tailored to the needs of each individual home).	Participating low-income households reduce energy use by a median value of 10% with a comparable reduction in household energy costs. Further reductions are expected for households that receive solar hot water systems.
3	Generate persistent electricity use reductions through the provision of ongoing support and communication through participants' peer network(s).	Effective peer-to-peer engagement leads to increased persistence of energy-efficient behaviours amongst participating households.
4	Develop and test methods to overcome split-incentive barriers in a select number of participant households by developing a method for upgrades to solar hot water systems (with degrees of subsidy) in rented properties.	Suggested approaches for overcoming split-incentive barriers that could be replicated in future projects.
5	Develop, implement, evaluate and disseminate effective, replicable models for reducing energy use by low-income households.	Effective, replicable models for reducing energy use by low-income households are implemented, evaluated and disseminated.

1.4 EVALUATION TO DATE

The Institute for Sustainable Futures at the University of Technology Sydney conducted a number of evaluation activities during the implementation of the PSP. These include:

- Evaluation Framework at the commencement of the PSP in May 2013
- Background Research report to inform project design in July 2013
- Livelihoods Workshop with PSP participants in February 2014 and Summary report in May 2014
- Evaluation Report of the Pilot phase of the PSP in June 2014.

A summary of these evaluations is detailed below. These reports were submitted to NCC (and subsequently the Department) as part of the Milestone Reporting for the LIEEP.

1.4.1 Evaluation Framework

The Evaluation Framework established the model for PSP data collection and analysis by:

- providing context across activities that determine the efficiency, effectiveness and/or appropriateness of the PSP by identifying;
 - external drivers to the PSP such as the Commonwealth Government and requirements of NCC to meet the obligations of the Funding Agreement
 - internal drivers such as the ability for the project to learn and improve from the Pilot, within the framework of the overall PSP
- documenting the project stakeholders, their needs, and how their skills and attributes affect the management of the project;
- defining the outcomes the PSP was seeking to achieve
- identifying inputs into the PSP that would translate into outputs and ultimately contribute to project outcomes
- identifying data sources for evaluation including:
 - Registration and participant group questionnaires (pre and post)
 - Home assessments
 - Livelihood workshops, and
 - Billing data.

The PSP was, where possible, delivered in accordance with the Evaluation Framework.

The Evaluation Framework was revisited for the purposes of this final evaluation, and updated to ensure evaluation covered the range of data collected (see Final Project Outcomes Logic in Table 15 and Table 16).

The Evaluation Framework is contained in **Appendix A**.

1.4.2 Background Research

The Background Research Report provided background evidence to inform and support design and delivery of the PSP. The report introduced theories of behaviour change and social practice, perceptions of energy efficiency and highlighted useful approaches to project design. The report also examined barriers to project implementation in engaging with low income and renter households. It also provided an analysis of, and conclusions from, past energy efficiency projects (via interviews with past project staff).

A summary of the key findings and recommendations of the Background Research Report include:

- No single behaviour change theory available can be described as ‘perfect’ or ‘right’ – what is consistent across theories is that behaviour is influenced by:
 - an individual’s perception of themselves within their environment
 - signals they receive about their behaviour from this environment.
- Social practice theory provides an alternative view of how individuals and structures participate in everyday practices.
- A deep understanding of biases and limitations of the end user needs to be identified as precursor to successful changes in behaviour.
- The 2013 United Voice Real Voices member survey provides a key reference point from which to draw narratives for the PSP e.g. members are already primed for narratives that articulate ‘cost of living’ pressures, especially electricity prices, as a class issue.
- It will be important to identify how PSP participants are empowered (through appeals to intrinsic values) and hence how well the project is achieving persistence of energy-efficient practices.

- A range of engagement materials and mechanisms will be required to satisfactorily engage participants.
- Segmentation technique based on either attitudes and actions or audience values may be more appropriate than segmenting by demographic characteristics.
- Use of a values approach may be most appropriate for broad communications whereas segmenting by actions could be useful when targeting a specific behaviour.
- Communicating across multiple mediums and tailoring messaging to value groups that are likely to be accessing that medium is recommended.
- While price barriers prevent low-income households accessing energy-efficient household appliances, other factors also play a significant role including:
 - reduced rates of financial or other literacy
 - language barriers and recent migrant or refugee status
 - reluctance to trust or engage with government agencies
 - illness or other health related concerns
 - transient employment
 - uncertain length of tenancy in buildings
 - behaviour of others
 - habit
 - comfort
 - health and hygiene.
- Installation of a broad range of energy efficiency technologies alongside wider education and communications projects presents an opportunity to assist low-income and disadvantaged households to embed technology within behaviours.
- Improving household energy efficiency may not always result in decreasing electricity bills because households could elect to realise non-energy or lifestyle benefits e.g. increased comfort during cold or hot weather events.
- Targeting of incentives to influence the behaviour of the landlord can help to overcome the split incentive barrier.
- Rebates can reduce the disincentive for owners/landlords to implement energy efficiency changes but are more likely to be effective when connected to regulatory obligations.

Analysis of other energy efficiency projects highlighted that:

- tailoring interventions to needs and wants of households is key to project success – there is no single project offering suitable for all households
- primary objectives of many energy efficiency projects are to improve electricity efficiency, lower electricity bills and provide more thermal comfort and energy literacy (compared to reducing greenhouse gas emissions)
- low-income energy efficiency projects have typically used government concession cards as an eligibility requirement, often an inadequate mechanism for identifying the most vulnerable and in need households
- owner-occupiers or public and social housing has been the focus of low income energy efficiency projects in the past
- the predominant model has been educational materials, combined with an in-home energy assessment and installation of basic energy efficiency items
- when solar hot water systems are installed in rented properties:
 - clear parameters about maintenance requirements are set and warranties are investigated on both parts and labour costs associated with replacing parts
 - the selection process considers the size of the household, how they use hot water, gas availability and connections and climate zones
 - the likely outcomes of the installation need to be clear to the participant
 - installation needs to be coupled with advice on tariffs to ensure households are not placed on a tariff that could result in higher electricity costs.

The Background Research Report is contained in **Appendix B**.

1.4.3 Livelihoods Workshop

The sustainable Livelihoods analysis (Ellis 2000) provides a framework for understanding capacity. Assessing household capacity provides an understanding of the values, interests and priorities of key stakeholders with respect to home energy efficiency. It also reveals the capacity of these stakeholders to adopt more energy efficient practices in the home and to understand capacity-building priorities.

This approach was used by the PSP in a workshop in February 2014 to identify the capacity of a small sample of participants. The participants were recruited through United Voice's membership base and had signed up to the project as Champions. A goal of 12 workshop attendees was set.

United Voice made intensive efforts to recruit participants to the Livelihoods workshops using financial incentives (\$50 Coles Voucher) and placing direct phone calls. Prior to the day of the workshop 20 people within a pool of 100 invitees said they would attend the workshop. However, primarily due to last minute shift changes and other shifting priorities, only 5 PSP participants attended the Livelihoods workshop. All 5 participants were homeowners from Western Sydney.

The workshop was conducted and the five participants completed a 'self-assessment' process using the Livelihoods method. The intention was to repeat the workshop 12 months later to determine how the capacity of participants to adopt more energy efficient practices in the home had changed. This was by comparing a range of indicators and self-assessment ratings to measure their capacity to save energy before and after participation in the PSP.

However, the relative success of the second workshop would hinge on all five members of the first workshop attending, to collect the post-participation data and eventually provide results during the final evaluation. One Livelihoods workshop attendee from the first workshop had withdrawn from the project due to lack of time, which also reduced the pool to 4 attendees. It was also clear that there was bias in the demographic profile of participants (all home owners from Western Sydney) and this sample, and their capacity data, was not representative of overall participation in the PSP.

Therefore, upon much reflection between Consortium staff, the second Livelihoods workshop was not conducted. Further, these findings suggested that workshops would not be an effective avenue for appropriately engaging participants in Champion style activities, and plans for workshops with Champions were also abandoned.

The Livelihoods Workshop Summary Report and key outcomes as well as result of the 'self-assessment' process is contained in **Appendix C**.

1.4.4 Pilot Evaluation

The PSP Pilot Phase was initiated to test a number of approaches that might be incorporated into the future roll-out of the PSP. Thirty (30) Pilot participants were recruited as United Voice members who had indicated concerns with energy costs and/or the environment or energy efficiency in previous UV member surveys.

The Pilot project brochure with a registration form was mailed out to these 30 members followed by a phone call within two weeks. A total of 18 registration forms were received and 5 verbal confirmations that registration forms were returned. Of the remaining 7 members recruited to the Pilot, 2 dropped out and 5 opted to be included in later rounds of the PSP. One more dropped out at the point of booking the assessment. Thus, the pilot included a total of 20 participants from the 27 recruited, giving a drop-out rate of 26%.

Each participant received a home assessment during September to October 2013, pre –assessment surveys and, after a 4-month period, post-assessment surveys. Pilot participants received In-home Displays only. The pilot did not test specific targeting of renters for the installation of solar hot water systems, billing data collection and analysis of actual energy consumption. Overall, early results from the pilot stage were positive.

The key findings and recommendations of the Pilot Evaluation Report were that the pilot:

- provided a good test of PSP objectives, data collection mechanisms and impacts on participants at an early stage of the PSP
- provided a snapshot of household characteristics likely to be represented in the wider PSP sample including:
 - single, couple and family households;
 - detached, and older dwellings;
 - large proportion of households using electricity for hot water, heating and cooling;
 - mix of owner occupied and rented homes;
 - mix of low-income employment industries; and
 - upwards of eight to ten consumer electronic appliances in the household.
- showed significant success in increasing energy literacy and feelings of control over electricity use at no cost to comfort within the home
- has contributed to a significant reduction in self-reported barriers to energy efficiency, in some cases halving the proportion of participants that cite these barriers
- identified four items that could be considered during the main PSP rollout:
 - revisions to the post-intervention survey and participant contact protocols (dedicating more resources to gather the post-intervention data);
 - importance of the right person as the home assessor (tighter scheduling of home assessments and ensuring consistency of participant experience);
 - importance of follow-up communications (variety of communications mediums to achieve persistence in energy efficient behaviours);
 - continued inclusion of the In-Home Display as an option in the menu of energy solutions (participants energy literacy increased); and
 - Adequately addressing the needs of renters (who were not included in the pilot).

The Pilot Evaluation Report is contained in **Appendix D**.

2

Project Delivery

2 PROJECT DELIVERY

2.1 PROJECT MANAGEMENT

2.1.1 PSP Key Stakeholders

The key stakeholders for the PSP included a consortium of organisations including NCC, UV, ISF and Solahart.

NCC was the LIEEP Grant Recipient and Consortium lead and led the development and implementation of the PSP. As lead organisation, NCC was responsible for overseeing the coordination and administration of the PSP including the requisite reporting and financial requirements as well as management of subcontractors.

United Voice NSW branch was the consortium member who, through its membership base and existing relationships as a trusted partner, engaged and recruited low-income households and their families. United Voice staff contributed to ongoing engagement with participants, working in collaboration with NCC staff. United Voice's Outbound Call Centre was used to approach members by telephone and United Voice field organisers approached members in person.

ISF was the consortium member responsible for evaluation of the PSP. ISF provided the Background Research Report to guide development of the project design, developed the Evaluation Framework for the project and provided two evaluation reports including an evaluation of the Pilot and the Final Evaluation Report (this report).

Solahart was the consortium member responsible for site inspections and installation of solar hot water systems and entered into a cost-sharing agreement for the installation of the solar hot water systems for the PSP.

Additional project oversight and experience was provided through a PSP Advisory Committee which included representatives from:

- Office of Environment and Heritage
- University of Sydney
- Australian Council Of Social Services
- Energy & Water Ombudsman NSW
- Ausgrid
- Tenants Union of NSW

CSIRO were engaged by the Commonwealth Government on the LIEEP program to:

- provide expertise on trial design and execution to the Commonwealth Government and Grant Recipients
- develop and maintain a centralised data repository to store trial data collected over the life of the LIEEP program
- conduct quantitative and qualitative analysis of LIEEP trials
- produce financial year reports for the Department detailing the outcomes of the LIEEP trials.

2.1.2 Data Management and Collection

Data management was a core piece of delivering the PSP and was overseen by NCC and UV staff.

Three types of project delivery data were captured:

- project delivery information and tasks
- participant information and interactions
- home energy assessment data.

Project Delivery and Participant Interactions

A number of online / cloud-based systems were considered and trialled during the project, as shown below in Table 2. In the end, two systems were chosen to primarily manage project data:

1. FluidSurveys to administer the assessment survey, 'Power Savers Assessment Tool' (PSAT)
2. Salesforce as a Client Relationship Management system (CRM).

These are described in more detail below.

Table 2: Project systems considered and utilised

SOFTWARE	USE FOR PSP
Project / task management software	
Wrike <i>Initially piloted, discontinued</i>	• project management tool to assist in the completion of cross-organisational tasks • mainly used by NCC internally as a back-up reminder for tasks • discontinued after one year as little time available to spend training key personnel in how to use
Asana <i>Initially piloted, continued</i>	• free task-management tool • enabled the UV project coordinator to create interactive lists of tasks, to be shared with the OCC (operated out of hours)
Participant relationship management software	
Google docs <i>Initially piloted, discontinued</i>	• tracked interactions with participants during the pilot phase • free and relatively quick and easy to set up • not sufficient to handle detailed and complex interactions required over the life of the project
Unison <i>initially piloted, discontinued</i>	• database system used by United Voice to manage membership database • used by UV during Round 1 and 2a recruitment • decided that including the recruitment piece within Salesforce would allow for cleaner management of data

SOFTWARE	USE FOR PSP
Salesforce <i>Identified post-pilot, continued</i>	- selected following exploration of potential Customer Relationship Management (CRM) software - eligible not-for-profit discount applied but funding for other non-core areas still required to purchase - worked with locally-based companies Arxxus and, later, Clouding Around to develop the SF platform which was used to: - maintain contact details - track 'journey' of each household through the PSP - schedule and manage home assessment bookings via an integrated calendar application shared with assessors - collect data for the Pre-Intervention Phone Survey, QR1, QR2, QR3 and POPs - deploy PARs and maintain an inventory of PARs - manage status of Billing Data Consent forms, PARs and SHWS installations - track potential Champions - track calls made and provide a history of interactions - attach files, communications and PAR receipts - note translation requirements - SMS participants (via the "SMS Magic" App) - produce quick and simple data reports and graphs
Survey tool for collecting home assessment data in the field	
Survey monkey <i>Initially considered, not utilised</i>	- free well-known tool - did not contain the necessary functionality (in particular, offline capability) for PSP needs
FluidSurveys <i>Initially piloted, continued</i>	- superior functionality, particularly sophisticated survey logic and offline capabilities - used by home assessors in the field regardless - fully customisable by Project Staff - very affordable alternative to developing Application for the same purpose

Billing Data and Consent Forms

It was agreed at the inception of the project, that in order to measure electricity consumption reductions and cost savings over the life of the project, the PSP should collect electricity consumption data from each of the 990 participants (the Pilot phase, covering 20 participants, did not measure electricity savings – see Pilot Evaluation Report in **Appendix D**). It was identified the electricity consumption (or billing) data would need to be obtained from the electricity distribution companies, responsible for reading the household's electricity meters.

PSP households were in areas serviced by the energy distributors Endeavour Energy and Ausgrid. Both organisations were approached by ISF with a data request to supply billing data for PSP participants in order to conduct an evaluation of electricity savings. It was identified that consent would be required from each householder, as well as the National Meter Identifier (NMI), address and customer name in order for the energy distributors to validate the participants and release the data.

During the Project Design stage, ISF worked in consultation with the energy distributors and NCC to develop a Billing Data Consent Form (see **Appendix E**) which the electricity account holder for each household assessed would be asked to sign. The form contained a number of fields relevant to the data export request that would be made at the end of the project to the distributors in order to obtain the consumption data for evaluation.

NCC was responsible for obtaining and recording these Billing Data Consent form.

It was known that the sample size of 990 was a small sample for evaluation purposes, so the PSP aimed to collect as many billing data consent forms as possible. It was also expected that there might be some attrition from those declining to sign consent forms or moving home. So as the project evolved, and the best approaches to maximising return on the Billing Data Consent forms started to emerge, the method for approaching participants and making the request changed.

An e-signature was initially preferred for the Billing Data Consent form in an attempt to make the process easy for the assessors to manage (e.g. avoid posting signed forms) and give an instant electronic record with the added benefit of saving paper. The e-signature plan was abandoned due to:

- technical issues with e-signatures via FluidSurveys
- the electricity account holder not being home at the time of the home assessment
- householders undecided about signing the form (after the energy assessor had left)
- translated versions being needed

The Billing Data Consent form was translated whenever requested by householders, but there were only a few requirements for this. The Billing Data Consent form was also translated into the top 5 languages for assessors to carry with them in case they encountered ESL difficulties.

Some householders did refuse to sign the Billing Data Consent form at the time of the home assessment, or wanted more time to consider signing. At times the electricity account holder was not home during the home assessment. In such cases, assessors were instructed to continue with the home assessment as normal, provided the household allowed it. For the first 50 – 100 assessments, it became apparent that a further incentive would be required to increase the rate of return of Billing Data Consent forms.

As such, a strategy was put in place to obtain as many Billing Data Consent forms as possible:

Plan A: the Billing Data Consent form was received at the home assessment. Assessors noted this as 'Yes' in FS and then mailed a batch of Billing Data Consent forms to NCC every fortnight. Of 906 households that consented to providing forms, 174 forms could not be obtained at the energy assessment (20.6% of forms) and had to be followed up with householders at various stages of the project. The reasons forms were not signed at assessment were:

- 99 – Account holder not present;
- 21 – Electricity bill unavailable at time of assessment;
- 4 – Householder refused outright;
- 50 – Householder wanted more time to consider it.

Plan B: if the account holder was not present at home assessment, the energy assessor (assessor) left a form and a reply-paid envelope at the home for the householder to return. The assessor would inform the householder that they would not be eligible to receive a PAR unless they signed and returned the Billing Data Consent form.

Plan C: if no form was received at 2 weeks post-home assessment, a cover letter, form and reply-paid envelope was mailed to the household. This was often integrated with the PAR phone call made to participants following their home assessment. NCC staff would discuss PARs with the householder, but clarify that these would only be provided once project staff were satisfied the householder either returned a satisfactory copy of their form signed by the electricity account holder, or that they could not sign the form because it was out of their control (e.g. difficulties obtaining consent from the account holder or the account holder was their landlord).

Plan D: if still no form was received at 4 weeks post-home assessment, an SMS was sent to the householder

Plan E: if still no form was received at 6 weeks post- home assessment, the householder was phoned

Although the above strategy did result in an increased rate of return of Billing Data Consent forms, there were still some householders who were not comfortable with the process, and refused to sign the Billing Data Consent form.

Table 3 shows a final breakdown of the Billing Data Consent form status of the 990 participant households (excluding 20 pilot households).

Table 3: Attrition of Billing Data Consent forms from PSP participants

Status of Billing Data Consent form	Description of Status	Numbers
Billing Data Consent forms Not Received		
Withdrew and no Billing Data Consent Form	Participants who dropped out and did not provide a signed Billing Data Consent Form	46
Unable to provide Billing Data Consent Form	Participants who wanted to provide a signed Billing Data Consent Form, but did not have the power/rights/ability to do so	7
Refused to sign Billing Data Consent Form	Participants who either said they are not willing to sign the Billing Data Consent Form, or Power Savers was unable to get in touch with them	31
TOTAL		84
Billing Data Consent forms Received		
Received signed hard copy Billing Data Consent Form	Signed by the householder at the home assessment	846
Billing Data Consent Form signed in FluidSurveys	For home assessment's completed at start of project	60
TOTAL		906

Therefore, consent to access billing data was obtained from 906 participant households in total.

Home Energy Assessments

The Home Energy Assessments (home assessments) were the source of a number of key pieces of information, including

1. Acceptance of the Privacy Notice and completion of the Billing Data Consent form, necessary in order to access billing data.
2. Demographic data, e.g. number of residents, tenure type and length
3. Energy bill information, energy sources, billing data (where possible) and tariff information
4. Dwelling data e.g. number of bedrooms, living rooms, dwelling material.
5. Recommended actions to be utilised to develop the PSAPs
6. Inventory of energy efficiency measures installed during assessment (e.g. *ValveCosy*™)
7. Recommended PARs

2.1.3 Home Assessors

A key part of the PSP design was the delivery of home energy assessments to participants. Advertisements (Expressions of Interest or EOIs) were released to recruit home energy assessors to deliver the home assessments.

Initial EOI: Pilot Phase

The initial EOI selected a qualified and experienced energy assessor for the delivery of the Pilot in Sydney. Existing connections between NCC staff and other organisations that had run previous energy efficiency projects in the Sydney region were explored. One potential candidate was recommended by a known and trusted organisation, and was subsequently asked to submit his CV and make a formal application for the role. Having fulfilled the criteria, this candidate was recruited as Pilot assessor to assist with the development and roll-out of the Pilot. The Pilot assessor was given an

induction to the project at NCC's offices and then conducted the home assessments with the 20 Pilot participants.

As the project developed and the frequency of home energy assessments increased, the need for an additional 4 home assessors to work alongside the original pilot home assessor was identified.

Second EOI: Rounds 1-3

This time, a more formal EOI was submitted on the ABSA (Association of Building Sustainability Assessors) website as well as through known networks that energy assessors would frequent such as the Alternative Technology Association (ATA). 10 responses to the advertisements (EOI) were received which was not considered a large response. Each of the additional four home assessors was identified via their registration and membership of ABSA. Assessors responded to the ABSA advertisement by submitting their Resume and a covering letter. The 10 responses were reviewed and suitable candidates contacted to discuss more particulars of the role.

Each home assessor was recruited on the basis of meeting certain selection criteria, namely:

- Certificate IV in Home Assessment
- Extensive practical experience in energy assessment of (low-income) households.

The EOI process resulted in a total of 5 home assessors recruited for the project. As with the Pilot assessor, the four new energy assessors were given an induction to the project at NCC's offices. The Pilot assessor was involved in delivering this induction. After this, each new assessor attended a minimum of one practical home assessment with an existing assessor, to ensure that the information conveyed to participants was consistent. Additionally, the training ensured that assessments complied with the project objectives and data collection requirements while remaining responsive to the diverse requirements of the target participants (e.g. NESB/CALD).

2.2 PARTICIPANT ENGAGEMENT

A potential PSP participant travelled through various stages:

- **Lead:** Nominated as a potential recruit and contacted to join the project
- **Recruit:** Eligible to participate and agreed to join the project
- **Participant:** Completed a home energy assessment.

2.2.1 Recruitment

Eligibility

United Voice was engaged as a consortium partner in the PSP due to their strong engagement with their membership, who predominantly work in low-income industries. This was a demographic who has not generally been engaged previously for energy efficiency benefits i.e. low-income working householders who do not access welfare or Centrelink services nor have a health care card (many of which fall into the second lowest income quintile).

Eligibility criteria set by the Department was quite generalised, loosely based on the definition of 'low income' being the 2nd quintile of income, as per ABS 6530 Household Expenditure Survey 2009-10.

PSP Eligibility Criteria was developed collaboratively between NCC and UV. The criteria included householders who were slightly higher wage earners than the 2nd income quintile but were eligible due to financial vulnerability created through relative proportion of income spent on housing, as well as energy stress indicators. International students and renters were also included with intent in the criteria.

Eligible groups included:

- Household income under \$68,540
- Renting + individual income under \$68,540 + paying >30% of income spent on rent;

- Renting + individual income under \$68,540 + unable to pay bills;
- Renting + individual income under \$68,540 and NESB;
- Household income under \$80,000 + NESB + >30% of income spent on rent or mortgage;
- Household income under \$80,000 + NESB + unable to pay bills;
- Household income under \$80,000 + >30% of income spent on rent or mortgage + unable to pay bills;
- Household income under \$80,000 + renting + NESB
- Household income under \$80,000 + renting + >30% of income spent on rent;
- Household income under \$80,000 + renting + unable to pay bills;
- International student

Eligibility criteria were utilised at the 'leads' stage of recruitment. Once a lead was confirmed eligible for the project and agreed to join the PSP, they were converted to a 'recruit'.

Recruitment method

Through negotiations with UV, NCC and the Commonwealth Government, the PSP decided to target the Regional Development Areas (RDAs) of Sydney, Hunter, Central Coast and the Illawarra (henceforth referred to as 'Regions'). UV did not have RDA information readily available in their records, so categorised leads for the PSP based on federal electorates that fitted roughly within those boundaries.

Federal electorates were used for the recruitment roll-out as these were manageable areas both in terms of size and distance for assessors to travel, and the boundaries would remain the same for the period of the project. These electorates were split between the planned control and non-control groups based on expected recruitment figures from each to have an equal proportion of each RDA in the control and non-control group.

Recruitment was also broken into rounds based on the original project plan (more discussion of recruitment rounds is contained in Section 2.4.1). During these different rounds recruitment was undertaken through a range of different strategies.

Due to time limits the use of a call centre proved to be the most practical and manageable form of recruitment. For this method, an electorate was mailed a recruitment package, and within two weeks leads would receive a call from the call centre. It was expected that not all leads would be eligible for the project, and that other factors (interest, time availability) would also play a role in recruitment success.

It was also expected that some recruits would withdraw from the project before receiving an energy assessment, as receiving an energy assessment. CSIRO indicated that the PSP should expect an attrition rate of 30-50%, therefore this rate was factored into the projects recruitment targets to ensure the overall participant target was achieved. Over time, United Voice finessed methods for recruitment to reduce drop-off rates which were very effective.

Champion and Organiser recruitment also played a crucial role in recruitment, however they are much less manageable and unpredictable methods when specific targets and timelines are required to be met.

Lessons Learned

Future programs of a similar nature to PSP could apply the following lessons to recruitment of participants:

- Use a call centre - an effective way to reach recruitment targets on a tight timeline
- Tailor call times to the industries or specifics of the demographic
- Provide adequate resourcing to allow NESB/CALD participants to engage
- Book home assessments on the same call as recruitment and complete the assessment within two weeks of the call to reduce attrition
- Use a CRM to manage all stages from recruitment to assessment booking on one screen

- Be aware that not all leads may meet eligibility criteria for the project so consider attrition based on this factor
- Use a trusted organisation with a strong pre-existing relationship to streamline recruitment

2.2.2 Participant Journey

The participant journey for the PSP sought to ensure a meaningful and enduring interaction with participants, encourage persistent behaviour change and meet the practical evaluation requirements of the project. Table 4 outlines the participant journey for the PSP.

Table 4: PSP Participant Journey

Timing	Elements of journey	Key responsibility
Start	Recruitment Pre-intervention phone survey Scheduling of in-home energy assessment (home assessment) Welcome letter sent out after recruitment	United Voice
2 weeks	2-hour home energy assessment; Support to householder to install small scale tailored energy efficiency equipment e.g. hot water pipe insulation, Ecoswitch™ (At-Assessment Retrofits)	NCC / Energy Assessor
1 month	Tailor made Power Savers Action Plan, based on home energy assessment, posted to householder.	NCC
2 months	Phone call to householder to review assessor recommendations and provision of post-assessment retrofit(s) (PARs)	NCC
3 months	First quarterly phone call (QR1) to householder.	United Voice
6 months	Second quarterly phone call (QR2) to householder. Fact sheets distributed via post as required / requested.	United Voice
9 months	Third quarterly phone call (QR3) to householder to: - check in, review progress; - ask about whether they would like to take the next step as a Project Champion; and - follow up on any outstanding previous steps (e.g. has rebate offer been taken up?)	United Voice
12 months	Post-intervention (evaluation) phone survey (POPS) conducted with householder to address project impact against baseline. Conclusion of journey. "Champions" invited to final Conclusion Event.	United Voice

Integrated into this participant journey were other educational materials such as seasonal newsletters (winter and summer), which were posted to all participating households, as well as SMS reminders relating to their scheduled energy assessment and rebate expiries.

Other aspects of the journey for some households included a subset of:

- 'Energy Champions' recruited and trained to promote energy efficiency, network with peers and share successful energy performance improvement stories
 - a subset of the above 'Energy Champions' helped to form Power Savers Teams (community focus groups) in their communities of practice
 - this included additional United Voice members who were not involved in PSP
- Households receiving installation of a free solar hot water system (home owners).

2.3 TREATMENTS

Each household participating in the PSP received an energy efficiency ‘treatment’ to help them save energy and money in their home. The treatment consisted of an in-home energy assessment (home assessment), At-Assessment Retrofit items followed by a Post Assessment Retrofit(s) (PARs) and a Power Savers Action Plan. In addition, 79 households received a Solar Hot Water System (SHWS) including one Pilot household.

2.3.1 Home Energy Assessments

Home Energy Assessments (home assessments) were conducted with all householders participating in the PSP. The home assessments were delivered by Energy Assessors (assessors) who were employed specifically for this role.

The home assessment process was designed to engage households, while still meeting data collection requirements defined by the Commonwealth Government and CSIRO. Home assessments were all conducted in participants’ homes by assessors over a 1-2 hour period.

Assessors guided the household through:

- A number of documentation requirements (as outlined in Section 4.1.2)
- Detail and visual aids relating to a number of energy efficiency themes:
 - hot water, including if solar hot water is feasible / recommended by assessors
 - swimming pool and spa use, if applicable
 - heating, including levels of comfort
 - cooling, including levels of comfort
 - lighting in and around the home
 - appliances, including age and efficiency, as well as standby power use
- Action pages for each themed page, prompting discussion between the assessor and householder, leading to the eventual formation of the Power Savers Action Plan
- Provision and/or installation of a suite of ‘At-Assessment Retrofit’ items, as applicable to each household
- Recommendations for ‘Post-Assessment Retrofits’ (PARs), tailored to each household
- Questions regarding the household’s willingness to participate in any future media/case studies, as well as any interest in the ‘Energy Champions’ aspect of the PSP
- From October 2014, questions to tenants regarding willingness and approval for the PSP team to approach their Landlord/Real Estate Agent directly, subject to the assessor recommending SHWS as an option for the rental home.

The basic expenditure model applied to the home assessment was based on the PSP receiving approximately \$500 of direct funding for each household which was applied as:

- \$200 for the assessor
- \$50 for At-Assessment Retrofits
- \$250 for PARs.

Due to the main holiday periods each year, there were minimal home assessments in December and January. The PSP completed all Round 1 and 2 assessments by the 31st January 2015, with the remaining Round 3 group home assessments starting from February 2015.

2.3.2 Retrofits

At-Assessment Retrofits

During each home assessment, assessors had at their disposal a suite of 'At-Assessment Retrofit' items that they had the option of providing and/or installing including:

- shower timer (4 minute)
- door snake
- thermometer (showing recommended temperatures for freezer/fridge/heating/cooling/hot water)
- *ValveCosy*™
- Lagging (insulation) for hot water pipes, plus zip ties
- LED globe (Osram 9W, 650lm, warm white, screw or bayonet)
- Door seal (Raven - RP17)
- Window and door seal (Raven - RP14)
- Tap aerator
- *Ecoswitch*™
- *Renshade*™

As the energy solutions for each household were tailored, the At-Assessment Retrofits provided by the assessor were chosen based on what would potentially make a difference for the particular household, and only in agreement with the householder. Assessors provided householders with any of the above items that the household did not already have, and that would also be of likely benefit in the household saving energy and money on their bills. On most occasions, all or most At-Assessment Retrofits were provided.

Post-Assessment Retrofits

Following the assessment, the participants received at least one type of Post-Assessment Retrofit (PAR):

- Energy efficiency equipment OR an In-Home Display energy monitor device up to a total value of \$250
- OR
- A rebate for energy efficiency appliances up to a total value of \$250.

These are listed in Table 5.

Table 5: Types of Post Assessment Retrofits

Energy Efficiency Equipment	Rebate (valid for 3 months)
An in-home display (IHD) for home owners OR A combination of the following items up to the value of \$250: • LED light-globes, LED downlights and PAR30 spotlight-globes • pedestal fan • ceramic fan heater • draught-proofing products (caulking tubes, door and window seals, draft-stoppers) • water-efficient showerheads • other extra At-Assessment Retrofit items	A rebate of up to \$250 to contribute to one or more of the following: • Fridge • Freezer • Fridge/freezer • Fridge seals • Washing machine • Dishwasher • Outdoor shutters • Whirlybird installation • Curtains/pelmets • Draughtproofing works • Insulation (ceiling or floor) • LED downlights • electric to gas HWS upgrade • storage to instant HWS • HWS temperature check • HWS size reduction • SHWS inspection/repair • Solar panels (photovoltaic) • Reverse-cycle air-conditioning • Air conditioner service • Ceiling fan / window fan / pedestal fan • Dyson Hot & Cool fan • Microwave • Rice cooker • Pressure cooker • Oven seals or hinges/stove repair • Clothes horse • Flyscreen • LED TV (to replace CRT or Plasma) • Skylight • Blankets (including electric)

An initial 3-month expiry was placed on all rebates in order to encourage householders to replace old inefficient appliances as soon as possible and for the PSP to evaluate the benefits within the LIEEP program period. In certain circumstances, an extension up to 6, 9 and/or 12 months or more was allowed to enable householders to save up the extra monetary contribution.

2.3.3 Solar Hot Water Systems

In addition to the rebate available for various adjustments/upgrades available to hot water systems (as set out in Table 5 above), the initial design of the PSP identified a target of providing 100 Solar Hot Water Systems to participants, which included:

- 50 fully funded SHWSs for home owners,
- 50 subsidised 'split-incentive' (cost-sharing) SHWSs for landlords and their tenants.

However as the project evolved, it was evident that the cost-sharing arrangement was not progressing to the point of *installing* systems, therefore in 2014 an additional target was included for evaluation:

- *Engage* 50 landlords and their tenants to develop up to 50 cost-sharing arrangements for installation of solar hot water systems.

This target is reflected in the final Project Logic Table 15.

Homeowners

The PSP had a funding pool of \$250,000 available for the installation of 50 fully-funded SHWSs for home owners.

During the home energy assessment, if a new SHWS was deemed beneficial, the energy assessor would conduct and record (in FluidSurveys) a basic site assessment to determine if the household was physically suitable for an installation, which included shading issues, roof type, pitch and orientation. The assessor also collected information about the following:

- Type of current hot water system
- Location of existing hot water system (i.e. plumbing configuration)
- Age of existing system
- Tank condition (if corrosion visible, needs replacement)
- Tank size
- Location of driveway (i.e. access).

A certain number of homeowners were then selected each month that ranked with the highest points based on the selection criteria in Table 6.

Table 6: Selection criteria for Solar Hot Water System installation in owned properties

Selection Criteria	Points / weighting
1. Number of occupants (1-2, 3-4, 5+)	25% (5%; 15%; 25%)
2. Age of HWS (1-5, 6-10, 11+)	50% (5%; 15%; 50%)
3. Electric Storage HWS	15%
4. Champions potential*	10%

*The PSP team decided to allocate a small weighting to householders who were likely Champions

Solahart contacted the selected home owners each month to arrange for a more detailed site inspection (than the first inspection at home assessment) to check for SHWS suitability. If this inspection was successful, an installation date was organised.

Tenants

No funding was allocated to the installation of SHWSs for tenants and landlords.

The project aimed to fund the cost of a solar hot water system by offering a significant discount, and sharing the remaining cost between the participant's landlord and the tenant under a cost-sharing or 'split-incentive' arrangement.

Administratively, a similar process to homeowners was initially undertaken by assessors in order to determine site suitability for a SHWS installation in a tenanted property. Slightly different criteria were used to rank priority for tenanted homes, as set out in Table 7.

Table 7: Selection criteria for Solar Hot Water System installation in rented properties

Selection Criteria	Points / weighting
1. Age of HWS (<1, 1-2, 3-5, 6-10, 11+)	50% (0%; 5%; 15%, 35%, 50%)
2. Length of tenure (< 6 mths, 12 mths, 18 mths, 24 > mths)	20% (0%; 10%, 15%; 20%)
3. Number of occupants (1-2, 3-4, 5+)	20% (5%; 10%; 20%)
4. Relationship with landlords (OK, Good, Excellent)	10% (0%; 5%; 10%)

A key aspect was both the age and condition of the current HWS. In late 2014, a slight adjustment was made to the criteria to give a higher weighting to older HWSs, as per the above. The PSP team decided it was highly unlikely for a landlord to change over a system that was not older (11 years or more) or in need of repair.

Critically important was obtaining permission from the tenant for the PSP team to contact their landlord or real estate agent. Without tenant consent, the PSP did not proceed. If permission was granted, NCC obtained contact details for the landlord.

In a later iteration of the FluidSurveys tool, and in order to streamline the process, assessors would ask for tenant permission at the home assessment, as well as obtain contact details for the landlord or real estate agent.

NCC or Solahart would then contact the landlord or real estate agent to attempt gain their agreement for a no-obligation Solahart site inspection to confirm site suitability.

A successful inspection would be followed by negotiation with the landlord and/or tenant regarding a cost-sharing arrangement.

A number of documents were produced in order to assist in informing both the landlord and tenant about the arrangement and the potential benefit including:

- Letter to Landlord/Real Estate Agent (including the PSP discount on offer)
- Fact Sheet for Landlords (including SHWS benefits and potential tax benefits)
- Landlord Agreement (between NCC and the Landlord)

If there was interest from the landlord or real estate agent, the letter and fact sheet were posted, and Solahart or NCC placed a phone call to follow up 1-2 weeks later.

2.3.4 Energy Champions

Individual Champions

The PSP aimed to recruit and support a total of 60 'Energy Champions'. The purpose of the Champions initiative was to empower householders to tell their stories to their peer networks and / or encourage others to get involved. United Voice led this aspect of the project, in collaboration with NCC.

There were different types of Champions, ranging from those who actively recruited others to the PSP, to those wanting to lead in promoting energy efficiency, either within their workplace or amongst their extended community.

CuriousWorks (digital media production subcontractors) worked with Pilot participants to create professional short videos to help promote the PSP. CuriousWorks carried out a formal training workshop series to enable the community to tell their stories through video and other digital means.

Through digital storytelling (e.g. video, photography, other digital interactions), it was hoped others in the community would also be actively encouraged to get involved.

To begin this process, four (4) of the first twenty (20) Pilots that were recruited to the project volunteered to be involved in a professional video to provide an overview of their experience with the energy assessment. These would then be used to assist with recruitment. A compilation of these four films can be found here: <http://youtu.be/HtOlwMOAhyl>

This video was screened at United Voice's delegates conference in late 2013 (resulting in a few recruits) and at a few industry meetings.

In communications with householders, UV encouraged them to ask their family, neighbours or work colleagues to join the PSP by providing a brochure in every PAR letter.

A large part of the Champions interactions were initially phone-based. The OCC had training around identifying and developing Champions, as well as a 'Champions Script' to follow when a potential champion was identified. Interaction with Champions then increased into late 2015, as more time was available for NCC and UV to work with the Champions and Teams face to face.

Power Savers Teams

The PSP was able to create five Power Saver Teams which occurred between Milestone 8 and 9 of the project. These were formed using PSP Champions, establishing a team where an existing workplace or community structure was already in place. Team development used four existing structures and an EOI process to connect individual champions to Power Savers Team activities. Table 8 outlines the goals that were identified for each structure and team.

Table 8: Goals of the Power Savers Teams

Structure	Power Savers Team	Goal
Workplace	Early Childhood Education and Care (ECEC) Centres	Develop ongoing community and peer to peer EE education through Early Childhood Education and Care (ECEC) Communities
Industry Group	Catholic Care Homecare Liverpool	Progress peer to peer education and activity amongst work colleagues and community beyond the home assessment option
Geographical Location	Oatlands Retirement Village	Increase EE knowledge and action within the Oatlands Retirement Village Community
UV Event	Delegates Conference	To provide PSP participants the opportunity to connect with others who have been part of the project and to encourage sharing of EE learning with others in the broader member community
Other	The EOI Group - Connecting Individual Champions to Team Activity	Surface potential for ongoing activity or other teams outside of those identified as having an existing structural base

The key activities completed by each of the five Power Savers Teams are outlined below.

Team 1: Early Childhood Education Centres

- Three centres participated in the Power Savers Team
- Each centre nominated their sustainability officer to take part in "Sustainability in Early Childhood" training delivered by TTA and incorporating resources developed by Cool Australia - the training is based on curriculum outcomes set by the Federal Government and included using energy efficiency as an example within the training

- The key focus was sharing the knowledge of energy efficiency, alongside the broader topic of sustainability, with the wider community via the Early Childhood Education Centres' peer networks
- Training delivered online in a flexible format over 6 hours- enabled educators to improve their own practice as well as being a platform from which they could develop a resource to support other educators improve their capacity to teach sustainability
- supported by an NCC project worker, educators who took part in the training were invited to contribute to a guide to be distributed broadly
- trained educators were supported to each run a workshop to test the effectiveness of the guide
- Table 9 outlines the key Power Savers Team activities undertaken by each centre

Table 9: Power Savers Team – Early Childhood Education Centres

ECEC Centre and Location	Team Activity
Centre 1: Community based centre located in Randwick	• Led the ECEC project and contributed most strongly to the development of the guide • Early adoption of the training into their centre activities • Gave clear recommendation on the format and inclusions of the guide • Facilitated a workshop with 14 educators from 12 centres across NSW
Centre 2: Privately owned centre located in Strathfield	• Took part in an onsite energy assessment improve the EE of the centre • Develop resources for two audiences; (i) families who use the centre to improve EE in the home and (ii) Other ECEC Centres to improve EE in the workplace • Intend to expand their website to have EE information appropriate for the home included • Provided a pilot template which could be adopted by other centres to improve EE (developed by one of the PSP assessors who worked closely with this centre)
Centre 3: A national ECEC chain located in Western Sydney	• Committed to train educators from other centres in the area from the same provider • Hosted an after-hours workshop, inviting all centre staff and neighbouring sister centres to participate. 16 educators and 5 centres represented. • Intended to take the learning and guide back to their centre networks broadly

Team 2: Catholic Care Homecare Liverpool

- Identified and worked with PSP participant who was homecare workplace leader to coordinate and to determine the content of 1 hr workshop which aimed to:
 - give those colleagues who didn't participate in the PSP opportunity to learn about EE
 - give those who did participate in project opportunity to talk about their own learning and experience and
 - provide care workers will simple skills so they could pass EE advice on to clients
- Worked with a PSP assessor who had relationship with leaders to support presentation and facilitation
- Held workshop during September 2015 monthly team meeting
 - 50 care workers participated who did not participate in PSP (including those in the team)
- high level of interest from workers on how they could make their own homes more EE

- identified pressure on budgets of care workers and their clients from electricity bills was high
- PSP fact sheets made available to participants and encouraged to take copies for clients as well - high take up
- request to provide electronic copies of presentation prepared by the assessor
- further request to distribute electronic copies of the presentation

Team 3: Delegates Conference

- In 2015 United Voice hosted biannual delegate's conference of 250 members, 24 had participated in the PSP
 - conference is opportunity for members from different industries and geographical locations to come together
 - home assessment phase of the project had concluded by the conference date, so further participation was not possible
 - Provided a chance for PSP delegates to talk about what they had learned and to connect with others who had also been part of the project
- Phone and mail contact was made with PSP delegates ahead of conference to talk through their experience of the project and their willingness to act as an ambassador
- PSP delegates were encouraged to think about a key behaviour change or learning they had throughout the project and to be prepared to share that with others
- PSP delegates provided with a badge stating "I did the Power Savers Project, ask me about it" and were ready to tell a little about their experience and learning
- PSP fact sheets given to PSP delegates to distribute
- PSP delegates had conversations about the PSP with non-participants but the principal engagement came from PSP delegates connecting with one another
- PSP delegates had not met prior to conference but enjoyed the opportunity to talk about and compare experiences

Team 4: Oatlands Retirement Village

- 2 PSP Champions were residents of the village
- Champions attempted to work with the body corporate to develop a community based energy efficiency action to take place post July 2015
- After numerous on site visits and conversations to progress with champions they reported that it was difficult to get approval from the body corporate and team activity was discontinued

Team 5: The EOI Group - Connecting Individual Champions to Team Activity

- At QR3, and where relevant in other Champions conversations, participants were invited to take part in local Power Savers teams
- There was soft interest in local team potential
- An Expression of Interest (EOI) was sent to all PSP participants to gauge interest in attending a PSP workshop or other activity:
 - EOI surveyed interest area, availability and location possibilities
 - Translated versions of EOI were provided to those who required written translations at other points in the project
- 28 EOI's were returned, 24 indicated interest in an ongoing activity

- The majority of EOI's did not share similar location preference or availability
- Due to time and resource constraints, instead of workshops, appropriate local councils energy efficiency projects were identified:
 - Councils were contacted and interested participants were referred to these projects (in their own and neighbouring regions)
 - 14 participants elected to be referred to local council groups

Final PSP Event

The PSP identified a conclusion event was an important final step in the PSP journey for participants. NCC and UV identified that the goal was collective engagement, including that at the dinner:

- participants engaged with each other
- participants felt that their contribution to the project was valued and celebrated
- the conclusion of the project was recognised
- light activities for people to engage in as a collective were provided e.g. photographing participants achievements during PSP, prizes of energy efficient products.

The dinner was held on Monday the 16th November at Diethnes Restaurant in Sydney. Forty two (42) project participants and guests attended from an anticipated fifty two (52). The three (3) principal PSP assessors and their partners and project staff from NCC and United Voice also attended. Overnight accommodation was provided for four (4) regional participants and workplace release organised for two (2) participants from the Sydney metro area.

The following activities were implemented to achieve the goal of collective engagement:

- take a photograph with your guest, or others, and hold an energy saving themed message
- a lucky door prize draw where 1st prize was a highly sought after Dyson Hot and Cool fan heater kindly donated by Appliances Online
- subsequent prizes were smaller energy saving devices such as an Ecoswitch™, shower timers etc.

Feedback from the dinner was very positive with participants enjoying the opportunity to connect with other members of the project and to meet project staff who they'd had numerous phone contacts with.

2.3.5 Communications

A wide range of communication mechanisms and materials were created to engage and support participating householders throughout the project.

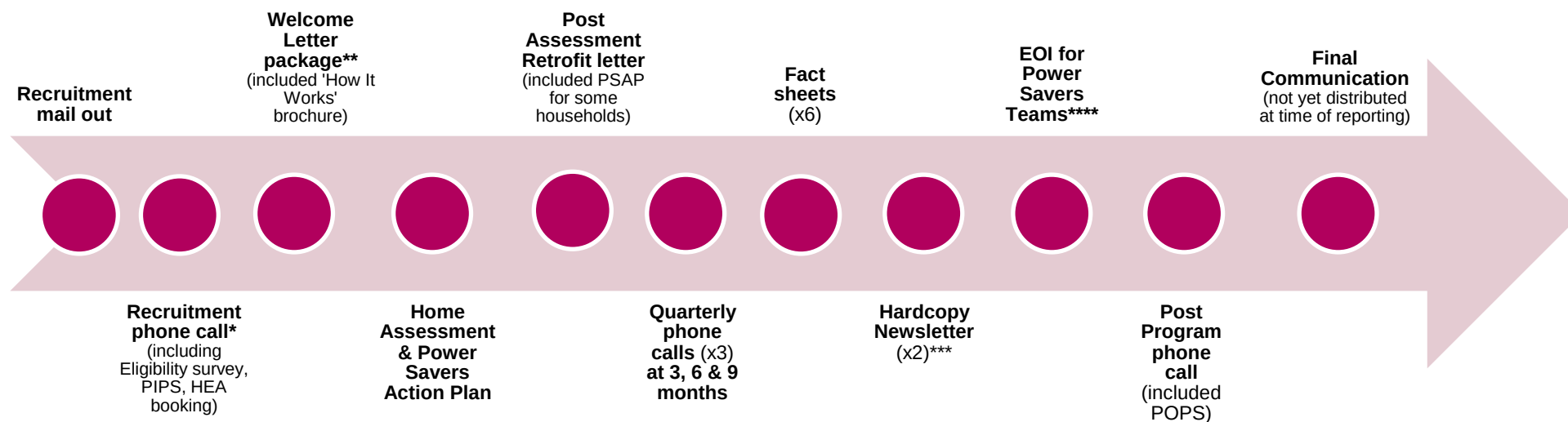
Communications occurred through three primary channels:

- the key in-home contact of the detailed home energy assessment
- phone calls at scheduled points along the participant journey
- mail outs to supplement the phone calls and provide additional information.

Call scripts were developed for all key phone calls.

The order of communications is indicated in Figure 1. As per the recommendation of the Pilot Evaluation Report, to place importance on “*follow-up communications (variety of communications mediums to achieve persistence in energy efficient behaviours)*”, the schedule was designed to ensure that participants received regular communication throughout their 12 months in the PSP.

Figure 1: Key communications received by PSP participants



*Also termed initial 'trifecta' call – commenced from Round 2

**Commenced mid-2014

***The Summer Newsletter was posted in December 2014 and the Winter Newsletter was posted in July 2015.

****EOI for Power Savers Teams was sent September 2015.

HEA = Home Energy Assessment, PIPS/POPS = Pre/Post-Intervention Phone Survey, PSAP=Power Savers Action Plan

Pre-Intervention Phone Survey

A Pre-Intervention Phone Survey was developed at the beginning of the project as an opportunity to gather information about participants' demographics and current knowledge, attitudes and behaviours.

Knowledge, attitude and behaviours were mostly explored through a series of questions using Likert-type response scales (e.g. strongly agree to strongly disagree, very clear to understand to very difficult to understand) to enable a baseline for determining how these factors would change for participants over the course of the project.

The Pre-Intervention Phone Survey was administered to participants from all rounds. Based on simple logistics and also feedback from the evaluation of the Pilot, the full list of pre-intervention questions were partly asked by the OCC, and partly asked in the early sections of the home assessment.

The Pre-Intervention Phone Survey is contained in **Appendix F**.

Power Savers Action Plans

As part of the home assessment conducted by assessors, a number of energy efficiency themes were discussed with householders including:

- the actions they are currently taking to save energy and/or increase comfort within their home ("is doing")
- the actions they should consider undertaking to save further energy and/or increase comfort in their home ("to do")
- the longer-term actions they should try to work towards ("do later").

The data collected on these 'action' pages informed the development of a tailored Power Savers Action Plan for each household. The Power Savers Action Plan, as with all other project communications with householders, was translated as required. The Power Savers Action Plan was tailored to each household and was designed to be a very brief, easy-to-read, summary report based on the households' home assessment, to encourage householders to check each 'Action' off their list.

The Power Savers Action Plans were posted to participants, with a separate cover letter, ideally between 2 weeks and 1 month post-assessment. Alternatively, if the timing of the households PAR deployment was in alignment, the Power Savers Action Plan was posted with the PAR letter and any PAR items, as required.

The Pilot Phase of the PSP identified that the Pilot Power Savers Action Plan was too lengthy and wordy. Additionally, the target audience have been identified as time-poor and for a significant number, English is a second language.

After approximately 500 Power Savers Action Plans had been compiled and sent, changes were made to simplify the process of compiling each Plan. Previously, it had been quite time consuming for NCC project staff to compile each Power Savers Action Plan. The new process involved a very small cost for the services of an Excel Macro coder, but dramatically improved the efficiency of Power Savers Action Plan compilation.

The Power Savers Action Plan also underwent a major facelift in November 2014, as it was noted in the feedback from participants (at Quarterly Check-Ins – described below) that some were finding it difficult to identify the Power Savers Action Plan.

Quarterly Check-ins (QR1, QR2 and QR3)

Three progress phone calls were scheduled:

Quarterly check-in 1 (QR1) - obtain some initial feedback from householders and verbal confirmation that the PAR was received. QR1 calls started in June 2014 and ideally were made 3 months after the home assessment was complete, and at a minimum of 1 month after the completion of the PAR deployment.

Quarterly check-in 2 (QR2) - obtain feedback from householders. QR2 acted as a catalyst to provide householders with further tailored information in the form of a library of 6 fact sheets. QR2 calls started in October 2014 and ideally occurred 6 months after the home assessment, and at a minimum 1 month after the QR1.

Quarterly check-in 3 (QR3) - scope potential stories of the PSP and ask participants to be part of local Power Savers teams. QR3 calls started in December 2014 and ideally occurred 9 months after the home assessment and at a minimum 1 month after the QR2.

Post-Intervention Phone Survey

The Post-Intervention Phone Survey was largely based on the Pre-Intervention Phone Survey, however, some questions were changed based on feedback from the process of administering the Pre-Intervention Phone Survey during the Pilot phase. Following the recommendation in the Pilot Evaluation Report (see **Appendix D**), the length of the questionnaire was shortened to reduce the amount of time required. In addition some questions were adjusted as questions were asked in the home assessment instead.

All Post-Intervention Phone Survey questions were conducted over the phone by the OCC. It was administered to the Round 1 and 2 treatment groups from February 2015 onwards, which was 12 months after the first PSP participants completed their home assessment.

The full Post-Intervention Phone Survey was not administered to the Round 3 group (the original control group) due to time and budget constraints, and the realisation that this group could not be used as a control group (see Section 2.4.2). Instead a reduced version was developed, which gathered essential information about participants' view of the project and focusing on participants reflecting on their PSP experience. It did not include the 'after' questions on elements such as perceptions of efficiency, literacy and control for the before and after analysis of the impact of the project on participants.

The data from these surveys is used to evaluate the behaviour and attitudes of PSP participants throughout the life of the PSP, and in particular, conduct before and after comparisons with responses from the Pre-Intervention Phone Survey.

The Post-Intervention Phone Survey is contained in **Appendix G**.

Other communications

Fact Sheets

The Fact Sheets included information for householders on:

- Draughtproofing
- Windows
- LEDs
- Cooling
- Heating
- Efficient appliances

Newsletters

Seasonal newsletters were prepared and posted to all participants who had completed a home assessment, to correspond with the change in season to support householders in ensuring their homes were adequately prepared for the expected temperature changes. The Summer Newsletter was posted in December 2014. A Winter Newsletter was posted in July 2015.

Champions Communications

Through the Champions and Teams projects, participants received additional communications to discuss further involvement as Champions. For the most part, the initial sourcing discussions with

Champions were had through the quarterly follow-ups, although at this stage they were not identified explicitly as Champions.

Once champions were selected for Power Savers teams ongoing conversations were conducted with UV project staff and a specific project staff member from NCC (dedicated to the ECEC team), which were conducted both in-person and over-the phone.

Additionally identified champions received a phone call and physical invitation to be a Power Savers ambassador at the 2015 Delegate's conference, and a phone call and invitation to the 'Final PSP Dinner'.

2.4 TREATMENT GROUPS

2.4.1 Recruitment Rounds

The total participant sample size of 1,010 was broken into a number of groups in order to:

- Run a pilot of the PSP with a small sample of participants to test:
 - the recruitment process for registering householders in the project
 - the energy efficiency treatments provided to the households.
- Recruit participants in a way that:
 - reflected availability and interest in the project over the course of the PSP
 - was able to be conducted in an efficient manner with the resources provided to the PSP consortium by the LIEEP grant
 - was equitable to United Voice's membership base.
- Allow for the treatments to be delivered in an efficient and effective manner, including consideration of availability of participants and energy assessors.
- Maximise the data being collected in order to complete evaluation purposes at the conclusion of the PSP.

Table 10 shows the final treatment groups that emerged from the PSP at conclusion – identified by their 'recruitment round'. The table illustrates the time period across when the participants were recruited, how many leads were identified from the UV member base, the target of participants, those eligible to participate and the final participant numbers.

Table 10: Treatment groups – Recruitment rounds

Round	Recruitment timing	Leads	Recruits	Participants	Target
Pilot	Sept 2013- Dec 2013	60	27	20	10-30
Round 1	Dec 2013 – Feb2014	1,785	186	128	200
Round 2a	Mar 2014 – Jun 2014	2,665	501	295	500
Round 2b	Jul 2014 – Dec 2014	3,732	397	247	
Round 3	Jan2015 – Mar 2015	2,732	483	320	300-320
TOTALS	Jul 2013 – Mar 2015	10,974	1,594	1,010	1,010

Table 11 illustrates, using the same recruitment rounds, the number of home assessments (including At-Assessment Retrofits) and PARs delivered to each household.

Table 11: Treatment groups – Assessments and retrofits

Round	Home energy assessments (including At-Assessment Retrofits)			Post assessment retrofits		Solar hot water	
	Timing	# completed	# completed by region	Timing	# completed	Timing	# installed
Pilot	Sep 2013 - Oct 2013	20	Sydney: 18 Hunter: 1 Cent. Coast: 1	Nov 2013	20 (all IHDs)	Dec 2013	1
Round 1	Feb 2014 - Aug 2014	128	Sydney: 125 Hunter: 2 Cent. Coast: 1	Apr 2015 - Dec 2015	114 Installed 2 Deployed*	Apr 2014 - Dec 2015	22
Round 2a	Mar 2014 - Aug 2014	295	Sydney: 214 Hunter: 57 Cent. Coast: 24	Jun 2014 - Dec 2015	243 Installed 2 Deployed*	Jul 2014 - Nov 2015	23
Round 2b	Aug 2014 - Dec 2014	247	Sydney: 192 Hunter: 13 Cent. Coast: 15 Illawarra: 27	Sept 2014 - Dec 2015	203 Installed 5 Deployed*	Sept 2014 - Apr 2015	9
Round 3	Jan 2015 - May 2015	320	Sydney: 272 Hunter: 29 Cent. Coast: 1 Illawarra: 18	Feb 2015 - Dec 2015	277 Installed 10 Deployed*	Mar 2015 - Nov 2015	23
TOTAL	Sep 2013 - May 2015	1,010	Sydney: 821 Hunter: 102 Cent. Coast: 42 Illawarra: 45	Nov 2013 - Dec 2015	876 (857 Installed, 19 Deployed)	Dec 2013 - Nov 2015	78

** Deployed indicates installation was unable to be confirmed with participant

Table 12 illustrates, using the same recruitment rounds, the scheduled communications delivered to each PSP participant.

Table 12: Treatment groups – Scheduled communications

Round	Pre-Intervention Phone Survey		QR1		QR2		QR3		Post-Intervention Phone Survey	
	Timing	#	Timing	#	Timing	#	Timing	#	Timing	#
Pilot	Jul 2013	20	Dec 2013	20	n/a	n/a	n/a	n/a	Mar 2014 - Apr 2014	15
Round 1	Dec 2013 - Feb 2014	119	Jun 2014 - Dec 2014	122	Oct 2014 - Feb 2015	118	Dec 2014 - May 2015	110	Feb 2015 - Nov 2015	105
Round 2a	Mar 2014 - Jun 2014	294	Aug 2014 - Apr 2015	281	Oct 2014 - Jun 2015	274	Jan 2015 - Sep 2015	251	Apr 2015 - Nov 2015	248
Round 2b	Jul 2014 - Dec 2014	241	Nov 2014 - July 2015	241	Feb 2015 - Oct 2015	231	May 2015 - Nov 2015	209	Aug 2015 - Dec 2015	204
Round 3	Jan 2015 - Mar 2015	373	Apr 2015 - Oct 2015	311	Jul 2015 - Nov 2015	286	n/a	n/a	Nov 2015 - Dec 2015	276
TOTALS	Jul 2013 - Mar 2015	1027	Dec 2013 - Oct 2015	975	Oct 2014 - Nov 2015	909	Dec 2014 - Nov 2015	570	Mar 2014 - Dec 2015	833

Table 13 over the page summarises the information from the above tables graphically, illustrating the timing of the various stages for each treatment group.

Table 13: PSP Treatment Groups – Timeline

		2013						2014												2015												
		J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	
Pilot	Recruitment																															
	PIPS																															
	HEA (+AARs)																															
	PARs																															
	SHWS																															
	QR1																															
	QR2																															
	QR3																															
	POPS																															
	Completion																															
Round 1	Recruitment																															
	PIPS																															
	HEA (+AARs)																															
	PARs																															
	SHWS																															
	QR1																															
	QR2																															
	QR3																															
	POPS																															
	Completion																															
Round 2a	Recruitment																															
	PIPS																															
	HEA (+AARs)																															
	PARs																															
	SHWS																															
	QR1																															
	QR2																															
	QR3																															
	POPS																															
	Completion																															
Round 2b	Recruitment																															
	PIPS																															
	HEA (+AARs)																															
	PARs																															
	SHWS																															
	QR1																															
	QR2																															
	QR3																															
	POPS																															
	Completion																															
Round 3	Recruitment																															
	PIPS																															
	HEA (+AARs)																															
	PARs																															
	SHWS																															
	QR1																															
	QR2																															
	QR3																															
	POPS*																															
	Completion																															

* Shortened version only, not included in survey data for analysis.

HEA= Home Energy Assessment, PIPS/POPS= Pre/Post-Intervention Survey, A/PAR = At/Post Assessment Retrofit, SHW = Solar Hot Water, QR1-3= Quarterly Phone Call Check in

2.4.2 Control Group for evaluating electricity savings

The use of a control group was identified at the commencement of the PSP as important in order to “provide an untreated research sample against which all other groups or samples in the research is compared” (Better Evaluation, 2015).

The evolution of the PSP control group was as follows:

- **August 2012:** LIEEP Expression of Interest (EOI) from the PSP Consortium proposed that: “500 low-income rental householders will be expected to participate as champions out of an eligible 5,000 United Voice householders approached.”
- **October 2012:** LIEEP Grant Application / Project Plan from the PSP proposed a Pilot with 10-30 people, and a further 1,000 householders participating overall, including 500 ‘non-control’ participants, and 500 ‘control group’ participants.
A randomised or stratification process was to be employed to assign participants to the control or non-control groups in order to ensure the independence of the control group.
- **January-June 2013:** Project was delayed for 5-6 months from the intended start date as changes to the Funding Agreement were negotiated, resulting in the need to look at alternative project designs.
- **Late 2013-early 2014:** In light of these early delays, as well as findings from the Pilot phase regarding the most appropriate methods for recruitment and procurement, it was agreed:
 - randomised selection of a control group was not able to be applied to the PSP considering the realities of the ‘real-life’ roll out of the project
 - randomised selection of a non-control group was not able to be applied to the PSP considering the realities of the ‘real-life’ roll out of the project, including:
 - home assessment booking processes and assessor availability
 - Participants needed some certainty as to when they could expect their home assessment.
 - Given the available budget, over-recruitment and attrition rates needed to be regularly monitored. We could not risk doing more than 1,010 home assessments.

As mentioned in the Project Plan:

Random selection and assignment of participants into control vs non-control groups is ideal, however the PSP has had to consider the organisational capacity of UV to recruit in such a way. Additionally, project design and the realities of project roll out lent itself strongly toward the first recruits being non-control participants and the later recruits (a subsample of 310) being ‘controls’. Analysis provided from this control/non-control participant comparison will seek to minimise systemic bias by matching as close as possible the characteristics of the control group with those of the non-control group.

To assist evaluation, the PSP is attempting, as much as feasible, to recruit an equal ratio of control and non-control households from each of the 4 geographic locations, as well as an equal ratio of households from the two ABCB climate zones that cover the PSP region. However, the PSP can only do what is feasible in ‘real life’.

- A selection of early recruits would be offered an incentive voucher (\$50) to re-join the project in 6 months’ time (Round 1b) in order to act as a ‘control’ group. Retrospective billing data would be obtained for such households (via consent provided in the Billing Data Consent form) to compare against non-control households. Following a 6 month hiatus, control households would then receive the same experience and offers as non-control households.

- **Early 2014:** It was at this stage it was realised that informing the control group about the project introduced bias. In hindsight, this was due to the changes to the rounds (and why) not being clearly understood by all consortium members. This resulted in continued efforts for creating a control group as follows:
 - After approximately 100 Round 1b participants were recruited as ‘controls’ and informed that their home assessment would be delayed in return for a \$50 incentive voucher, it was clear that a new design would be required. This new design meant that all of the first recruits to the PSP would be classed as non-controls (approximately 680, including 41 Round 1b participants who re-joined), with their assessments to be complete between February 2014 and January 2015.

The later recruits (approximately 310) would act as ‘controls’ by only beginning their journey 12 months after the first non-control households (i.e. February 2015) – Round 3. In order to eliminate bias of the control group which had occurred with Round 1b:

- The control group would not be exposed to the PSP or any PSP interventions, and when recruited would provide consent for release of retrospective billing data (via the Billing Data Consent form) to compare against non-control group
 - 9 electorates (7 in Sydney, 1 in Hunter and 1 in Illawarra) of the entire recruitment pool (36 electorates – 26 in Sydney, 4 in Hunter, 2 in Illawarra and 2 in Central Coast) were quarantined amongst the different regions to be the recruitment pool for the control group to assist as much as possible in having similar geographical characteristics amongst non-control and control households.
 - The group would only receive home assessments 12 months after the first non-control households.
- **August 2015:** Despite best efforts with project design and rollout, it was highlighted that a combination of potential recruitment bias, the reduction in the project time period and, importantly, the reduction in the number of participants for the potential control group may lead to less statistical significance for evaluation. It was proposed that recruitment bias be tested and if found to exist, de-identified data from non-participating households in the regions would be requested from the electricity distributors that could act as a different form of control group.
 - **January 2016:** Once data was obtained for evaluation, the proposed control households (approx. 310) with available data fell to around 100 households due to a combination of Billing Data Consent forms not being signed (for more detail see Section 2.1.2), missing NMIs and validation of customer details by the electricity distribution businesses (for more detail see Section 4.1.4 and 4.3.1). The need for testing recruitment bias was moot as the final number of control participants was too small to be considered a statistically valid control group.

Therefore, for the quantification of savings described in Section 4.3, the approx. 310 (former control) participant households (Round 3) are grouped with the approx. 680 non-control participant households (Rounds 1-2).

Instead, a sample of de-identified electricity consumption data from non-participating households was obtained from the electricity distribution companies to act as the control group for the purposes of PSP evaluation.

3

Evaluation Logic

3 EVALUATION LOGIC

3.1 PURPOSE OF EVALUATION

Evaluation attempts to explain why a particular outcome has occurred, how well a project or activity was undertaken, whether it was a good thing to do, and what should be done in the future in light of the evaluation findings.

This Data Evaluation Report covers evaluation of the entire project. It draws upon earlier evaluation activities and data as well as data collected throughout the project implementation. It is prepared according to the Department's requirements and includes analysis of pre and post questionnaire, billing data and commentary on project learnings.

3.2 PROJECT OUTCOMES LOGIC

In order to evaluate the PSP, a Project Outcomes Logic table was developed (part of the Evaluation Framework contained in **Appendix A**). The logic table defines the:

- outcomes the project is seeking to achieve (i.e. the thing we want to change)
- inputs into the project which will translate into project outputs, and ultimately contribute to project outcomes
- success criteria which provide linkages between inputs, outputs and outcomes
- performance measures and targets against which success criteria are assessed.

3.2.1 Initial Logic

The Project Outcomes Logic table developed at the beginning of the PSP project for evaluation purposes is presented in Table 14 over the page.

Table 14: Initial Project Outcomes Logic

Results hierarchy	Outcome or planned results	Success factors	Performance measures	Target	Basis for comparison	Assumptions and/or comments
High-level outcomes Intermediate outcomes	1. Participants have increased sense of control over their electricity use and electricity bills. 2. Participants have persistent reductions in their electricity use 3. Increased electricity literacy among participants 4. Reduced electricity use in participants households, with significant reductions achieved for households receiving hot water systems	- Achieving deep engagement with participants - Clear messaging and appropriate solutions for households to achieve energy savings - Project efficiently managed to meet targets with available funds	1.1 Self-assessment based on pre and post project questionnaire 2.1 Livelihoods workshops pre and post project with 6-12 participants 3.1 Self-assessment based on pre and post project questionnaire 4.1 Billing data analysis of electricity consumption pre and post intervention, and against control group	1.1 100% improvement on some measures of control of electricity use and bills as measured on Likert scale in questionnaire 2.1 30-50% of indicators identified in Livelihoods workshop demonstrate improvement and hence increased capacity to use energy more efficiently 3.1 100% improvement on some measures of energy literacy as measured on scale 4.1 By final evaluation report, electricity use reductions of 5-10% in participant households due to installation of retrofits	1.1 Compared with control group questionnaires 1.2 Post project results compared with pre-project results. 1.3 Compared with control group questionnaires 1.4 Compared with control group electricity use, and where available pre-intervention data	- Participants want to save energy - Participants may take energy savings as increased consumption, but have an awareness of this. - Participants value engagement and want to participate - Participants see their Union as a trusted adviser - Participants will use the energy efficiency retrofits and advice - Control group and/or previous energy use data is adequate to forecast future 'without intervention' energy use
Outputs	- Participants - Home assessments, installation of energy solutions and production of energy savings action plans - Installation of solar hot water systems - Communications created for the project		- Reaching recruitment targets - Project roll out on schedule - Energy efficiency retrofits and assessments delivered - Hot water systems are negotiated and installed	1000 households successfully recruited - Project delivered according to key milestones and dates in Project Plan - Assessments and tailored energy solutions delivered to 1000 households 100 Solar Hot water systems successfully installed in households, including some with split-incentives.	- Progress against project plan - Project objectives and costs met within funding envelope	
Inputs	- People - Communications materials - Energy Efficiency retrofits - Solar hot water systems - Project systems		- Recruitment of project staff - EOI completed for home assessors - Project systems including record keeping, participant management systems created and implemented	100% recruitment of required UV and NCC project staff and volunteers 2-3 competitive EOI for home assessors - Creation and implementation of required systems, project documents and materials as per Funding Agreement.	- Progress against project plan - Project objectives and costs met within funding envelope	

3.2.2 Final Logic

While the logic table will form the benchmark for evaluation now the PSP is complete, a more detailed logic including additional performance measures and outcomes is required. This is to ensure the final evaluation of such a large multi-year project is as comprehensive and complete as possible (and time permits).

The final logic reflects evolution of the PSP including:

- implementation from 2012-2015
- evaluation as more data was collected across this period
- governance of LIEEP across several Commonwealth government transitions.

The final evaluation focuses on two parts:

Program Evaluation of the overall implementation of the project by the PSP consortium, specifically:

1. Participation (key output of the initial project logic, expanded and renamed)
2. Project Management (a key output of the initial project logic)

Impact Evaluation of the impact of the project on household energy efficiency, specifically:

3. Impact on Electricity Use
 - a. Reduced electricity use (Outcome 4 of initial logic)
 - b. Persistent electricity use reductions (Outcome 2 of initial logic)²
4. Impact on Participants
 - a. Electricity Literacy (Outcome 3 of initial logic)
 - b. Sense of Control (Outcome 1 of initial logic)
 - c. Peer-to-peer networks (introduced as a new outcome)

Drawing from the initial Project Outcomes Logic (Table 14), Table 15 presents a proposed Final Project Outcomes Logic focused on the **Program Evaluation** categories outlined above and Table 16 the **Impact Evaluation** categories outlined above.

These tables identify a range of performance measures and detail targets as well as suggested performance metrics against which the PSP can be evaluated. Some of these metrics have been introduced during this final evaluation process in order to comprehensively evaluate the data provided at this stage of the PSP. Table 15 forms the structure for Section 5 of this report – Findings of Program Evaluation, while Table 16 forms the structure for Section 6– Findings of Impact Evaluation.

² A note on 4b. Persistence of Electricity Use Reductions

Persistence was included in the Initial Project Logic as Outcome 2: *“Participants have persistent reductions in their electricity use”*. It also features as one of the overall project objectives:

3	<i>Project Objective:</i> Generate persistent electricity use reductions through the provision of ongoing support and communication through participants’ peer network(s).	<i>Planned Outcome:</i> Effective peer-to-peer engagement leads to increased persistence of energy-efficient behaviours amongst participating households.

It was referenced in both the Background Research Report in a recommendation: *“it is important to consider how PSP participants are empowered (through appeals to intrinsic values) and hence how well the project is achieving persistence of energy-efficient practices”*, and in the Pilot Evaluation Report: *“importance of follow-up communications (variety of communications mediums to achieve persistence in energy efficient behaviours)”*.

A method was introduced to the PSP, the Livelihoods method, to measure capacity of participants to save energy in response to Outcome 2. While this was a measure of capacity (now its own metric), it falls short of providing the necessary data required to measure persistence of electricity reductions. Effectively measuring and evaluating persistence of electricity savings would require evaluation of the project beyond its current timeframes as well as a larger data sample. As a result, the Final Project Outcomes Logic does not include targets or specific metrics for persistence. Additional metrics have been introduced to capture the other key elements of Project Objective #3, specifically peer-to-peer networks (5c). Information on follow up communication methods by the project are also evaluated under 2. Project Management.

Table 15: Final Project Outcomes Logic – Program Evaluation

Category	Performance Measure	Target	Metrics
1. Participation	Recruitment targets are reached	990* households successfully recruited	No. of leads per recruitment campaign No. recruited/eligible per recruitment campaign No. of Recruits who withdrew before assessment No. of participants who participated in the project (by location/tenure)
	Energy efficiency retrofits and assessments delivered	Assessments and tailored energy solutions delivered to 990* households	No. of households receiving home energy assessments (by location/tenure) No. of households receiving retrofits No. of home energy assessment cancellations by participants
	Solar hot water systems are negotiated and installed	50 solar hot water systems installed in owner households - funded through grant funding	No. of fully funded solar hot water systems installed owner households
		50 solar hot water systems installed - funded under landlord/ tenant cost sharing agreements	No. of solar hot water systems installed under landlord/tenant cost sharing agreements
		50 landlords and their tenants engaged to develop up to 50 cost sharing arrangements for installation of solar hot water systems	No. of landlords and tenants engaged to develop cost sharing arrangements for installing solar hot water systems
2. Project Management	Project rolled out on schedule	Project delivered according to key milestones and dates in Project Plan	% of milestones reached by due date
	Sufficient project staff recruited	100% recruitment of required UV and NCC project staff and volunteers	No. of FTE staff dedicated to recruitment
	EOI completed for home assessors	2-3 competitive EOI for home assessors	No. of EOI's completed for home assessors
	Project systems including record keeping, participant management systems created and implemented	Creation and implementation of required systems, project documents and materials as per Funding Agreement	No. of record keeping & participant management systems created
			No. of milestone reports delivered to the Department
			No. of communication materials/mechanisms created No. of points of contact with participants using communications materials

* Adjusted to exclude Pilot Participants

Table 16: Final Project Outcomes Logic – Impact Evaluation

Category	Performance Measure	Target	Metrics
3. Impact on Electricity Use			
a. Reduced Electricity Use	Decreased electricity consumption as evidenced by billing data analysis of electricity consumption pre and post intervention, and against a control group	Electricity use reductions of 5-10% in participant households due to installation of retrofits	Average % change in electricity across all participating households during project Average kWh saved per day per household Average \$ saved per quarter per household Average kg CO2-e saved per day per household
	Increased capacity of Livelihoods workshop participants	30-50% of indicators identified in Livelihoods workshop demonstrate improvement and hence increased capacity to use energy more efficiently	% of Livelihood workshop indicators improved
	Participants perceived reduced electricity use	Improvement on some measures of self-reported energy efficiency as measured on Likert scale in questionnaire*	Rating of importance of electricity reductions Rating of motivation for electricity reductions Proportion reporting taking energy efficiency actions Proportion reporting improved energy efficiency
b. Persistent Electricity Reductions	N/A - Persistence of electricity reductions beyond the life of the PSP not able to be measured as part of this evaluation.		
4. Impact on Participants			
a. Electricity Literacy	Self-assessment based on pre and post project questionnaire	Improvement on some measures of energy literacy as measured on Likert scale in questionnaire*	% change in participants reporting that “not sure how to reduce electricity use” stopped them reducing energy use % change in proportion of participants reporting they are aware of how their household electricity use compares to others % change in proportion of participants reporting that their electricity bill is clear and easy to understand
b. Sense of Control	Self-assessment based on pre and post project questionnaire	Improvement on some measures of control of electricity use and bills as measured on Likert scale in questionnaire*	% change in proportion of participants reporting they feel in control of electricity USE % change in proportion of participants reporting they feel in control of electricity BILLS % change in proportion of participants reporting “lack of control to make improvements to the property” as a barrier to reducing energy use
c. Peer-to-peer networks	Champion outreach	60 peer-to-peer champions recruited 3 Power Savers Teams formed	No. of champion participants engaged No. of Power Savers Teams formed

*This target was revised from the initial project logic as 100% improvement on some measures in Likert scale would not be realistic, rather statistically significant *improvement* on some measures would be a more realistic target. The target was set prior to the development of the survey questions, and Likert scale responses and therefore it was necessary to revise this target. A Wilcoxon Signed-rank test was run on the survey results to determine statistical significance, more details are contained in Section 4.3.2

4

Evaluation Method

4 EVALUATION METHOD

4.1 DATA SOURCES

This section outlines the sources of data that were used by ISF to complete the Program Evaluation and Impact Evaluation.

4.1.1 Project Delivery Data

ISF requested data from the NCC/UV core project team for each of the identified Participant and Project Management metrics (the findings of which are contained in Section 5.1 and Section 5.2 respectively).

Data for the Participation metrics was included in a single, large export from Salesforce of all project data relevant to this evaluation. This information was analysed and summarised according to the agreed metrics and then compared with NCC/UV's own analysis for verification.

Data for the Project Management metrics was exported from the PSP project delivery systems, and supplemented and contextualised through personal communications from the PSP core project team out of their own knowledge and experience of the project.

4.1.2 Home Energy Assessment data

The complete set of data collected during the Home energy assessments was exported from FluidSurveys and provided as a separate source of data.

Three pieces of information were extracted from the home assessment data and merged with the Salesforce data export:

1. home tenure type for demographic analysis in Section 5.1.1
2. the number of At-Assessment Retrofits delivered in Section 5.1.2
3. Participants' self-reporting of their energy efficiency in Section 6.1.3.

4.1.3 Participant survey data

Participant responses to the Pre- and Post-Intervention Surveys were recorded in Salesforce, and provided as part of the single Salesforce data export. The key data utilised for evaluation was responses to the survey by participants on:

- sense of control over energy use and bills
- energy literacy
- barriers to reducing electricity (lack of control and knowledge only)
- attitudes to electricity reductions (importance of reducing electricity use and motivations to reduce electricity use)
- participant perceptions of their energy efficiency³.

Only participants who completed both the pre- and post-surveys were included in the sample, a total of 526 (though not all participants completed all questions).

³ Only the 'Post' data was recorded in Salesforce. As mentioned earlier, some 'Pre' data was collected during the Home energy assessment and recorded in FluidSurveys and some was collected via the Pre-Intervention Phone Survey and recorded in Salesforce.

4.1.4 Billing Data

Participant Data

As described in Section 4.3.1, electricity consumption data (or billing data) was requested for 776 households from electricity distribution companies Ausgrid and Endeavour Energy.

Consumption data was exported from Ausgrid and Endeavour Energy's databases and provided to ISF in a csv file. This was then used to conduct the evaluation of electricity, cost and emissions savings from the PSP.

Useable Data for Evaluating Savings

Beyond the attrition experienced through the Billing Data Consent form process, there was further attrition of 'usable' data as described in Table 17, and the final number of households that were eligible to be used in the final savings analysis equated to 776.

Table 17 : Attrition of 'Useable' data for evaluation

Timeline / Activity	Overview	Description
Feb 2014 - Oct 2015: Implementation	906 householders provided consent.	Over the life of the project, a total of 906 participants were known to have provided consent for the Project to access their billing data.
Oct 2015: NCC Export to ISF Dec 2015: Data request to distributors	Upon investigation, only 776 of the 906 consent forms were found to be compliant due to: - incorrect NMI's (number incomplete/incorrect, or gas NMI provided instead of electricity) - participants outside the Ausgrid or Endeavour operating area - signatures lost through IT error - householders that moved home - householders that withdrew	Initially, in an effort to streamline the record keeping process for Billing Data Consent forms, consent from households was captured as an e-signature using the Fluidsurveys 'Power Savers Assessment Tool' (PSAT) using a tablet. However, after the first 60 energy assessments were already completed, NCC discovered that some of the web links to the e-signatures had broken. In order to prevent further losses of e-signatures, NCC changed the e-signature process to a hard copy signature process. Some NMIs were written down incorrectly, some households did not write their NMI, some households wrote down the wrong number (i.e. could not correctly identify the NMI on their bill and noted another unrelated number).

Upon conclusion of the implementation phase of the PSP, NCC exported relevant data from the 776 Billing Data Consent forms to ISF to request the data export from Endeavour Energy and Ausgrid.

Despite the 776 valid Billing Data Consent forms provided, validation of the participant records by Endeavour Energy and Ausgrid reduced the data used for evaluation further to 553 households and the method applied for the savings evaluation reduced this further to 396 households (more detail is provided in Section 4.3.1).

Non-Participant Billing Data

As described in Section 2.1.2, using a sub-set of the participant group as a control group was not possible due to bias and size. Therefore, in addition to the participant billing data, ISF also requested a sample of de-identified billing data records from Ausgrid and Endeavour (30,000 household billing data records from each) in order to provide a control group for comparison against the participant group.

This data was provided to ISF as a csv file, which was then utilised (as a control group to compare against the participant group) to evaluate electricity, cost and emissions savings for the PSP.

4.2 PROGRAM EVALUATION OF PROJECT

The overall implementation of the project by the PSP consortium was evaluated through analysis of:

- Project delivery data exported from Salesforce
- Home Energy Assessment data exported from FluidSurveys and combined with Salesforce data
- Personal communications from the PSP core project team

The information provided from Salesforce was summarised in tabular and graphical format before being assessed against the performance targets. This was supplemented by data from the Assessment data to present findings for home tenure and the At-Assessment Retrofits.

The information provided on project delivery by the project team was verified against the evaluators' own knowledge of the project as gathered and reported in Section 2, before being summarised and assessed against the performance targets.

4.3 IMPACT EVALUATION ON SAVINGS

The impact of the PSP on electricity savings was evaluated through analysis of:

- billing data in order to quantitatively estimate electricity savings
- participant self-reported workshop and survey data in order to understand participant perceptions of their ability to make savings
- persistence of electricity reductions

4.3.1 Analysis of billing data

The original intention of the quantitative estimation of PSP savings was to use a regression based model to estimate project level electricity savings, using billing data and household demographic data. However due to a smaller than expected data sample and no characteristics other than consumption (e.g. no socio-economic or dwelling information) being available for the non-participant data set, the matched pairs mean comparison (MPMC) method was chosen for evaluation as it relies on electricity consumption data only.

Size of Data Set

The primary data set used in the evaluation of saving was quarterly electricity billing data obtained from the Ausgrid and Endeavour Energy electricity networks for PSP participant households. In addition, quarterly electricity billing data for a randomised sample of approximately 60,000 non-participant households across both network areas was collected to form a non-participant pool of households for comparison against PSP households. These non-participant households excluded net- and gross-solar tariff households.

As discussed in Section 2.1.2, the initial set of PSP participant electricity billing data reduced from a total of 1,010 households to 846 households, removing those who had not signed the Billing Data Consent form. This number was further reduced to 776 households due to incorrect National Metering Identifier (NMI) numbers and households being outside the Ausgrid and Endeavour Energy networks.

These 776 NMIs were then sent to Ausgrid or Endeavour Energy who validated the NMIs against their own records system (using customer name, NMI, address and date range aligning with quarterly billing cycle and meter readings). If the customer records, NMI or address did not match with the records held by Endeavour or Ausgrid (due to the electricity retailer not providing up to date customer details), the billing data was not able to be released. In addition, if the billing cycle was not yet

complete, the data for that cycle was not able to be provided. Therefore, the billing data received from Endeavour or Ausgrid totalled 553 households.

Those households who had withdrawn from the project and participated in the pilot phase of PSP were then removed, bringing the sample to 496 households.

Quarterly billing data collected for participant and non-participant households were summed across tariffs (i.e., peak and off-peak) to give total electricity consumption per household for each quarterly billing period. Consumption records were then filtered with non-residential tariffs, null consumption values, or outliers. These records were then removed from the data set resulting in 485 households. (Note, further records were removed following this step to bring the data set to 396 households – more information is provided below in Table 20).

Table 18 illustrates the total number of starting households and losses incurred from the filtering steps.

Table 18: Description of participant and non-participant records

	Participant Households	Participant Consumption Quarterly Records	Non-participant Households	Non-participant Consumption Quarterly Records
Starting Households (following validation by Endeavour Energy & Ausgrid)	553	20,951	59,493	2,227,438
Withdrawn/pilot participants	57	2,926	NA	NA
Null consumption values	8	1,269	258	315,017
Outlier consumption points	0	3	0	221
Outlier households	3	38	148	1,840
Final Records	485	16,715	59,087	1,910,360
Final Ratio (households to records)	1:14		1:32	

These records were put through a binning algorithm whereby monthly consumption was estimated based on quarterly meter readings, as described in Rickwood (2012). Binned consumption figures were then converted to average day figures by dividing total estimated monthly consumption in a given month by the number of metered days in the month. The process of converting quarterly billing data into monthly figures has a smoothing effect on the data such that consumption in any given month is influenced by consumption that occurred up to two months before or after that month, as per the quarterly billing cycle (Moglia, 2009). As such, to avoid cross-over of both before and after intervention consumption figures on the one billing cycle, two months either side of the intervention period are removed from participant consumption data. The resulting data set therefore contains definitive before intervention and after intervention consumption figures for analysis.

The savings calculated from the evaluation would include those experienced from a combination of the treatments; education, home assessment and PARs--the analysis cannot conclusively identify savings attributable to a particular treatment. In order to calculate savings from individual PARs, a larger sample and longer time period of data would be required.

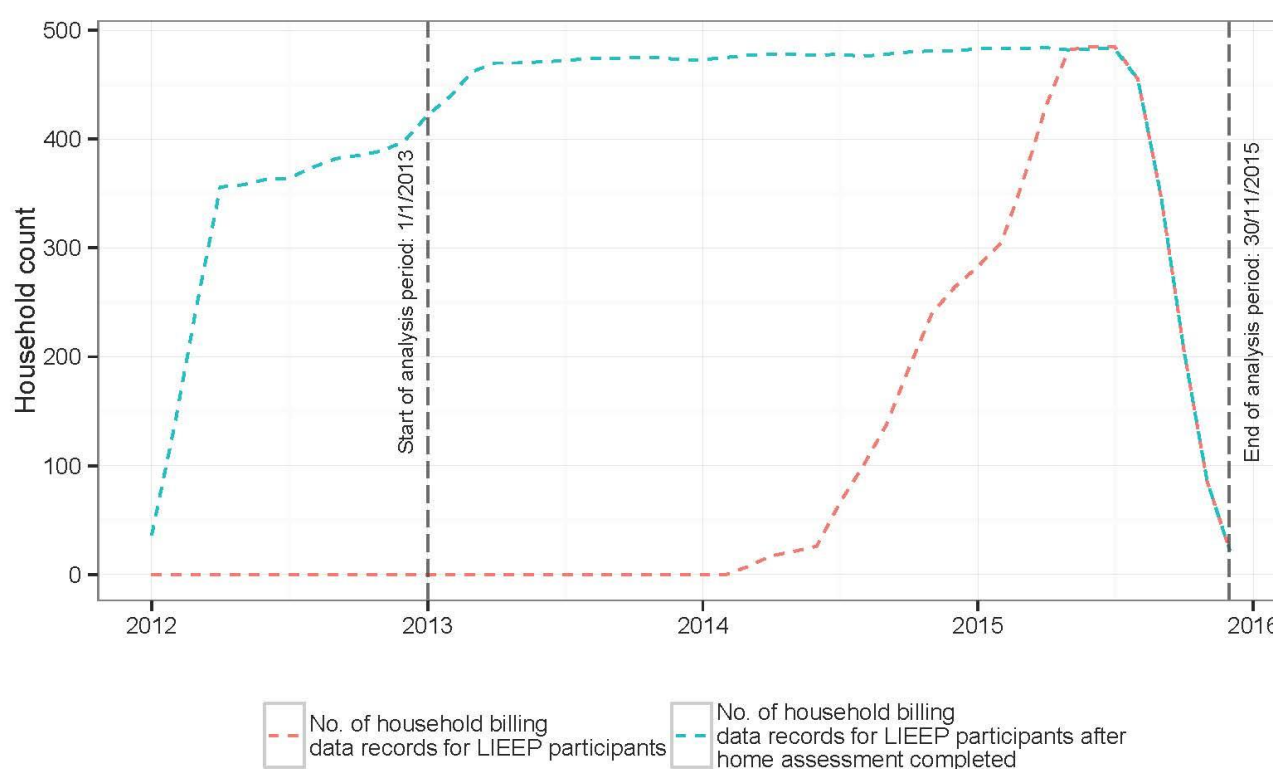
The billing data described above, the location of the household (suburb, LGA and region) and the date the home assessment was completed were merged to form the final data set used in the evaluation of savings.

Figure 2 below shows the growth over time of the number of household billing data records for participants in PSP prior to home assessment and for households after the home assessment.

The blue line shows a rapid rise in the number of billing records available in 2012, coinciding with the earliest date these records were provided by the electricity distributor (i.e. two years prior to the registration date on the signed Billing Data Consent form). It increases to the total 485 records until the final date electricity distributors could provide the data based on quarterly billing cycles and meter readings for these participants in December 2015.

The red line shows the number of billing records for households after the home assessment coinciding with the Round 1 home assessments occurring in mid-2014 and concluding with Round 3 in late 2015. Also on this graph is marked the period used for evaluating the data from 1st January 2013 to 30th November 2015.

Figure 2: Number of Household Billing Data Records over time



Characteristics of Data Set

Table 19 identifies the data that was provided for the non-randomly selected participant (PSP) and randomly selected non-participant (de-identified) data sets.

Table 19: Data collected for participant and non- participant data sets

Data Type	Participant data set (non-random)	Non-Participant data set (random)
NMI	✓	✓
kWh electricity consumption by quarter	✓	✓
Tariff information (net- and gross-solar tariffs)	✓	✓
Location (suburb, LGA and region)	✓	✓
Socio-economic characteristics	✓	✗
Energy efficiency intervention(s)/treatment(s)	✓	✗

The participant and non-participant data covers a period from 2011 to January 2016. 2011 is the earliest time period of data provided by Endeavour Energy and Ausgrid based on the time period participants provided consent for release of data from the signed Billing Data Consent forms.

The savings estimation occurs over the period January 1st 2013 to November 30th 2015. The estimation begins in January 2013 as is to enable at least 12 months of data pre-intervention to utilise the chosen evaluation method (MPMC). November 30th 2015 is the latest possible quarterly billing data provided for evaluation that allowed analysis to be conducted in time for the deadline for this report.

Matched Pairs Mean Comparison (MPMC) method

Prior to receiving data, it was assumed that with a sample of approximately 1,000 households that a regression analysis would be conducted to identify electricity savings. Regression is a useful approach for the evaluation of savings as a finer level of detail can be gained on project specific savings than with other methods of evaluation (for examples, see Rickwood et al, 2012; Fyfe et al, 2014). However the small sample size obtained and the lack of other determining factors for non-participant households meant the regression approach was inappropriate for estimating savings.

The matched pairs mean comparison (MPMC) is a conceptually simple but computationally intensive method specifically designed for estimating energy and/or water savings using only billing data (Fyfe et al, 2010; Rickwood et al, 2012) where detailed demographic and other structural information is unavailable for participants and non-participants.

The core logic of the MPMC approach is:

- Each participant household is matched with a non-participant household that has a similar consumption pattern before the intervention period
- Since each paired non-participant household had a similar consumption pattern to its paired participant household, it serves to indicate what the participant household's consumption would have been had it not had an intervention, acting as a pseudo control
- Once what each household would have consumed without intervention is estimated, the observed differences from what the participants actually consumed can be taken, and can be attributed to savings from participation in the project

The process for matching participant and non-participant households is rigorous, going through a series of statistical tests to best match participant and non-participant households. This approach controls implicitly for climate factors, changes in appliance ownership and other trends.

By matching participant and non-participants on a household-by-household basis, the savings estimate process reduces to a test of statistical significance of savings using a paired t-test. For more details on the approach see (Fyfe et al, 2010).

Households that cannot be matched to random non-participant households due to insufficient data, or matches that fail a series of statistical tests which validate the strength and robustness of the matches made, are excluded from the final data set. The complete matching process yields two sets of participants and matched non-participant households of equal size over the same time period. Table 20 is a summary of the number of matched participants from which savings are estimated for PSP.

Table 20: Matched pairs records for PSP

	PSP Participants	PSP Non-participants
Initial household records	485	59,087
Matched household records	396	396
Time period of analysis	1/1/2013 – 30/11/2015	1/1/2013 – 30/11/2015
Total number of consumption records	13,860	13,860

Cost and emissions savings method

To calculate cost savings associated with electricity saved by PSP households, published 2015 projected average c/kWh residential electricity prices for 2015/16 were obtained (AEMC, 2015). Electricity prices remained relatively constant over the 2014 to 2016 period, so selection of this average cost figure was deemed appropriate. This was then applied directly to the electricity savings over the quarter to give the cost saved per kilowatt hour per household per quarter (\$/kWh/hh/quarter).

To calculate the greenhouse gas emissions savings from purchased electricity, the avoided scope 2 and 3 (indirect) emissions were calculated. Scope 2 emissions are those physically produced by the burning of fuels (coal, natural gas, etc.) at the power station. Scope 3 is the indirect emissions from the extraction, production and transport of fuel burned at generation and the indirect emissions attributable to the electricity lost in delivery in the transmission and distribution network.

A combined scope 2 and 3 emissions factor was obtained which provide the kilograms of carbon dioxide equivalent (CO₂-e) emitted per unit (kWh) of the generation of the electricity purchased and consumed by the households.

The scope 2 and 3 emission factor for the state of New South Wales for 2015 of 0.96 kg CO₂-e/kWh for consumption of purchased electricity from the grid was utilised (Department of the Environment, 2015).

This emissions factor was applied directly to the PSP household electricity savings to give the kilograms of carbon dioxide equivalent avoided per household per day (CO₂-e /hh/day).

Limitations of datasets

There have been a number of limitations with the data used for the savings analysis conducted.

The size of the final dataset was reduced to more than 50% of the original size from 990 households to 396 household records. This was due to exclusion of:

- Households who had not signed Billing Data Consent forms
- Households with invalid NMI
- Pilot Participants
- Participants outside the Ausgrid or Endeavour operating area
- Participants who had withdrawn from the project
- Participants without matching names, addresses or NMIs in Ausgrid & Endeavour Energy's records (due to electricity retailers not providing up to date information)
- Removal of records non-residential tariffs, null consumption values, or outliers
- Failure of the households to pass one of the four statistical tests of the matched pairs process.

While the data provided covers a period from 4th quarter 2011 to January 2016, the savings estimation occurs over the period January 1st 2013 to November 30th 2015 (when the home assessments and PARs occurred), which reduces the time period for evaluation. In addition to this, participants were recruited and participated in the PSP in rounds, rather than all at one point in time. Therefore, the 12 months of data pre-intervention and post intervention varies for each household.

All of these factors have made observing the effect of the savings challenging, and has limited the available analytical approaches. This includes analysing savings by individual treatments (PARs), recruitment round groups and specific participant experiences such as the Champion participants and participants receiving solar hot water systems or In-Home Displays.

However, evaluation of savings cannot be considered independently from co-benefits of treatments provided to PSP participants. These are further discussed in Section 5 and 6.

4.3.2 Analysis of participant self-reported data

The Pre-intervention and Post-intervention surveys conducted with participants before and after their participation in the project included three questions related to electricity use reductions:

1. **How important is it for you to use less electricity in your home?**
 (Very important / Somewhat important / Not very important / Not important at all / Unsure)
 (n=490)
2. **How motivated are you to reduce your electricity use?**
 (Very motivated / Somewhat motivated / Not very motivated / Not motivated at all / Unsure)
 (n=490)
3. **How would you rate your household energy efficiency?**
 (1 - Not energy efficient / 2 – Inefficient / 3 – Adequate / 4 - Energy efficient / 5 - Very efficient)
 (n=525).

Data from each survey was recoded numerically and then compared to determine if householders reported increased motivation and energy efficiency at the end of the project, and by extension, reduced electricity use. The differences between the before and after responses were tested using the Wilcoxon Signed-rank test to determine statistical significance of any observed difference. Any observable differences not able to be confirmed as statistically significant, were rated as a partially achieved improvement.

Comparisons were made at the group level, rather than at the individual level to avoid confounding that can occur from variance in repeated rating scale questions⁴.

The post-survey also contained a direct question on whether participants were actively taking steps to reduce energy use. The results of this question were reported as is.

As explained in Section 2.4.2, no control group was utilised to evaluate the changes in sense of control and energy literacy of participants.

Limitations of datasets

As noted earlier in Section 2, the full post-survey was not conducted with Round 3 completions because they had a shorter participant journey due to project timeline restrictions, and it was decided by the PSP team that it would not be a comparable group. The shorter participation journey could potentially reduce the positive impact of the project on these householders, but this cannot be confirmed. The absence of post-survey data for these 276 householders (33% of the sample) could therefore potentially introduce a positive bias in the results.

The use of a CRM tool such as Salesforce for capturing survey responses meant that a substantial amount of data needed to be transformed in order to be suitable for analysis. In some cases this involved simply translating response labels to numerical values, while in other cases, qualitative data needed to be recoded as separate variables. Furthermore, some data was not contained in Salesforce and had to be imported from the FluidSurveys extract. All of this introduces the possibility for manual coding errors.

Recommendations

The Smart Grid, Smart Cities project (which trialled smart grid energy technologies in NSW households) conducted an evaluation included a comparison of participant perceived bill savings with actual bill savings. It found that respondents were able to roughly gauge the level of savings they were receiving on their bill (Langham, et al, 2014). The pre- and post-survey could be redesigned to include specific questions on participant perceptions of the amount of electricity and/or bill savings achieved. Furthermore, including a question on perceived bill savings in the Pre-Intervention Phone

⁴ The responses to these questions were collected using 5-point rating scales. Comparisons of before and after rating scales has limitations: a household's answer can change on any given day (e.g. the day before a heatwave, a participant might say they are in control of their energy use, but the day after might say they are not), and perceptions of the construct being measured can change during the project (e.g. a household might consider themselves to be very energy efficient before the project but then learn about more efficiency measures, and therefore define themselves as less efficient at the end of the project, even if their efficiency behaviours have increased). Direct comparisons between a household's before and after response therefore need to be interpreted with caution.

Survey and Post-Intervention Phone Survey to compare against the evaluation findings of actual electricity savings could have provided more insight into PSP participant's ability to gauge bill savings.

Capturing the responses to surveys in dedicated survey research tools (which are often built to export data in an analysis-ready format) reduces the risk of error in analysis.

4.3.3 Analysis of Persistence

As noted in Section 3.2.2, defined metrics and performance targets were unable to be developed to effectively and appropriately measure persistence within the timeframe of this evaluation (which concluded less than 3 months after the final participants completed their participation in the project). Instead, analysis focused on anecdotal evidence of inputs and outputs that were designed to achieve persistence. In order to effectively evaluate persistence, a longer timeframe following completion of the project would be required.

4.4 IMPACT EVALUATION ON PARTICIPANTS

Evaluation of the impact of the project on participants was determined primarily through analysis of the Pre-intervention and Post-intervention surveys.

The surveys contained three specific questions on each of the two key elements under consideration, energy literacy and sense of control, as shown in Table 21. A copy of the full surveys is contained **Appendix F and G**.

Table 21: Literacy/control survey questions

Energy literacy	Sense of control
Which of the following things stop you from reducing energy use in your home? Not sure how to.* (Yes/No) I am aware of how my household electricity use compares to my neighbours, friends and family. (Strongly disagree / Disagree / Agree / Strongly agree / Unsure) (n=514) When you receive your electricity bill, how clear and easy is it to understand? (Not at all clear / Not very clear / Somewhat clear and understandable / Very clear and easy to understand / Unsure) (n=513)	Which of the following things stop you from reducing energy use in your home? Lack of control to make improvements to the property.* (Yes/No) I feel in control of my electricity use. (Strongly disagree / Disagree / Agree / Strongly agree / Unsure) (n=514) I feel in control of my electricity bills. (Strongly disagree / Disagree / Agree / Strongly agree / Unsure) (n=516)

** Showing only the question elements relevant to literacy and control. The full set of elements for this question is included in the surveys in **Appendix F and G**.*

As with the analysis of participant perceptions of savings (see Section 4.3.2), data was recoded numerically and then compared to determine if householders reported increased literacy and control at the end of the project. The differences between the before and after responses were tested using the Wilcoxon Signed-rank test to determine statistical significance of any observed difference. Any observable differences not able to be confirmed as statistically significant, were rated as only partially achieved improvement.

The before and after data from the two binary response (Yes/No) questions were reported as is.

Comparisons were made at the group level, rather than at the individual level to avoid confounding that can occur from variance in repeated Likert-scale questions (see above).

As explained in Section 2.4.2, no control group was utilised to evaluate the changes in sense of control and energy literacy of participants.

Lessons Learned

Providing a control group who also completed the survey before and after the PSP may have provided for a more robust evaluation of changes in participant's attitudes towards energy efficiency.

Limitations of datasets

As discussed above, Round 3 participants (who had a shorter participation journey) did not complete the Post-Intervention Survey and are therefore not included in this analysis. The absence of these 276 participants (33% of the sample) from the analysis could therefore potentially introduce bias into the results.

In order to undertake analysis, the survey data needed to be transformed, introducing the possibility for manual coding errors.

Recommendations

The following recommendations are suggested for any future programs of a similar nature to PSP, with respect to evaluation data sets:

- Maintain one primary source of all participant-related data
- Survey data collection and storage should keep in mind straightforward export of data to enable efficient evaluation
- Include questions that directly invite participant perceptions of changes *during* the project (as well as before and after the project) to confidence in interpretation of before and after comparison results.

4.5 REPORTING ON FINDINGS

The following two sections set out the findings of the program and impact evaluation.

Results are ordered according to the categories in the Final Project Outcomes Logic set out in Table 15 and Table 16, as follows:

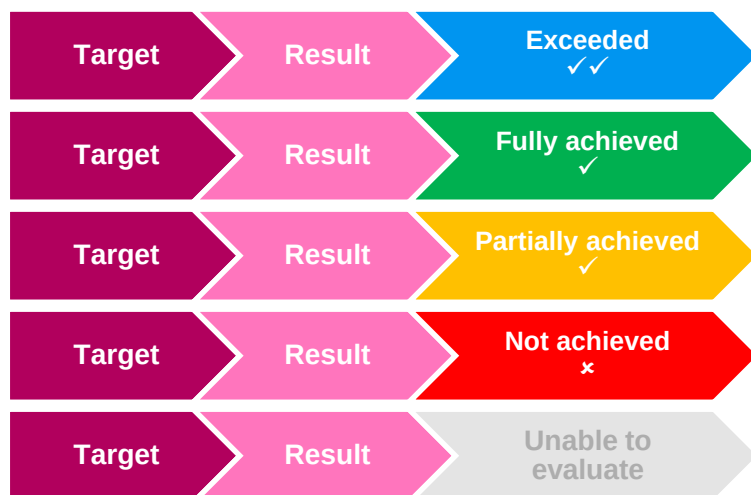
Program Evaluation of the overall implementation of the project, specifically:

1. Participation
2. Project management

Impact Evaluation of the impact of the project on household energy efficiency, specifically:

3. Impact on electricity use
 - a. Decreased electricity consumption
 - b. Increased capacity of Livelihoods workshop participants
 - c. Participants perceived reduced electricity use
 - d. Persistence of electricity reductions.
4. Impact on participants
 - e. Electricity literacy
 - f. Sense of control
 - g. Peer-to-peer networks.

Performance against targets (that align with performance measures in the tables on the previous page) and the results of the evaluation against associated metrics will be indicated via the graphics in Figure 3.

Figure 3: Conclusions indicator

The performance measures, targets and metrics from the Final Project Outcomes Logic are provided again over the page.

Table 22: Final Project Outcomes Logic – Program Evaluation (repeated)

Category	Performance Measure	Target	Metrics
1. Participation	Recruitment targets are reached	990* households successfully recruited	No. of leads per recruitment campaign No. recruited/eligible per recruitment campaign No. of Recruits who withdrew before assessment No. of participants who participated in the project (by location/tenure)
	Energy efficiency retrofits and assessments delivered	Assessments and tailored energy solutions delivered to 990* households	No. of households receiving home energy assessments (by location/tenure) No. of households receiving retrofits No. of home energy assessment cancellations by participants
	Solar hot water systems are negotiated and installed	50 solar hot water systems installed in owner households - funded through grant funding	No. of fully funded solar hot water systems installed owner households
		50 solar hot water systems installed - funded under landlord/ tenant cost sharing agreements	No. of solar hot water systems installed under landlord/tenant cost sharing agreements
		50 landlords and their tenants engaged to develop up to 50 cost sharing arrangements for installation of solar hot water systems	No. of landlords and tenants engaged to develop cost sharing arrangements for installing solar hot water systems
2. Project Management	Project rolled out on schedule	Project delivered according to key milestones and dates in Project Plan	% of milestones reached by due date
	Sufficient project staff recruited	100% recruitment of required UV and NCC project staff and volunteers	No. of FTE staff dedicated to recruitment
	EOI completed for home assessors	2-3 competitive EOI for home assessors	No. of EOI's completed for home assessors
	Project systems including record keeping, participant management systems created and implemented	Creation and implementation of required systems, project documents and materials as per Funding Agreement	No. of record keeping & participant management systems created
			No. of milestone reports delivered to the Department
			No. of communication materials/mechanisms created No. of points of contact with participants using communications materials

* Adjusted to exclude Pilot Participants

Table 23: Final Project Outcomes Logic – Impact Evaluation (repeated)

Category	Performance Measure	Target	Metrics
3. Impact on Electricity Use			
a. Reduced Electricity Use	Decreased electricity consumption as evidenced by billing data analysis of electricity consumption pre and post intervention, and against a control group	Electricity use reductions of 5-10% in participant households due to installation of retrofits	Average % change in electricity across all participating households during project Average kWh saved per day per household Average \$ saved per quarter per household Average kg CO2-e saved per day per household
	Increased capacity of Livelihoods workshop participants	30-50% of indicators identified in Livelihoods workshop demonstrate improvement and hence increased capacity to use energy more efficiently	% of Livelihoods workshop indicators improved
	Participants perceived reduced electricity use	Improvement on some measures of self-reported energy efficiency as measured on Likert scale in questionnaire*	Rating of importance of electricity reductions Rating of motivation for electricity reductions Proportion reporting taking energy efficiency actions Proportion reporting improved energy efficiency
b. Persistent Electricity Reductions	N/A - Persistence of electricity reductions beyond the life of the PSP not able to be measured as part of this evaluation.		
4. Impact on Participants			
a. Electricity Literacy	Self-assessment based on pre and post project questionnaire	Improvement on some measures of energy literacy as measured on Likert scale in questionnaire*	% change in participants reporting that “not sure how to reduce electricity use” stopped them reducing energy use % change in proportion of participants reporting they are aware of how their household electricity use compares to others % change in proportion of participants reporting that their electricity bill is clear and easy to understand
b. Sense of Control	Self-assessment based on pre and post project questionnaire	Improvement on some measures of control of electricity use and bills as measured on Likert scale in questionnaire*	% change in proportion of participants reporting they feel in control of electricity USE % change in proportion of participants reporting they feel in control of electricity BILLS % change in proportion of participants reporting “lack of control to make improvements to the property” as a barrier to reducing energy use
c. Peer-to-peer networks	Champion outreach	60 peer-to-peer champions recruited 3 Power Savers Teams formed	No. of champion participants engaged No. of Power Savers Teams formed

*This target was revised from the initial project logic as 100% improvement on some measures in Likert scale would not be realistic, rather statistically significant *improvement* on some measures would be a more realistic target. The target was set prior to the development of the survey questions, and Likert scale responses and therefore it was necessary to revise this target. A Wilcoxon Signed-rank test was run on the survey results to determine statistical significance, more details are contained in Section 4.3.2

5

Findings: Program Evaluation

5 FINDINGS: PROGRAM EVALUATION

This section sets out the results of the evaluation of the overall implementation of the PSP by the consortium, including:

1. Participation
2. Project management

5.1 PARTICIPATION

Participation in the project was evaluated against the following performance measures:

- recruitment targets are reached
- energy efficiency retrofits and assessments delivered
- hot water systems are negotiated and installed.

5.1.1 Reaching recruitment targets

Table 24: Final Logic subset – Reaching Recruitment targets

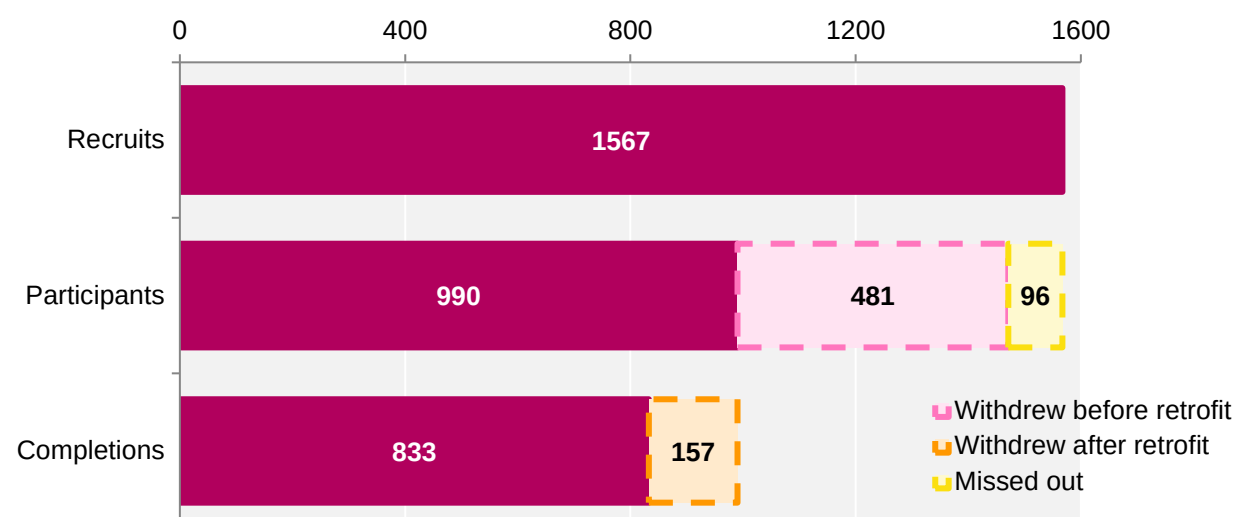
Performance Measure	Target	Metrics
Recruitment targets are reached	990 households successfully recruited	No. of leads per recruitment campaign No. recruited/eligible per recruitment campaign No. of Recruits who withdrew before assessment No. of participants who participated in the project (by location/tenure)

PSP recruitment began with generating **leads** (those invited to the PSP), signing on **recruits** (those who fit the eligibility criteria for the PSP), moving **participants** through the PSP journey (those who were offered all elements of the project) and delivering the PSP to **completions** (those who received all elements of the PSP).

The project had a target of 990 participants, excluding the pilot. It contacted 10,914 leads, resulting in:

- **1,567 householders recruited to the project**
(i.e. agreed to participate in the project)
 - 577 recruits (37% of the total householders recruited) subsequently withdrew or dropped out from the project prior to starting their participation in the project. Of these, 481 explicitly requested to withdraw, while 96 simply stopped responding to calls.
- **990 householders began participation in the project**
(i.e. completed a pre-intervention survey and received a home energy assessment)
 - 157 participants (16% of the total participating householders) subsequently withdrew from the project following their assessment. Of these, 87 withdrew before the opportunity to receive a post assessment retrofit, while 70 withdrew after receiving a retrofit.
- **833 householders completed the full project**
(i.e. remained as participants throughout the full term of the project, completing the Post-Intervention Phone Survey upon completion)

These numbers are shown in Figure 4. Assessments and retrofits are discussed in more detail in Section 5.1.2.

Figure 4: Recruits, participants and completions

* Missed out refers to participants who were unable to successfully book a home energy assessment, but never explicitly withdrew from the project. This includes householders who simply stopped responding to communications from the project, but also householders whose busy lives made it difficult to schedule and attend an assessment in the timeframes of the project.

The breakdown of leads, recruits, participants and completion by recruitment round are shown in Table 25. The number of participants in Round 1 (128) fell short of the target of 200. This was largely as a result of the delayed participation of R1B participants, with only half of recruits going through to become participants. This was partly offset by Round 2 exceeding its target of 500 by an additional 42 participants. The target for Round 3 was therefore adjusted from 300 to 320 in order to meet the overall project target.

Table 25: Leads, recruits and participants by round

Round	Time Period for Recruitment	Leads	Recruits	Target	Participants		Completions	
Pilot*	Sept 2013 - Dec 2013	60	27	10-30	20		15	
Round 1a	Dec 2013 – Feb 2014	1,785	91	200	78	128	61	105
Round 1b			95		50		44	
Round 2a	Mar 2014 – Jun 2014	2,665	501	500	295	542	248	452
Round 2b	Jul 2014 – Dec 2014	3,732	397		247		204	
Round 3	Jan 2015 – Mar 2015	2,732	483	300(320)	320		276	
	Sub-Total	10,974	1,594	1,010	1,010		848	
	TOTAL ex pilot	10,914	1,567	990	990		833	

* The pilot group were subject to their own evaluation. This is available in the ISF Pilot Evaluation Report in **Appendix D**. Therefore pilot participants are excluded from the rest of this evaluation.

The number of leads generated by United Voice from the membership base was significant (ten times more) than the target for participants. It was understood that not all of these leads would be eligible for the project, and that the targeted group would need to be large as they would have limited available time (a potential contributor to attrition).

United Voice identified a target of recruiting 10% of their members in each of the 4 regions. This target was exceeded across all regions. A notable contribution to this effort was recruitment through:

- Union delegates and officials within the United Voice membership
- PSP Champions to friends and family outside of the United Voice membership.

84% of the total 990 participants completing the PSP project received the full experience of *both* home assessments and retrofits. 37% of the total householders recruited withdrew from the project before home assessment, well in line with planned attrition as raised by CSIRO, and 16% of the total participating householders withdrew from the project after home assessment.

The availability of householders to respond to communication from the PSP and to schedule assessments was not adequate for a small portion (0.06%) of recruits who dropped out and therefore did not receive the benefits of the project.

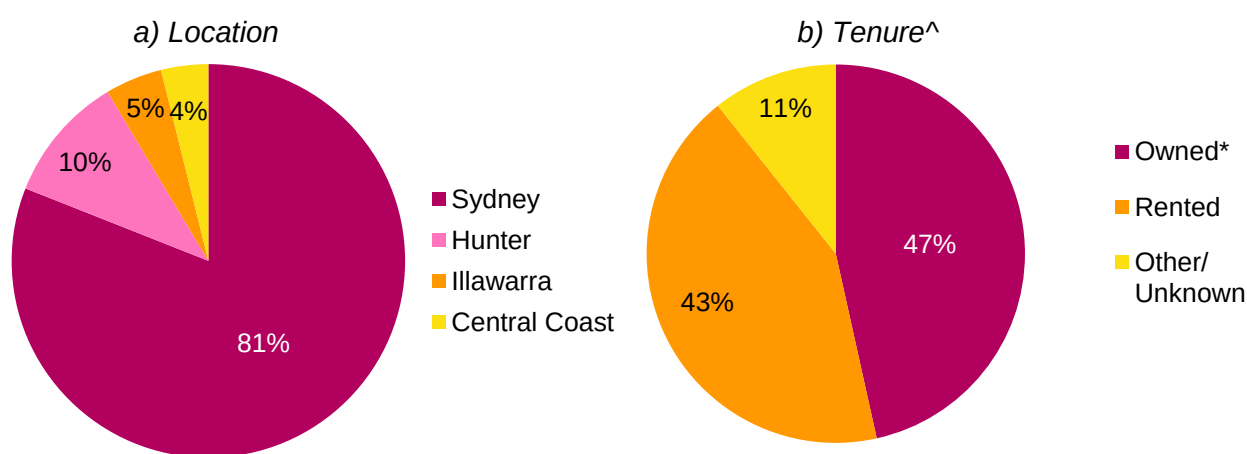
From the Pilot phase a 27% attrition rate was identified in converting recruits into participants. In the June 2015 Project Plan delivered to the Department, it was expected “that a 30-50% attrition rate would be realistic and due to the timelines of the project there will be a pool of recruits at the end of each assessment period that were unable to be booked in the period – either due to number constraints, or inability to contact the participant and find an appropriate time”. Therefore a 37% attrition rate is in the lower range of estimates for the PSP.

Demographics of recruits

During project design, four key regions (Sydney, Hunter, Illawarra and Central Coast) were identified for the PSP. In addition, a key project objective was to target both homeowners and renters in low income households. These demographic characteristics for the final 1,567 PSP recruits were analysed.

It was found that the majority of recruits (81%) were from Sydney, as shown in Figure 5a, with another 19% coming from regional areas around Sydney. Recruits were split roughly equally between owners (47%) and renters (43%), (with the remainder other/unknown) see Figure 5b. These proportions remain approximately the same across both the participant and completion cohorts.

Figure 5: Breakdown of recruits by location and home tenure



* Owned includes “Outright” and “Mortgaged” as this question was not disaggregated at the Recruitment stage.

^ Does not add to 100% due to rounding

The majority of householders that participated in the PSP were in the Sydney region. It is not surprising that the area with the highest population density (Sydney) resulted in having the most PSP recruits.

The PSP was successful in recruiting almost half homeowners and half renters to the PSP, which may be a reflection of the United Voice membership base. The 2011 Sydney census⁵ of households across all income levels identified 62% of households were homeowners, 30% renters and 8% other or not stated. This demographic spread for the PSP recruits may indicate a higher rate of renters compared to homeowners in low income households as defined by the PSP eligibility criteria.

⁵ <http://profile.id.com.au/australia/tenure?WebID=250>

Key lessons learned including positive outcomes and challenges, as well as recommendations for future projects of a similar nature are summarised in Sections 7.3.2 and Section 7.4.3.



5.1.2 Energy efficiency assessments and retrofits delivered

Table 26: Final Logic subset – Assessments and Retrofits

Performance Measure	Target	Metrics
Energy efficiency retrofits and assessments delivered	Assessments and tailored energy solutions delivered to 990 households	No. of households receiving home energy assessments (by location/tenure)
		No. of households receiving retrofits
		No. of home energy assessment cancellations by participants

Home energy assessments were completed for all 990 participants. During the Assessment, At-Assessment Retrofits (a range of energy efficiency equipment) were delivered to all but 3 participating households. Post assessment retrofits were installed for 837 households⁶. These numbers are summarised in Table 27.

Table 27: Home energy assessments and retrofits delivered

Home energy assessments completed:	990
At-Assessment Retrofits installed	987
Post-assessment retrofits (PARs) installed:	837*

Assessments

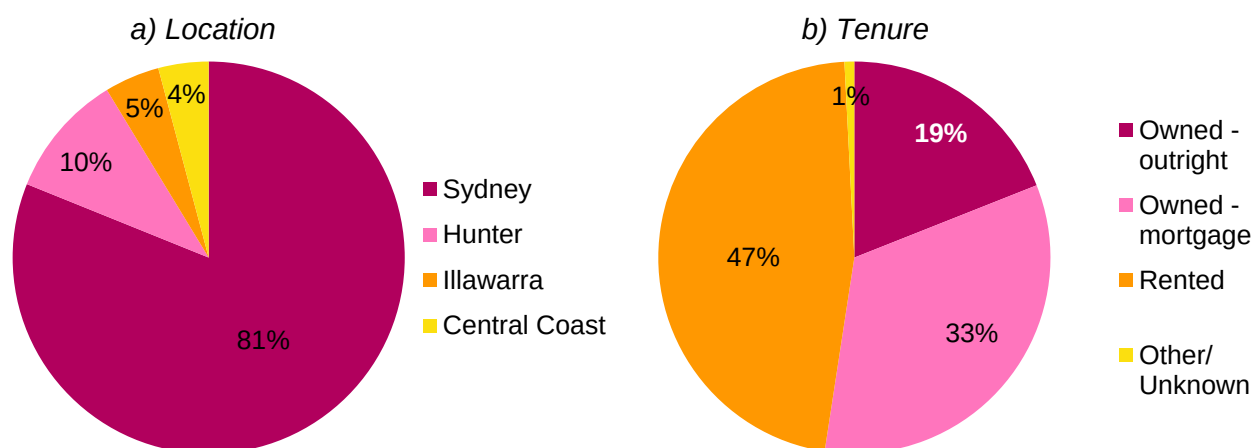
Figure 6 shows the breakdown of participant households receiving home energy assessment by location and home tenure. The breakdown by location is similar to that in Figure 5a.

On the other hand, the breakdown by tenure shows a much smaller proportion of 'unknown' tenure and is therefore a better representation of household tenure with 52% of participants owning a home and 47% renting. In the 2011 Sydney census of households across all income levels⁷, 62% of households identified as homeowners and 30% identified as renters. Therefore the PSP participants included more people who were renting their home than average.

⁶ *Post-assessment retrofits were offered to an additional 66 households, but not deployed.

⁷ <http://profile.id.com.au/australia/tenure?WebID=250>

Figure 6: Breakdown of PSP households receiving home energy assessments⁸ by location and tenure



Home ownership breakdown shows that 19% of PSP low income households who received a home assessment owned their homes outright and 33% had a mortgage. Of the 62% of households identified as homeowners in the 2011 Sydney census⁹ of households across all income levels 29% owned their houses outright, 33% had a mortgage. Therefore the PSP participants who owned their homes included less people who owned their homes than the average.

Retrofits

During the home assessment (across 990 households), At-Assessment Retrofits were delivered to 987 participating households, which consisted of only energy efficiency equipment.

Following the home assessment 837 participants received at least one type of Post-Assessment Retrofits (PARs) as shown in Figure 7:

- Energy efficiency equipment up to a total value of \$250 – 56% of households
- A rebate for energy efficiency appliances and/or fixtures/services up to a total value of \$250 – 34% of households.
- An In-Home Display (IHD) monitor device up to a total value of \$250 – 13% of households.

A small number of the 837 households (5%) received more than one type of retrofit – these are counted twice in the above percentages. The full breakdown of combinations is shown in Table 28.

Figure 7: Breakdown of Retrofits delivered

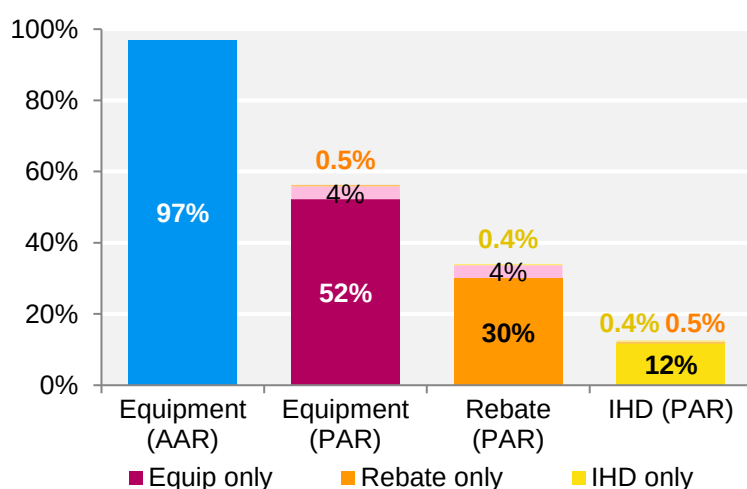


Table 28: Retrofit combinations

	Equip	Rebate	IHD
At-Assessment Retrofit			
Equip only	99.7%		
Post Assessment Retrofit			
Equip only	52%		
Rebate only		30%	
IHD only			12%
Equip & Rebate	4%		
Equip & IHD	0.5%		0.5%
IHD & Rebate		0.4%	
	56%	34%	13%

⁸ Proportions for PARs were within 1% of shown home assessment figures.

⁹ <http://profile.id.com.au/australia/tenure?WebID=250>

The rebates sometimes required participants to spend additional money of their own (which was likely already limited), whereas the equipment did not. This may explain the preference for households to receive equipment rather than a rebate. Limited time, motivation and knowledge of participants to select and purchase equipment may also have contributed to this result.

66 households completed the project without having a retrofit deployed, due to the following reasons:

- chose not to take up PAR offer (55 householders)
- difficulty contacting (12 householders)
- refused to sign the Billing Data Consent form (9 householders).

Assessment appointments and cancellations

A key to understanding the implementation of home energy assessments is the effort that was required to secure and complete the appointments, in this case the number of home energy assessment appointments that had to be rescheduled due to cancellations.

At the beginning of the project, records on number of cancellations were not kept due to project system limitations, however anecdotal evidence suggested the rates of cancellation were increasing and needed to be addressed more formally.

In May 2014, assessors, UV and NCC came together to discuss measures to be taken to minimise cancellations. Specific measures were put in place by UV to reduce the cancellation rate, including:

- Introduction (from Round 2a, August 2014) of the 'Trifecta call': booking the assessment during the recruitment call for the assessment to occur within 2 weeks.
- Confirmation calls by assessors prior to the appointment.
- Booking assessments with at least 48 hours' notice for assessor.

At the same time, Salesforce was implemented, which allowed for cleaner access to information and communications between the call centre making the appointments and assessors. It also enabled the recording of cancelled appointments.

Table 29 shows the cancellations for each round, beginning with Round 2a¹⁰. As expected the effort required to secure assessments (ie. number of appointments per successful assessment) decreased as time went on, reflecting the improvement of process. The substantial drop from Round 2a to Round 2b is likely a reflection of all Round 2b assessments being booked as part of the 'Trifecta' call described above.

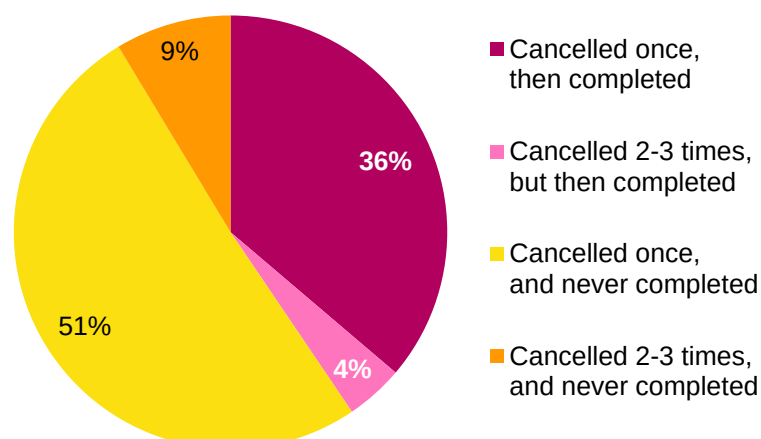
Table 29: Home energy assessment appointment cancellations

	Appointments scheduled	Cancellations	Assessments completed	Effort to secure assessment
Round 2a ¹¹	393	98	295	1.33
Round 2b	293	46	247	1.19
Round 3	361	41	320	1.13

Of those who cancelled, 13% cancelled two to three times. In total, 40% went on to successfully complete an assessment (36% after only cancelling once, but 4% after cancelling two to three times) (Figure 8). Interestingly further analysis of the data found that those participants who cancelled two to three times, had almost the same eventual completion rate as those who only cancelled once (39% vs 41%), indicating that it is worth persevering.

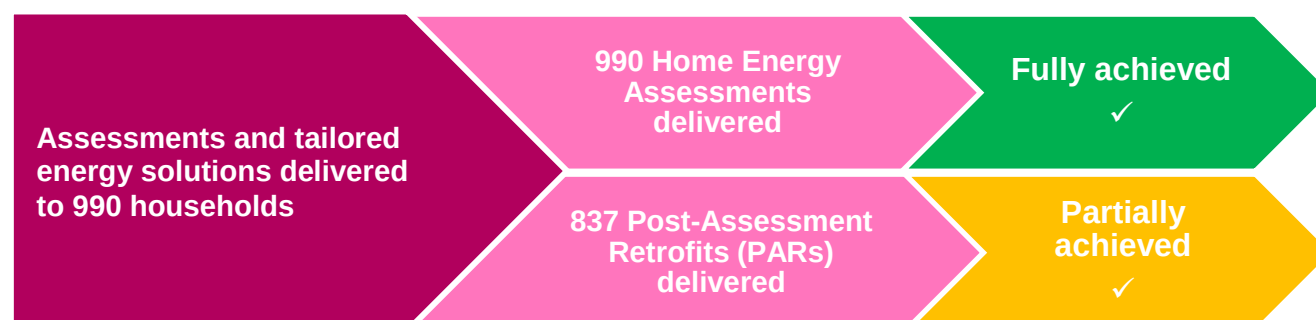
¹⁰ The large majority of assessments for Round 1 were scheduled and completed prior to the implementation of Salesforce and the beginning of capturing data on cancellations.

¹¹ Salesforce was implemented during the middle of the assessment period for Round 2a, which means that some cancellations may have occurred that were not recorded, so this data may understate the effort required for Round 2a.

Figure 8: Cancellations leading to successful assessments

Therefore the PSP fully achieved the total 990 home energy assessments and partially achieved the delivery of PARs to those households.

Key lessons learned including positive outcomes and challenges, as well as recommendations for future projects of a similar nature are summarised in Sections 7.3.3 and Section 7.4.4.



5.1.3 Solar hot water systems are negotiated and installed

Table 30: Final Logic subset – Hot water systems

Performance Measure	Target	Metrics
Solar hot water systems are negotiated and installed	50 solar hot water systems installed in owner households - funded through grant funding	No. of fully funded solar hot water systems installed owner households
	50 solar hot water systems installed - funded under landlord/tenant cost sharing agreements	No. of solar hot water systems installed under landlord/tenant cost sharing agreements
	50 landlords and their tenants engaged to develop up to 50 cost sharing arrangements for installation of solar hot water systems	No. of landlords and tenants engaged to develop cost sharing arrangements for installing solar hot water systems

The PSP set an original target to install 100 solar hot water systems in low income households: 50 for participants who owned their homes (by offering a free solar hot water system) and 50 for participants that rented (by offering a discounted solar hot water system to landlords under a cost-sharing arrangement with tenants).

This was in addition to other hot water system retrofits offered as PARs which included upgrades (electric to gas, storage to instant), temperature check, size reduction and inspection or repair (if required).

The PSP had a funding pool of \$250,000 available for the installation of 50 fully-funded SHWSs for home owners.

No funding was allocated to the installation of SHWSs for tenants and landlords. The project aimed to fund the cost of a solar hot water system by offering a significant discount and sharing the remaining cost between the participant's landlord and the tenant under a cost-sharing or 'split-incentive' arrangement.

A total of 148 participants were approached regarding a solar hot water system, 85 of whom owned their own home, while 63 rented.

Rental households

For the renter households, the PSP faced unexpected complications. A number of stages had to be successfully navigated in order to successfully install a solar hot water system in rental properties:

1. the tenant had to agree to their landlord/real estate agent being contacted and provide contact details to NCC
2. the landlord/real estate agent had to agree to participate in the project
3. a Solahart site inspection had to deem the house suitable for solar hot water
4. the landlord had to agree to a cost-sharing arrangement (or pay outright)
5. the solar hot water system would then be installed.

Table 31 shows the outcome for each renter household by stage.

Table 31: Status of Solar hot water systems in renter households

	Sub Total exited	Cumulative exited
Stage 1: 63 renter householders contacted		
2 participants deemed not eligible (homeowners)	2	2
8 participants unable to be contacted, following 10 attempts each	8	10
31 participants declined to be part of project • 13 due to circumstance (9 were soon moving home, 3 had or were about to get new hot water systems, 1 had gas) • 11 thought the landlord would not be interested • 3 did not want to disturb the landlord or real estate agent • 2 believed the project too hard or were too busy • 2 gave no reason	31	41
Stage 2: 22 real estate agents / landlords were contacted		
4 real estate agents were unable to be contacted	4	45
1 real estate agent declined to participate	1	46
13 landlord declined to participate	13	59
Stage 3: 4 properties were assessed for suitability*		
2 properties were deemed unsuitable	2	61
Stage 4: 2 landlords discussed cost-sharing arrangements		
2 landlords declined the cost-sharing arrangements	2	63
Stage 5: 0 solar hot water systems installed in rentals		

*Using Salesforce data obtained during Home Assessment

41 (65%) of rental households exited the initiative due to the circumstances of, or decision by the participant. A further 20 (32%) rental households exited the initiative due to decisions by the real estate agent or landlord. The remainder (3%) were assessed as being unsuitable properties. This resulted in no hot water systems being installed in renter households. This demonstrates the significant efforts by NCC and UV to engage tenants and landlords, without success.

To reflect this change for the evaluation, the number of rental properties *engaged*, rather than having solar hot water systems *installed*, was an additional target evaluated. The target, introduced via a Deed of Variation executed on 4 June 2014 with the Department, was: “50 landlords and their tenants engaged to develop up to 50 cost sharing arrangements for installation of solar hot water systems”. In total, as illustrated in Table 31, 63 renters were contacted and as a result 22 landlords (and/or their real estate agent) were then contacted, demonstrating that the target of ‘50 landlords and their tenants engaged’ was partially achieved.

Further discussion is included in the PSP Final Report around the key findings of the cost sharing arrangements offered to tenant and their landlords, in particular the motivations and behaviours of tenants and landlords with respect to sharing the cost of a solar hot water system.

Owner Households

In contrast, for owner households, the situation was more straightforward.

The PSP had a funding pool of \$250,000 available for the installation of 50 fully-funded SHWSs for home owners. Due to system cost reductions and a changing STC (Small-scale Technology Certificate) price along with Solahart in-kind discounts, 85 households were offered a fully funded solar hot water system.

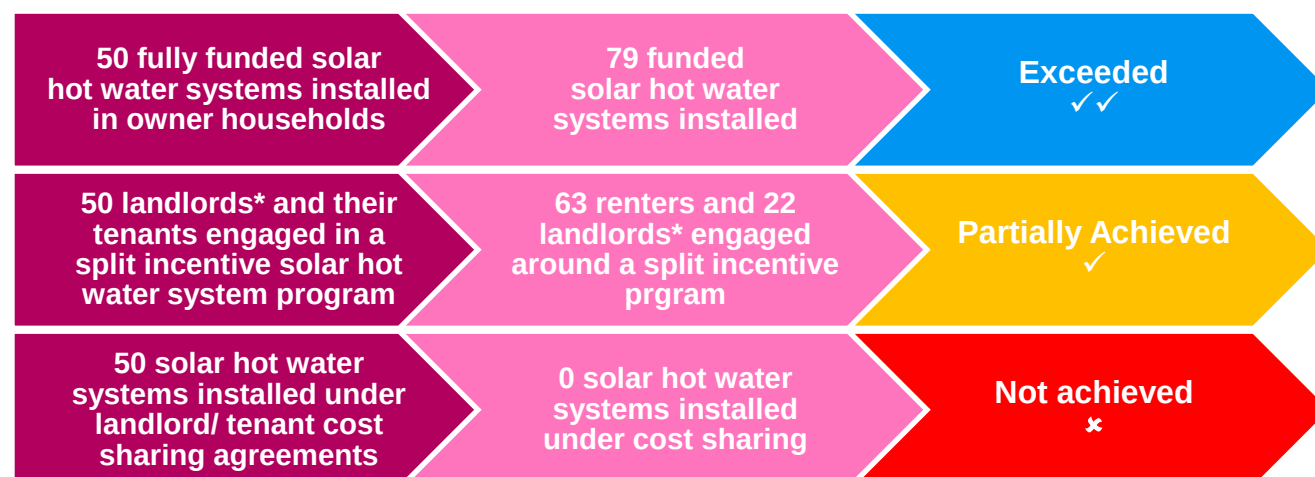
5 households (including 1 where the Strata did not approve) were deemed not suitable for solar hot water during a site inspection, 2 declined and the remaining 79 (including 1 Pilot) had a fully funded solar hot water system installed at their home (Table 32).

Table 32: Status of Solar hot water systems in owner households

	Offered	Declined	Not suitable	Target	Installed
Owners	86	2	5	50	79

The PSP therefore exceeded the target of 50 solar hot water systems installed in owned households.

Key lessons learned including positive outcomes and challenges, as well as recommendations for future projects of a similar nature are summarised in Sections 7.3.4 and Section 7.4.5.



* Landlords or their real estate agents

5.2 PROJECT MANAGEMENT

Management of the project was evaluated against the following performance measures:

- Project rolled out on schedule
- Sufficient project staff recruited
- EOI completed for home assessors
- Project systems created and implemented.

5.2.1 Project rolled out on schedule

Table 33: Final Logic subset – Project on schedule

Performance Measure	Target	Metrics
Project rolled out on schedule	Project delivered according to key milestones and dates in Project Plan	% of milestones reached by due date

The project was delivered according to eleven key Milestones, i.e. a series of deliverables due by a certain date in order to receive a segmented level of funding. Some Milestone deliverables inevitably needed to be adjusted slightly, as compared with the original Funding Agreement, due to unforeseen circumstances. All changes were agreed between NCC and the Department.

Nine out of eleven milestones have been completed at the time of writing this report and the remaining two milestones are due 1 March 2016 and 1 April 2016. Therefore 100% of milestones due to date have been completed on schedule.

Key lessons learned including positive outcomes and challenges, as well as recommendations for future projects of a similar nature are summarised in Sections 7.3.5 and Section 7.4.6.



5.2.2 Sufficient project staff recruited

Table 34: Final Logic subset – Project staff

Performance Measure	Target	Metrics
Sufficient project staff recruited	100% recruitment of required UV and NCC project staff and volunteers	No. of FTE staff dedicated to recruitment

The PSP budgeted for recruiting 4 FTE staff for the PSP and 4 FTE were recruited (3 at NCC and 1 at United Voice).

Staff recruited

NCC

3 full time staff were recruited by NCC specifically for the PSP project, both on time and within budget.

United Voice

The project budgeted for 1 core project staff (full-time) at United Voice, and 3 staff were recruited on time and within budget to meet this FTE role, varying between full time and part time roles:

- One staff member for 2 months full time
- Two staff members carried a 1.5FTE role for 6 months
- From 2015, one FTE staff member (whose role reduced to 0.8 FTE in September 2015)

Institute for Sustainable Futures

No new staff were recruited for the PSP from ISF.

Solahart

No new staff were recruited for the PSP from Solahart.

The performance measure of 'sufficient project staff recruited' can be analysed further through looking at a combination of the existing staff and in-kind staff time contributed across consortium organisations: Nature Conservation Council of NSW, United Voice, the Institute for Sustainable Futures and Solahart.

Existing staff

As would be expected, PSP project funds went towards salary costs for staff already hired.

NCC

Two existing full time staff (one who took maternity leave then returned part time to the project) and one existing part time/casual staff member at NCC spent time on the PSP.

United Voice

No existing full- or part-time staff at UV spent time on the PSP that was not in-kind. Some budget was required for UV staff costs in the call centre for supervisor's time. Casual staff from United Voice's Outbound Call Centre undertook casual shifts on the recruitment, assessment booking and ongoing participant engagement piece of the PSP. In the latter half of 2015 two of these staff were employed on a part-time contract (0.7 FTE) to complete the remaining participant engagement.

As the project progressed it became clear that substantively more resources were required to undertake the tasks of the outbound call centre and funding was reallocated from other areas to cover this gap.

Institute for Sustainable Futures

ISF had a high turnover of staff over the course of the PSP from 2012-2016, in total five existing researchers from ISF worked on the PSP. Two full time researchers (one the project manager) went on maternity leave during the project and one staff member replaced these roles – this was during a period where little input was required by ISF on the PSP. One researcher (project manager) returned part time to the project following maternity leave. Three full time researchers departed ISF during the project and were replaced by two full time and one part time staff member.

The time allocated for the evaluation of the PSP was underestimated by ISF and the staff turnover contributed to a portion of the additional time spent by ISF. A portion of the PSP budget was allocated for purchasing billing data which was transferred to the time spent on evaluation tasks.

Solahart

One existing full time staff member (State Manager) was allocated to the project.

In-kind staff time

The LIEEP funding agreement required matching of grant funds with in-kind time by consortium members, therefore in-kind staff time was planned.

NCC

At various times in the PSP, volunteers lent assistance with various aspects of the project, particularly in regards to coordination of PAR deployment. Additionally, NCC's CEO and Communications Officer provided considerable in-kind assistance.

United Voice

In-kind staff time was originally planned for the PSP. This included hours for casual staff to be recruited by UV. The in-kind contributions over the period of the project came in substantially over budget.

In practice, the majority of the in-kind contributions occurred with organisational staff engaging to assist the 1 FTE project staff to undertake required tasks. This indicates that the number of paid staff recruited was not sufficient, and that more paid staff would be required to complete a project such as this in the future.

Institute for Sustainable Futures

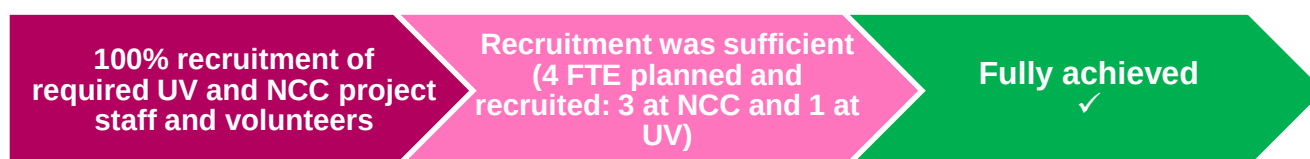
In-kind staff time was provided by ISF for participation in consortium meetings, assisting NCC with data manipulation to meet the CSIRO schema requirements and as needed meetings to discuss and clarify evaluation requirements. The number of meetings exceeded the in-kind time planned by ISF for the PSP.

Solahart

In-kind staff time was provided by Solahart for participation in consortium meetings, coordinating installations of solar hot water systems with solar hot water dealers and completing associated paperwork.

In conclusion, the PSP budgeted for 4 FTE and 4 FTE were recruited. This indicates the target was fully achieved.

Key lessons learned including positive outcomes and challenges, as well as recommendations for future projects of a similar nature are summarised in Sections 7.3.5 and Section 7.4.6.



5.2.3 EOI completed for home assessors

Table 35: Final Logic subset – EOI for home assessors

Performance Measure	Target	Metrics
EOI completed for home assessors	2-3 competitive EOI for home assessors	No. of EOI's completed for home assessors

Advertisements (Expressions of Interest or EOIs) were released to recruit energy assessors to complete the home assessments for PSP as described in Section 2.1.3

A target was set for 2-3 competitive EOIs to be completed and a total of 2 EOIs were completed (one direct hire and one competitive). The first was the EOI for the energy assessor for the Pilot phase (resulting in one assessor) and the second was the EOI for the energy assessors for Rounds 1-3 (resulting in four additional assessors).

Key lessons learned including positive outcomes and challenges, as well as recommendations for future projects of a similar nature are summarised in Sections 7.3.5 and Section 7.4.6.



5.2.4 Project systems implemented

Table 36: Final Logic subset – Project Systems

Performance Measure	Target	Metrics
Project systems including record keeping, participant management systems created and implemented	Creation and implementation of required systems, project documents and materials as per Funding Agreement	No. of record keeping & participant management systems created
		No. of milestone reports delivered to the Department
		No. of communication materials/mechanisms created
		No. of points of contact with participants using communications materials

All required systems, project documents and communication materials were implemented for the PSP as per the Funding Agreement. This included successful use of Salesforce as a record-keeping and participant management system, delivery of all required Milestone reports to the Department and a wide range of communications materials and mechanisms created and delivered successfully to PSP participants.

Record keeping & participant management systems

Record keeping and participant management systems were implemented with 7 initial systems trialled. Following trial, 3 systems were then replaced with the final system: Salesforce as discussed in Section 2.1.2.

Milestone project document reports delivered

At each Milestone identified in the Project Plan, a Milestone Report was created, documenting the project tasks completed to date, any variations that occurred (or would be necessary in the future) and lessons learned.

A total of 9 (of 11) Milestone Reports have been delivered at the time of writing this report, comprising 100% of reports due to date.

Communication mechanisms and materials

PSP Participant communications

A wide range of communication mechanisms and materials were created to engage and support participating householders throughout the project.

Communications occurred through three primary channels:

- the key in-home home energy assessment with an energy assessor
- phone calls at scheduled points along the participant journey
- mail outs to supplement the phone calls and provide additional information.

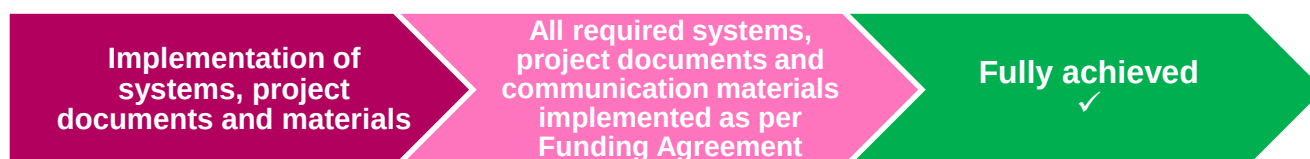
In total, 8 communication mechanisms were utilised and participants received at least 9 communication materials during their participation in the PSP, as shown in Table 37.

Table 37: Communication mechanisms and materials

Communication mechanisms	Communication materials
1. In-home contact via home energy assessment 2. Recruitment booking calls (included Pre-Intervention Phone Survey) 3. PAR calls 4. QR 1 5. QR 2 6. QR 3 (excluding Round 3) 7. Champion calls 8. Post project phone call (including Post-Intervention Phone Survey)	1. Recruitment mail out 2. Welcome letter 3. 'How it Works' brochure 4. Power Savers Action Plan 5. PAR letter 6. Fact sheets (x 6) 7. Hardcopy newsletters (x2) 8. Final communication 9. EOI for Power Savers Teams (in mid 2015)

In total there was 1 home assessment, 7 phone calls made and 7 mail outs sent, totalling 15 points of contact with each PSP participant at the time of writing this report. Final communications are yet to be sent to participants.

Key lessons learned including positive outcomes and challenges, as well as recommendations for future projects of a similar nature are summarised in Sections 7.3.5 and Section 7.4.6.



5.3 OTHER PROGRAM EVALUATION FINDINGS

5.3.1 NESB/CALD Participants

The PSP included a focus on assisting low-income tenants and low-income people from non-English speaking backgrounds. While data for the impacts on this demographic was not included in this final evaluation, these impacts have been further analysed and discussed in the PSP Final Report.

5.3.2 Control Group

Designing the project to select the control group from within the original sample of 1,010 households (i.e. 500 households), in hindsight, should not have been considered, given the already small sample.

The shortening of the total PSP by 5-6 months (without extension to the final deadline) led to an inevitable need for changes to project design. Despite these barriers, the PSP team attempted to create a control group several times with significant effort. However, in the end, the intended household data was unable to be used as a control group for evaluation purposes.

The consequence was that time and effort ensuring the control group was in place could have instead been spent on maximising the participation experience for all PSP households.

However, data from all 990 households was still utilised in the evaluation and increased the size of the participant group resulting in more statistical significance of the results.

Had the original 500 controls been established in a strict 'control' manner (randomly selected with no bias and no participation in the project), this would have resulted in only 500 participants, which with

attrition would have made project impacts impossible to evaluate. Impact evaluation remained challenging even when all 990 household records were included.

Had the request for de-identified billing data not been made to provide an alternative control group, it would not have been possible to identify savings from the PSP.

Therefore the final result, despite the challenges faced with the control group creation, is probably the best solution for an energy efficiency program such as LIEEP i.e. using de-identified billing data as the control so that no participants miss out on the benefits of the program.

Recommendations for future projects are included in Section 7.4.7.

5.3.3 Data Management

Software for Project Management

Data management requirements for the PSP were not initially budgeted for, so funding needed to be reallocated from other line items.

The implementation of Salesforce had significant positive impacts for the running of the PSP in being able to share information across organisations in real time and to provide a customisable system.

5.3.4 Household consent for billing data

Some householders were resistant to the Billing Data Consent forms during the initial energy assessments, because:

- They did not receive clear advice they would be given the Billing Data Consent form upon registration;
- Highest priority importance was not placed on obtaining the form until months into the project.
- There was no incentive for returning forms after the energy assessment. After reflection on the initial stages, the PSP decided to change the PAR offer to be reliant on the return of the Billing Data Consent form, which proved to be effective.

Better communicating the purpose of the form at registration and assessment resulted in a substantial increase in the rate of return of the forms.

One issue encountered by the PSP team in gaining this consent was that if the official Account Holder was not present at the home assessment, then a form had to be left behind by the assessor with a reply-paid envelope. When a form was left behind, it relied on the householder to act on it, i.e. to have the Account Holder fill it in, sign it, and mail it. Levels of householder compliance/diligence with this varied, with a follow-up call(s) having to be made by NCC, and sometimes NCC posting out of a new Billing Data Consent form and envelope to the householder.

Another issue encountered was when some householders thought the assessor was asking them to switch energy provider. Factors that may have contributed to this concern could include:

- previous negative experiences with door-knocking solicitation by energy providers or marketers;
- misinterpretations of expectations;
- misunderstandings compounded by householders having English as a Second Language.

As the PSP progressed, the OCC tightened up the language they used when discussing what is involved in the home assessment, including that the assessor would be asking them to fill in a Billing Data Consent form, that householder's details would be de-identified for the purposes of evaluation of the PSP.

5.3.5 Obtaining billing data from electricity distributors

In requesting the data from the electricity distributors, maintaining engagement with the organisations over the course of the multi-year project presented challenges. Staff turnover (within the energy distribution companies and within the PSP consortium), changes to the project design, changing expectations for consent and changing data specifics over time were barriers experienced to obtaining the data in an efficient manner. The lack of consistent records between the electricity retailer and distributor resulted in the validation process removing a significant portion of possible billing data records that could have been utilised in the evaluation. In addition, the legal privacy requirements of releasing data, which differed between the two electricity distributors, added complexity and delays to the delivery of billing data for evaluation (initially weeks which extended to over a month). Delays then reduced the time for evaluation to a shorter period than expected.

While there was no charge to obtain the electricity billing data from the distributors, which was helpful to the project budget, the expectations about producing evidence of customer consent changed. Initially a sample of Billing Data Consent forms (and access to Billing Data Consent forms upon a spot check request) was deemed acceptable by the electricity distributors in order for the data to be released. However once the formal data request was submitted, copies of all signed Billing Data Consent forms were then requested by one distributor. The PSP data storage process was not designed in a way to for all forms to be provided; therefore this was a time intensive and unexpected process for the PSP consortium to provide all of the Billing Data Consent forms.

The validation process conducted by the electricity distributors involved checking customer details against the billing details from the electricity retailers, and if records were not current the data was not able to be released. This reduced the already reduced data set further.

The project relied on an informal approach to obtaining billing data, based on relationships between the PSP consortium and the electricity distributors.

Recommendations for future projects are included in Section 7.4.7.

6

Findings: Impact Evaluation

6 FINDINGS: IMPACT EVALUATION

This section sets out the results of the evaluation of the impact of the project on household energy efficiency.

6.1 IMPACTS ON ELECTRICITY USE

Impact on electricity use was evaluated against the following performance measures:

- Reduced electricity use
 - Decreased electricity consumption via billing data analysis
 - Increased capacity of Livelihoods workshop participants
 - Participants perceived reduced electricity use
- Persistence of electricity reductions.

6.1.1 Decreased electricity consumption

Table 38: Final Logic subset – Decreased electricity consumption via billing data analysis

Performance Measure	Target	Metrics
Decreased electricity consumption as evidenced by billing data analysis of electricity consumption pre and post intervention, and against a control group	Electricity use reductions of 5-10% in participant households due to installation of retrofits	Average % change in electricity across all participating households during project Average kWh saved per day per household Average \$ saved per quarter per household Average kg CO ₂ -e saved per day per household

In order to evaluate whether PSP participants electricity consumption had decreased due to the PSP treatments delivered to their households, an analysis was conducted on their electricity billing data records. The performance measure highlights the analysis of electricity consumption pre and post intervention and against a control group. Both pre and post intervention billing data was collected and utilised in the analysis. Pre-intervention data was collected and utilised up to 24 months prior to the intervention. With the final round of participants receiving their treatments in 2015, the post intervention data was limited for some participants. The final evaluation results were derived from the matched pairs mean comparison method against a control group, which was drawn from de-identified non-participant data provided by the electricity distributors.

Section 4.3.1 provides more detail on the methodology applied to reach the findings across:

- non-matched pairs, using the validated billing data for 485 of the total 990 households for data from January 2012 to January 2016 including:
 - mean daily consumption
- matched pairs, using the final matches for billing data for 396 households of the total 990 households from January 1st 2013 to November 30th 2015 including:
 - mean daily consumption
 - average daily and quarterly consumption
 - mean daily consumption with heating degree days
 - regional consumption
 - solar hot water participant consumption
 - reduction in electricity use and bills

Demographic and tenure profile of matched pairs

In comparison to the total participants, the 396 matched pairs had a similar demographic and tenure profile. As the numbers for the Hunter and Central Coast regions were small, these regions were combined in order to present the results. As illustrated in Table 39 with the majority of participants in the matched pairs sample were in the Sydney region (81%), followed by Hunter and Central Coast (13%) and the smallest sample in Illawarra (6%). More of the matched pair sample participants owned their homes (52% than rented (47%).

Table 39: Demographic and tenure profile of matched pairs

	Total Sample	Matched Pairs Sample (396)
Sydney	81%	81%
Hunter and Central Coast	14%	13%
Illawarra	5%	6%
Owners	52%	58%
Renters	47%	41%
Unknown	1%	1%

Non-Matched Pairs

Mean daily consumption

Firstly the evaluation analysed the data across non-matched pairs, using the validated billing data for 485 of the total 990 households. This data was from January 2012 to January 2016. This reflects the earliest time period of data provided by Endeavour Energy and Ausgrid based on when participants provided consent for release of data on the signed Billing Data Consent forms (two years prior to the date of PSP registration), and the latest period data was provided from quarterly billing cycles when data was requested in December 2015 - January 2016.

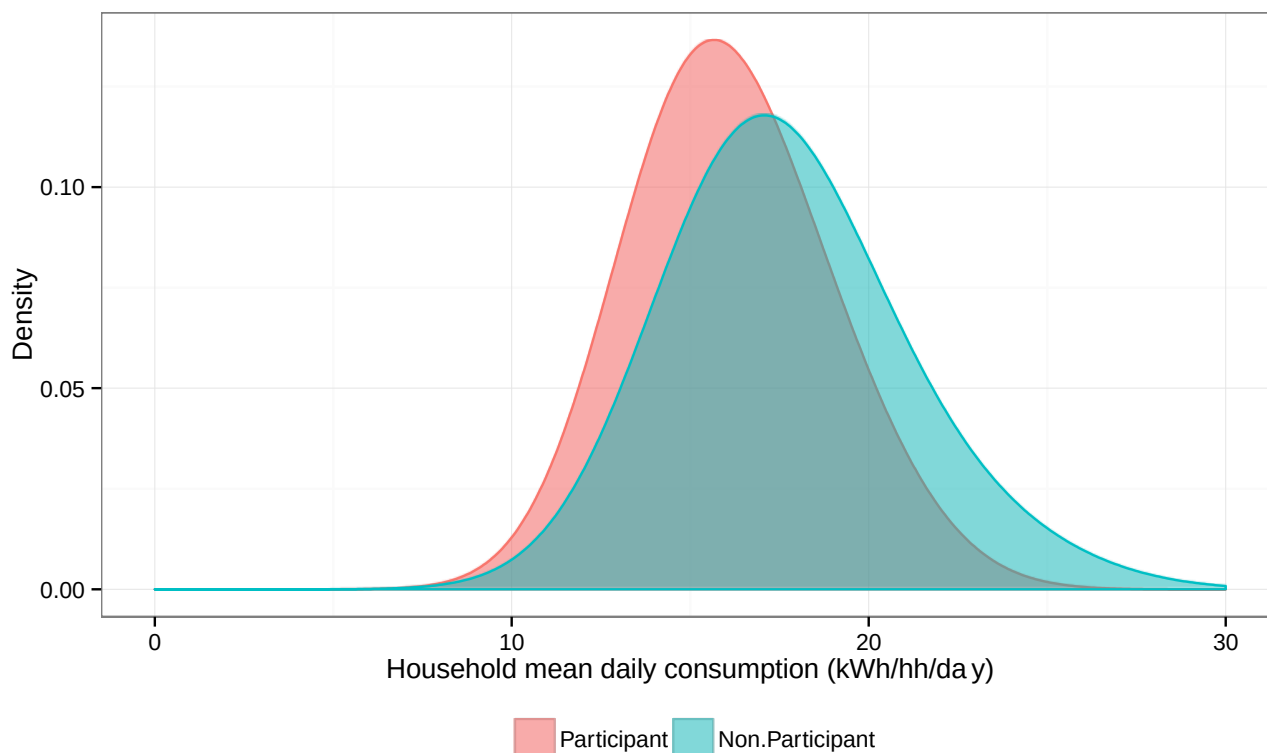
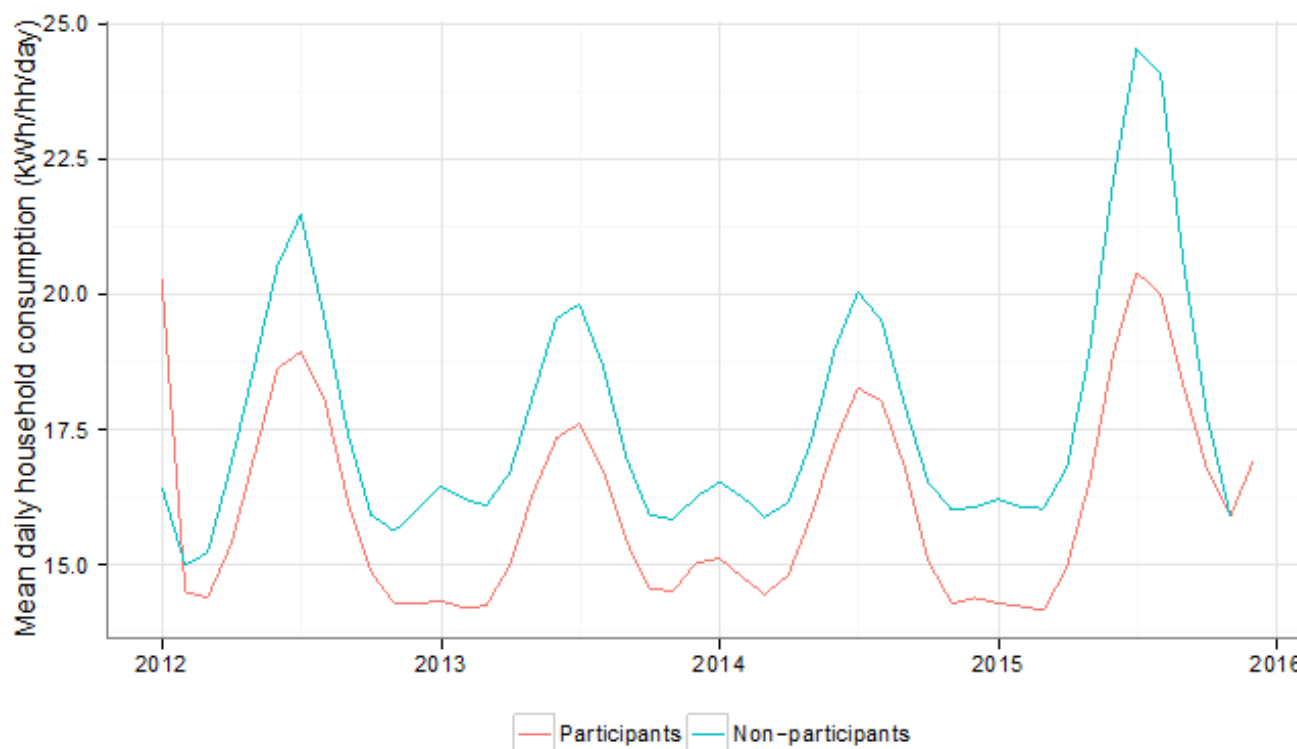
Figure 9 and Figure 10 contain a histogram of raw (i.e., non-matched) mean participant and non-participant consumption, and a time series graph comparing mean daily participant and non-participant consumption in kilowatt hours per household per day (kWh/hh/day). Together, these figures show the differences in participant and non-participant household consumption over the period of analysis.

Figure 9 (over the page) shows a clear discrepancy in mean participant and mean non-participant data over time, with non-participant households (blue) generally consuming electricity at a higher rate than participant households (pink). This highlights the importance to control for determinants of electricity consumption such as climate, household structure and socio-economic factors.

Figure 10 (over the page) illustrates that both participants and non-participants follow a similar response to weather indicated by the similar peaks in consumption in each winter across the period. In particular, it illustrates peaks in electricity consumption during winters, likely indicating higher consumption of electricity for heating homes when compared to using electricity to cool homes in summer. It also illustrates that the winter of 2015 showed higher electricity use when compared to the winters of 2013 and 2014.

Following the trend in mean consumption over time, however, participant households (red line) consumed electricity at a lower rate than non-participant households (blue line). This is likely due to the participant households being low-income, therefore likely to be lower electricity consumers (IPART, 2006; Rickwood, 2009) and the non-participant households being drawn from a random sample of households irrespective of income bracket.

This demonstrates the need for an evaluation method that can take into account socioeconomic and household structural data, hence the use of the matched pairs mean comparison (MPMC) method (described in further detail in the methodology Section 4.3).

Figure 9: Mean daily consumption density histogram**Figure 10: Mean daily consumption over time**

Matched Pairs

Mean consumption over time

The matched pair process was then applied to the billing data, reducing the sample size to 396 households and conducting the estimation over the period January 1st 2013 to November 30th 2015.

Figure 11 and Figure 12 show the outcome of the pair matching process. When compared to Figure 9 and Figure 10, the effect of the matching shows the mean consumption profiles of participants and non-participants are similar, but the largest difference in savings is in 2015. This correlates with the sharp rise in data records available at this time (as illustrated in Figure 2) showing that the more records available, the stronger the ability to detect electricity savings. Also illustrated on Figure 12 are the time periods when home assessments were completed for each recruitment round, indicating the start of the treatments (i.e. At-Assessment Retrofits).

Figure 11: Matched household daily consumption density histogram

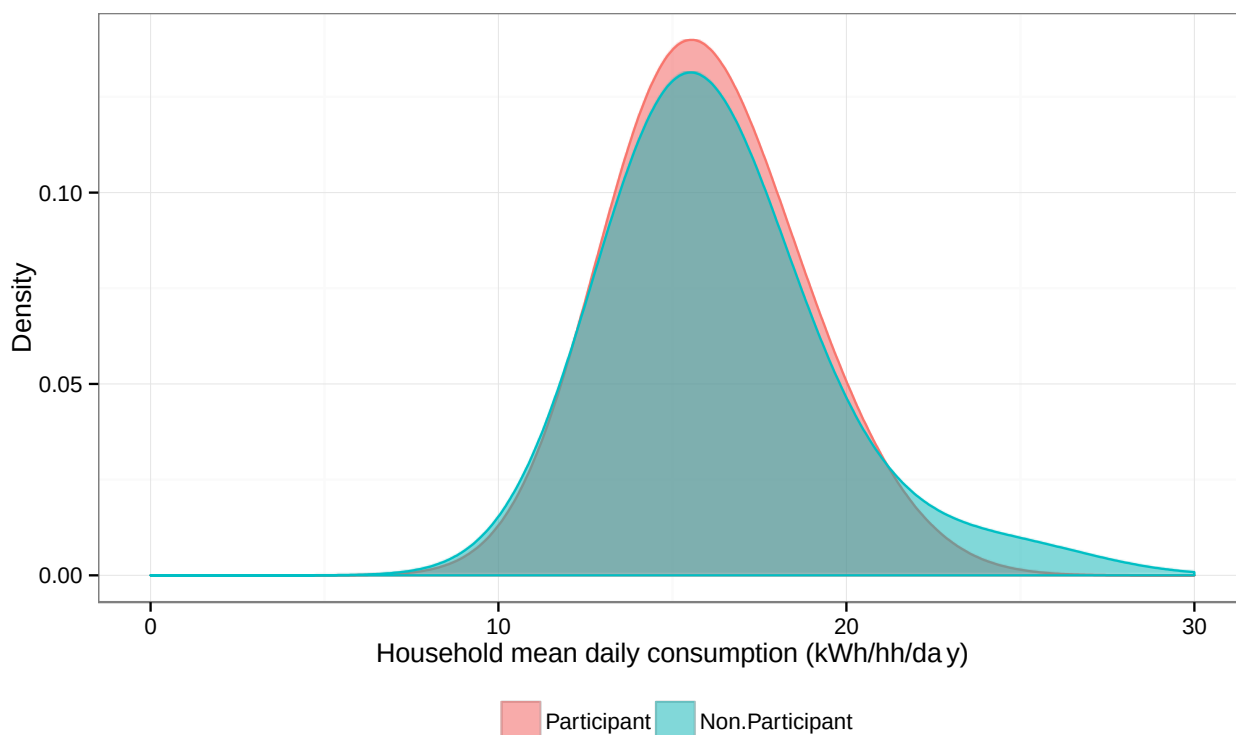
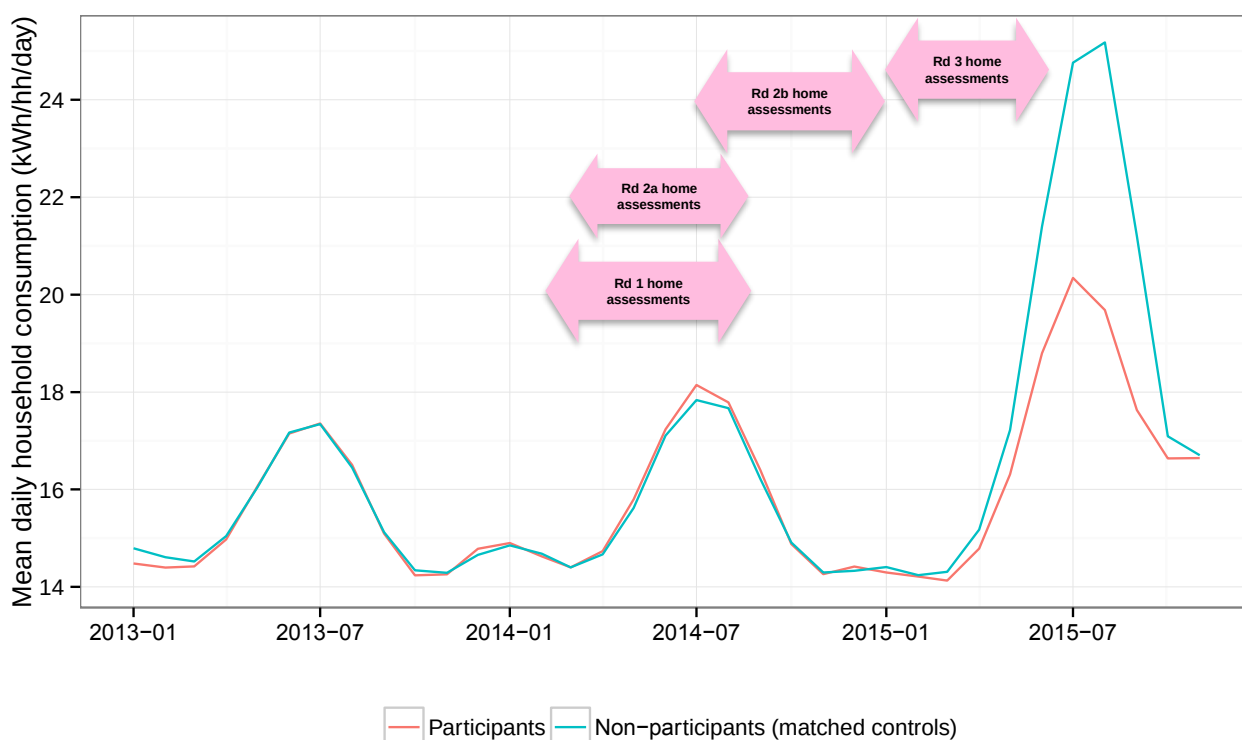


Figure 12: Matched household daily consumption over time



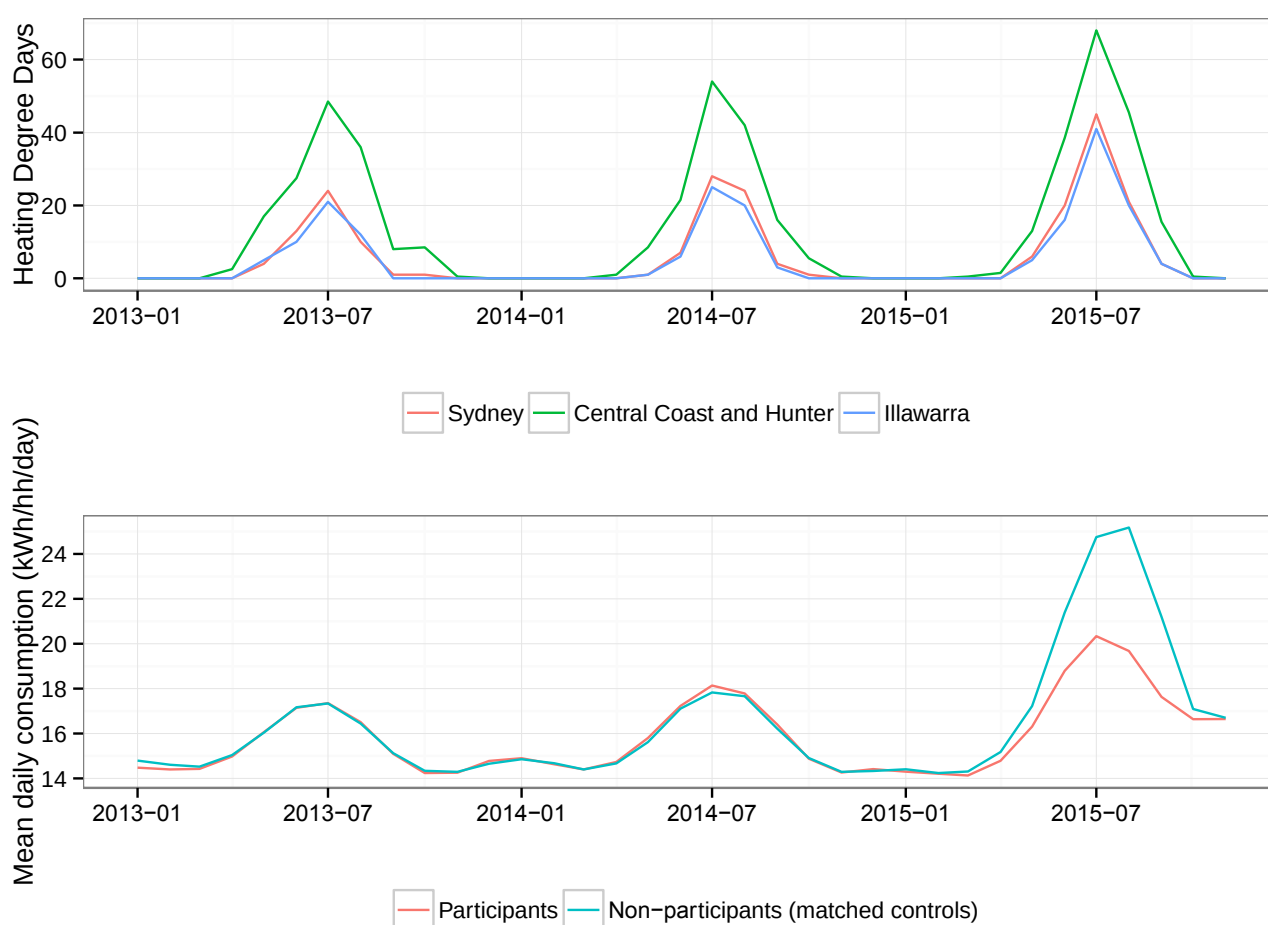
Mean consumption total

For the matched pairs sample across the evaluation period of January 2013 and November 2015, the mean electricity consumption was calculated to be 1,485 kWh per household per quarter and 16.3 kWh per household per day.

Mean consumption with heating degree days

Evident in Figure 12 (on the previous page) are peaks associated with the winter months in each year over the analysis period, most likely correlating with household heating use. A coarse heating degree day analysis was conducted to observe the response to colder weather pattern. Weather data was obtained from the Bureau of Meteorology to calculate heating degree days from a base temperature of 12 degrees Celsius for each of the three regions. This is shown graphically in the two graphs in Figure 13.

Figure 13: Heating degree days and matched household daily consumption over time



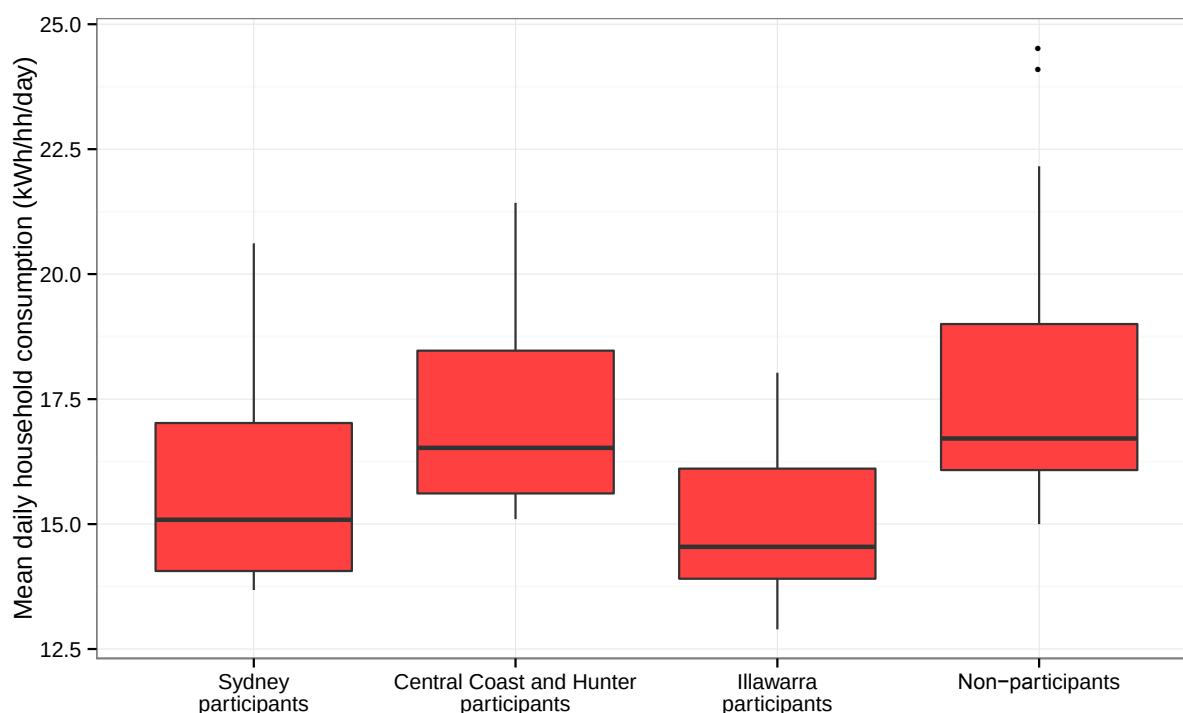
There is a clear difference in mean daily consumption between participants and non-participants in winter 2015, showing that the participant response to colder climate has reduced following the home energy assessment.

Following the home assessment Post Assessment Retrofits (PARs) such as ceramic fan heaters, draught-proofing products (caulking tubes, door and window seals, draft-stoppers), hot water system retrofits or upgrades (from electric to gas, storage to instant or reduction in size), curtains/pellets, insulation (ceiling or floor), reverse-cycle air conditioning, blankets (including electric) may have contributed specifically to the more efficient use of electricity in these households during winter. However, these electricity savings cannot be directly attributed to the above PSP treatments without further qualifying analysis.

Regional Variation in Consumption

Figure 14 show boxplots describing the regional variations in mean daily consumption across the three PSP regions (Sydney, Central Coast and the Hunter, and Illawarra) compared with the non-participant group (i.e. the de-identified data from electricity distributors, which included households from the same region). The regions of Central Coast and Hunter were combined as the samples for these were very small.

Figure 14: Regional variation in mean daily consumption

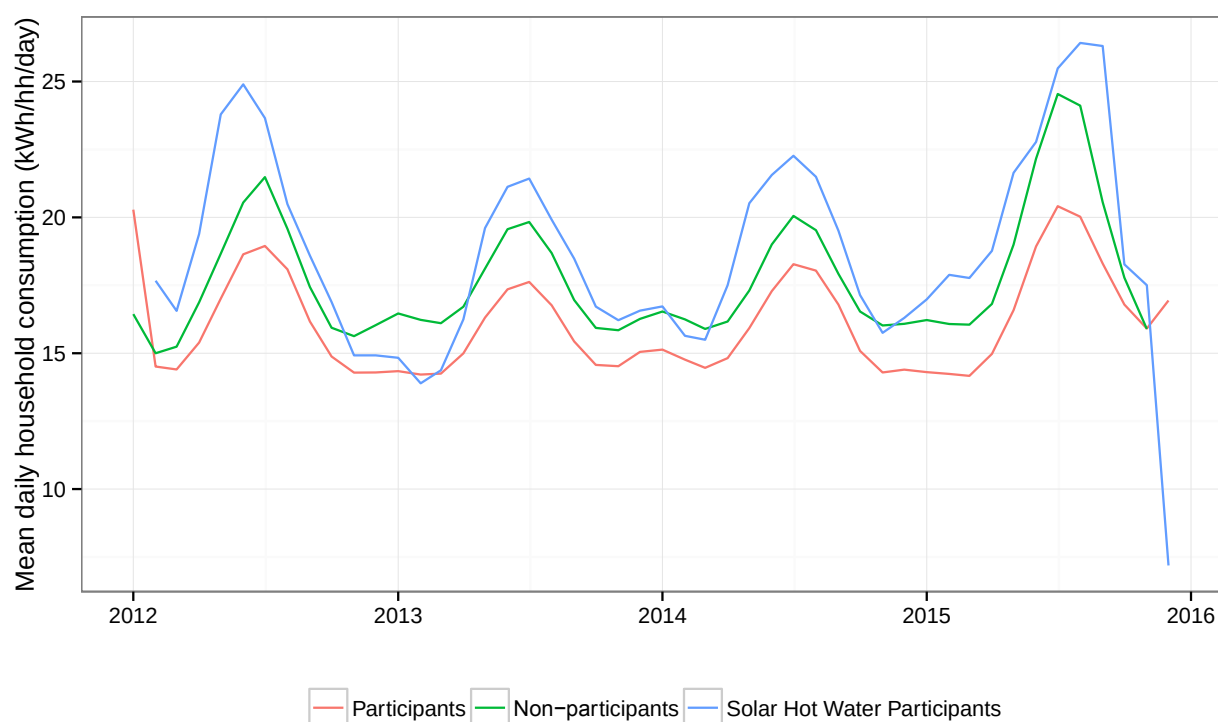


Overall mean consumption is lower for PSP participants in all regions compared to non-participants. The results show PSP participants in the Central Coast and Hunter regions had higher mean electricity consumption than Sydney PSP participants and Illawarra PSP participants had the lowest mean consumption.

Solar Hot Water Participant Consumption

A number of PSP participant households had solar hot water systems installed, and it was requested that a savings analysis be done to determine electricity savings for these particular households. Due to the processes of data validation described in Table 18, a large number of household data entries were removed, including the bulk of solar hot water heating households, rendering a savings analysis on these particular households inappropriate. To demonstrate, Figure 15 below contains the mean household consumption of the remaining solar hot water system households in the participant data ($n = 19$), showing solar hot water households consuming more electricity than both participant and non-participant pools, therefore no savings were found. Due to the small sample size, this may not reflect reality, so a savings estimate for this group of households has not been completed.

Figure 15: Solar hot water household daily consumption



Reductions in electricity use and bills

Using the evaluation approach outlined in Section 4.3.1, savings have been calculated for:

- average kWh of **electricity saved** per day (and per quarter), per participant household
- average **percentage of electricity saved** per day, per participant household
- average **kilograms CO₂-e avoided** per day, per household
- **average cost saved** per quarter, per household.

The paired t-test was used on the matched participant and non-participant pairs gives a difference in estimated means, which can be interpreted as savings and a level of statistical significance of the difference in means.

The savings estimation occurs over the period January 1st 2013 to November 30th 2015 for the matched pairs sample of 396 households.

Savings calculated are summarised in Table 40. The table also indicates the confidence intervals for each average figure calculated.

Table 40: Estimates of PSP savings per household

	Total Participants (396)	Sydney Participants	Central Coast and Hunter Participants	Illawarra Participants	Renters	Owners
Avg. kWh electricity saved per day	0.477 ± 0.232 kWh	0.421 ± 0.259 kWh	0.563 ± 0.596 kWh *not signif at 95%	1.23 ± 0.681 kWh	0.548 ± 0.323 kWh	0.46 ± 0.31 kWh
Avg. kWh electricity saved per quarter	43.41 ± 21.11 kWh	38.31 ± 23.57 kWh	51.233 ± 54.24 kWh	111.93 ± 61.97 kWh	49.87 ± 29.39 kWh	44.59 ± 28.21 kWh

	Total Participants (396)	Sydney Participants	Central Coast and Hunter Participants	Illawarra Participants	Renters	Owners
Avg. % electricity saved per day	2.92% ± 1.42%	2.63% ± 1.62%	3.34% ± 3.52%	9.01% ± 4.99%	3.76% ± 2.2%	2.6% ± 1.8%
Avg. kg CO₂-e emissions avoided per day	0.458 ± 0.222 kg	0.404 ± 0.249 kg	0.541 ± 0.572 kg	1.181 ± 0.654 kg	0.526 ± 0.31 kg	0.44 ± 0.298 kg
Avg. \$ saved per quarter	\$11.88 ± \$5.78	\$10.49 ± \$6.45	\$14.02 ± \$14.84	\$30.64 ± \$16.96	\$13.65 ± \$8.05	\$11.46 ± \$7.72

Across the matched pairs PSP participant sample of 396 households over the period January 1st 2013 to November 30th 2015, the results show an average of 0.5 kWh (± 0.2 kWh) saved per household per day and 43.41kWh (± 21kWh) saved per household per quarter. This is, on average, a 3% (± 1.4%) saving in electricity use per household per day. This kWh savings amounts to an average of \$12 (± \$6) saved per quarter per household and 0.5 kg (± 0.2 kg) of carbon dioxide equivalent emissions avoided per household per day.

Further to this, regional savings were also estimated, although due to small sample sizes, the estimate for Central Coast and Hunter was insignificant. This shows that the highest savings were experienced by PSP participants in the Illawarra region (1.2 ± 0.7 kWh/hh/day) and the lowest savings experienced by PSP participants in the Sydney region (0.4 ± 0.3 kWh/hh/day). This amounts to the highest average saving of 9% (± 5%) per household per day and \$30 (± \$17) per household per quarter experienced by Illawarra participants and the lowest of 3% (± 2%) and \$10 (± \$6) per household per quarter experienced by Sydney participants.

When comparing to mean electricity consumption by region PSP participants in Illawarra had the lowest consumption, yet experienced the highest savings, which may mean the PSP treatments were more effective in this region at saving electricity. Conversely Sydney PSP participants had the second highest mean electricity consumption, yet experienced the lowest savings, which may mean the PSP treatments were less effective in this region at saving electricity. Interestingly, the most participants were in Sydney (81%) reflecting a small savings across a larger sample, and the least were in Illawarra (6%) reflecting a larger savings across a small sample.

Savings were also estimated for participant households by tenure status. It was shown that renters saved on average 1.2% more electricity than owner occupiers. However, this savings estimate is potentially misleading, as household characteristics have not been taken into account. For example, renters may occupy smaller dwellings than owner-occupiers, and this effect has not been considered. To properly account for dwelling characteristics on savings by tenure type, a multiple regression model would need to be performed. However there was insufficient data available for this to be completed.

Due to limitations in the data, PSP specific savings beyond regional location and tenure (including savings from individual treatments and the installation of Solar Hot Water systems) have not been possible. Considering these limitations, the method used is best available. However a more rigorous method with appropriate data would reveal more accurate savings estimates by participant subsets.

Total savings experienced across the 396 matched pair sample of PSP participants across the three years of the evaluation period (2013, 2014 and 2015) are illustrated in Table 41. Total electricity and carbon emissions savings were calculated by using the average savings, multiplying by the number of households marked as having an assessment done per months to give a total kWh saved per day, then multiplying by the number of days in the month to give kWh saved per month and summing to give a total kWh saved per year. Cost savings were by multiplying the total consumption by the

average NSW figure of 0.2737 \$/kWh (also used to calculate the per household dollar savings). Results are presented by year to show the disparity between savings in each year of the project.

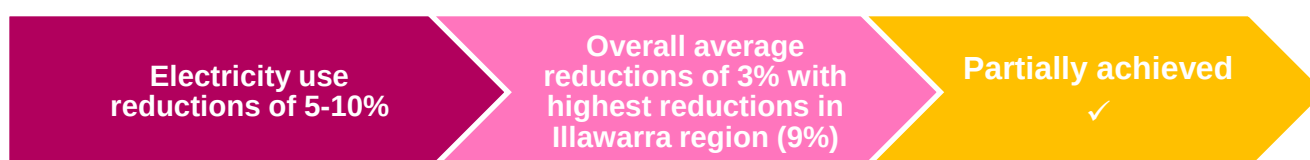
Table 41: Total electricity emissions and cost savings by PSP participants (396 sample)

	2013	2014	2015
Total kWh electricity saved by PSP participants	0	15,540	57,212
Total kg CO ₂ -e emissions avoided by PSP participants	0	14,918	54,924
Total \$ saved by PSP participants	0	4,253	15,659

The results show no savings in 2013, with savings increasing from 2014, and the maximum savings being achieved by PSP participants in 2015. This aligns with the delivery of the first treatments to Round 1 participants in 2014 and Round 2 and 3 participants in 2014-15.

With overall average reductions of 3% (with the highest reductions of 9% in the Illawarra region), the PSP partially achieved the target of “electricity use reductions of 5-10% in participant households due to installation of retrofits”.

Key lessons learned including positive outcomes and challenges, as well as recommendations for future projects of a similar nature are summarised in Sections 7.3.6 and Section 7.4.7.



6.1.2 Increased capacity for reductions

Table 42: Final Logic subset – Increased capacity for reductions

Performance Measure	Target	Metrics
Increased capacity of Livelihoods workshop participants	30-50% of indicators identified in Livelihoods workshop demonstrate improvement and hence increased capacity to use energy more efficiently	% of Livelihoods workshop indicators improved

The sustainable Livelihoods analysis was used by the PSP in a workshop in February 2014 to identify the capacity of a small sample of five PSP participants to reduce energy in their homes. It was proposed to repeat the workshop 12 months later with the same group following the home assessments and PARs, so that the self-assessment process could be used to evaluate the performance metric that 30-50% of livelihood indicators demonstrate improvement.

However, for reasons discussed in Section 1.4.3, the follow up Livelihoods workshop was not conducted therefore there is insufficient data in order to evaluate this performance metric.

Low participation is not related to the Livelihoods method and is not unique to shift-workers and low income earners. ISF have routinely experienced a 30% attrition rate for regional climate change workshops which utilise the Livelihoods method. Similarly working age people are generally under represented at community workshops that ISF has facilitated using the Livelihoods method – instead retirees often make up the majority of attendees.

Key lessons learned including positive outcomes and challenges, as well as recommendations for future projects of a similar nature are summarised in Sections 7.3.6 and Section 7.4.7.

30%-50% of Livelihoods workshop indicators demonstrate improvement

Post-Livelihood workshop not conducted

Unable to be measured

6.1.3 Participant perceptions of reductions

Table 43: Final Logic subset – Perception of reductions

Performance Measure	Target	Metrics
Participants perceived reduced electricity use	Improvement on some measures of self-reported energy efficiency as measured on Likert scale in questionnaire*	Rating of importance of reducing electricity Rating of motivation for electricity reductions Proportion reporting taking energy efficiency actions Proportion reporting improved energy efficiency

The surveys conducted pre-and post- intervention¹² included questions related to reducing energy use, including:

- the importance of reducing electricity
- how motivated PSP participants felt to reduce electricity use
- how energy efficient PSP participants felt.

These questions were analysed to determine how these factors had changed following participation in the project.

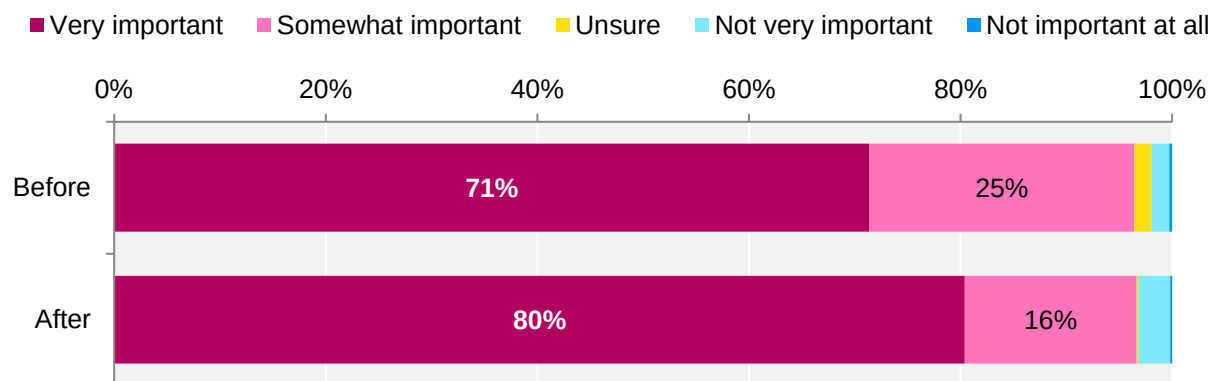
The Post-Intervention Phone Survey also asked whether PSP participants felt they had acted to reduce electricity use.

Participant reporting of the importance of, and motivation for reducing electricity were practically identical. The only differences were in the distribution between those rating very important/motivated compared to somewhat/important motivated.

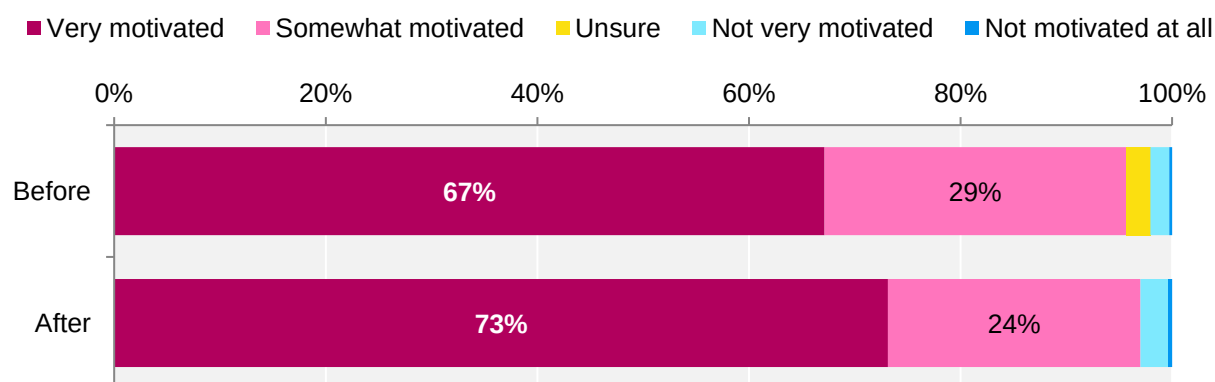
Both elements were very high at the start of the project (96% rated reductions as somewhat or very important, and themselves as somewhat or very motivated - Figure 16 and Figure 17). This is potentially a result of self-selection (sampling) bias: those who believe that electricity reductions are important and who are motivated to act are more likely to agree to participate in an energy efficiency project. It is also likely a result of the target population of low-income households who, on average, spend a large portion of disposable income on energy bills. Therefore, motivations to reduce these household costs may be higher than the general population (a deliberate selection bias).

This high baseline therefore only allowed for modest improvements in participant ratings of these indicators. The overall proportion of people rating these elements as 'very' or 'somewhat' increased by 1%. The main change was a shift of people from somewhat important/motivated to very important/motivated. The proportion considering electricity reductions to be very important increased by 9% (from 71% to 80%) while the proportion rating themselves as very motivated increased by slightly less, at 6% (from 67% to 73%). The subtle difference between the two highlights that attitudes (i.e. belief in the importance of reductions) do not directly translate into motivations to act. However in this case, 94% of participants reported that they had actively taken steps to use less energy during the project (Figure 18).

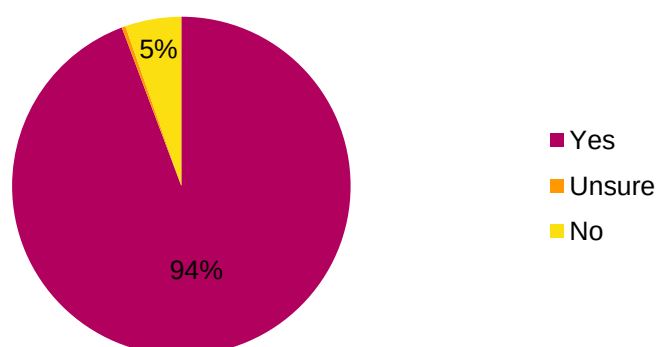
¹² As explained in Section 4.3.2, the Post-Intervention Survey was not undertaken with the Round 3 participants (n=277, or 33% of sample), who are therefore excluded from this analysis. Results should therefore be interpreted with caution as they do not represent the full sample of participants.

Figure 16: Participant rating of the importance of reducing electricity

In response to: How important is reducing electricity?

Figure 17: Participant motivation for electricity reductions

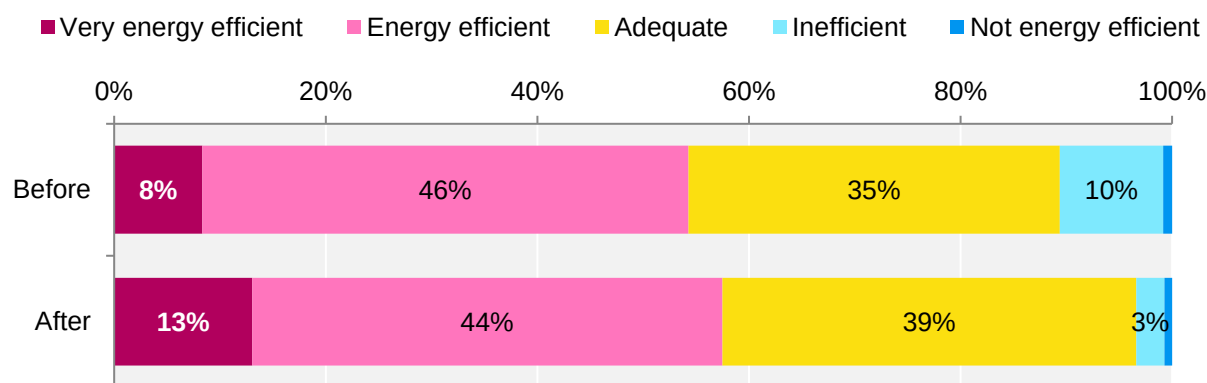
In response to: How motivated are you to reduce electricity use?

Figure 18: Participants reporting actively reducing energy

In response to: Have you actively taken steps to use less energy?

Despite the above, changes in participant ratings of their own energy efficiency were only modestly positive (Figure 19). The proportion of participants rating themselves as energy efficient or very energy efficient increased from 54% to 58% (including an increase from 8% to 13% as 'Very efficient'), while the proportion who rated themselves as 'Inefficient' or 'not efficient' decreased from 11% to 4%.

Given the high proportion of participants "very motivated" to reduce electricity (73%) at the end of the project, the smaller proportion of participants confident that they are energy efficient (57% energy efficient, only 13% very energy efficient) indicates that some barriers still exist to the participant householders reducing their electricity use.

Figure 19: Participant rating of energy efficiency

In response to: How would you rate your energy efficiency?

Based on the above findings, the PSP has fully achieved the target of improving on some measures of self-reported energy efficiency.

Key lessons learned including positive outcomes and challenges, as well as recommendations for future projects of a similar nature are summarised in Sections 7.3.7 and Section 7.4.8.



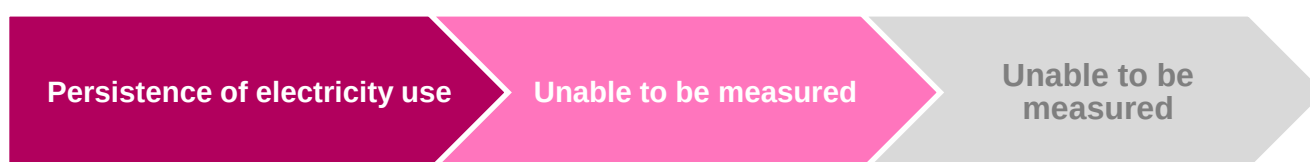
6.1.4 Persistence of electricity reductions

The project initial ‘theory of change’ as evidenced in the Initial Project Logic (in Table 14) was that the provision of ongoing support and communication to participants would lead to persistent energy efficient behaviours amongst participating households.

The project aimed to provide this ongoing support through peer-to-peer networks. This occurred successfully through the Energy Champions and Powers Savers Teams process. Section 6.2.3 provides more detail on these initiatives.

As discussed in Section 5.2.4 the project also planned and successfully implemented a comprehensive communication campaign to provide regular and continual communication with participants.

While persistence can only be measured by looking at the energy consumption patterns beyond the life of the PSP, several activities have been put in place that would enable evaluation of this measure at a future date. Further collection of billing data would be required to link the impact of these activities to electricity reductions. This could form the basis of a future project focusing on peer-to-peer learning for energy efficiency in low income households and the impacts on persistence of electricity reductions. An evaluation framework, including objectives targets and metrics, could be developed in order to facilitate this evaluation.



6.2 IMPACTS ON PARTICIPANTS - LITERACY AND CONTROL

Impact on energy literacy and sense of control were evaluated against the following performance measures:

- self-assessment of energy literacy
- self-assessment of sense of control
- peer to peer networks.

6.2.1 Electricity Literacy

Table 44: Final Logic subset – Literacy

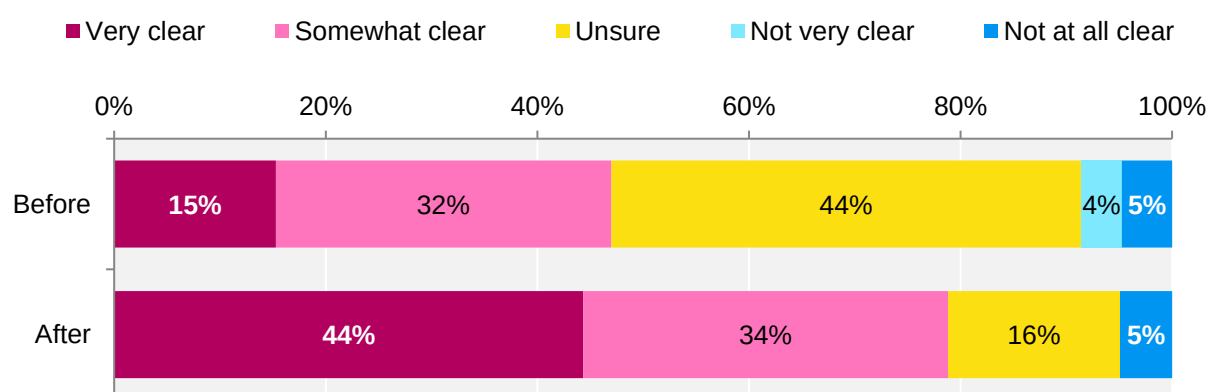
Performance Measure	Target	Metrics
Self-assessment based on pre and post project questionnaire	Improvement on some measures of energy literacy as measured on Likert scale in questionnaire	% change in participants reporting that “not sure how to reduce electricity use” stopped them reducing energy use % change in proportion of participants reporting they are aware of how their household electricity use compares to others % change in proportion of participants reporting that their electricity bill is clear and easy to understand

Participant perceptions of energy literacy were identified through three questions included in the pre- and post-intervention surveys¹³. All three measures showed a substantial improvement:

- The proportion of participants who stated their bill was very or somewhat clear and easy to understand **increased from 47% to 79%** (Figure 20).
- The proportion of participants who agreed or strongly agreed they were aware of how their electricity use compared to others **increased from 45% to 69%** (Figure 21).
- The proportion of participants who reported they were prevented from reducing their electricity use due to a lack of knowledge **decreased from 48% to 0.4%** (Figure 22).

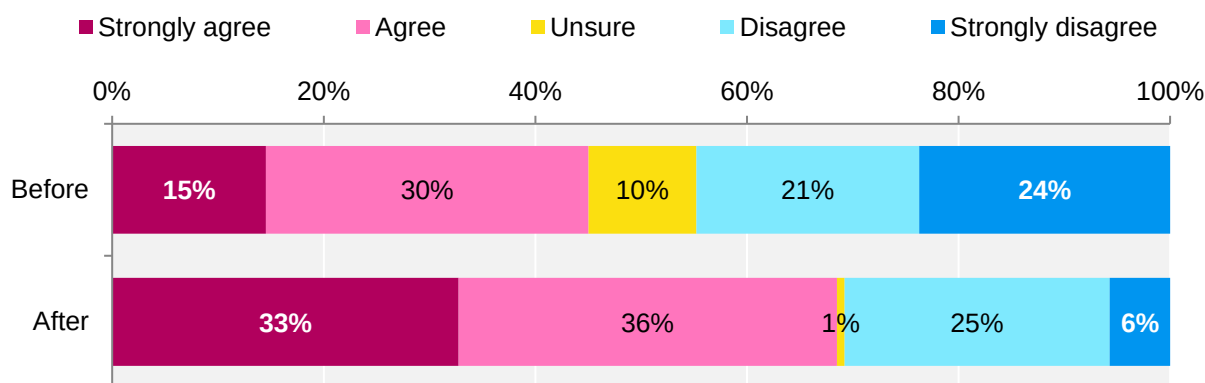
Overall this reflects the success of the PSP to increase electricity literacy amongst low income householders.

Figure 20: Ability to understand electricity bill

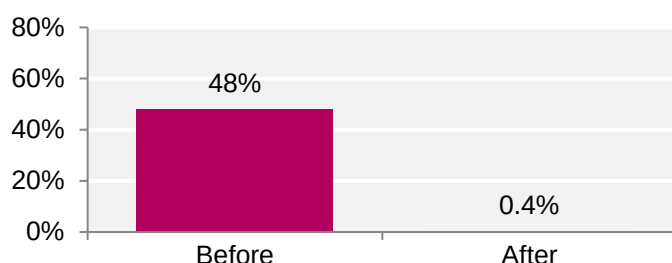


In response to: When you receive your electricity bill, how clear and easy is it to understand?

¹³ As explained in Section 4.3.2, the Post-Intervention Survey was not undertaken with the Round 3 participants (n=320, or 33% of sample), who are therefore excluded from this analysis. Results should therefore be interpreted with caution as they do not represent the full sample of participants.

Figure 21: Awareness of household electricity use compares to others

In response to: I am aware of how my household electricity use compares to my neighbours, friends and family

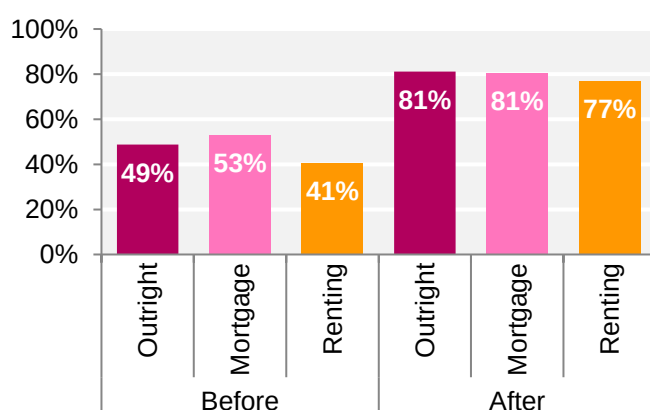
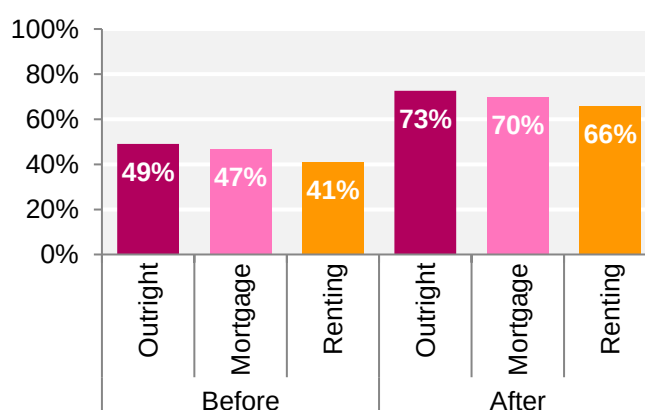
Figure 22: Electricity use reductions prevented by lack of knowledge

In response to: Which of the following things stop you from reducing energy use in your home? Not sure how to.

An analysis of literacy before and after participation broken down by home tenure type (Figure 23 and Figure 24), revealed similar patterns across the two measures:

- Before the project, literacy was similar across all tenure types, with those who owned their home either outright or mortgaged slightly more likely to agree than those who rented (6-8% difference in ability to understand bill and 7-12% difference in awareness of relative use).
- After the project, the differences narrowed further, though those who owned were still slightly more likely to agree (4-7% difference in ability to understand bill and 4% difference in awareness of relative use).

The narrowing of the gap between renters and owners is very slight but reflects that the PSP was equally successful in increasing the literacy of both owners and renters.

Figure 23: Owners vs renters agreeing they are able to understand electricity bill**Figure 24: Owners vs renters agreeing they are aware of how household electricity use compares to others**

6.2.2 Sense of Control

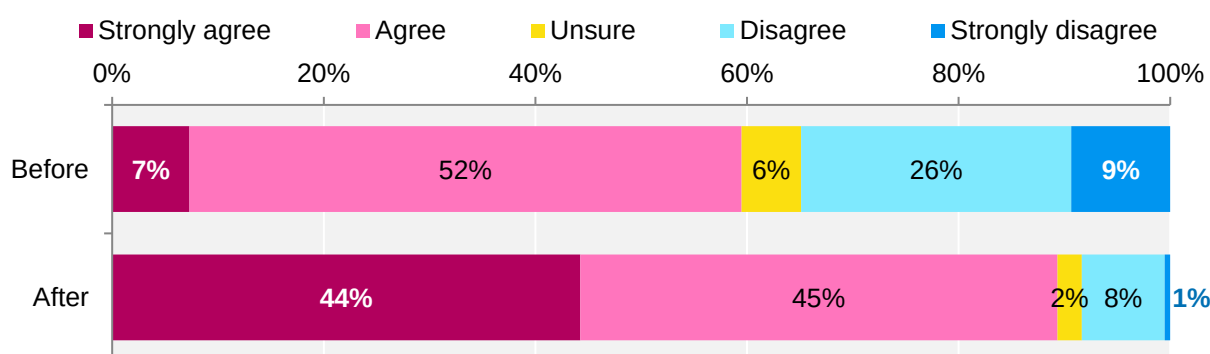
Table 45: Final Logic subset – Sense of Control

Performance Measure	Target	Metrics
Self-assessment based on pre and post project questionnaire	Improvement on some measures of control of electricity use and bills as measured on Likert scale in questionnaire	% change in proportion of participants reporting they feel in control of electricity USE % change in proportion of participants reporting they feel in control of electricity BILLS % change in proportion of participants reporting “lack of control to make improvements to the property” as a barrier to reducing energy use

Participants were directly asked about their sense of control over electricity use and bills in the pre- and –post surveys¹⁴. At the start of the project over half the participants agreed that they felt in control of their electricity use and bills. Following the project, participant perception of their control demonstrated a substantial further improvement:

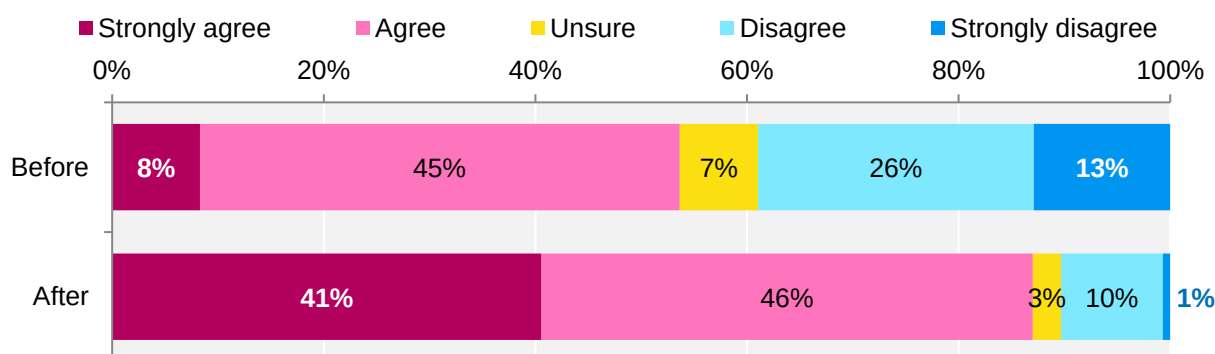
- The proportion of participants who agreed or strongly agreed they had control over their **electricity use** increased from 60% to 89%. The proportion of participants who strongly agreed increased by more than 6 times, from 7% to 44% (Figure 25).
- The proportion of participants who agreed or strongly agreed they had control over their **electricity bill** increased from 53% to 87%. The proportion of participants who strongly agreed increased by more than 5 times, from 8% to 41% (Figure 26).

Figure 25: Sense of control of electricity use



In response to: I feel in control of my electricity use.

Figure 26: Sense of control of electricity bill



In response to: I feel in control of my electricity bills

¹⁴ As explained in Section 4.3.2, the Post-Intervention Survey was not undertaken with the Round 3 participants (n=320, or 33% of sample), who are therefore excluded from this analysis. Results should therefore be interpreted with caution as they do not represent the full sample of participants.

An analysis of sense of control before and after participation, broken down by home tenure type (Figure 27 and Figure 28), revealed slightly different patterns for control over use and control over bills:

- Before the project, control of electricity use was similar across all tenure types, though those who owned their home outright (63%) were slightly more likely to agree than those who owned through mortgage (59%) or rented (58%).
- After the project, the differences narrowed further, though those who owned via a mortgage aligned with those who owned outright, leaving a slightly larger gap between owners and renters

As above with literacy, the narrowing of the gap between renters and owners is very slight but reflects that the project was successful in increasing the sense of control of both owners and renters, though a very slightly more modest impact on renters.

Figure 27: Owners vs renters agreeing they had control over their electricity use

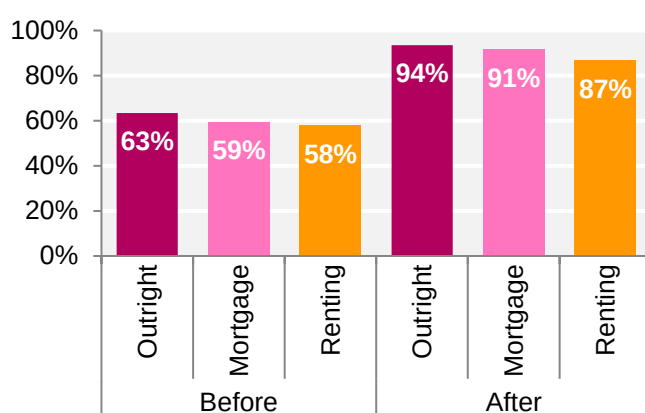
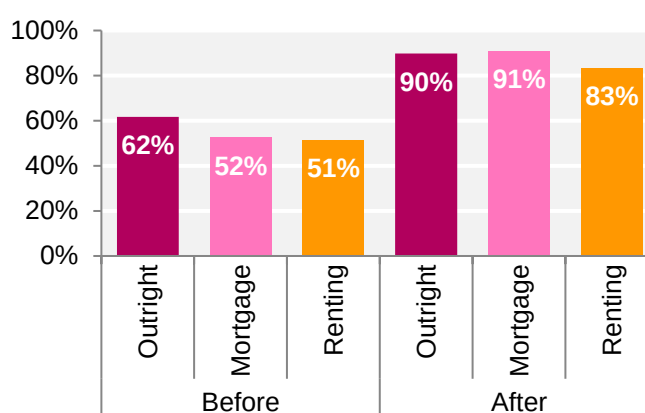


Figure 28: Owners vs renters agreeing they had control over their electricity bill



Participants were also asked whether they were prevented from reducing their electricity use by a lack of control (Figure 29). Only a small proportion initially answered yes to this question (8%), despite 34% of participants disagreeing that they felt in control of their electricity use. This seems an unexpectedly low number, and it is hypothesised that this disparity of results from participants not understanding this question sufficiently.

An analysis of response by home tenure type (Figure 30) reveals that no renter householders chose this option in their pre-intervention survey. Given the barrier that renting creates for control over electricity use particularly with regards to upgrading equipment, this appears to confirm the hypothesis. Therefore the improvement of 4% seen in Figure 29 does not adequately measure the improvement in this area.

Figure 29: Electricity use reductions prevented by lack of control

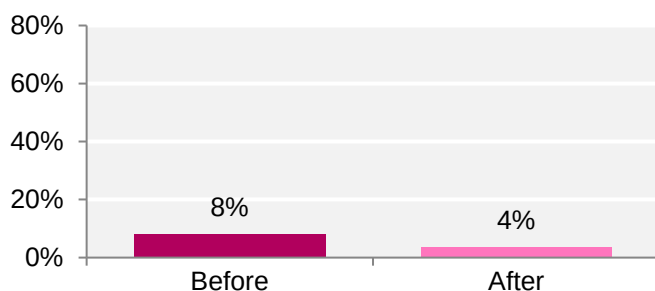
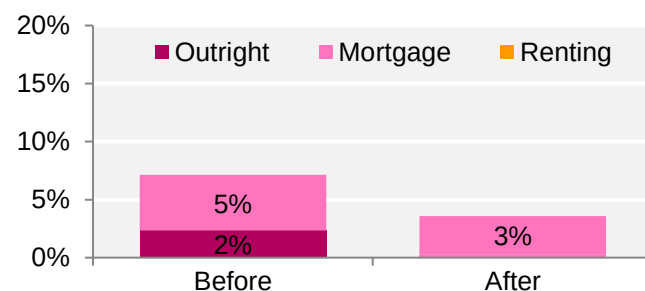


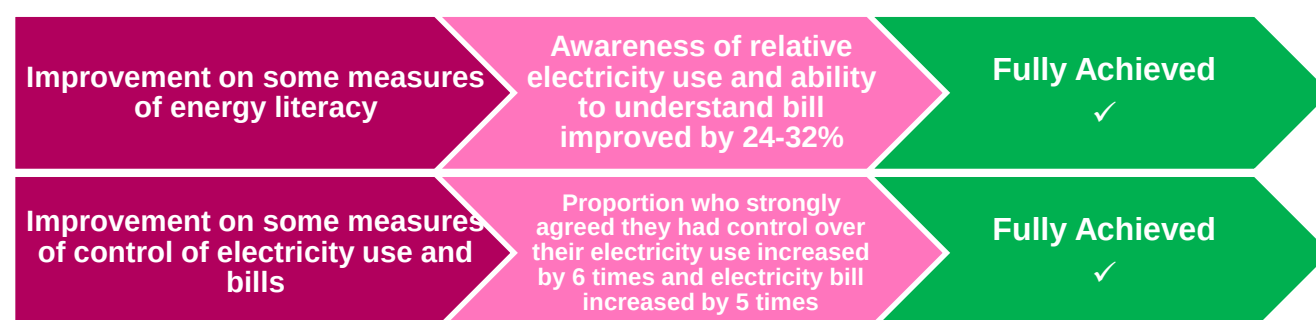
Figure 30: Electricity use reductions prevented by lack of control, by home tenure



In response to: Which of the following things stop you from reducing energy use in your home? Lack of control to make improvements to the property.

Based on the above findings, the PSP has fully achieved the target of improving on some measures of self-reported energy literacy and control of electricity use and bills.

Key lessons learned including positive outcomes and challenges, as well as recommendations for future projects of a similar nature are summarised in Sections 7.3.7 and Section 7.4.8.



6.2.3 Peer-to-peer networks

Table 46: Final Logic subset – Peer-to-peer networks

Performance Measure	Target	Metrics
Champion outreach	60 peer-to-peer champions recruited 3 Power Savers Teams formed	No. of champion participants engaged No. of Power Savers Teams formed

PSP Champions recruited

A key feature of the PSP was the use of “peer-to-peer networks and storytelling to inspire and sustain energy-efficient behaviours”. This was targeted through the development of individual leaders, or Energy Champions who would empower householders to tell their stories to their peer networks and / or encourage others to get involved. Champions ranged from those who actively recruited others to the PSP, to those wanting to lead in promoting energy efficiency, either within their workplace or amongst their extended community. Formal training was provided on storytelling and training was delivered to call centre staff to recruit Champions. Four pilot participants volunteered to be involved in a professional video to provide an overview of their experience with the energy assessment, which was screened at United Voice’s Delegate’s conference in late 2013 and at a few industry meetings, resulting in a few recruits. Champions were also encouraged to ask their family, neighbours or work colleagues to join the PSP using a brochure in every PAR letter. Champions’ interaction was phone based initially, then increased into late 2015, as more time was available for face to face interaction.

The level of individual Energy Champion activity implemented in the PSP exceeded expectations, with 224 Champions being involved, compared to the target of 60. This was primarily expressed through participants’ one to one conversations with others about their own experience. Individual champion conversation strongly supported recruitment to the project and was the predominant way participants exercised leadership. Table 47 outlines how many participants took part in each of the Champion actions. Many participants undertook more than one type of action.

Table 47: Summary of Champion actions taken

Action	Number of participants who took this action
Encouraged others to join	206
Attended Final Dinner	19
Engaged in media or story-telling	12

Action	Number of participants who took this action
Spoke to others about saving energy	80
Set up a Power Savers team	11
Other	8

While the engagement of energy champions in energy efficiency in their homes (and encouraging their peers to engage) may have led to additional electricity reductions in their households, sufficient data was not available at the time of the evaluation in order to ascertain if this occurred.

Power Savers Teams formed

The formation of Power Savers Teams was a successful outcome for the PSP with eleven (11) Energy Champions successfully facilitating the formation of a total of five (5) teams (exceeding the target of 3), across a variety of structures including:

1. Workplace: Early Childhood Education and Care (ECEC) Centres
2. Industry Group: Catholic Care Homecare Liverpool
3. Geographical Location: Oatlands Retirement Village
4. UV Event: Delegates Conference
5. Other: The EOI Group - Connecting Individual Champions to Team Activity.

Goals were set across a combination of energy efficiency education, knowledge sharing, learning and action. With the exception of Team 1 (Early Childhood Education and Care Team), all team actions were a one off event.

The first team delivered activities through Champions workplaces across three Early Childhood Education Centres in Randwick, Strathfield and Western Sydney. This team achieved successful training of staff, delivery of workshops, educational resources across all centres and an onsite energy assessment for the centre in Strathfield. This team has also broadened the scope of its knowledge sharing by undertaking training of other educators in other centres.

The second team was led by an Energy Champion who was a homecare workplace leader. A workshop was delivered about the PSP during a September 2015 Catholic Care Homecare Liverpool monthly team meeting attended by 50 care workers (non PSP participants). This resulted in a high level of interest from workers on household energy efficiency and a high uptake of educational materials (such as PSP fact sheets).

The third team targeted 2 PSP Champions who were residents of the Oatlands Retirement Village. The champions attempted to work with the body corporate to develop a community based energy efficiency action, but despite numerous site visits and conversations approval from the body corporate was not given and the team activity was discontinued.

The fourth team was formed by targeting 24 PSP participants attending the United Voice biannual 2015 delegates conference to share their PSP experience. These participants had conversations about the PSP with non-participants but the principal engagement came from PSP delegates connecting with one another (as this was the first time they had met).

The fifth team was formed by sending an Expression of Interest (EOI) to all PSP participants to gauge interest in attending a PSP workshop or other activity. This team was formed where participants were eager for ongoing energy efficiency education and activity but no opportunity to create a viable PSP team existed. 28 EOI's were returned, 24 indicated interest in an ongoing activity. As the majority did not share similar location preference or availability, combined with time and resource constraints, 14 participants elected to be referred to local council groups to participate in appropriate local council's energy efficiency projects.

Three of the five Power Savers Team activities (Teams 1, 2, and 4) resulted in a range of peer-to-peer networks being formed and energy efficiency information being shared. The teams successfully inspired energy-efficient behaviours amongst peer networks, which may serve to benefit from a similar offering to PSP in the future.

Other Outcomes

Final PSP Event

The conclusion event, the final PSP dinner, was successfully held with forty-two attendees and a range of collective engagement goals achieved. Feedback from the dinner was positive.

Based on the above findings, the PSP has exceeded the target of recruiting 60 Champions and forming 3 Power Savers Teams.

Key lessons learned including positive outcomes and challenges, as well as recommendations for future projects of a similar nature are summarised in Sections 7.3.7 and Section 7.4.8.



7

Conclusions & Recommendations

7 CONCLUSIONS AND RECOMMENDATIONS

The final evaluation of the PSP under the LIEEP has found the project achieved a range of positive outcomes for low income household energy efficiency, despite several barriers faced during project implementation. Overall the PSP has successfully reached and assisted a new target demographic, namely 1,010 low income households in Sydney, Hunter, Illawarra and Central Coast regions, to better understand and be able to reduce their energy use in the home.

7.1 PERFORMANCE AGAINST PROJECT OBJECTIVES

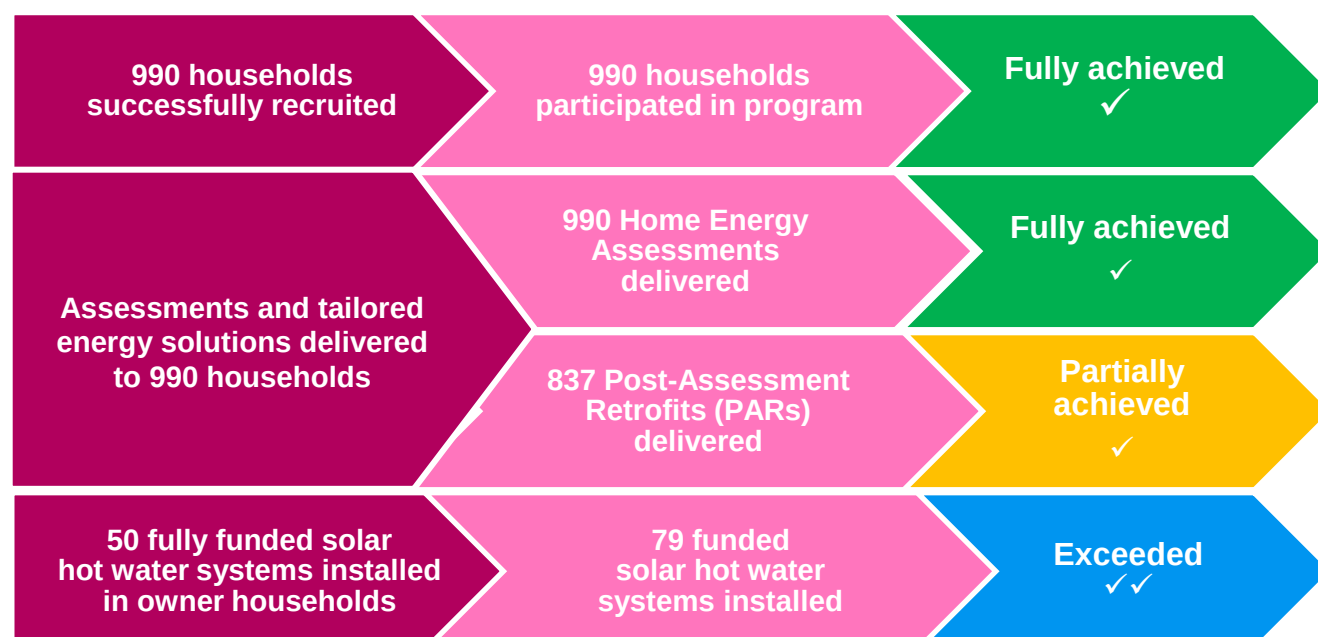
The performance against the five PSP project objectives (as described in Table 1 at the beginning of this report) has been summarised below mapping the target, associated metrics from the Final Project Logic to the PSP project objectives and including the completed evaluation result (as exceeded, fully achieved, partially achieved, not achieved or unable to evaluate).

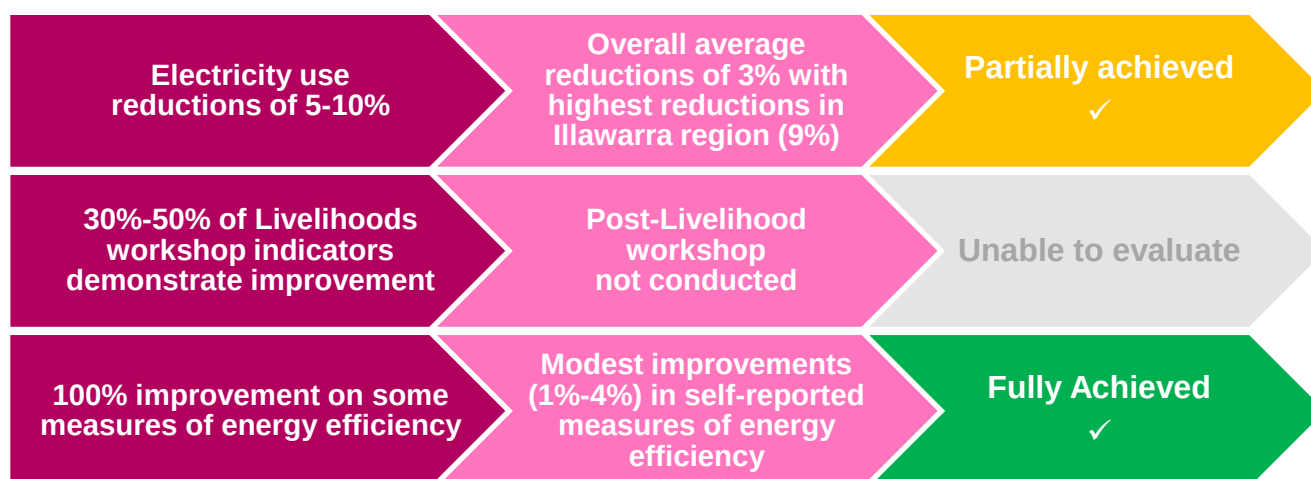


The conclusions indicators summarise the results, indicating that:

- 3 of the metrics were exceeded (17%)
- 9 of the metrics were fully achieved (50%)
- 3 of the metrics were partially achieved (17%)
- 1 metric was not achieved (6%)
- 2 of the metrics were unable to be evaluated (11%)

1. Reduce electricity use in participants' homes through the provision of one-to-one guidance (Energy Assessment and ongoing engagement with project staff), combined with the installation of energy efficient technology in participants' homes

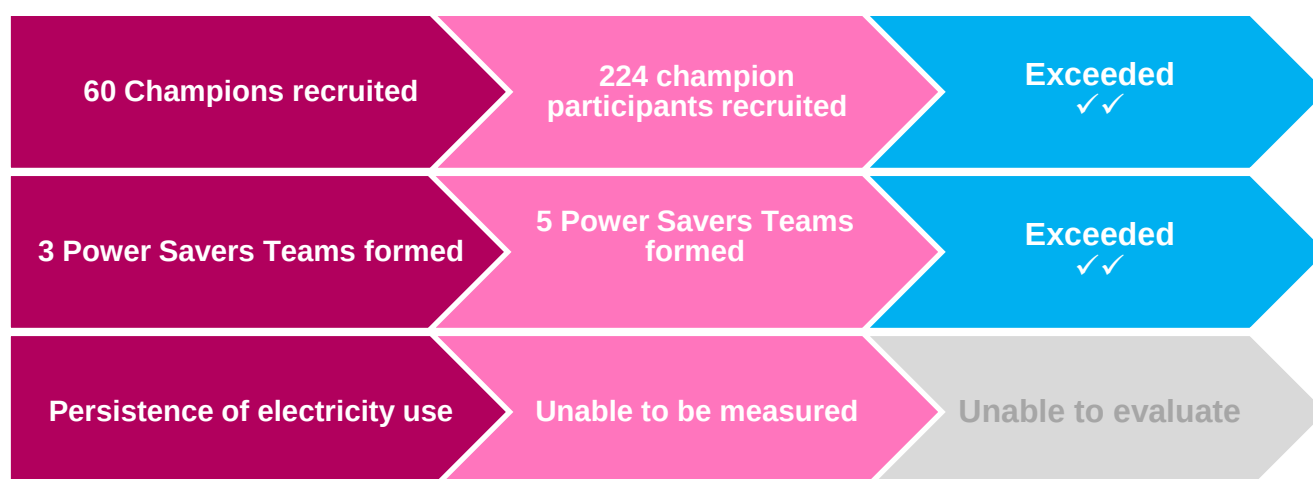




Of the seven metrics that were relevant to reducing electricity use in the home, 1 was exceeded, 3 were fully achieved, 2 partially achieved and one was unable to be evaluated.

Overall the PSP was successful in achieving average electricity use reductions (when compared to a control group) of 3% across all participants, and in the Illawarra region reductions were as high as 9%. A key success was the installation of 79 fully funded solar hot water systems in participant households, which far exceeded the target of 50 households. In addition, the PSP achieved its targets to recruit the full 990 participants and deliver home assessments to each of these participants. The PSP sought to measure the capacity of participants to save energy in the home through a Livelihoods method, however, the implementation was unable to be completed and this metric was not able to be evaluated.

2. Generate persistent electricity use reductions through the provision of ongoing support and communication through participants' peer network(s).

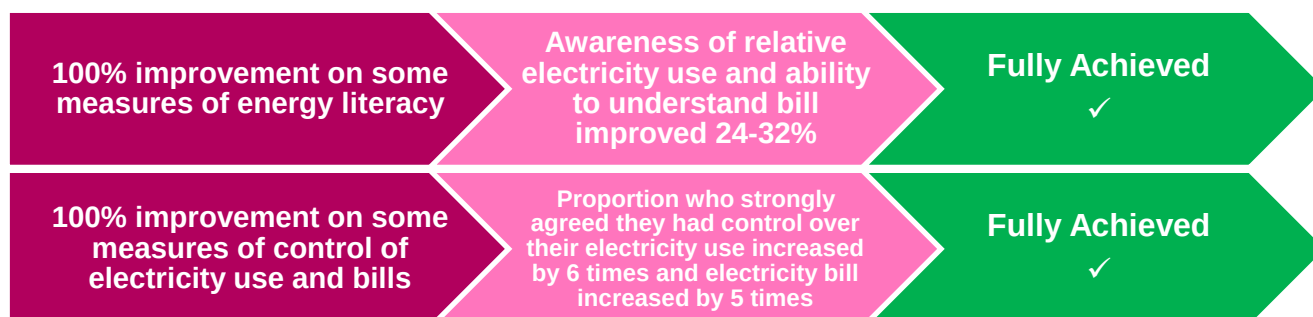


Of the three metrics that were relevant to generating reduction through peer networks, 2 were exceeded and 1 was unable to be evaluated.

Despite the evaluation of the peer-to-peer network having few metrics, the evidence provided demonstrates that the use of individuals as 'champions' and workplace/industry networks to share and disseminate knowledge of household energy efficiency was successful. 224 energy champions were identified compared to the target of 60 and were a key contributor to the PSP reaching its recruitment targets. 11 of the champions went on to form a total of 5 'power savers teams' who spread knowledge of energy efficiency across peer networks in three Early Childhood Education centres, a homecare provider organisation, attendance at the United Voice Delegates conference and by connecting with energy efficiency activities offered by local Councils. This represents an

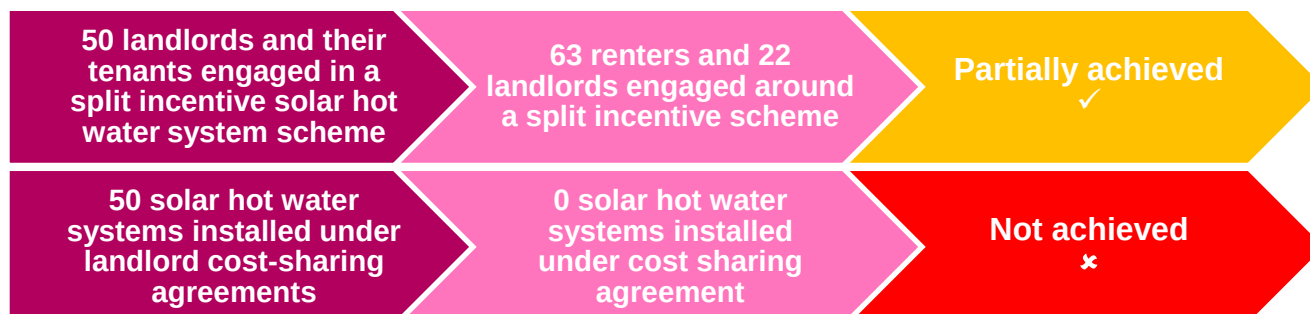
opportunity for low income householders to reduce energy in the home through projects that support leadership at an individual level and through workplaces and industry channels.

3. Increase energy literacy among participants and therefore contribute to participants having a sense of control over their electricity use and electricity bills.



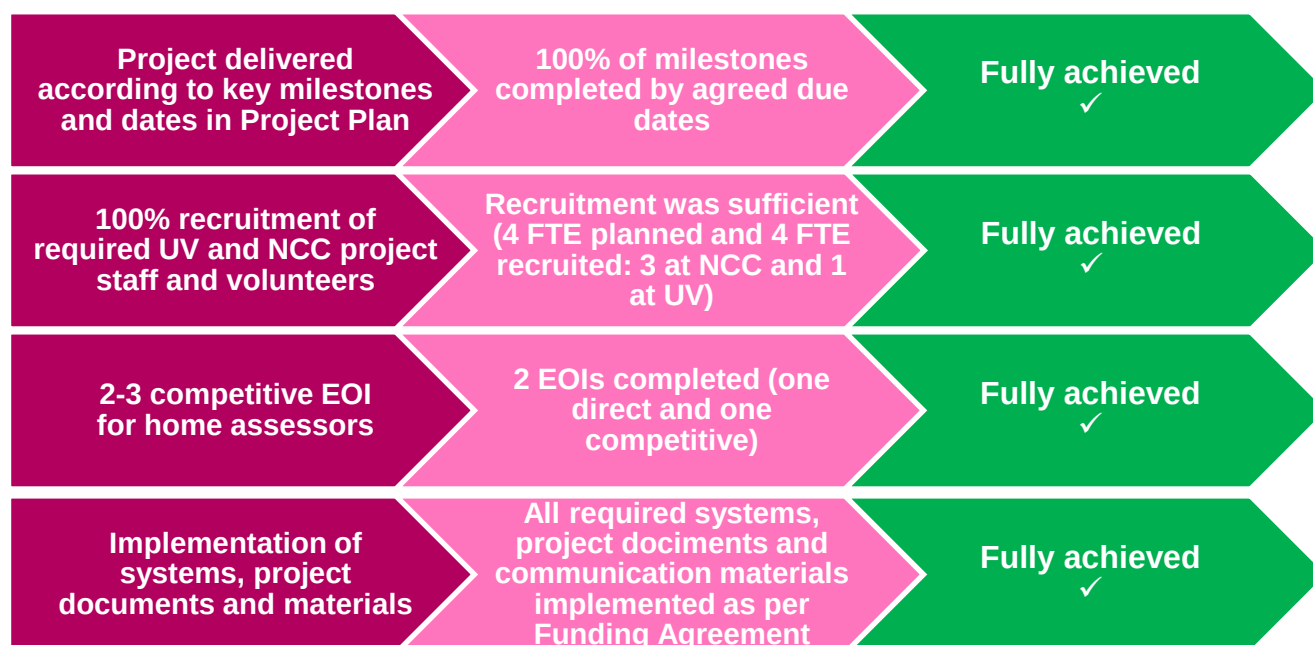
Both metrics to measure participant's sense of control over their electricity use and bills were fully achieved by the PSP. Energy literacy of participants improved up to 32% across the questions asked in the pre and post intervention surveys. In addition, the proportion of PSP participants who strongly agreed they had control over their electricity use increased by 6 times and strongly agreed they had control over their electricity bill increased by 5 times.

4. Develop and test methods to overcome split incentive barriers in a select number of participant households by developing a method for upgrades to solar hot water systems (with degrees of subsidy) in rented properties.



Testing methods to overcome split incentive barriers through subsidised solar hot water systems was the least successful result across two metrics. While attempts were made to engage renters, and subsequently their landlords or real estate agents, the target of engaging 50 combined was only partially achieved with 63 renters being engaged, but only 22 landlords or real estate agents continuing with engagement. The final result was that no solar hot water systems were installed under cost-sharing agreements in PSP participant rental properties. The PSP experienced tenants who, when requested to participate and connect the PSP with landlords, were tentative and cautious. Landlords did not engage in the offering as hoped, and real estate agents were not interested – this is likely that the financial incentive was not attractive enough to result in uptake. Financial incentives may therefore not be the most effective way to overcome split incentive barriers in low income rented properties.

5. Develop, implement, evaluate and disseminate effective, replicable models for reducing energy use by low-income households.



Despite being faced with challenges throughout the project, including milestone changes and project hurdles which required the PSP design to be revisited, the PSP consortium fully achieved all of the four of the metrics to develop and deliver an effective model for reducing energy use by low income households. The delivery of the project on time according to milestones (and despite changes) was successful. Despite underestimating the requirements for detailed projects systems and data management, as well as no budget being available, the PSP fully achieved the successful implementation of systems, documents and materials. Recruitment for adequate staff for the PSP (4 FTE estimated and recruited) was fully achieved, however all organisations contributed in-kind staff time over and above the planned time.

7.2 PERFORMANCE AGAINST LIEEP OBJECTIVES AND BENEFITS

7.2.1 LIEEP Objectives

The PSP trialled and evaluated a number of different approaches (energy audits and retrofits) in various locations (four NSW regions) to assist low-income householders to become more energy efficient. It also captured and analysed data and information (through surveys, home audits and billing data analysis) to inform future energy efficiency policy and program approaches. Therefore the PSP has successfully met the key objectives of the LIEEP program.

7.2.2 LIEEP Benefits

A number of benefits were identified by the LIEEP. Table 48 provides observations on whether these benefits were achieved by the PSP.

Table 48: Performance against LIEEP benefits

LIEEP Benefits	Observations at conclusion of PSP
Assist low-income households to implement sustainable energy efficiency practices to help manage the impacts of increasing energy prices and improve the health, social welfare and livelihood of low-income households.	- Assisted over 1000 LIHs including those that are NESB and CALD to not only implement EE practices, but also to increase their understanding of EE in the home, in particular: - Understanding electricity bill - Raising awareness about the importance of saving energy - Education on energy efficiency and what it means via brochures, in person home visits, In-Home Displays, peer to peer learning via videos etc - Achieved electricity reductions and cost savings, as well as emissions reductions for some LIHs participating in the project – helping to manage the impacts of electricity prices - Health, Social Welfare and Livelihood are discussed in the Final Report
Build the knowledge and capacity of consortium members to encourage long-term energy efficiency among their customers or clients.	Knowledge of NCC, UV, ISF and Solahart to implement energy efficiency projects increased significantly due to PSP through: - design (and redesign across changes in government) of a large scale multi-year residential energy efficiency project - identifying, attracting and recruiting households where energy efficiency was a relatively new topic - completing iterations of a project design based on what was possible with participants - development and delivery of energy efficiency education materials - recruitment of home energy assessors and call centre staff - delivery of residential home energy audits - delivery of residential energy efficiency retrofits - delivery of participant workshops on energy efficiency - design and delivery of self-assessment surveys - collection, storage and manipulation of participant and household data - evaluation of the project's implementation and impact - wrap up activities with participants Customers and clients that may benefit from the outcomes of PSP include: - Low income households - NESB/CALD households - United voice members who did not participate in PSP - NCC Members or prospective members - Residential energy efficiency projects ISF may evaluate in the future - Solahart customers from LIHs or NESB/CALD
Build capacity of Australia's energy efficiency technology and equipment companies by maximising the opportunities for Australian industries to participate in the projects	The following energy efficiency technology and equipment companies participated in the PSP: - Solahart – provision and installation of solar hot water systems - Arxxus and Clouding Around– CRM implementation development and assistance - Valvecosy™ and other equipment providers

7.3 LESSONS LEARNED

The following section details the key lessons learned including the positive outcomes and challenges of the PSP.

7.3.1 Evaluation approach

Positive Outcomes: Evaluators were able to adapt to a number of project design changes and arrive at a valid evaluation method that provided reliable data.

Challenges: The evaluation logic was developed as required at the commencement of the PSP. This set the requirements for data collection and evaluation. However, as the project design evolved and project timeframes changed, parts of the evaluation logic became less relevant. A pilot evaluation was conducted which assisted with informing the main rounds of the project, however subsequent evaluations beyond this did not eventuate such as the Livelihoods method workshop to gather data after participation and, due to changing project timeframes, a mid-point evaluation was instead replaced by the final evaluation. Project timeframes changing, attrition rates for recruitment, attempts to form a control group from the participant pool and attrition of billing data due to participant consent and validation process by the electricity distributors all presented unexpected barriers for the project evaluation. The evaluation logic and associated targets and metrics needed to be further defined at the final evaluation stage as some targets no longer applied to the project as it had been implemented. This created challenges for the evaluators as well as consortium partners.

7.3.2 Recruitment

Positive Outcomes: Recruitment through a large membership base of an organisation that had strong existing relationships and trust with members was a key success. The use of Champions and Union delegates/officials to recruit was effective. In addition, the dedicated, trained UV call centre staff could deliver planned and persistent attempts to maintain contact with householders and provide consistency to conversations through quality control. Attrition rates were factored into the recruitment process (30-50% attrition rate in converting a lead to a recruit) which facilitated efficient planning and delivery. In addition, the use of Salesforce CRM as a tool for data management and inter / intra-organisational communication aided in efficiencies for recruitment and beyond. NESB/CALD participants were successfully recruited and participated in the PSP through provision of interpreters and translations by the project.

Challenges: Recruitment was less manageable and predictable through the Champions and Union delegates/officials compared to recruitment through the call centre.

7.3.3 Home Assessments and Retrofits

Positive Outcomes: Quality one on one time between the energy assessor and participant during the home assessment allowed time to explain the electricity bill – this may explain the successful outcomes on electricity literacy and sense of control. The retrofits provided at the home assessment (such as the EcoSwitch™) provided a free and tangible benefit to participants from the assessors and broke down barriers. Draughtproofing was identified as a new opportunity for energy efficiency in homes from the home assessment.

Challenges: The initial absence of clear processes for assessors when managing home assessment bookings (e.g. clustering and timing for travel efficiencies and managing cancellations) was a challenge faced by the PSP. However, this improved as the project progressed. Cancellations and 'no-shows' were not factored into budgeting of assessor payments resulting in unexpected costs. A target of achieving 100% installation of post assessment retrofits was unrealistic as not all householders chose an installation and some became ineligible after they declined to sign the consent form for billing data. Differing knowledge and awareness levels of participants required different levels of support to complete the post assessment retrofits e.g. some were capable and/or

had time to research the best appliance, others required more assistance from PAR managers/specialists. Privacy Notices and billing data consent forms were viewed as potential barriers to participation by a small group of participants. Some householders did not need the full PAR budget but there was limited capacity for the PSP to help some participants who needed further assistance purchasing new appliances. Energy efficiency equipment/technology providers were not engaged through an agreement so households could have received PARs more efficiently and at a lower cost (e.g. insulating/block-out curtains, draughtproofing). IHD procedures resulted in lag time between the home assessment and the install, and support and communications during and after the install date were limited for IHDs. Translators varied between home assessments and other points of contact, resulting in information needing to be repeated.

7.3.4 Solar Hot Water scheme

Positive Outcomes: Working with a professional installation partner (Solahart) with years of experience in the Australian market meant that the project saw very few problems with installation of the solar hot water systems in owned homes. This reduced risk was a key to the success of this aspect of the PSP.

Challenges: The incentive of a discounted solar hot water system was not enough for landlords and/or tenants to take up this energy efficiency retrofit. Involving landlords through their tenants, without a contract or agreement contributed to the high rate of attrition – tenants were concerned about the impact on their relationship with their landlord and the terms of their tenancy being negatively affected. Landlords and real estate agents showed little interest in the offering. Selection criteria and decision-making for the cost sharing offer was not clear to energy assessors and householders which resulted in confusion.

The 2008/9 Just Change energy efficiency program (Dillon et al, 2009) which targeted low income households provided an evidence base for the design of the PSP's split incentive scheme, however, Williams (2008) suggests that financial incentives alone are not sufficient to overcome split incentives – this has been supported by the findings of the PSP. In addition, a study in the United States which focused on owner and occupant split incentives for heating/cooling and insulation in residential dwellings found “only small overall energy savings may be possible from policy interventions aimed at correcting the split incentive issues” (Gillingham, 2012).

The revised target of *engaging* 50 landlords in cost sharing discussions with their tenant (as opposed to actual installation of systems) was unrealistic, given the reality of large attrition between engaging tenants and engaging landlords. In hindsight, a larger initial sample size of tenants was needed to achieve the target for engagement.

Providing a fully funded system to a PSP home owner when strata was involved also presented challenges including time constraints of meeting with strata and obtaining written approval.

7.3.5 Project Management

Positive Outcomes: The delivery of the PSP was successful in its nature as an energy efficiency trial. Agility was demonstrated in the project management approach, where lessons were learned and the project continuously improved and tailored to better assist householders. In particular, the pilot phase resulted in key learnings that were incorporated into the project rounds. Efficiencies of project management were identified and delivered through the use of the CRM and the call centre. The recruitment of energy assessors was mostly successful, as was their delivery of assessments to households. The pilot assessor developed and tested home assessment methods during the Pilot evaluation which were evolved throughout the successive rounds. The assessor also trained the four assessors who delivered home assessments for the main rounds. Salesforce was an effective and highly adaptable CRM platform which enabled tracking of interactions with households centrally and effective communication across organisations, especially the call centre.

Challenges: The project design evolved in a way that was not necessarily expected or designed for in the project evaluation methodology. This meant use of the original project evaluation methodology

was challenging and several parts of the project logic needed to be updated (see Table 14, Table 15 and Table 16).

In addition, the changing of milestones impacted on all consortium members and created inefficiencies in delivering the project.

In addition, the data management component of the PSP was not appropriately budgeted or planned for in the original project design, so budget had to be diverted from project implementation to develop the CRM (Salesforce) for the PSP. The experience of staff to deliver the CRM meant this task could not be carried out as efficiently as hoped. In addition, in-kind time spent by NCC, UV and ISF staff exceeded the planned time in the original budget. Skills outside of the original scope of UV and ISF's roles needed to be drawn upon for parts of the PSP to be delivered effectively.

7.3.6 Impact on Electricity Use

Positive Outcomes: The PSP achieved electricity savings and bill savings in low income households across all regions. While the data sample was smaller than expected, the analysis was able to detect savings against a control group.

The Livelihoods method to identify and evaluate the capacity of participants to reduce energy in their homes was partially tested for an energy efficiency project for the first time despite the cessation of the follow up workshop. The workshop also provided an opportunity for five early PSP participants and Champions to share experiences and provide feedback on the PSP.

Challenges: Observing the effect of electricity savings was challenging due to the small final sample size for analysis following significant attrition of data. This limited the available analytical approaches such as analysing savings by individual treatments, recruitment groups and specific participant experiences such as the Champion participants and participants receiving solar hot water systems or In-Home Displays. However, evaluation of savings cannot be considered independently from co-benefits of treatments provided to PSP participants. Anecdotal evidence and self-reported improvements via survey data has shown that the PSP achieved co-benefits alongside the electricity savings.

With respect to the survey data, the full post-survey was not conducted with Round 3 completions because they had a shorter participant journey due to project timeline restrictions, and it was decided by the PSP team that it would not be a comparable group. The shorter participation journey could potentially reduce the positive impact of the project on these householders, but this cannot be confirmed. The absence of post-survey data for these 276 households (33% of the sample) could therefore potentially introduce a positive bias in the results.

The use of a CRM tool such as Salesforce for capturing survey responses meant that a substantial amount of data needed to be transformed in order to be suitable for analysis. Furthermore, some data was not contained in Salesforce and had to be imported from the FluidSurveys extract. These introduced the possibility for manual coding errors.

Participants started out with such high motivation (likely due to sampling and selection bias) when joining the PSP that there was little room for improvement. Due to the PSP recruiting an already motivated group of householders, the project only achieved modest improvements in self-reported energy efficiency. However, the proportion of participants who reported they were prevented from reducing their electricity use due to a lack of knowledge decreased during the PSP indicating that participants were feeling more informed about energy efficiency.

The lack of participation at the Livelihoods workshop, in particular ensuring participants returned for the second workshop, was a challenge for the approach to measuring capacity of participants to save energy in the home. Only a small pool of 100 recruits was available when the Livelihoods workshop was planned. In addition, many PSP participants were shift-workers who are unable to plan far in advance. This led to the second workshop not being conducted and the method not being able to be completed.

7.3.7 Impact on Participants

Positive Outcomes: Using energy assessors to educate participants on how to read their energy bills and explaining behaviour change or the use of specific retrofits to gain direct control of energy use in the home was identified as key in increasing awareness of participants. Participants appreciated the individual approach and amount of time assessors spent on education during the home assessment.

7.3.8 Peer to Peer Networks

Positive Outcomes: Anecdotal evidence showed the Energy Champions activity flourished and exceeded expectations through peer to peer education and recruitment. Champions played a significant role in the PSP meeting recruitment targets because these activities could be carried out informally with the participant's workmates, family or community. Champions also provided broader education as participants shared their knowledge beyond those directly participating in the project - a valuable contribution to an ongoing legacy of the PSP. Teams succeeded when attached to a pre-existing structure such as a workplace or industry. Working with a range of organisations beyond the PSP was beneficial to extend opportunities for participants to engage with others in their communities around energy efficiency. While the final event had fewer participants than expected, this enabled the PSP to provide work place release and accommodation for attendees who were restricted in their ability to attend due to work or regional location.

Challenges: The UV PSP Coordinator had less capacity to undertake substantive face-to-face development with Champions so more administration and project management was needed than planned. The Champions were initially engaged by phone in 2013/14 which then evolved into face-to-face engagement through the teams in 2015. In 2015 the formation of teams was relatively resource intensive (an average of 15 hrs per week). Participants' availability for Champions or Teams activity was limited as all were low income householders, many working casual irregular hours or shift work with limited time to commit to extracurricular activity therefore Champion activities required recognition and respect of lifestyle pressure and time constraints of participants. The geographical spread of the project meant bringing people together at the same time and place was challenging for Champion activities and the final event. Design of the Champions activities developed over time therefore subsequent reporting and evaluation at some stages information was not detailed enough to enable a comprehensive evaluation.

7.4 RECOMMENDATIONS

The following provides the key recommendations from the PSP to inform future programs that target energy efficiency in low income households.

7.4.1 General Recommendations

Low income working householders could be targeted by future programs as this trial has shown that savings can be achieved through energy efficiency projects with this demographic. A project with a larger participant group, more clearly defined project length, treatment delivery at a point in time and with data collection that factors in attrition would enable the analysis of savings at a more detailed level, such as savings achieved by particular demographic groups and from particular energy saving measures.

One-to-one knowledge and education on household energy efficiency through the use of an in home assessment with a home assessor has proven effective in this trial and could be the focus of future energy efficiency programs. Directly engaging with householders through the home assessment (such as discussion of the electricity bill) and retrofits (such as an In-Home Display and an Ecoswitch™) has delivered increases in self-reported levels of electricity literacy and sense of control over electricity use for both owners and renters.

The use of personal (e.g. family and friend) and peer (e.g. workplace or membership organisation) networks was an effective method for engaging and recruiting low income householders. In addition, recruiting champions across workplaces or existing community activities appeared to encourage participation in home energy efficiency by low income working householders, although the evidence is anecdotal. This kind of approach also has strong support in the literature on behaviour change, so programs that tap into the peer to peer method for empowering and engaging this audience in saving energy may achieve success in the future.

Future projects could build upon existing work of the PSP to expand this project to more UV members (e.g. PSP round 2). Government could also engage with other member-based organisations which represent low income householders or community-based organisations where strong peer networks and a pre-existing level of trust with members exists. A focus could be on industries/sectors (e.g. childcare, aged/home care) as illustrated by the success of the PSP power savers teams, which could form the basis of a future energy efficiency program. In addition, accessing these householders in a workplace setting as part of other workplace activities may be more likely to increase participation in energy efficiency programs, as this demographic has limited time availability (shift working and long working hours).

There is still some way to go with tenants and landlords in terms of trust and engagement on energy efficiency and addressing barriers to split incentives. Tenants were cautious due to fears about changes in their tenancy. Landlords (and real estate agents) lacked interest in changes that provide benefits to the tenant through reduced electricity bills or increased comfort. Engaging landlords, property owners, real estate agents, strata management or body corporates in a different way (than via their tenants) could be the focus of energy efficiency schemes in the future that seek to address barriers to split incentives. Other ways to address split incentives could prove to be a more effective method e.g. energy efficiency equipment rental programs (Cluett et al, 2016).

The success of energy efficiency project evaluation, as with any large scale project delivered to a sample of participants across multiple years, relies on a clearly defined project design from the outset. Design should inform data collection, storage and analysis throughout the project delivery to ensure evaluation at the close of the project is comprehensive, useful and informative to future projects. Changes to project design and length have implications for evaluation across a wide range of metrics and directly affect data quality and quantity and consequently the ability to report in detail on the project's impact. The use of evaluation logic that can evolve with the project is also paramount – a logic which draws upon a systems approach to evaluation can ensure that evaluation meets the needs of the funding agency, implementation partners and subsequently participants themselves.

Key to project success is the necessary skills and experience of the organisations delivering the project. Careful consideration is required for the implementation of project administration, project management systems, data collection and storage and relationship management. The PSP trial has built the knowledge and capacity of consortium members to encourage long-term energy efficiency among their customers or clients. At the writing of this evaluation report, no data was yet available on the cost effectiveness of the PSP, however the results (to be reported in the final report) will identify if this knowledge and capacity building has occurred in a cost efficient manner.

7.4.2 Evaluation approach

The evaluation logic selected for the project at its inception was based on assumption that the PSP would be delivered as expected. An evaluation logic which utilised a systems approach may have allowed for a more iterative approach which considers external enablers and barriers rather than being designed around a linear logic.

7.4.3 Recruitment

Future programs of a similar nature to PSP could apply the following lessons to recruitment of participants:

- Identify a planned attrition rate between assessment and completion of project, and factor this into evaluation targets

- Include a focus on identifying leaders within the peer-to-peer network and supporting these individuals to recruit
- Use a member-based organization which has pre-existing relationships (and trust already established) with potential participants
- Match eligibility criteria to the target audience

7.4.4 Home Assessments and Retrofits

Future programs of a similar nature to PSP could apply the following to home assessments and retrofits:

- Consider hiring assessors who are also qualified electricians to enable more retrofits at home assessment – this would require more time at home assessment and necessary logistics and infrastructure (e.g. transporting more equipment)
- Consider developing formal partnerships and agreements with energy efficiency equipment/technology providers may increase efficiency
- Employ or engage translators for the life of the project to maximize efficiencies of delivery and minimize language barriers at the home assessment
- Obtain data from the IHDs during and after the project to provide more insight into household energy use, the impact of other interventions and the householders energy literacy and sense of control – this could be a key focus of a future research project (or extension of) the PSP as 13% of PSP participants had an IHD installed
- Seek landlord approval for any changes to fixtures in tenanted properties

7.4.5 Solar Hot Water scheme

Future programs of a similar nature to PSP could apply the following to solar hot water retrofits in owned homes:

- Target older, damaged and larger hot water systems
- Incorporate necessary time to meet approval requirements when installing solar hot water in apartments with strata involved

Future programs of a similar nature to PSP could apply the following lessons to the offering of split-incentives for solar hot water systems to tenants and their landlords:

- When seeking to contact the landlord, it may be required to also contact the real estate agent, which could present a barrier to implementation
- Agreements with the landlord should deliver a ‘win-win’ for both tenant and landlord
- The term of the agreement should extend beyond the life of the project
- Obtain landlord or real estate agent contact details at the home energy assessment - phone calls made at a later stage were not as effective
- Consider the relationship between tenants and landlords which may present a barrier to implementation
- Incentives for real estate agent staff to engage with split incentives is limited, approaching decision makers within the real estate agent company (such as CEO/ managers of agencies) is recommended
- Incentives for landlords are inadequate to achieve uptake
- Consider other incentives for addressing split incentive barriers to achieving energy efficiency in rental properties such as energy efficient equipment rental programs (Cluett et al, 2016)
- Consider further research into the barriers for split incentives with respect to energy efficiency in low income rental households in Australia including behavioural and attitudinal surveys of tenants and analysis of end use data from households in this demographic
- When setting evaluation targets for evaluating split incentive offerings:
 - Focus separately on targets for successfully engaging tenants (i.e. the tenant agrees for their landlord/real estate agent to be contacted) and for successfully engaging landlords (i.e. the landlord agrees to discuss cost-sharing arrangements)

- Make targets proportional to the attrition at each stage of the project demonstrated by projects such as PSP
- Focus targets on outcomes (e.g. successful engagement) rather than inputs (e.g. number of participants invited)
- Consider standards for leased properties to replace electric with solar or instantaneous hot water

7.4.6 Project Management

Future programs could ensure milestones for multi-year project are realistic, firm and allow for time for the project design and evaluation method to be revisited. This would enable more efficient project management and delivery.

Future programs of a similar nature to PSP could apply the following lessons to the hiring of project staff:

- Ensure a CRM is identified and utilized at the commencement of the project to maximize efficiencies of recruitment, data collection and project implementation – include training for project staff
- Consider the use of existing channels of communication with potential participants (such as call centres) for efficient use of staff time
- Ensure staff and organisations have necessary skills to undertake tasks, for example:
 - Involve organizations that have understanding of and experience working in the Australian electricity sector (in particular with electricity distribution and retail companies)
 - Consider partnering with electricity distributors or retail organisations to deliver low income energy efficiency projects
 - Include organisations or individual with project management experience and knowledge across multi-year projects such as the identification and implementation of a suitable CRM, design of surveys and identification of online survey tools, data collection storage and management, financial management and project administration

Future programs of a similar nature to PSP could apply the following lessons to the hiring of energy assessors:

- Recruit or involve energy assessors during the project design or a pilot of the project to enable efficient design of assessment process/procedures and subsequent delivery of home assessments
- Utilise existing networks to recruit energy assessors through pre-existing relationships to enable clearer communication and stronger commitment to the project from assessors

Future programs of a similar nature to PSP could apply the following lessons to the implementation of project systems:

- Include adequate planning, budget and testing of project systems
- Seek to collect, store and export all data from one system where possible

7.4.7 Impact on Electricity Use

Future programs of a similar nature to PSP could apply the following lessons to obtaining billing data:

- Develop a formal arrangement, such as a signed contract between the PSP consortium and electricity distributors for obtaining data
- Conduct a 'dry run' of data request following the project Pilot, or first 'round' of assessments to identify barriers to obtaining data
- Establishing expectations clearly with the consortium and electricity distribution companies
- Communicate the purpose of billing data consent with participants such as:
 - Discussing the purpose of the form early in the participant experience e.g. at registration and assessment

- Making retrofits conditional on return of forms
- Ensuring hard-copies are obtained unless dealing with well-established IT systems
- Ensuring forms are stored in a way to be easily extracted, updated and exported
- Ensuring consent begins at the point of intervention, not the time of signing

Future programs of a similar nature to PSP could apply the following to the analysis of electricity savings using billing data:

- ensure in-depth communication of analysis techniques between researchers and project staff so that evaluation methodologies are understood by all parties
- allow for large rates of attrition in available billing data when seeking data from energy distributors (due to validation processes)
- allow of sufficient time period for analysis to provide adequate pre and post-intervention data
- consider including further analysis of:
 - trends of electricity and gas prices over the time period to provide additional insight to results
 - the characteristics of households with respect to other criteria that may impact electricity use in the home and potential for savings e.g. differing degrees of social disadvantage across participants in the regions targeted by the PSP

Future programs of a similar nature to PSP could apply the following to the analysis of participant capacity to save energy in the home:

- Include a larger pool of participants in order to make the Livelihoods method effective and in order to maximize attendance at a workshop with a demographic similar to the PSP
- Apply the livelihood method in a different way than was trialled in the PSP such as:
 - in a workshop within participants' workplace (as opposed to outside work hours) bringing people together has the added benefits of facilitating social learning, networking and information exchange among participants - the workshop could be held before or after other meetings or events so participants have a greater reason to attend
 - via individual phone interviews and surveys to maximize participation in both before and after capacity assessment although pursuing a workshop format would have
- Introduce additional approaches to measure capacity such as specific questions in the pre- and post-intervention surveys

Future programs could consider survey question design which aims to test participant perceptions against actual performance. Additional questions could be included in the pre- and post-survey to analyse:

- participant perceptions of the amount of electricity and/or bill savings achieved (established as a good proxy for savings in the Smart Grid Smart Cities project which conducted similar surveys), and comparison of this against the evaluation findings of actual electricity savings (to analyse participant's ability to gauge bill savings)
- more detailed info on what participants did or tried
- participant perceptions of changes during the project (after the project) to add confidence to comparison of before and after results

Providing a control group for comparing survey data against is recommended for future programs.

Capturing the responses to surveys in dedicated survey research tools (which are often built to export data in an analysis-ready format) is recommended to reduce the risk of error in analysis.

A follow-up project, including evaluation, to measure the persistence of electricity savings based on the peer to peer activities of the PSP that encourage energy efficiency in low income households could be focus in the future. Alternatively (or additionally) an extension to the PSP which revisits households (e.g. in 12 months' time) could assist with evaluating persistence.

In addition, a project which extends collection of billing data beyond the life of the PSP would be beneficial to enable further analysis of electricity savings. Additional post intervention data could enable analysis of how electricity savings relate to regional characteristics, socio-economic

characteristics and seasonal changes in home electricity use by PSP participants. However, the sample size remains a challenge for this analysis.

7.4.8 Impact on Participants

Future programs of a similar nature to PSP could apply the following to the analysis of self-reported levels of electricity literacy and sense of control:

- Include one on one home assessments with participants
- Ensure language needs of participants are understood and catered for with translators and translated education materials
- Ensure home assessments include:
 - education on behaviour change
 - training on use of specific retrofits with the homeowner
 - discussion of the home owners electricity bill

The following recommendations are suggested for any future programs of a similar nature to PSP, with respect to evaluation data sets:

- Maintain one primary source of all participant-related data
- Survey data collection and storage should keep in mind straightforward export of data to enable efficient evaluation
- Include questions that directly invite participant perceptions of changes *during* the project (as well as before and after the project) to confidence in interpretation of before and after comparison results

7.4.9 Peer to Peer Networks

Future programs of a similar nature to PSP could apply the following to the use of peer-to-peer networks to inspire and sustain energy efficient behaviours:

- Deliver a strong focus on champion-based projects
- Develop peer-to-peer engagement on energy efficiency that:
 - targets the barriers low-income workers face when involved in community and activities outside the workplace
 - is built through existing community structures such as workplaces
 - targets sectors with mutual self interest in improving education of the work force on energy efficiency (e.g. Home and Community Care, Early Childhood Education)
 - targets workplaces where employer may support facilitated training on energy efficiency
 - subsidises and incentivises to improve participation by those vulnerable due to precarious employment or insecure housing
 - partners with external organizations, such as local councils, to expand opportunity for ongoing and sustainable involvement in community energy efficiency action
 - considers including evaluation which collects adequate data so that the impact of peer to peer energy efficiency activities on electricity savings can be detected

8

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Appendices

APPENDIX A - EVALUATION FRAMEWORK

APPENDIX B – BACKGROUND RESEARCH REPORT

APPENDIX C – LIVELIHOODS WORKSHOP SUMMARY

APPENDIX D – PILOT EVALUATION REPORT

APPENDIX E – BILLING DATA CONSENT FORM

APPENDIX F – PRE-INTERVENTION PHONE SURVEY

APPENDIX G – POST-INTERVENTION PHONE SURVEY

