Final Report of the LIEEP Power Savers Program (PSP)

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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.

ABOUT THE AUTHORS

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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

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NCC would particularly like to acknowledge the contributions of the following to the delivery of the PSP:

- The PSP Consortium partners and all staff
- The five home energy assessors
- Members of the PSP Advisory Committee, and
- The Department of Industry, Innovation and Science

POWER SAVERS CONSORTIUM

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DEPARTMENT OF INDUSTRY, INNOVATION AND SCIENCE

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Australian Government
Department of Industry, Innovation and Science

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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 c*osts 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 Effectiveness Ratio	
Cost Level	**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 Cost 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.

5: 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.

6: 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.

7: 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.

8: 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.

9: 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.

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

11: 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.

12. 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 quintiles[2]. The PSP included a focus on assisting low-income tenants and low-income people from non-English speaking and/or culturally/linguistically diverse backgrounds.

[2]as 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 household to address project impact against baseline. Conclusion of journey.	United Voice

Timing	Elements of journey	Key responsibility
	"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 householdss, 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 assessors. 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:
    - the home assessment
    - the PSAP
    - 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 actionsPSP staff undertook extensive research and peer review on a number of energy efficiency topicsThe 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.

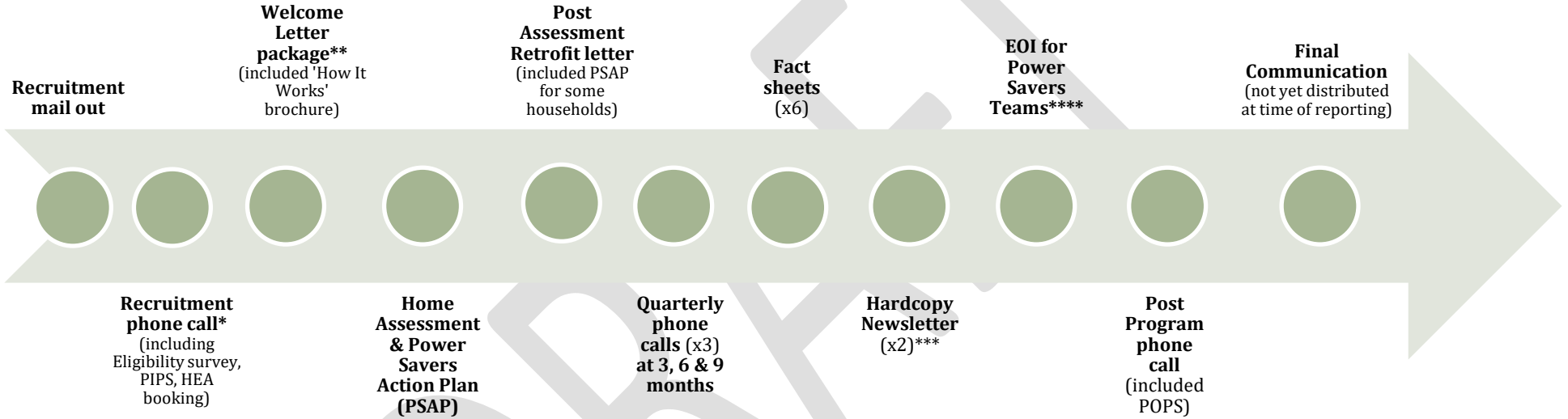
The dinner was held on Monday the 16th November at Diethnes Restaurant in Sydney. Forty two (42) project participants and guests attended from an anticipated fifty two (52). The three (3) principal PSP assessors and their partners and project staff from NCC and United Voice also attended. Overnight accommodation 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 children[3] 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 2011[4].

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 occupiers[5], they are more likely to have older inefficient appliances[6] and have higher risk of living in homes with inefficient electric hot water systems and poor draught proofing[7] .

Most poignantly low income households are recognised as self-limiting their energy use, compared to higher income households, in an effort to reduce energy costs[8]. 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.

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[3]Stone, 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 *Initially piloted, discontinued*	• 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 *Initially piloted, continued*	• 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 *Initially piloted, discontinued*	• 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 *initially piloted, discontinued*	• 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
Identified post-pilot, continued
	• 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 *Initially considered, not utilised*	• free well-known tool • did not contain the necessary functionality (in particular, offline capability) for PSP needs

NAME OF SOFTWARE	USE FOR PSP
FluidSurveys *Initially piloted, continued*	• 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 efficiency[9].

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 (CO_2-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

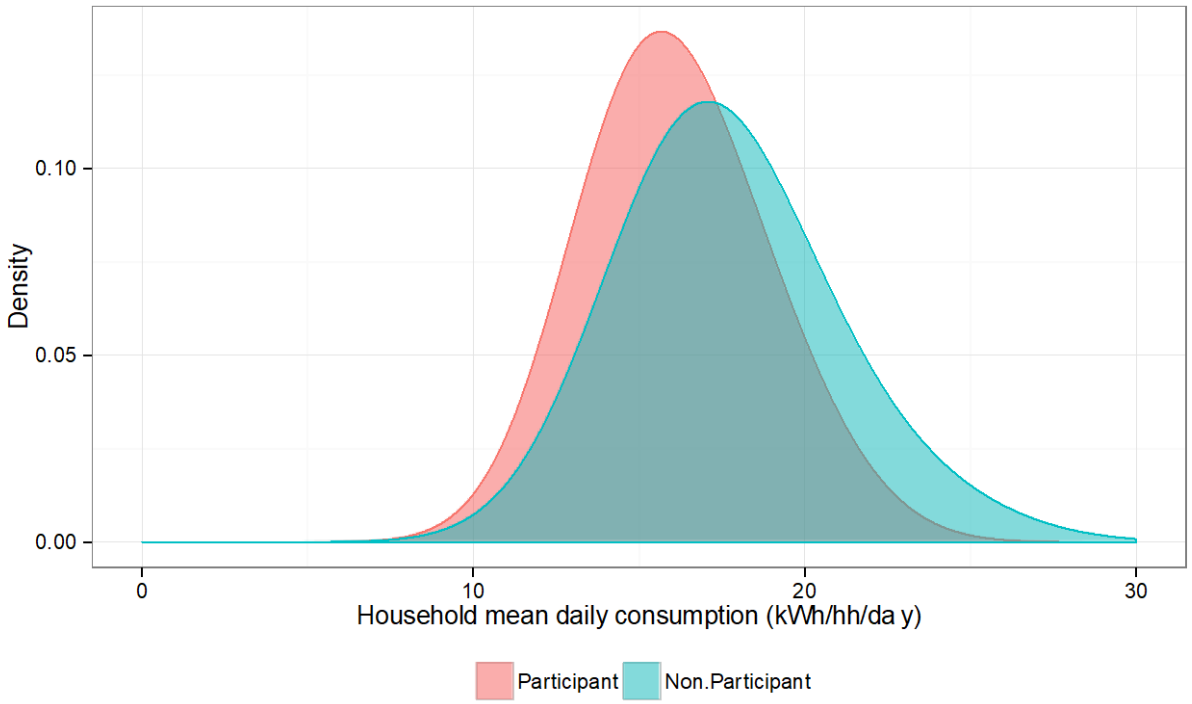
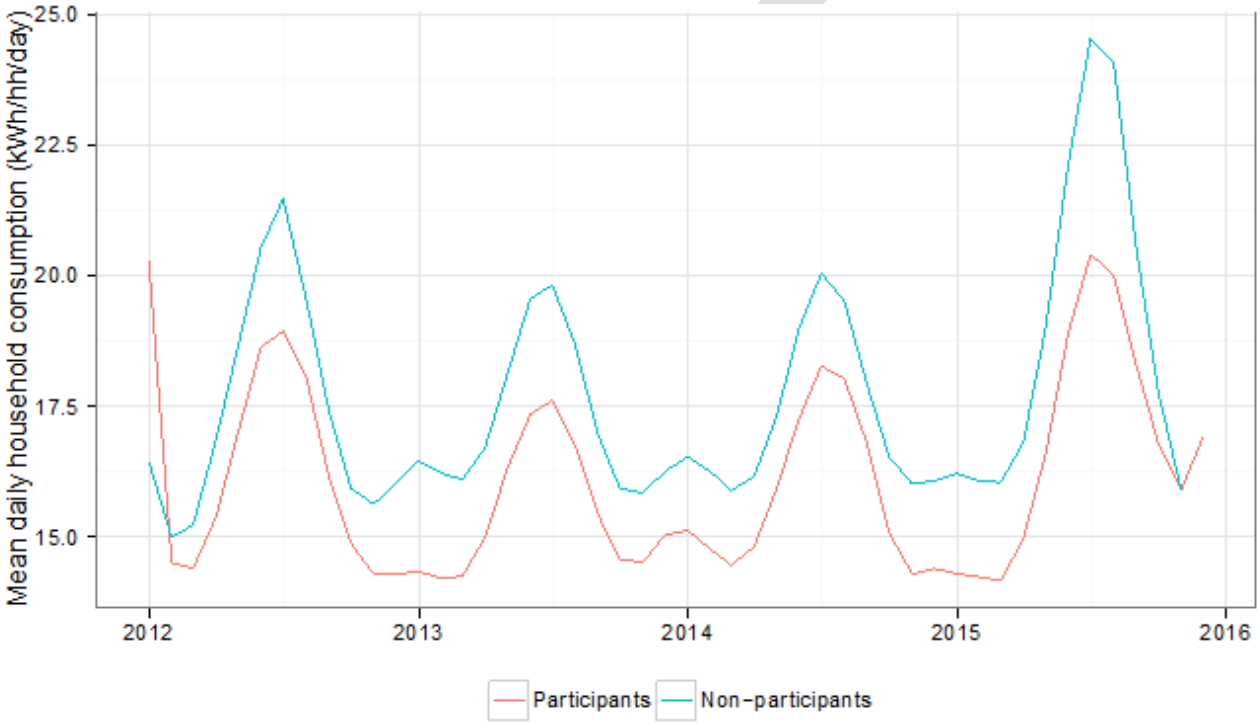


Figure 3 illustrates that both participants and non-participants follow a similar response to weather indicated by the similar peaks in consumption in each winter across the period. In particular, it illustrates peaks in electricity consumption during winters, likely indicating higher consumption of 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

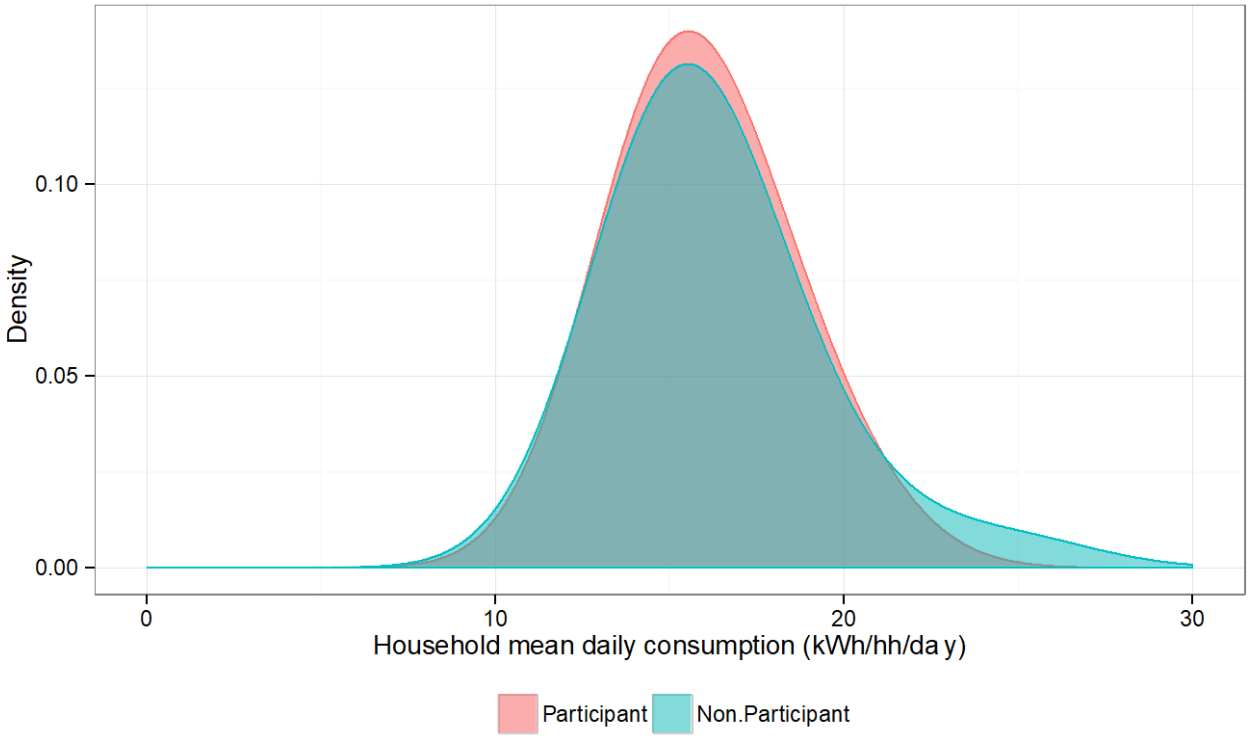
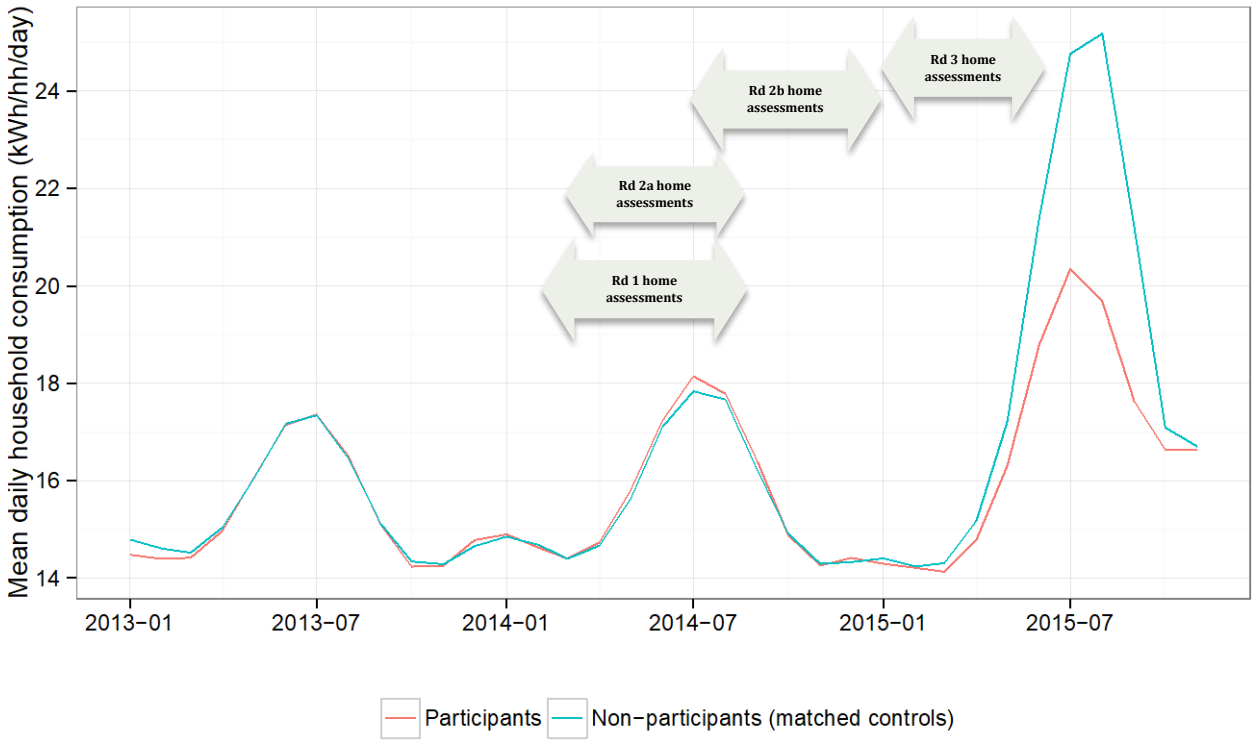


FIGURE 5: MATCHED HOUSEHOLD DAILY CONSUMPTION OVER TIME



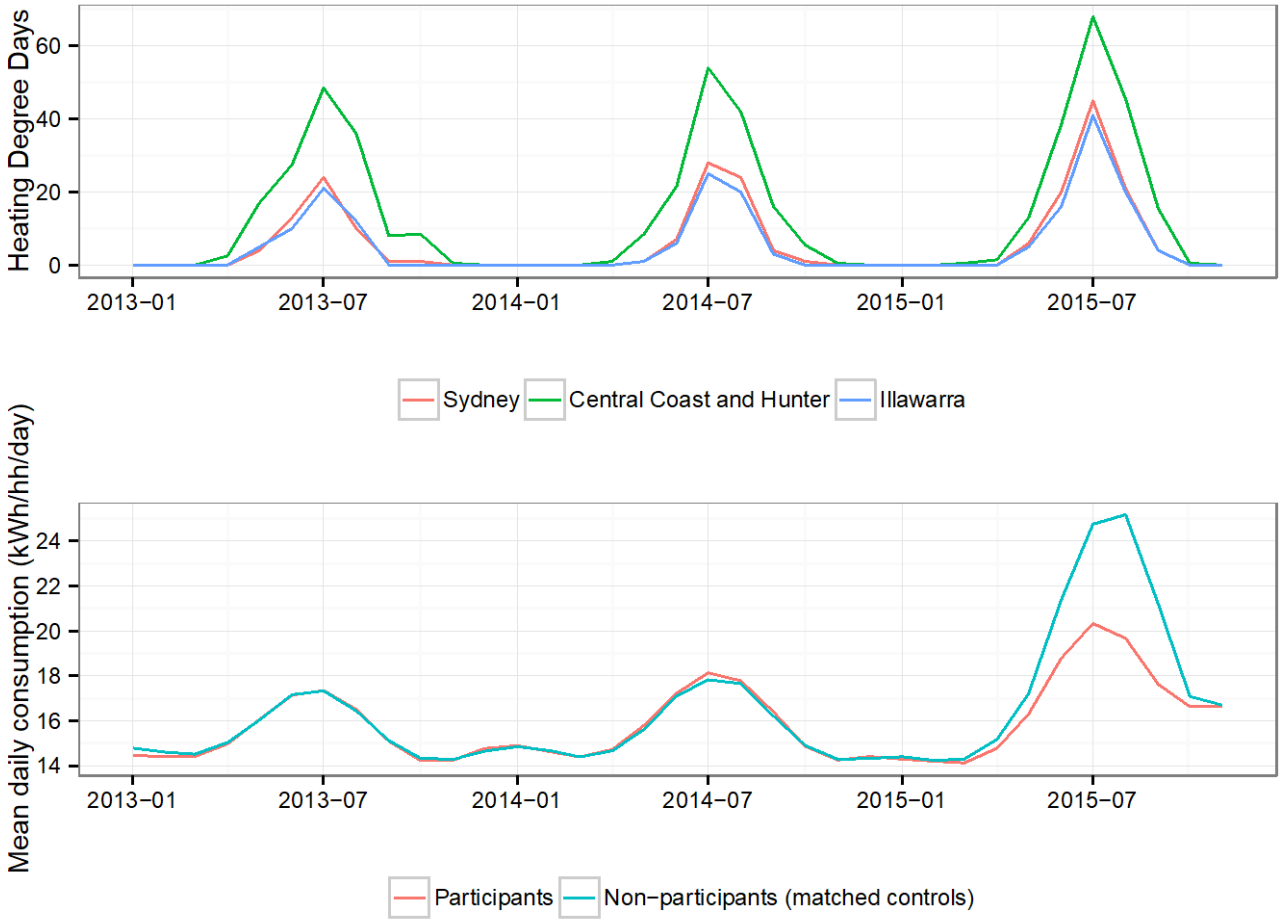
Mean consumption total

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.

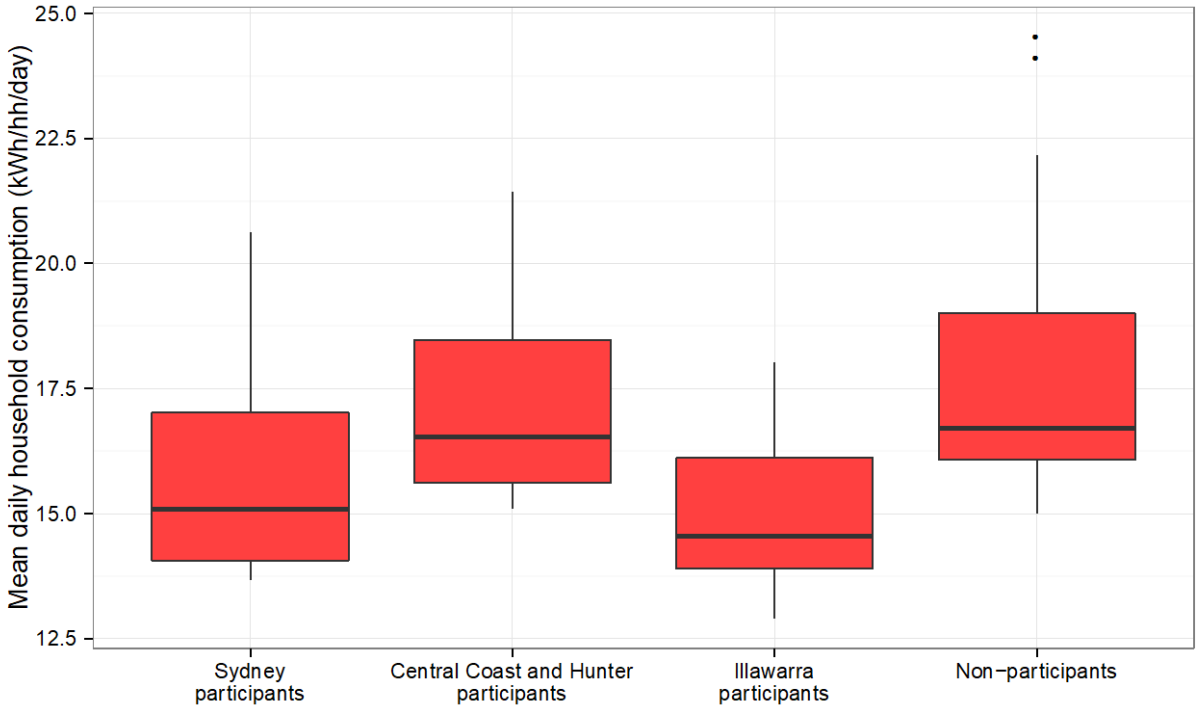
Following the home assessment, the Post Assessment Retrofits (PARs) implemented for insulation and draught-proofing, hot water system retrofits or upgrades, curtains/pelmets, reverse-cycle air conditioning and blankets may have contributed specifically to the more efficient use of electricity in these 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 CO_2-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 CO_2-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?

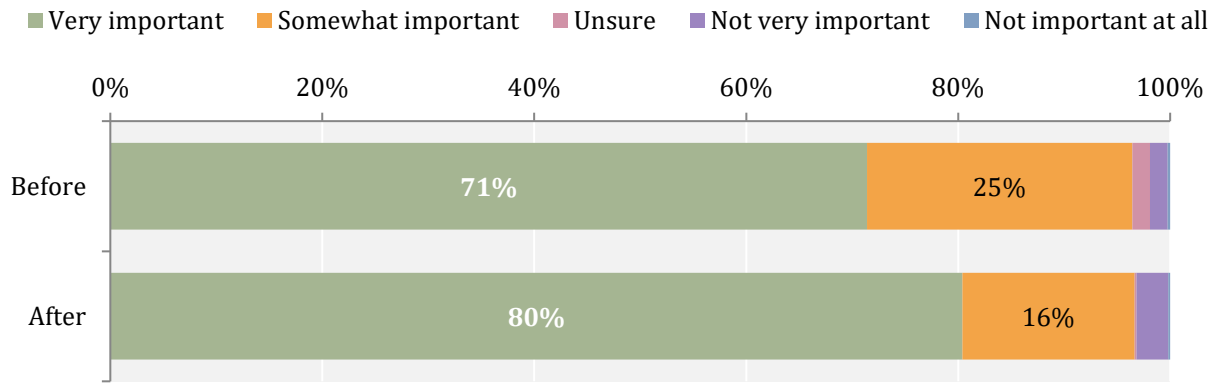
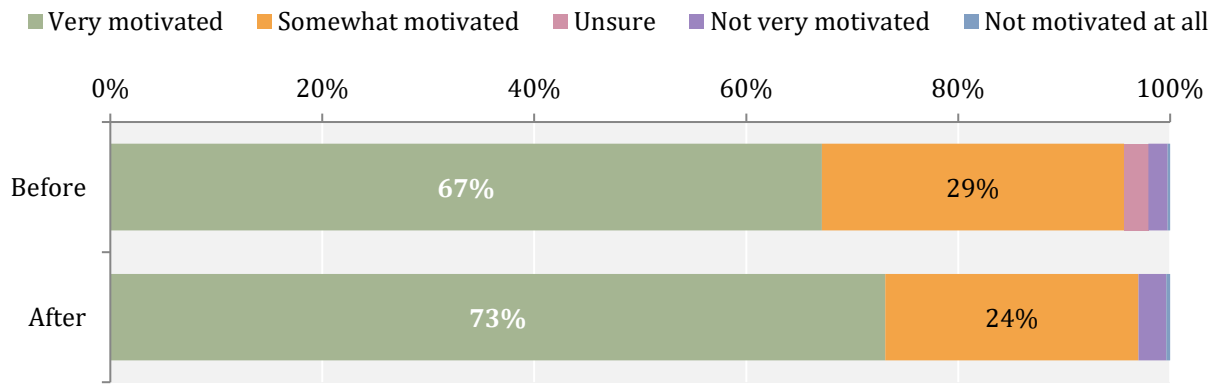


FIGURE 9: PARTICIPANT MOTIVATION FOR ELECTRICITY REDUCTIONS

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.

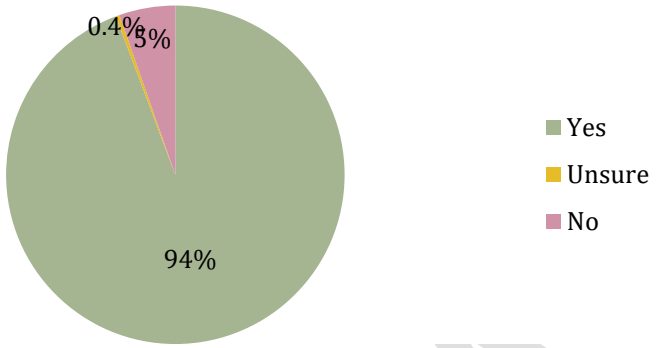
The proportion considering electricity reductions to be very important increased by 9% (from 71% to 80%) while the proportion rating themselves as very motivated increased by slightly less, at 6% (from 67% to 73%).

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?

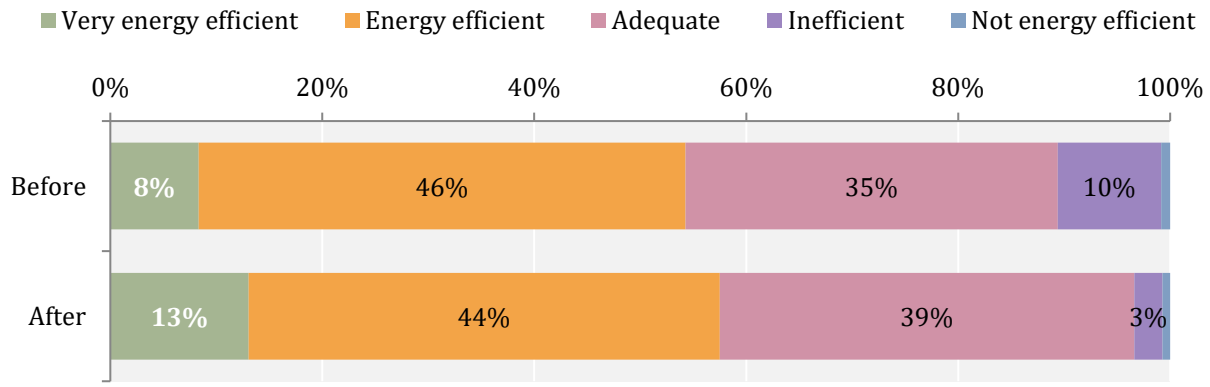


Despite the above, changes in participant ratings of their own energy efficiency were only modestly positive (Figure 11).

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 surveys[10]. 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. 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?

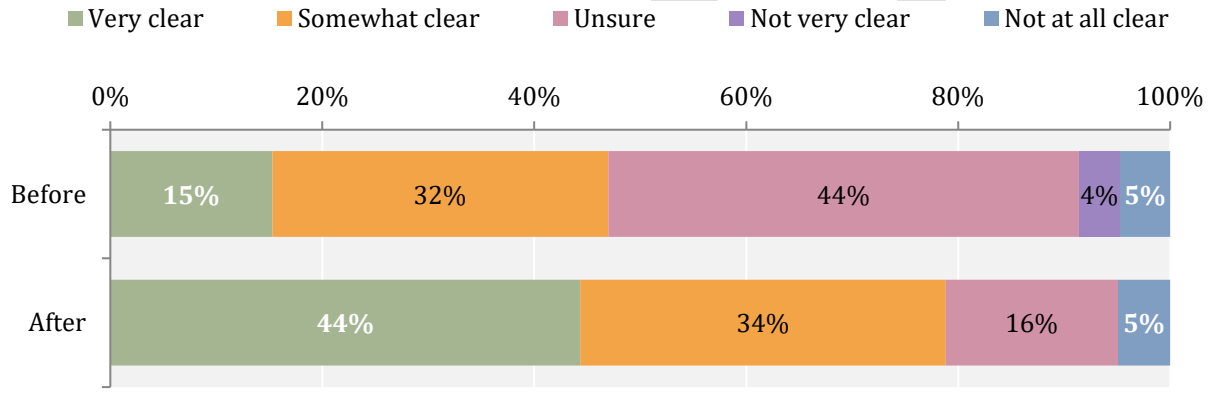
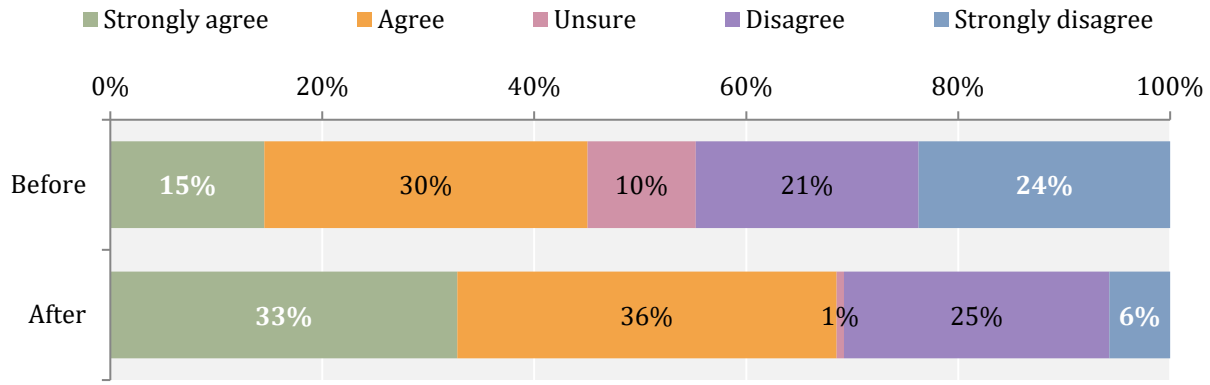


FIGURE 13: AWARENESS OF HOUSEHOLD ELECTRICITY USE COMPARES TO OTHERS

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

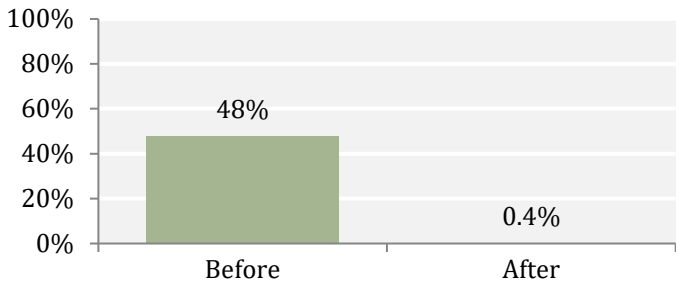


In the Pre- and Post-intervention Surveys, participants were asked what prevented them from reducing their energy use, and were provided with a range of options. As seen in Figure 14, before taking part in the PSP, almost half of all participants identified a lack of knowledge as a barrier to reducing 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

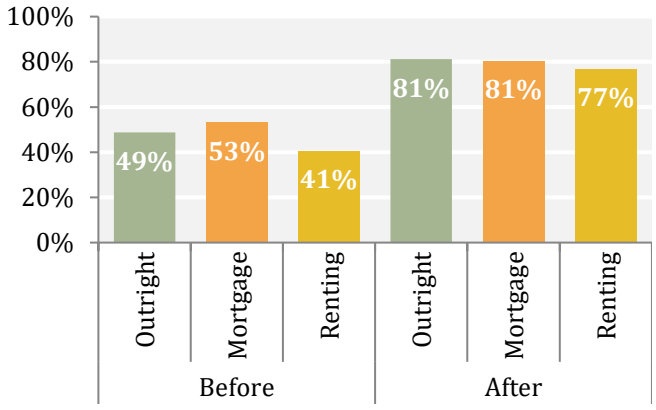
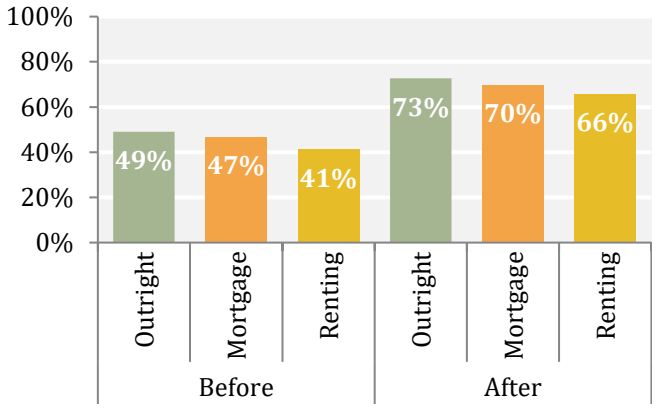


FIGURE 16: OWNERS VS RENTERS AGREEING THEY ARE AWARE OF HOW HOUSEHOLD ELECTRICITY USE COMPARES TO OTHERS



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

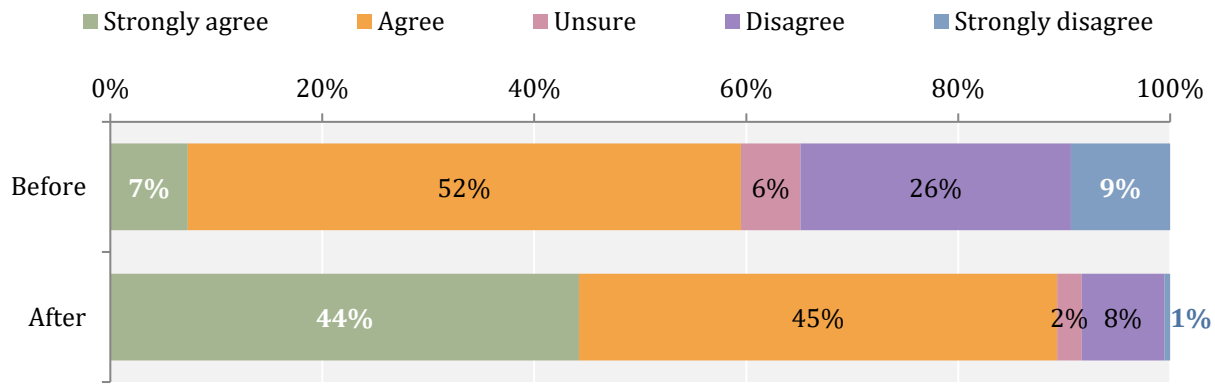
Participants were directly asked about their sense of control over electricity use and bills in the pre-and – post surveys[11].

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% (Figure 18).

FIGURE 17: SENSE OF CONTROL OF ELECTRICITY USE

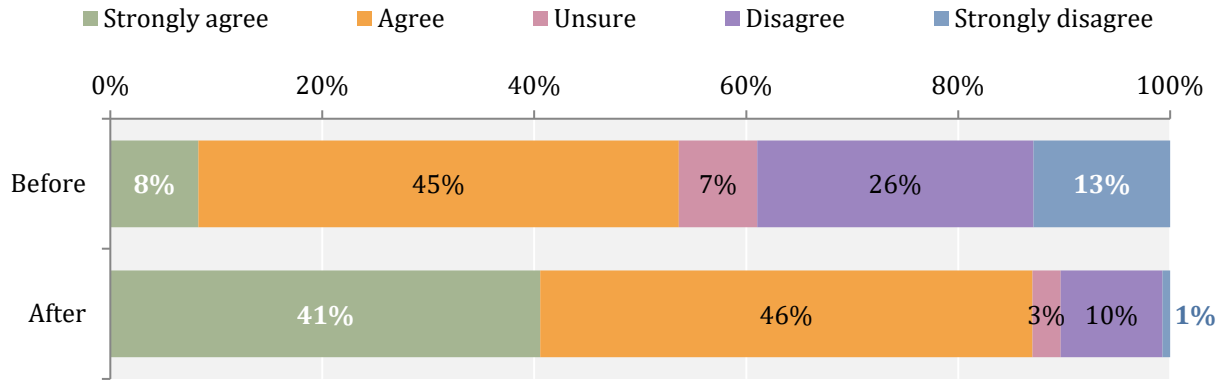
In response to: I feel in control of my electricity use.



[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: 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

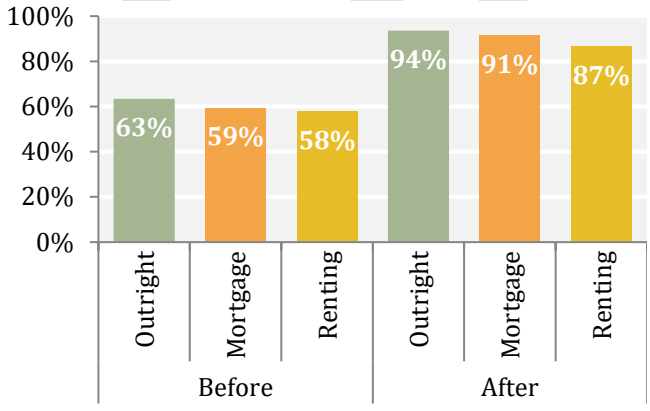
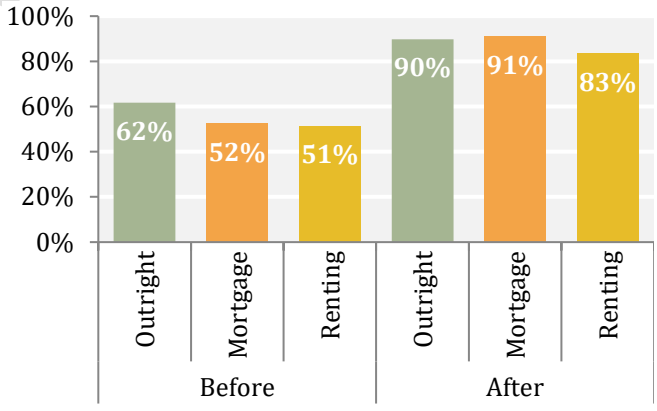


FIGURE 20: OWNERS VS RENTERS AGREEING THEY HAD CONTROL OVER THEIR ELECTRICITY BILL



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.

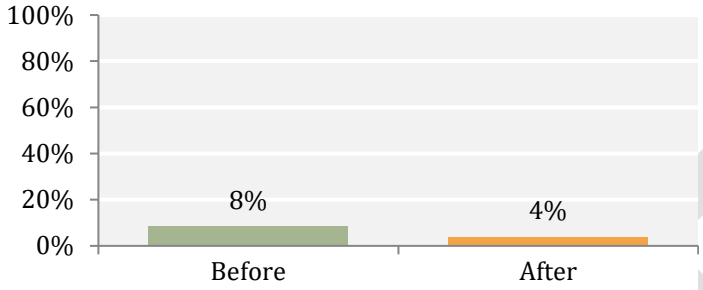
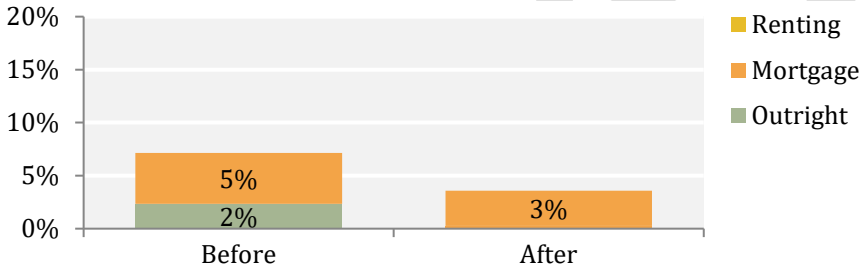


FIGURE 22: ELECTRICITY USE REDUCTIONS PREVENTED BY LACK OF CONTROL, BY HOME TENURE



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/Ht0IwMOAhyI. 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 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

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:

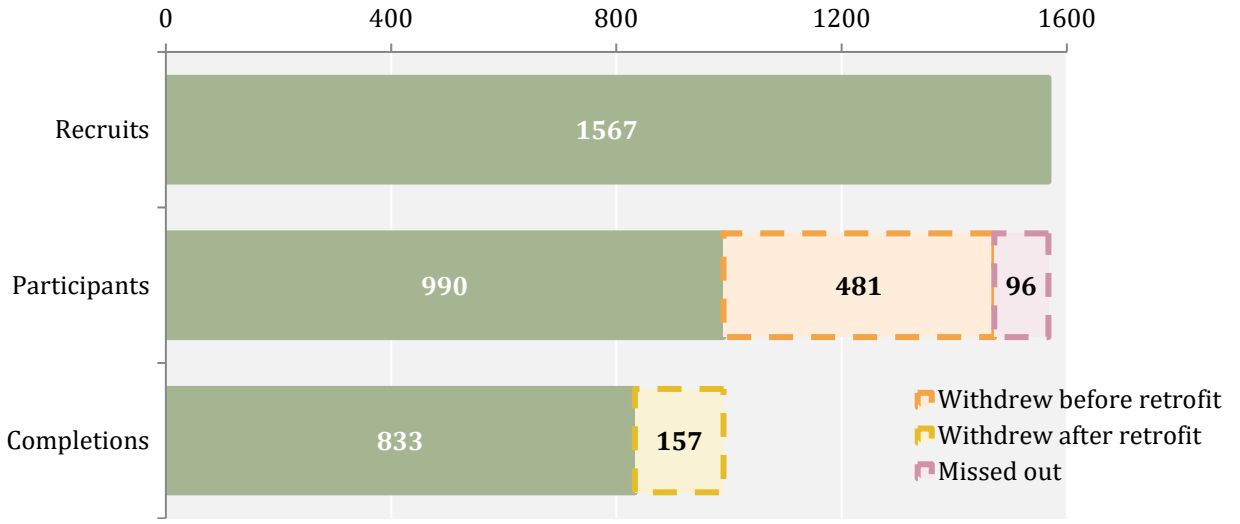
- **1,567 households recruited to the project**
  (i.e. agreed to participate in the project)
  - 577 recruits (37% of the total households recruited) subsequently withdrew or dropped out from the project prior to starting their participation in the project. Of these, 481 explicitly requested to withdraw, 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
Croation	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.

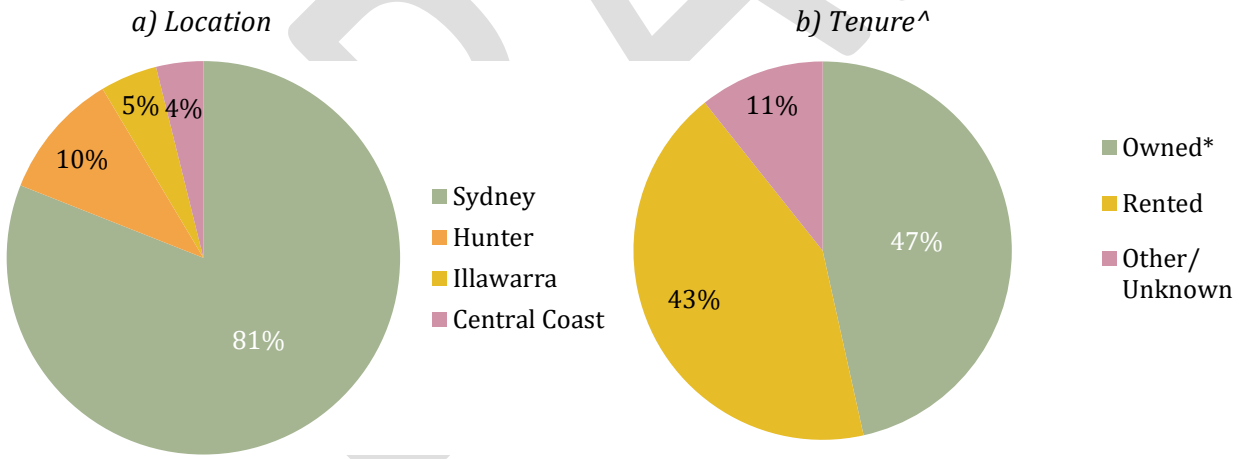
One assessor noted that on several occasions a translator did not arrive, and due to direct contact details of the interpreters not being provided these situations were difficult, as the assessor was required to contact UV, who needed to call the call centre at TIS and attempt to resolve the problem 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 census[12] 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 where 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 households[13]. These numbers are summarised in Table 30.

TABLE 30: HOME ENERGY ASSESSMENTS AND RETROFITS DELIVERED

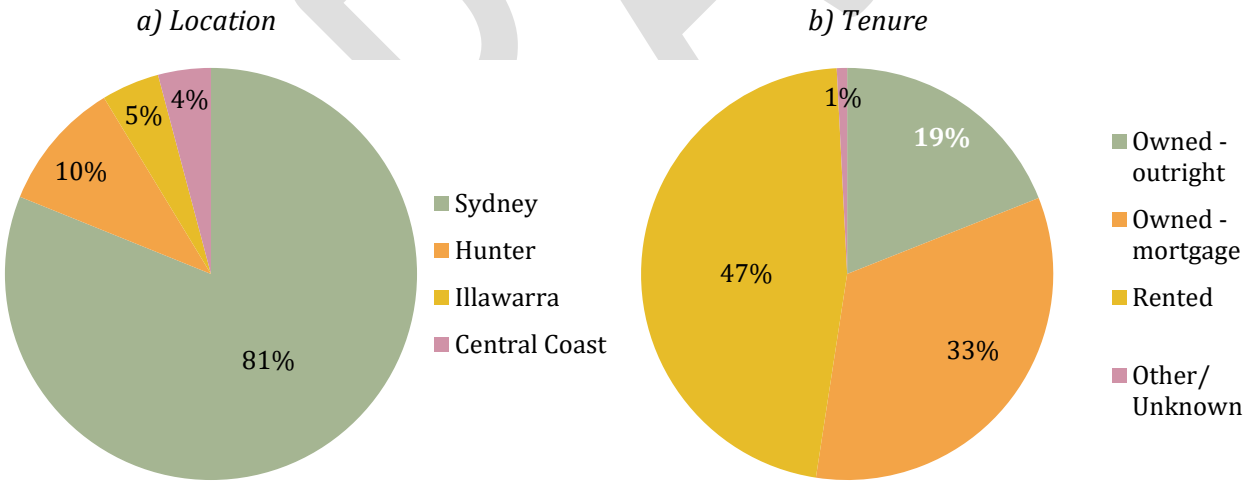
Home energy assessments (HEAs) completed:	990
At-Assessment Retrofits (AARs) installed	987
Post-assessment retrofits (PARs) installed:	837*

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 levels[14], 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 ASSESSMENTS[15] 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 census[16] 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

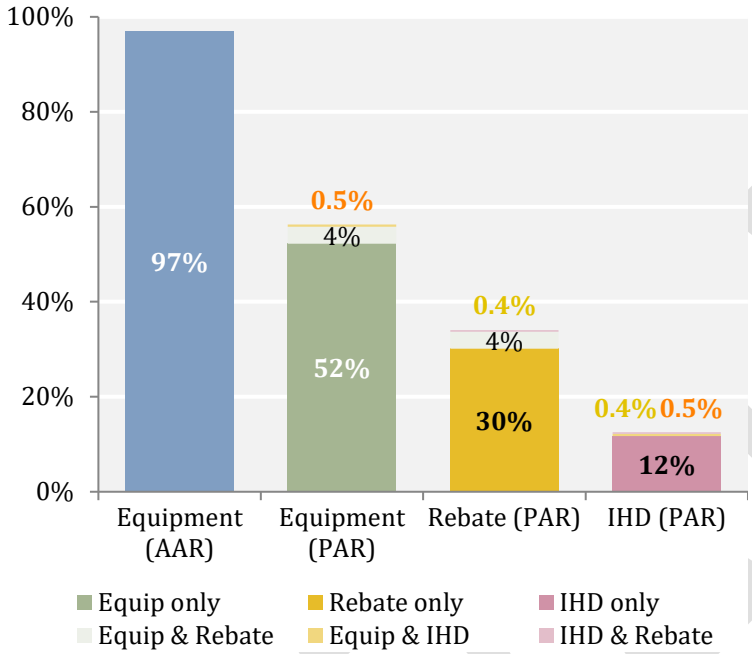


TABLE 32: RETROFIT COMBINATIONS

	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 2a[17].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.

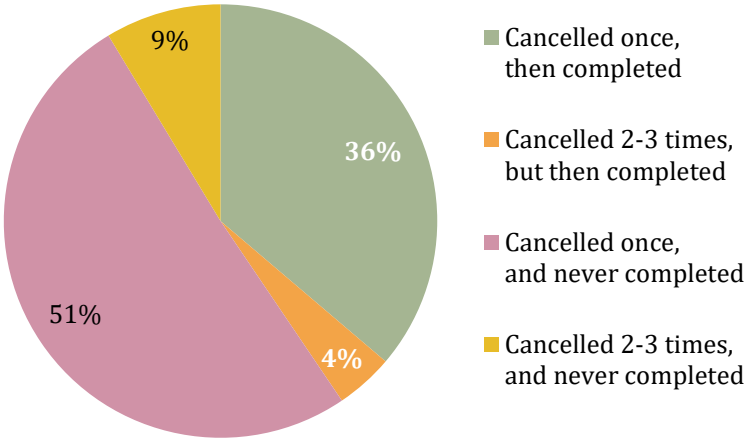
Despite our best efforts, by September 2014 it had become untenable for the Hunter assessor to continue. An agreement was reached that the Hunter assessor would complete some of the remaining home assessments closest to Newcastle. We then organised another one of our assessors to travel up from Sydney 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

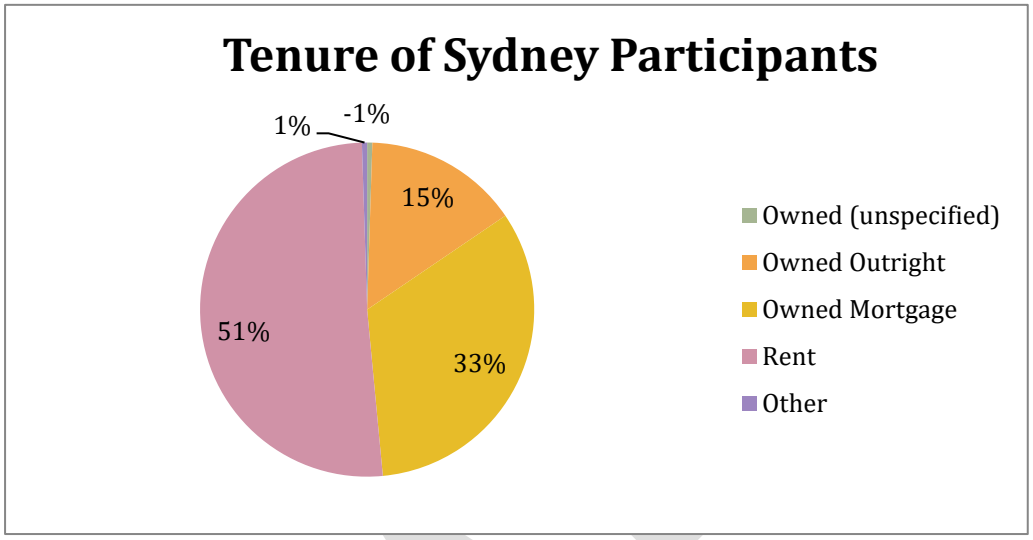
The PSP was successful in recruiting renter households to the program with 47% of participants identifying as renting.

The 2011 Sydney census[19] 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.

[19] http://profile.id.com.au/australia/tenure?WebID=250

Figure 28shows 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



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.

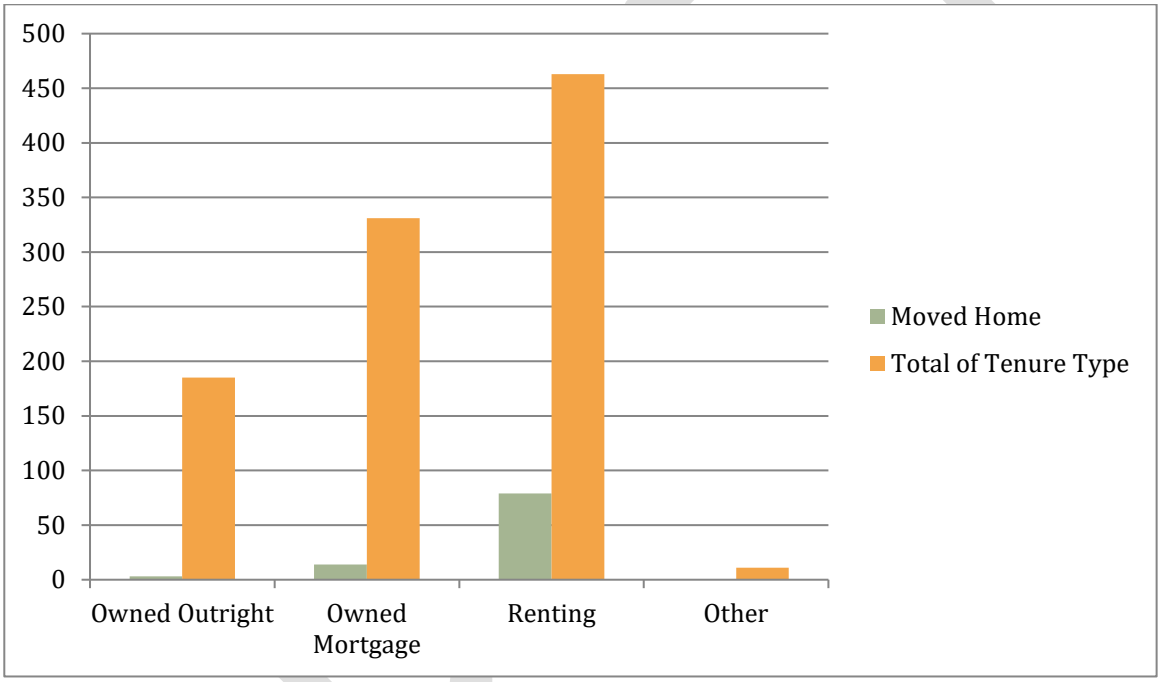
Unfortunately as a result of this, the program was unable to provide or analyse information about the participants feeling of a lack of control over their homes. However, as seen below, conversations with participants has identified that this is a substantive barrier to energy efficiency and security 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 deductible[20]. 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 all[21].

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.

Whist 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 Renshade 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 CALCULATED[22]

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	Level 1 + Recruitment and participant maintenance costs (Data Management, Comms, Champions)
Level 3 – Total Business	Level 1 + Level 2 + associated administrative costs (overheads etc.)
Level 4 - Total Trial	Level 1 + Level 2 + Level 3 + 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 ± $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] inappropriate[23]". An accurate analysis of the SHWS treatment was not possible using the existing dataset obtained from the energy distributors.

Discounts not factored into calculations

[23] ISF DER, p94

- 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:

1. 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

2. 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

3. 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

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 Effectiveness Ratio	
Cost Level	**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):

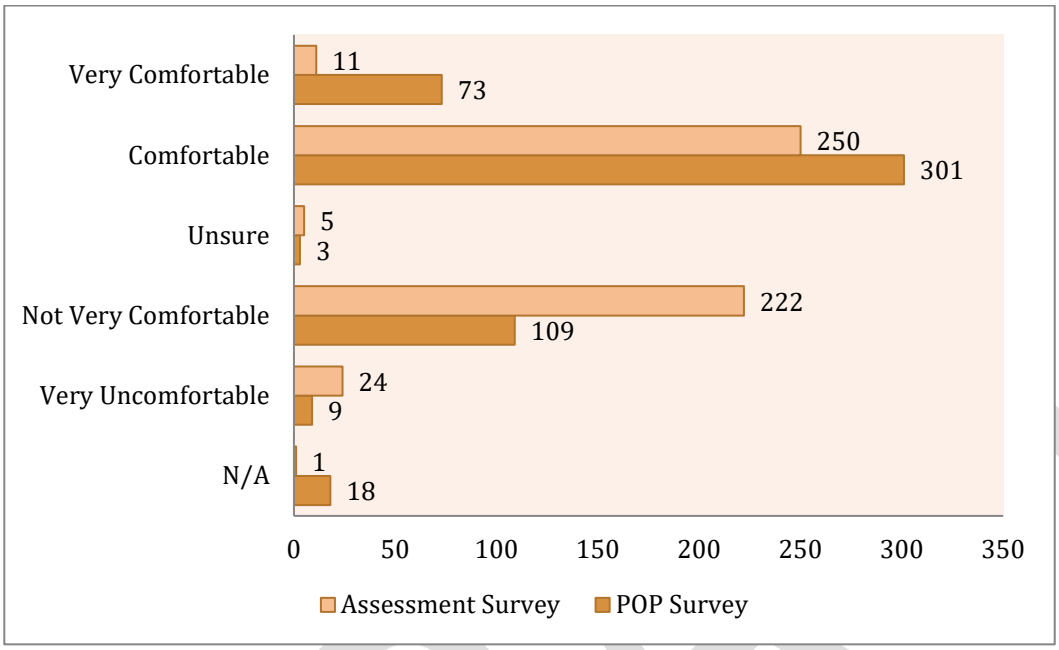
- How comfortable do you feel in your home in the cooler months? (Very comfortable, comfortable, not very comfortable, very uncomfortable, unsure)
- How comfortable do you feel in your home in the warmer months? (Very comfortable, comfortable, not very comfortable, very uncomfortable, unsure)

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

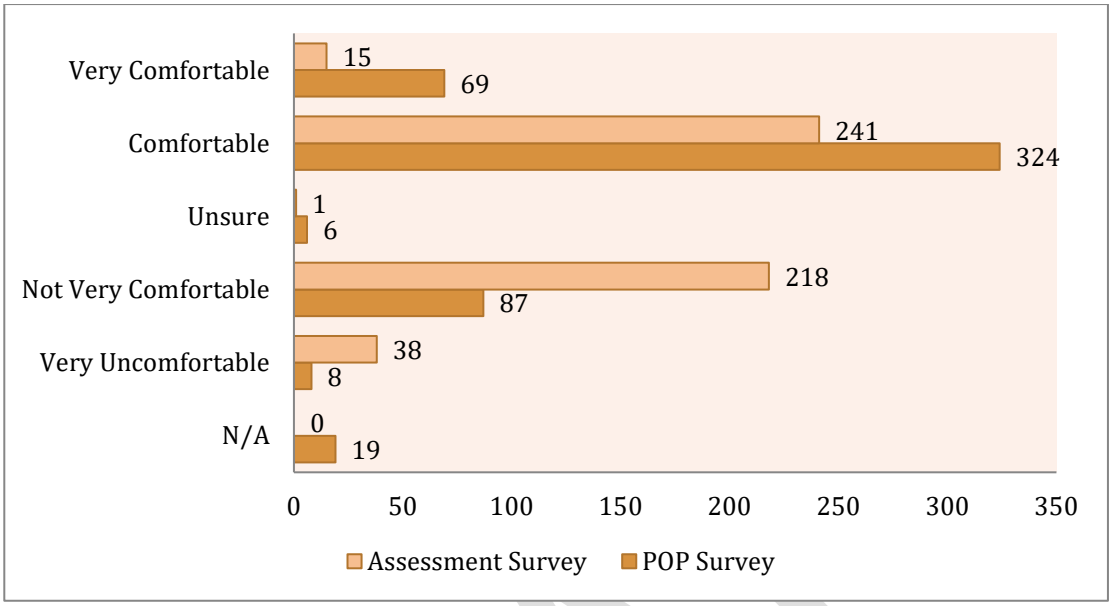
At the end of the PSP, there were fewer participants who claimed that they were either "very uncomfortable" or "not very comfortable" in their homes by 63% and 51% respectively. On the other hand, more participants were recorded to have marked improvements in their homes. A total of 51 more participants 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 prevented 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 participantss 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 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 deductible[25] . 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 all[26]

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.

(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.

[25]ACOSS, *People on Low Income and Energy Efficiency,* 2013

[26]ACOSS, *People on Low Income and Energy Efficiency,* 2013

(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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