THE FUTURE POWERED FAMILIES REPORT

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Table of Contents

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Definitions

Assessor	Person who conducts a home energy assessment
Baseline	Pre-intervention
Follow up	Post-intervention
New Parents	Households with an oldest child of fifteen years or younger
Statistically Significant	Outcomes are most likely due to factors other than chance
The department	The department of Industry and Science and all predecessing departments

Acronyms

CALD	Culturally and Linguistically Diverse
FPF	Future Powered Families
LIEEP	Low-income Energy Efficiency Program
MCH	Maternal Child and Health
NMI	National Meter Identification
VEET	Victorian Energy Efficiency Target

Executive summary

Future Powered Families (FPF) was a three year, $1,803,200 behaviour change oriented, energy efficiency project. Delivered by Environment Victoria, FPF was funded through the Commonwealth Government Low-income Energy Efficiency Program (LIEEP).

The FPF project was designed to trial and demonstrate energy efficiency behaviour change programs targeted towards 'hard to reach' groups such as new parents. New parents are defined as households with an oldest child of fifteen years or younger. The families targeted through the FPF project were identified as facing a number of well-documented and distinct barriers which typically prevent access to mainstream energy efficiency awareness programs.[1]

These barriers include:

- family responsibilities, particularly care for young children;
- cost or affordability;
- language, particularly low levels of English proficiency;
- literacy, including low literacy in first language (where English was a second language);
- cultural differences, such as food preferences, wariness of government or official services based on negative past experiences (in Australia or their country of origin) and gender roles;
- a reluctance to access services in unfamiliar or intimidating settings; and
- a lack of energy efficiency resources in rural areas.

The FPF project trialled three types of intervention:

1. Once-off energy saving workshops: Workshops of several hours' duration were delivered by FPF staff to existing parents' groups, adult English classes or situations with a regular attendance of parents with young children;

2. Home energy assessor training: new parents were trained by FPF staff to deliver basic home energy assessments to households recruited through their own personal networks;

3. Home energy assessments: Households recruited through assessors' networks received personalised energy-saving advice delivered by members of their own community in the comfort of their own home.

Components 2 and 3 together comprised a peer-to-peer learning model. This was adopted to assess the effectiveness of using trusted and credible sources (ie. peers) to overcome the language and cultural barriers identified above. Information delivered through the FPF project focused on low- to no-cost interventions which had the potential to deliver maximum energy and monetary savings for least investment in time and effort.

Baseline and post-intervention surveys of participants were used to determine the impact of each type of intervention on participants' behaviour (ie. whether there were observed changes in a range of energy-saving behaviours), and whether those changes in behaviour translated into changes in household energy consumption and bill savings.

[1] For example: https://aifs.gov.au/cfca/publications/are-disadvantaged-families-hard-reach-engaging-disadva

In terms of its primary objective of engaging new parents with energy efficiency information, Future Powered Families met or exceeded its targets. FPF met workshop delivery targets ahead of schedule and exceeded target numbers of assessor and home assessment participants (see Table 2, p. 16).

FPF was delivered to a total of 6,133 participants speaking 139 languages across 15 municipalities in metropolitan Melbourne, Geelong, the Latrobe Valley, the Wimmera and Central Victoria. Nearly 400 (392) participants were trained to undertake home energy assessments, 4,322 householders received home energy assessments and 1,233 individuals attended an energy saving workshop. Environment Victoria worked with 201 community organisations across diverse sectors and ethnic communities to recruit participants and deliver the project.

As a result of the Future Powered Families project, thousands of low-income and disadvantaged Victorians who were unlikely to have sought out energy efficiency information for themselves, have been exposed to relevant and accessible energy efficiency information.

The project achieved observable changes in energy saving behaviours amongst the three groups of participants. The extent of reported energy behaviour changes varied by intervention, with the assessor group demonstrating higher incidences of energy saving behaviours and workshop participants displaying the lowest. Evidence from follow up surveys suggested that participants maintained their energy saving behaviours across the project period, suggesting that new behaviours had been successfully normalised within household practice and hence were likely to be sustained into the future.

As well as surveying participants to assess behaviour change impacts, the FPF project collected electricity consumption data from retailers via participant National Meter Identification (NMI) numbers. This compensated for potential weaknesses in survey data (for example, self-reporting biases) and allowed for a greater degree of confidence in the reported energy efficiency achievements. However, this data could only be collected from retailers from participants who met three criteria: they had not moved house in the last twelve months, there was a smart meter on the property, and they had given written consent for data to be collected.

In terms of the project's impact on home energy consumption, both the assessor and home assessment participant groups had achieved reductions in their energy consumption, although only the home assessment recipients achieved reductions that were statistically significant over the project period. Both households with young children and older children achieved reductions in their energy use, although overall energy use by households with young children (oldest child of 0-3 years) was higher than that of households with older children (oldest child of 4-15 years).

Unfortunately, insufficient data was collected from participants of once-off workshops on which to base meaningful conclusions about energy consumption. However, this result in itself allows for conclusions to be drawn about the relative effectiveness of FPF intervention types on the delivery of energy efficiency information. Where engagement with participants was 'light', ie. contact of only a few hours in a group workshop setting with no peer-to-peer communication, participants appear to have been insufficiently motivated or engaged with the project to invest the time and effort in completing a survey and providing the NMI number that would have provided consent for electricity data to be collected from retailers. However, where a peer-to-peer model was employed and more time and effort was invested in providing tailored advice via a personalised home assessment, participants were sufficiently motivated to complete baseline and follow up surveys.

Numerous challenges presented during project delivery, which led to some adaptation and evolution of the project as it progressed. Key challenges included the abovementioned low rates of data

collection from workshop participants, difficulties with recruiting sufficient participating households that met the original criteria (that the oldest child be aged 3 years or younger), the resource intensity of developing relationships with community organisations, and some problems with project design including the length and format of workshops and surveys.

This report discusses the key outcomes of the FPF project, and identifies opportunities for improving the design and implementation of similar programs in future. While the project exceeded its targets in terms of program delivery, and achieved demonstrated changes in energy use behaviour by participants, the impact of observed behaviour change on broader issues of energy affordability and household well-being can be more difficult to quantify.

Nevertheless, key conclusions from the project can be summarised as:

- Effective behaviour change programs should be designed to maximise accessibility by addressing the specific barriers that prevent households from adopting energy-saving actions.
- The components of the project which adopted a peer-to-peer learning model (ie. training of assessors and subsequent delivery of home assessments by these assessors) exceeded project targets. This suggests that peer-to-peer learning is a successful model for overcoming these barriers and engaging 'hard to reach' groups in the delivery of energy-saving information.
- Energy-saving information delivered by FPF was more likely to translate into sustained behaviour change in the assessor and home assessment groups, compared with the once-off workshop participants. This suggests that when dealing with disengaged groups (ie. groups who would not otherwise seek out energy-saving information), the 'lighter' the contact and hence the shallower the engagement with participants, the less likely it is that sustained behaviour change will be achieved.
- Behaviour change-oriented programs such as Future Powered Families can achieve significant reductions in energy use and consequent bill savings for disadvantaged households.
- Where complementary retrofit measures are offered to householders (such as DIY draught sealing, low-flow showerheads etc.), there must be a seamless follow up process (imposing very little time and monetary cost on the householder) for them to be effective.
- Programs based on peer-to-peer learning models can deliver important co-benefits for participating communities, which contribute to their capacity to tackle future challenges.

These findings of the Future Powered Families project have implications for a number of policy issues beyond the scope of this behaviour change trial. These issues should be considered in the delivery of future policies and programs to promote energy conservation amongst low-income and disadvantaged groups.

- Community awareness and education programs should not assume that all community members have an equal opportunity to participate, but should explicitly identify and address the barriers that prevent some members of the community from accessing resources. Accessibility is enhanced through the use of a peer-to-peer learning model, provision of culturally appropriate catering, translators, translated materials and the use of graphics and images to cater for low literacy levels;

- Opportunities could be explored for creating additional forms of motivation beyond monetary bill savings, to encourage sustained energy-saving behaviour change. The high proportion of fixed charges in energy bills reduces the scope for changed behaviour to translate into meaningful bill savings. Hence, promotion of an energy usage target per household or other types of positive, real-time feedback should be explored;
- Future programs should acknowledge that where the underlying cause of high or unaffordable energy use is related to poor quality housing and appliances, behaviour change alone will not be sufficient to provide meaningful assistance. Comprehensive, integrated behaviour change and retrofit programs, including targeted assistance for the upgrade of inefficient appliances and installation of basic measures such as insulation and efficient lighting, are also required. The FPF project's experience with liaising with the Victorian Energy Efficiency Target scheme has demonstrated that there must be a seamless integration between the behaviour change and the follow up retrofit elements of the program, to be effective.
- Renters face additional barriers to implementing energy saving measures, particularly in terms of gaining permission from landlords (or reluctance to request permission) for the installation of even minor energy-saving measures. Effectively addressing the split incentive facing landlords and tenants requires the introduction of minimum standards at the point of lease, combined with the establishment of complementary financing mechanisms to enable landlords to meet standards.
- Programs provided by energy retailers for customers experiencing financial hardship should focus on prevention (through the provision of energy efficiency advice and services) as well as assisting those customers already in hardship.

The views expressed herein are not necessarily the views of the Commonwealth of Australia, and the Commonwealth does not accept responsibility for any information or advice contained herein.

1 Introduction

Energy is an essential service for maintaining the health and wellbeing of residents and the comfort and liveability of homes. Rapid rises in electricity, gas and water prices in recent years have increased costs to consumers, and increased financial pressure on low-income households. While low-income households typically consume less energy than other households, energy costs can represent 10 percent of their disposable household income. This is three times higher than the proportion of disposable income spent on energy by higher income households,[2] meaning that even small increases in utility bills can have a significant impact on already stretched household budgets.

Several programs are in place in Victoria to assist households manage their energy use and bills. These include the Energy Saver Incentive (or Victorian Energy Efficiency Target or VEET scheme), which subsidises the installation of energy and water efficiency measures in homes, appliance labelling schemes, online efficiency advice provided through retailers and government agencies, and hardship programs provided by energy retailers for customers experiencing difficulty paying their bills.

Despite these programs, energy unaffordability continues to be a significant and growing problem in Victoria. Many low-income households are either struggling to pay their bills, rationing their energy use or cutting expenditure on other essentials such as food.[3] Disconnection rates have risen alarmingly in recent years, increasing by 359 percent for electricity and 239 percent for gas since 2008-09.[4] At the same time, the proportion of energy customers participating in retailer hardship programs has risen 35 percent.[5]

The Commonwealth Department of Industry and Science has funded the Low-income Energy Efficiency Program (LIEEP) to trial a range of new and innovative approaches to delivering energy efficiency programs to low-income and disadvantaged households. LIEEP intends to address the barriers and challenges in the uptake of energy efficient approaches, and capture these learnings for future programs.

1.1 Environment Victoria

Environment Victoria is one of Australia's leading independent and not-for-profit environment groups. Environment Victoria's Sustainable Living team has been working with low-income and culturally and linguistically diverse (CALD) communities since 2004. Focusing on hard to reach and vulnerable communities, Environment Victoria has worked closely with these communities to develop and implement a range of projects such as GreenTown and Multicultural Leaders in Sustainability. In 2010, Environment Victoria won the Eureka Prize for the Advancement of Climate Change Knowledge. Environment Victoria is also a leading member of the One Million Homes Alliance, which has been advocating since 2009 for a comprehensive package of policy change and targeted investment to improve the home efficiency of Victoria's one million low-income households.[6]

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[2] ABS, 2012, *Household Energy Consumption Survey, Australia: Summary of Results*.
[3] Chester, L. 2013, "The impacts and consequences for low-income Australian households of rising energy prices", University of Sydney.
[4] Consumer Action Law Centre 2015, *Heat or Eat.*
[5] VCOSS, 2015, "Submission to Inquiry into Financial Hardship Programs of Energy Retailers".
[6] OMH 2015, *2025 Roadmap to Energy and Water Efficient Homes*, www.onemillionhomes.org.au

1.2 Future Powered Families and LIEEP

Environment Victoria received a grant of $1,803,200 through round 1 of LIEEP to deliver the Future Powered Families (FPF) project over three years. Taking into account $119,150 of in-kind contributions, the total value of the project was $1,922,350.

Environment Victoria was the lead agency for project delivery with support from consortium members Brimbank City Council, Hume City Council, The Smith Family, ecoMaster, Yarra City Council, Maribyrnong City Council, Latrobe City Council, Swinburne University, Hindmarsh Shire Council and Volunteering Western Victoria.

FPF was delivered as a behaviour-change focused, action research trial, designed to address key barriers facing new parents in implementing energy efficiency actions in their homes. Key barriers identified include constraints facing time-poor households with young children in adopting energy saving behaviours and reduced efficiency education resources in regional areas. New parents from CALD communities additionally encounter a lack of accessible energy efficient information.

1.2.1 Time poor households with young children

The introduction of a new baby to a family often brings with it a period of instability and adjustments to the household. This period is additionally associated with increased energy use resulting from more time spent at home and higher appliance use (such as washing machines, water and space heating etc).

New parents commonly do not have the time or the motivation to access energy efficiency information as learning parenting skills tends to dominate time and priorities. FPF intended to support these parents by delivering simple and quick energy efficiency messages and information in a context that is relevant to new parents. For example, maintaining heater temperatures between 18 and 20 degrees will ensure that the home is heated to a comfortable level, while the risk of Sudden Infant Death Syndrome is reduced by minimising exposure to thermal stress, and energy bills are reduced. FPF additionally intended to support new parents re-entering the workforce by providing training that would assist in the development of employment skills.

1.2.2 Reduced resources in regional areas

Households in rural and regional areas do not have access to the same breadth of energy efficiency programs available in metropolitan areas. Programs often have limited reach and resources to deliver programs in regional areas and hence meet the needs of these households.

1.2.3 Energy efficiency information accessibility

Energy efficiency information provided by government and other organisations for use by the general public is often designed in a way which makes it inaccessible to CALD communities (or households from non-English speaking backgrounds) and Indigenous households.

Information-heavy factsheets or complex language and technical terminology can be difficult to understand for people with low literacy levels or for whom English is not their first language. Many CALD households also have low literacy in their first language, meaning that even translated materials can remain inaccessible if not appropriately designed (eg. incorporating images and visual aids). Direct translation of information that is not culturally relevant or does not resonate with the reader's lived experience is also likely to have limited impact.

Mainstream information is also commonly available as online resources, which low-income households may find difficult to access if they do not have internet access or have low levels of computer literacy.

Cultural factors can also contribute to CALD and Indigenous households being reluctant to access mainstream services with which they are unfamiliar or do not have pre-existing trusted relationships. Unfortunately in the energy efficiency sector, these cultural barriers have been exacerbated by previous negative experiences where the households' low English proficiency or literacy has been exploited by unprofessional businesses.

As a consequence, low-income and other marginalised households are commonly unaware of programs or assistance for which they are eligible (such as rebates).

1.3 Future Powered Families objectives

Addressing the barriers identified above, the objectives of the FPF project were to:

- Support more than 5000 low-income households across Victoria to take up energy efficient behaviours and use less energy;
- Increase understanding of the barriers preventing low-income groups from adopting energy efficient behaviours and products;
- Identify cost effective interventions; which result in low-income families achieving maximum energy savings;
- Support parents entering and or re-entering the workforce by increasing home assessors' confidence and employability.

FPF employed three methodologies: Home energy assessor training, home energy assessments and energy saving workshop information sessions.

Workshops were designed to deliver practical energy saving information to groups of parents. Information was delivered in an interactive manner with behaviours specifically chosen for their probable frequency and the likelihood of householders having a specific item, for example a second refrigerator. Parents seeking to extend their knowledge, re-enter the workforce or engage other parents were trained as assessors to deliver home energy assessments. Home energy assessments enabled no or low cost actions tailored to each household to be implemented.

All participants created a personal 'My energy saving plan' to motivate and reinforce energy efficient choices. Retrofit products were provided to support all participants in their energy saving plans. FPF worked with organisations that interact with parents, recruiting areas where parents already meet (such as playgroups). The project provided information in a usable format, including in range of languages and via interpreters; interactive programs; and low or no cost ways to reduce energy use.

1.4 Program evolution and adaptation

1.4.1 Changes to FPF eligibility criteria

The first FPF proposal envisaged engagement with new parents, predominantly through Maternal and Child Health (MCH) nurses. As a result, new parents were defined as households with an oldest child who is three or younger.

Throughout the course of the program it was found that this demographic was difficult to reach. Nurses in low-income municipalities were difficult to engage in the program due to their high

workload and the large numbers of newborns and new parent groups they were supporting. The education programs delivered by MCH nurses to new parent groups were highly structured with a strong health focus, which given available time constraints, mitigated against adding additional energy efficiency information. The workshop structure was amended to one energy saving session tailored to the parents of newborns. However engagement continued to prove difficult. When seeking to go beyond the MCH centre network to recruit participants, the criteria became restrictive, which made recruitment more resource-intensive. For example, when delivering workshops in playgroups, three quarters of the participants were ineligible because they had an older child. This was a common occurrence and led to a large proportion of resources being inefficiently allocated to recruitment and delivery.

At the same time, parents who were interested in becoming energy assessors hesitated and became disengaged because their personal networks lacked parents of children three years or younger. Furthermore, parents of older children reported continued growth in energy costs as children become older, and hence expressed their need for energy saving measures in their homes. Following discussions with the funding body, this led to a change to the definition of new parents to households with an oldest child of fifteen years or younger.

Environment Victoria expanded the project to compare the two theories: that parents whose oldest child is three or younger need assistance because their energy use has increased, and that parents whose oldest child is fifteen or younger need assistance because their energy use is continuing to increase and they have more time to engage with energy saving than first time parents.

To participate in any aspect of the project (attend a workshop, become a home energy assessor or have a home assessment), the criteria was amended to participants who:

- Lived in Victoria;
- Had at least one child;
- The oldest child was 15 or younger;
- Had a combined household income of $1500/week ($78,000/year) or less;
- Did not live in public housing (housing run by the Department of Human Services).

1.4.2 Changes to employment support

FPF sought to accredit the assessor training to enable permanent employment in the home assessment industry after the project. However it became evident upon commencing the project that few opportunities were available for FPF home energy assessors.

Two opportunities are currently available which did not fit the training provided. Home energy assessments are a professionalised service requiring assessors to have engineering or building industry experience. As FPF is open to all participants regardless of their education and employment history, the home energy training provided by FPF does not meet the Energy Efficiency Council standards and hence participants are ineligible for professional accreditation. The second option is low skilled positions as non-electrical VEET installers. Employees do not need to have energy audit, building or engineering experience and hence do not need to attend FPF training to secure this position.

Consequently, rather than focusing on the attainment of a specific qualification, FPF emphasised the development of transferable skills to improve the employability of participants. These included communication skills, networking, relationship-building, completion of paperwork and the ability to follow procedures.

1.4.3 Changes to Indigenous engagement

FPF initially identified that Indigenous communities faced cultural and other barriers that made them reluctant to access mainstream energy efficiency services. The intention was to spend year one building relationships with the Indigenous community in order to work with them in year two. FPF attempted to connect with Indigenous groups through the Indigenous Liaison Officer at Yarra City Council, Koori Kids and Dads project and by regularly attending the Yarra Aboriginal Support Network meetings. FPF also delivered an energy saving workshop for Shepparton's Indigenous community.

However, it became clear that success would depend on the development of strong and trusted relationships through partnerships with Indigenous communities over a longer period of time. For Environment Victoria to develop the respectful relationships necessary to deliver the FPF project successfully would require greater investment of time and resources than the project had available. Consequently, a decision was made to re-focus the FPF project to working with CALD communities, an area in which Environment Victoria had greater experience and relevant skills.

1.5 FPF and innovation

Home energy assessments are a widely recognised tool for obtaining an individualised understanding of household energy use. Despite their potential for improving home energy efficiency and cutting bills, the use of home energy assessments in low-income households and CALD communities has been limited.

Home energy assessments can be conducted by industry-accredited professionals. However, professional energy audits can be prohibitively expensive and provide information in an excessively technical format. Furthermore, a households' lack of familiarity with the energy assessor and cultural differences can inhibit the willingness of CALD households to access home assessments.

Community organisations such as Kildonan do offer energy audits free of charge. Kildonan trains community workers who have an in-depth understanding of CALD communities, and hence Kildonan energy and financial advisors are able to bridge cultural divides. However access to this service is primarily through referral, with householders needing first to be identified as at risk or receiving assistance for financial and energy hardship in order to receive the energy audit.

The Positive Charge model works to provide a bridge between community organisations, local government and industry. Taking a 'kitchen table' approach, consultants provide an action orientated approach to energy assessments on a fee for service basis. All householders residing in Positive Charge member councils are eligible to partake in this service. However individuals must self-select. Low-income and CALD households are unlikely to self-select due to upfront cost hurdles and perceived lack of usefulness.

Householders can also individually complete a home energy assessment with the use of online toolkits. However, many low-income and CALD households have difficulty accessing online tools because of low English proficiency, the use of complex terminology, low computer literacy, and/or lack of access to a computer.

Home assessments conducted by peers represent a change in the energy assessment approach that enables the cultural barriers and lack of trust within communities to be bridged. Information delivered in an informal environment enables householders to be engaged with the material through the reflection of their own behaviours and consequently be assimilated into their individual

households. This firsthand understanding of the life circumstances of householders by the FPF assessors is an essential and unique element of FPF. Peer assessors are able to communicate in their language, transcending language issues. Furthermore, peer educators also have greater connections within communities, are able to hold and develop trust within their communities, and connect to householders who are not engaged in traditional community programs.

No two home assessments are the same, hence this ability to work through barriers with peers enables information to be transferred and creates a sense of social cohesion. The peer-to-peer learning model enables community empowered members to share their knowledge in a safe, supportive and culturally relevant manner. Peer learning acknowledges community members as vital ambassadors and their inherent knowledge of household practices.

Peer learning is not a new approach and it has been widely applied, in particular in the health and education sectors. These approaches have been limited in geography, ie. peer learning located in a specific community or education institution. FPF utilises peer learnings to not only empower community members to make decisions about energy use, but also to become leaders in their community.

2 Project design

2.1 Project objectives and targets:

- Support more than 5,000 low-income households across Victoria to take up energy efficient behaviours and use less energy;
- Increase understanding of the barriers preventing low-income groups from adopting energy efficiency behaviours and products;
- Identify cost effective interventions which result in low-income families achieving maximum energy savings;
- Support parents entering and or re-entering the workforce by increasing home assessors' confidence and employability.

2.2 Methodology

FPF worked with low-income families throughout metropolitan Melbourne and Central Victoria.

FPF utilised three approaches to deliver the project: energy saving workshops, home energy assessor training, and home energy assessments. In all approaches, FPF focused on low or no cost, high gain and low effort energy-saving behaviours, with monetary savings continually emphasised as a motivator for adoption and implementation of selected energy saving behaviours.

2.2.1 Energy saving workshops

Energy saving workshops were designed to enable information to be disseminated to large groups of participants who would not otherwise be likely to seek out that information for themselves. Workshops explained where the largest proportion of energy is used in the home, focusing on simple behaviour changes householders could make to reduce their energy usage and save money. In most cases, workshops were delivered to existing groups that contained a high proportion of parents that met the eligibility criteria, for example parent support groups, young mum's groups and English language classes. Workshops were designed to run for one or two hours, although durations were adjusted according to group program structures.

A game was played with a set of cards, each with a behaviour related to energy use, for example setting your heater too high, having long showers, and not turning appliances off at the wall. For each item shown, the money saving associated with changing that behaviour was discussed. Behaviours with greater likelihood of achieving energy savings with minimal cost and effort were emphasised to demonstrate the ease of behaviour change. Each participant received an energy saving plan[7] for their own home. Participants developed individual energy saving plans in workshops if time permitted. In the first year of the project, participants received draught seal tape, a thermometer with recommended heating and cooling temperatures on it and a shower timer. For the rest of the project participants received a thermometer, a shower timer and energy saving reminder stickers.

[7] Participants were provided with a list of energy saving behaviours. Each participant was asked to identify existing behaviours. Participants then selected three new energy saving behaviours to implement in their home.

2.2.2 Home energy assessor training

Parents were trained in conducting basic home energy assessments and the creation of energy saving plans. The training built upon learnings and materials from workshops, expanding it to include simple and low cost home alterations such as draught sealing, effective window coverings, window shading, and winter and summer heating and cooling energy tips. Childcare, interpreters and catering was provided in all training sessions. Trainings were conducted in either one full day or two, four hour sessions and located in venues in close proximity to trainees.

The training covered the following:

- Setting up home assessments
- Occupational health and safety
- Home visit communication techniques
- Working through a home, room by room
- Using the Energy Assessment forms
- The physical structure – recommendations and suggestions
- Behaviours and habits – recommendations and suggestions
- Identifying opportunities and barriers
- Connecting householders to further information and large retrofit opportunities
- Energy bills

2.2.3 Home energy assessments

The trained assessors then visited other parents' houses (friends, family or other community members) to conduct home energy assessments. Home energy assessments provided tailored and in-depth information delivered in participants' homes, helping them understand their energy use, visualise home improvements and create personalised energy saving plans.

The assessors recruited households for assessments through their existing social networks or through word of mouth from these networks. Each home assessment was expected to take approximately 45 minutes to an hour.

All home assessments received a retrofit kit of simple sustainability products. In the first year of the project this was a draught snake, shower timer, draught seal tape, thermometer and their choice of, a standby power controller, a water saving showerhead, a HeaterMate or a draught seal kit consisting of a draught seal for the bottom of a door, gap filler and a gap filler gun[8]. For the rest of the project participants were given a draught snake, shower timer, stickers, thermometer and their choice of a Heatermate, standby power controller or two rolls of draught seal tape. Participants were given a choice of products based on the assumption that products which were deliberately chosen were more likely to be used. Assessors were paid an honorarium of $50 for each eligible home they assessed.

[8] Stickers contained messages to remind participants about energy saving behaviours to reinforce action. Standby power controllers automatically turn appliances off at the power switch. Heatermate is a thermostat which can be retrofitted to heaters.

2.3 Data Collection

Data were collected through a number of mechanisms, as outlined below. Survey data and electricity consumption data were submitted to CSIRO to enable analysis of all LIEEP programs.

2.3.1 Household energy use surveys

All participants were surveyed on their energy use behaviours and household characteristics pre-intervention (baseline) and post-intervention (follow up). Baseline surveys were filled in on paper by the participant, or done verbally in the presence of the interviewer. Follow up surveys were filled out by the participant at home, either in hard copy or online, with a very small number done over the phone with an interviewer. Control group participants were offered a $25 gift voucher for the completion of each of the baseline and follow up surveys. All other groups received no financial incentive for baseline surveys, but were either entered into a prize draw or offered a $25 gift voucher if they returned the follow up survey.

The accuracy of quantitative survey data may have been constrained somewhat due to a range of self-reporting biases:

- participants who completed surveys (whether verbally or in written form) in the presence of another may give answers they perceive to be socially acceptable;
- participants may underestimate and/or overestimate their energy use due to errors in memory and/or measurement;
- some workshop participants were surveyed as a group due to time restraints and language difficulties. Group data collection may attract a consistency bias, where the previous answer/s may influence subsequent responses.

In acknowledgement of the limitations of survey responses, electricity consumption data was also collected from all participants. Consistent with the funding agreement and the Data Collection and Reporting Plan, consent from households is required for the collection of electricity consumption data. Consent forms were distributed to all participants with the baseline surveys. Completed consent forms with valid National Meter Identification (NMI) numbers were then sent to relevant electricity retailers to allow them to supply consumption data. The collection of electricity consumption data was limited to households which had a smart meter and householders who had not moved residence. Some difficulties were encountered with obtaining consent from householders throughout the project and these are discussed in greater detail later in the report (see section 5.3.5 Collection of National Meter Identification Numbers).

2.3.2 Qualitative data

Qualitative data was also collected using three methods:

- Most significant change case studies;
- Survey feedback;
- Focus groups.

The open ended Most Significant Change methodology was carried out with home assessors to evaluate the project. Assessors with a good grasp of English, good communication skills and who had completed more than eight home energy assessments were selected for the most significant change interviews.

To explore the co-benefits of FPF, the most significant change (MSC) approach was chosen to provide an outcomes and impact orientated evaluation. The main focus of MSC is on program evaluation and improvement. The MSC benefits include[9]:

- Identification of unanticipated changes;
- Ease of communication across cultures.
- Opportunity to explore why one change is more important than another;
- Provides rich picture of what is happening and an understanding of complex relationships;
- Focus on learning and project development/improvement.

Home assessment recipients and workshop participants were given the opportunity to provide feedback on their surveys, so as to identify other issues not covered by the survey questions and capture qualitative data on participants' experiences.

The project also conducted focus groups involving assessors, so as to collect detailed feedback from these key participants. Focus groups are useful in gathering large amounts of data across a broad range of areas in a short timeframe. However it is important to note that focus group participants were self-selected. Dominant personalities may also dominate discussion, masking other individual viewpoints

2.3.3 Follow up data

In order to analyse the effectiveness of the program, participants were asked to complete a follow up survey six to twelve months after participation. Follow up surveys were conducted via a hard-copy form posted to participants, an online survey emailed to participants, or over the phone. Entry to a prize draw or a $25 gift voucher was offered to participants to encourage participants to complete the follow up survey.

*Table 1 Minimum quantity of follow up survey responses required **

<table>
<tr><th>Period</th><th colspan="5">Treatment</th></tr>
<tr><th></th><th>Control</th><th>Workshops</th><th>Advisers</th><th>Households child 0-3</th><th>Households child 4-15</th></tr>
<tr><td>Y1</td><td rowspan="3">95 out of 126</td><td>35 out of 200</td><td>26 out of 70</td><td colspan="2">67 out of 550</td></tr>
<tr><td>Y2</td><td rowspan="2">88 out of 1001</td><td rowspan="2">74 out of 327</td><td rowspan="2">87 out of 914</td><td rowspan="2">93 out of 2380</td></tr>
<tr><td>Y3</td></tr>
</table>

*Minimum percentage to give 95% +/-10% confidence interval calculated. Sample size calculator http://www.nss.gov.au/nss/home.nsf/pages/Sample+size+calculator

Long term results were collected from all year one participants in year three of the project. As longitudinal analysis of energy use behaviour was not a stated objective of the project, it was

[9] Davies, R. and Dart, J. 2005, *The Most Significant Change (MSC) Technique: A guide to its use*, Rick Davies and Jess Dart, Trumpington, Cambridge, United Kingdom, and Hastings, Victoria, Australia.

determined that a target of 61 completed surveys would provide an adequate indication of energy use change, while ensuring the survey collection process remained within budget.

2.4 Participant recruitment and retention

FPF worked closely with councils and various service providers with established connections to low-income communities, to recruit participants for the workshops and assessor training. Councils and service providers were chosen due to their community demographic, Socio-Economic Indexes for Areas scores and the programs they delivered. FPF engaged with selected personnel within each organisation: early childhood centres educators, playgroup educators, nurses within MCH centres, teachers within adult English classes, bi-cultural workers, case workers, community development officers and children services within councils and community centres such as neighbourhood houses. FPF regularly attended network meetings such as the Migrant Resource Centre North-West network to promote both workshops and energy assessor training.

Workshops were recruited through partnerships, networking and approaching children service organisations, primary school hubs, playgroups, mother's groups, English classes and conversation groups. Similarly, home energy advisers were recruited through workshops and social organisations such as Adult Multicultural Education Services, the Smith Family and New Hope foundation. Flyers were distributed to community centres, digital and paper newsletters, volunteer agencies, MCH centres, child care centres, schools, libraries and employment agencies. Home energy adviser trainings were also advertised on Facebook pages of groups and organisations.

Where possible, control groups were recruited through similar workshop recruitment networks. Playgroups and early children's centres were singled out as control groups, hence any further involvement contact with the project was limited. Where recruitment through workshop networks were not possible, control groups were also recruited through posters at child care centres, libraries and toy libraries, announcements in newsletters and councils and outsourcing control group recruitment. Control group members were matched to demographic profile of participants.

Assessors self-selected to participate in the home assessment training. As longs as assessors complied with the project eligibility criteria, ie. that their oldest child was 15 or younger and they were a low-income household, they were not required to meet additional criteria in order to undertake the training. FPF program design initially envisaged using training materials from ecoMaster. However it quickly became apparent that participants' existing knowledge was limited and they were more in need of simple advice (e.g. "avoid heating empty rooms") than detailed technical information.

Retention strategies were employed only for the assessor group, as they were the only group for which sustained contact with the project was required. FPF staff called assessors regularly to check on home assessment progress, met with them individually when progress wasn't evident, acted to address concerns or problems arising and created opportunities for group learning, feedback and motivation.

3 Results

FPF was delivered to 6,133 participants across metropolitan Melbourne and regional Victoria. FPF exceeded its recruitment targets for all energy interventions.

Table 2 Participants engaged

	Control	Workshops	Trained assessors	Home energy assessments
Target	95	1200	240	3550
Total	186	1233	392	4322

FPF worked with many municipalities: Geelong City Council, City of Greater Dandenong, City of Melton, Wyndham City Council, Frankston City Council, Brimbank City Council, Hume City Council, City of Darebin, City of Casey, Maribyrnong City Council, City of Yarra, City of Kingston, Mornington Peninsula Shire, City of Whittlesea, Hindmarsh Shire Council, Mt Alexander Shire Council, Latrobe City Council, City of Greater Bendigo, City of Ballarat and Hobson's Bay City Council.

3.1 Retention of assessors

The project initially limited assessors to the completion of 16 home assessments. However, upon feedback from assessors, this assessment limit was increased to 30. By the end of the project, an average of 10.7 home assessments had been completed by each assessor.

Table 3 Percentage of home assessments completed

Number of Home Assessments+	Percentage Completed
0	18.9%
Up to 8 home assessments	33.6%
Between 8 and 16 home assessments	26.9%
Greater than 16 home assessments	20.7%

+ includes ineligible home assessments

3.2 Electricity data analysis

Electricity data from the homes of 86 assessors and 104 assessment households was collected from energy retailers. Insufficient electricity data was collected from workshop participants to complete the data analysis. Data was collected on daily intervals for a mean period of 564 days. A total of 114,653 sample observations were collected.

A balanced panel model was employed to compare assessor and householder interventions with control participants. Accounting for the correlation between weather and power usage, and delayed observed energy changes with behaviour change, the Least Squares method was used to estimate the model (see Appendix B: Balanced panel model). The model significantly accounted for 51.8% of variance; this degree of variance is more than adequate for social research data[10].

Home assessments were the only intervention to show significant decreases in their average energy consumption (B = -.161, SE = .041, t = -3.919, p <.001). Assessors did not significantly decrease their energy consumption (B = .061, SE = .049, t = 1.258, p = .208). In contrast, control groups significantly increased their energy consumption (B = 2.543, SE = .144, t = 17.633, p <.001).

Table 4 Average energy Consumption (Kwh) for assessor training and home assessments

10 Tabachnick, B. G., & Fidell, L. S. 2007, Using multivariate statistics. Boston: Pearson/Allyn & Bacon.

	Assessor Training	Household Assessment	Control
Total avg.	**7.384**	**9.450**	**11.692**
Pre- intervention	8.1032	9.523	11.165
Post- intervention	7.102	9.187	11.871
Percentage Difference	-12.36	-3.53**	+6.32**

Note: ** denotes a significant difference in the full analysis at p <.001

Households with an oldest child aged between zero and three years and householders with an oldest child between four and fifteen years saw a decrease in energy consumption. Energy use of households with younger children was greater than households with older children at both baseline and follow up.

Table 5 Energy consumption of householders with child of 0-3 or 4-15 years

Oldest child age (years)	Household Assessment (Kwh)		
	Baseline	**Follow up**	**Percentage Change**
0-3	10.971	9.788	-10.78%
4-15	9.617	9.194	-4.40%
OTHER	5.962	4.006	-32.81%

Note: Valid demographic data unavailable for 33.3% of households

3.3 Follow up surveys

With the exception of all year one participants and workshop participants, target numbers of follow up surveys required to achieve a 95% confidence level with a variance of 10%, were met. Given the relatively small number of participants in year one and the increased responses from year two and three participants, this is expected to have minimal impact

Environment Victoria was unable to reach year one targets due to issues with the new parent definition, see section 1.4.1 Changes to FPF eligibility criteria. Furthermore, the incomplete collection of year one baseline surveys was primarily due to collection methods and inefficient monitoring of survey data collected. Observing these issues, survey data collection was closely monitored in year two and three, resulting in sufficient collection of surveys. Workshop surveys continued to present issues. FPF staff trialed a range of approaches with varying effectiveness. These include provided translated surveys, delivering the survey to facilitators to enable completion prior to workshops, and completion of surveys in group settings (for further details see Section 6.4 Surveys).

Table 6 Follow up responses collected: A

Period/Treatment	Control		Workshops		Assessors	
	Target	Collected	Target	Collected	Target	Collected
Year 1	95 out of 126	94 out of 126	35 out of 200	7 out of 54	26 out of 70	5 out of 22
Year 2 Year 3			88 out of 1001	116 out of 726	74 out of 327	102 out of 392

Table 7 Follow up responses collected: B

Period/Treatment	Households		Households child 0-3		Households child 4-15	
	Target	Collected	Target	Collected	Target	Collected
Year 1	67 out of 550	37 out of 211				
Year 2 Year 3			87 out of 914	88 out of 914	93 out of 2380	141 out of 2380

3.4 Energy saving behaviours

Participants completed surveys at initial contact (baseline) or six to twelve months after engagement (follow up). Participants who did not answer any questions, or answered some but not all questions were removed from the analysis. As a result, although a large number of surveys were collected from participants, the removal of these participants may have affected conclusions. This was especially pertinent to control participants. The reduced numbers of control participant follow ups reduced the capacity to draw robust conclusions for the control group.

3.4.1 Changes to household size

With the exception of control participants, there was a general increase in the average number of people in each household between baseline and follow up surveys. This data should be interpreted with caution as not all participants across interventions responded to this question.

Table 8 Changes to household size

Intervention	Baseline	Follow Up
Control	4.1	3.3
Workshops	3.4	3.6
Assessors	3.7	4.2
Households	3.9	4.4

3.4.2 Heating and cooling

Turning off the heater overnight

With the exception of the control group, all interventions increased the rate of turning off the heater overnight. This reduction was coupled with the increase in turning off the heater for between one and three days. The increases of non-applicable responses suggest an increased rate of participants with no heaters.

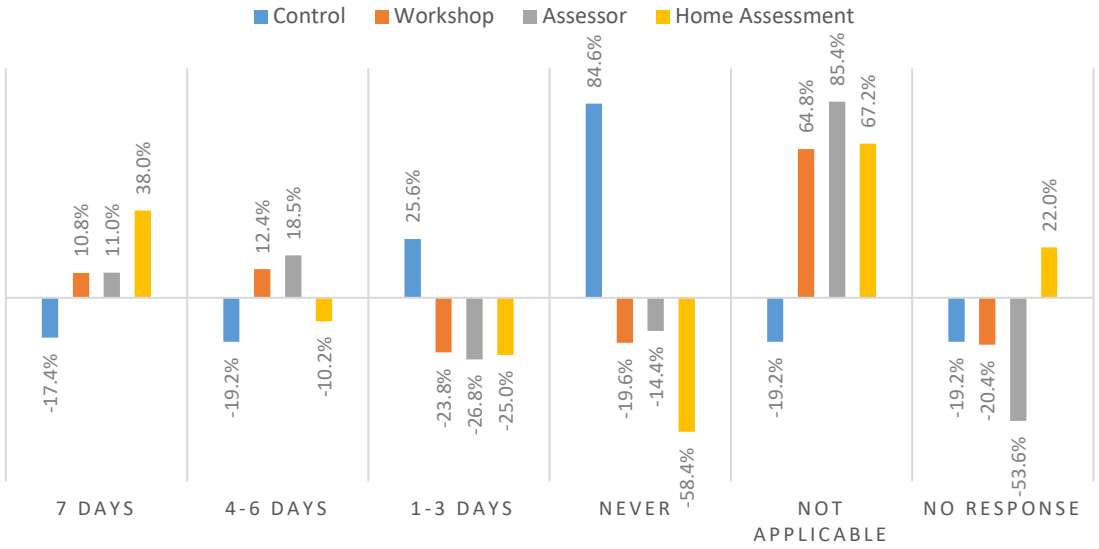

Figure 1 Percentage change of turning off heaters overnight

Temperature of heater

FPF recommended that heater thermostats be set at eighteen to twenty degrees. With the exception of control paticants, all interventions reduced the frequency of heater thermostats being set at temperature ranges of 26 degrees or more. Assessors demonstrated the greatest degree of change, reducing the frequency of higher temperatures and increasing the frequency of temperatures of 19 degrees or less. Home assessment recipients followed a similar trend. Control participants reported the greatest increase in heaters being set to 26 degrees or higher. However, control participants responses may be distorted as there was a significant increase in follow up responses.

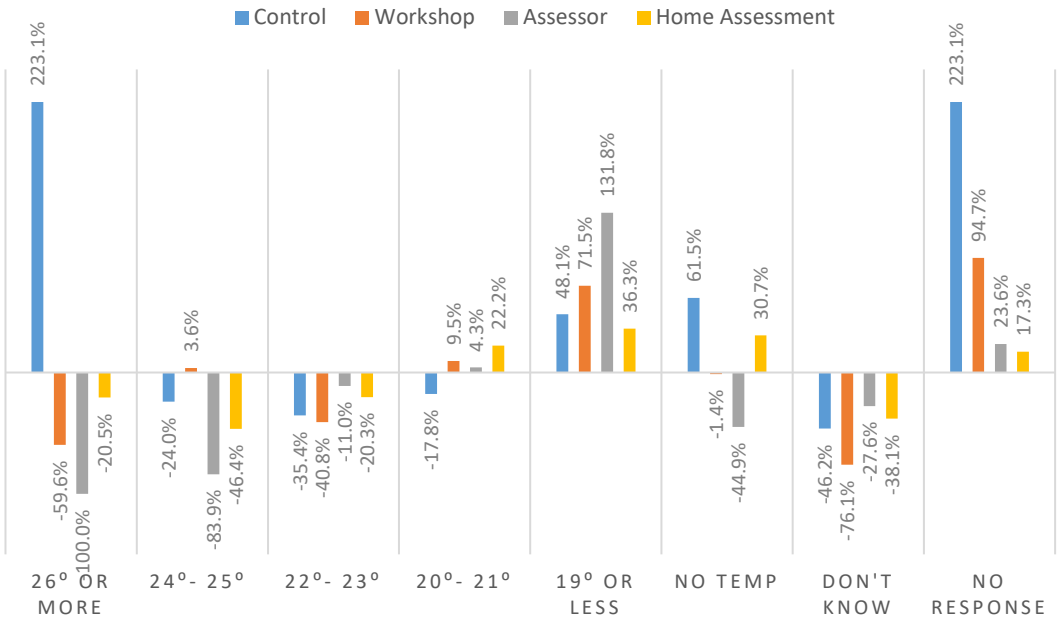

Figure 2 Change of heater temperatures

Rooms heated in winter

Across all interventions, results showed small changes to the number of rooms heated. Assessors reported increased heating of living rooms but reduced bathroom and kitchen heating. Home assessment recipients reduced the heating of other rooms, but increased bathroom and bedroom heating. Workshop participants reduced bedroom and bathroom heating. A reduction in the heating of all rooms is reported by workshop and home assessment participants. However, insufficient follow up responses were collected from control participants to provide a percentage change for this measure.

Table 9 Change in rooms heated in winter

Rooms heated	Workshop	Assessors	Home assessments
Bedroom	-23.1%	0.8%	10.3%
Bathroom	-6.1%	-15.0%	42.7%
Kitchen	6.9%	-20.7%	0.0%
Dining room (where you eat meals)	9.1%	-30.9%	-0.7%
Living room/lounge room (where you relax, watch TV or read a book)	15.7%	18.8%	6.9%
Other rooms	-7.8%	-55.8%	-83.2%
All the rooms in the house are heated	-9.8%	-1.8%	-38.9%
None of the house is heated	156.2%	-1.8%	73.2%

Heating when no one is in the room

A reduction in the frequency of heating unoccupied rooms was reported by workshop, assessor and home assessment participants. The greatest reductions in 'always heating empty rooms' was

achieved by home assessment recipients, followed by assessors and workshops. These reductions were coupled with an increased frequency in 'never heating when rooms are unoccupied'. However it is important to note that there was an increase in the number of assessors reporting the room heating question to be 'not applicable'. This suggests that baseline percentages were possibly underestimated as assessors may have been unaware of their heating appliances. This is in comparison with control participants who increased the frequency of 'always heating unoccupied rooms'.

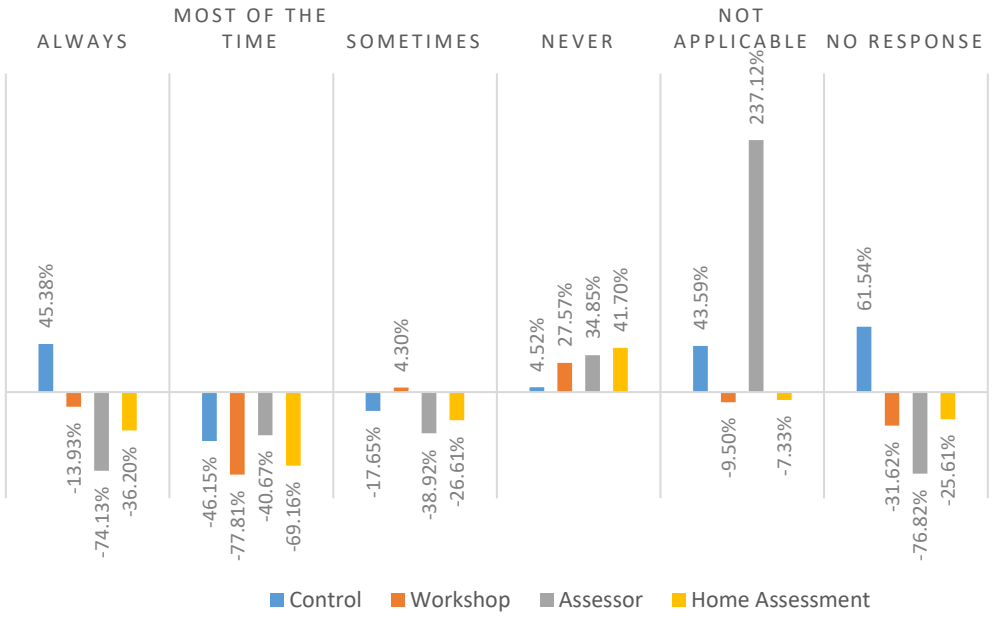

Figure 3 Changes to heating empty rooms

Does your heating system allow you to heat some rooms and not others?

There were insufficent responses to support analysis of these results. Across all intervention groups, 80 to 90 percent of participants did not respond (see Appendix C: Reported energy behaviours).

Air conditioner or cooler temperature

It was recommended that thermostats for cooling appliances be set to temperature ranges of 25 to 27 degrees. Both assessors and home assessment recipients reported reduced rates of thermostats being set at 28 degrees or higher, while the frequency of temperature settings of between 24 and 25 degrees increased. Conversely, control and workshop participants reported lower frequencies of setting temperatures in this range. Response rates from control and workshop participants were low and hence results for these groups must be interpreted with caution.

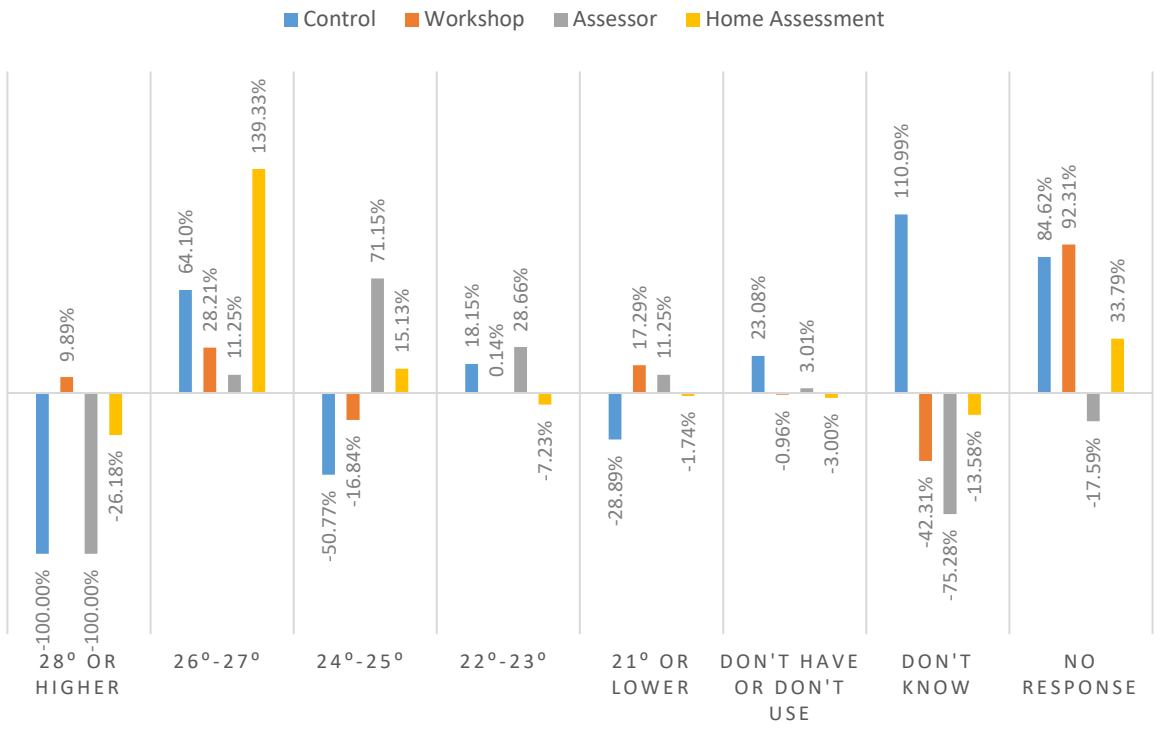

Figure 4 Change of cooling temperatures

How often does this include cooling rooms with no-one in them at the time?

There were insufficient survey responses to this question.

Number of rooms cooled

FPF materials provided to all participants recommended prioritising the use of fans over cooling systems (eg. air conditioners and evaporative coolers). It was also suggested that where possible, zoning for cooling systems be used so as to reduce the volume of space to be cooled. Year one workshop participants did not respond to this question, insufficient workshop responses were collected to enable strong conclusions.

Assessors and home assessment recipients reported a decreased frequency of 'cooling of all rooms' and 'not cooling the house'. Bathroom cooling decreased across all interventions. Control group participants reported the greatest change, although this may be due participants' prior knowledge to and thus questions may have prompted participants on their cooling habits. The high rates of reduced bathroom cooling in control participants may have been affected by small sample size and hence may not be reliable.

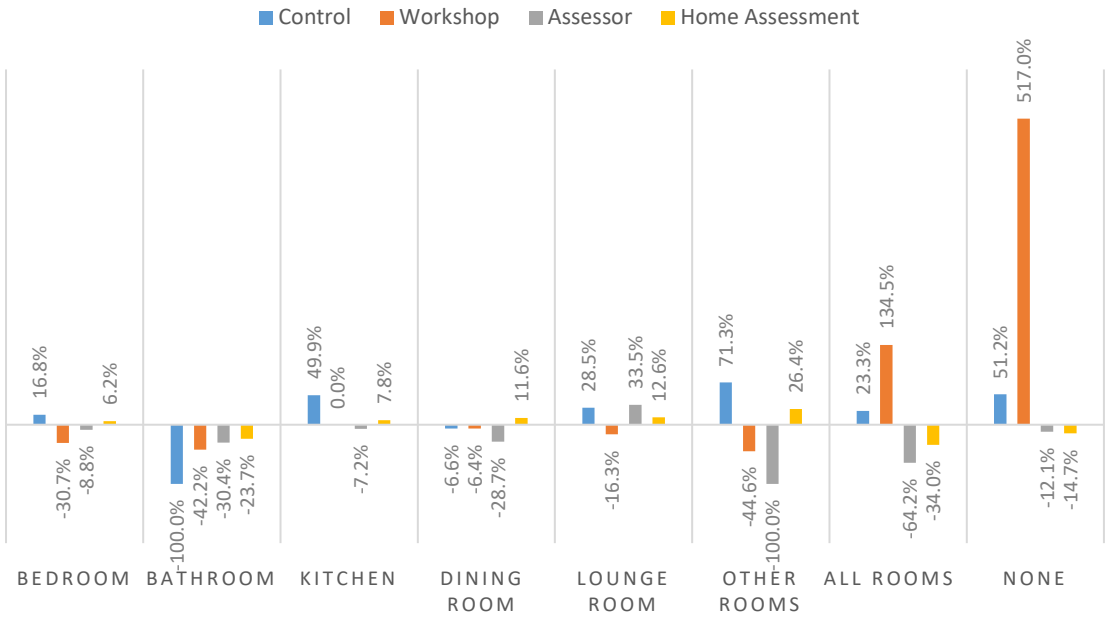

Figure 5 Change to rooms cooled

3.4.3 Appliances

Turning off appliances at the power point

All intervention groups reported increased rates of 'turning off appliances at the power point', coupled with a reduction in the rate of 'never turning off appliances'. Results for workshop participants may have been affected by high rates of non-response to this question and hence small sample size. Assessors reported the greatest reduction in the frequency of 'never turning off appliances', which correlated with an increase in the frequency of 'turning off appliances'.

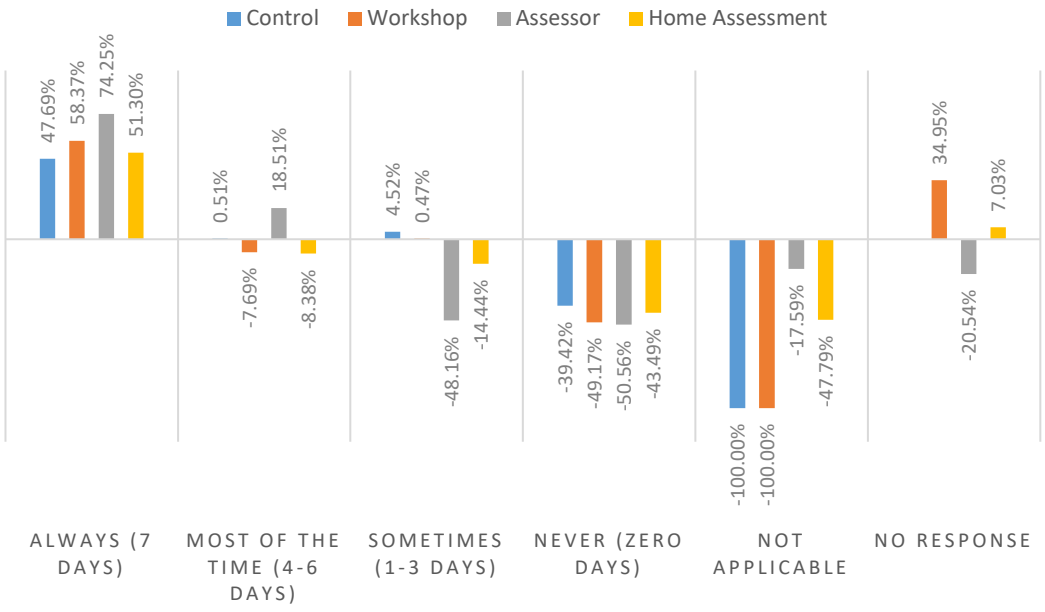

Figure 6 Change of turning appliances off at the power point

Use of standby controllers

All intervention groups reported an increase in the use of standby power controllers. This result was particularly noteworthy for control and workshop participants, as they did not receive standby controllers in their FPF retrofit kits. This suggests that either these households received standby controllers from other sources (such as through VEET installations), or that the survey acted as a prompt to use products they already had in their homes.

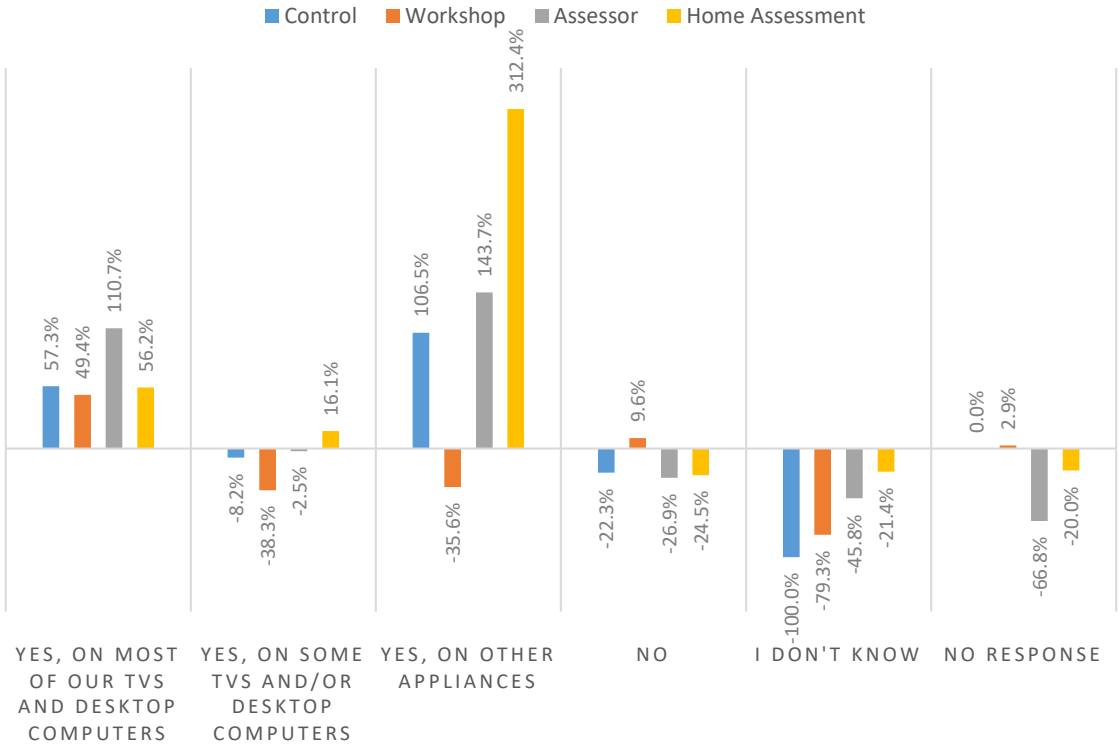

Figure 7 Percentage change in use of standby controllers

Refrigerators and freezers

Minimal changes to use of combined fridge and freezers were reported across all interventions. Workshop participants reported decreased use of separate fridges while the usage of other refrigeration appliances rose amongst control, workshop and assessor participants. Possession of mini bars increased across control, workshop and home assessment groups.

Table 10 Change in number of refrigerators

Intervention	Combined fridge/freezer	Separate fridge	Separate freezer	Other (e.g. mini bar, beer cooler)
Control	-5.31%	-4.66%	7.26%	83.87%
Workshop	-5.51%	-34.10%	36.40%	164.45%
Assessor	0.03%	-3.46%	13.88%	-62.67%
Home assessment	-2.92%	11.80%	-8.11%	133.36%

3.4.4 Laundry

Washing machine water temperature

To reduce the cost of water heating, it was recommended that where possible, washing machines be set to the cold cycle. With the exception of control group participants, use of cold water increased across interventions, with the use of warm water decreasing. The low response rate by control group members and home assessment recipients may have amplified the reported changes in the use of warm water by this group.

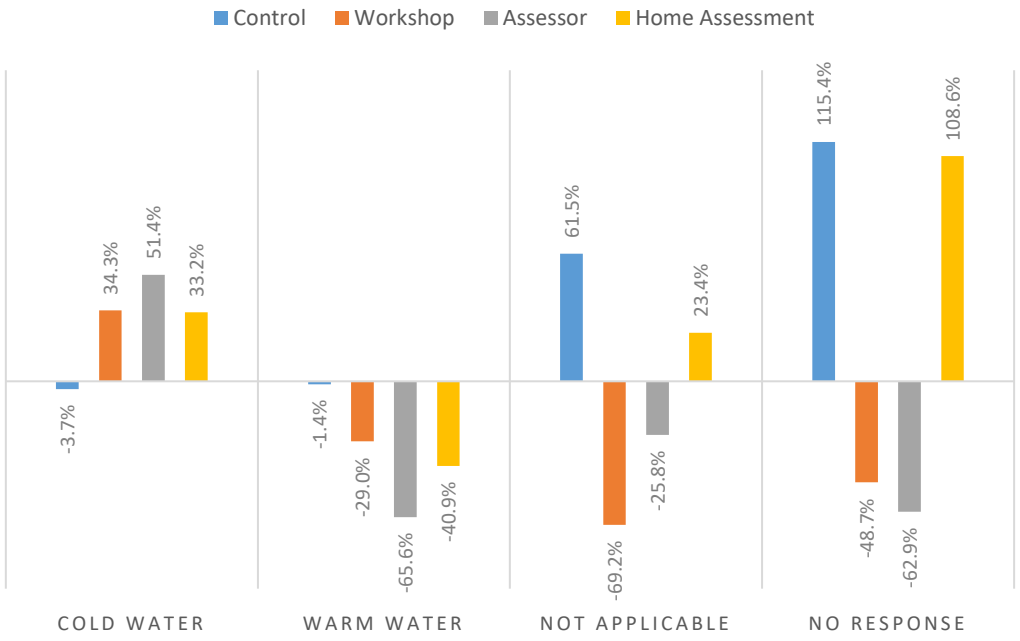

Figure 8 Change in laundry water temperature

Tumble dryer usage

Between 60 to 70 percent of workshop, assessor and home assessment participants did not have a tumble dryer. Rates of tumble dryer did not change through the project period. The small number of participants who did have a dryer reported a decrease in the 'use of dryer of seven or more times a week' in both summer and winter. Workshop participants reported a 56 percent increase in 'use of dryer one to three times a week', which aligned with results from control participants (see Appendix C: Reported energy behaviours).

3.4.5 Bathroom

Shower times

Shower durations reduced across all interventions. The frequency of 'showers of more than 15 minutes' duration reduced, while the frequency of 'showers of 4 minutes or less' increased. The greatest increase in the frequency of 'showers of 4 minutes or less' was achieved by home assessment recipients, followed by assessors. However high non-response rates of assessors may have masked the true responses.

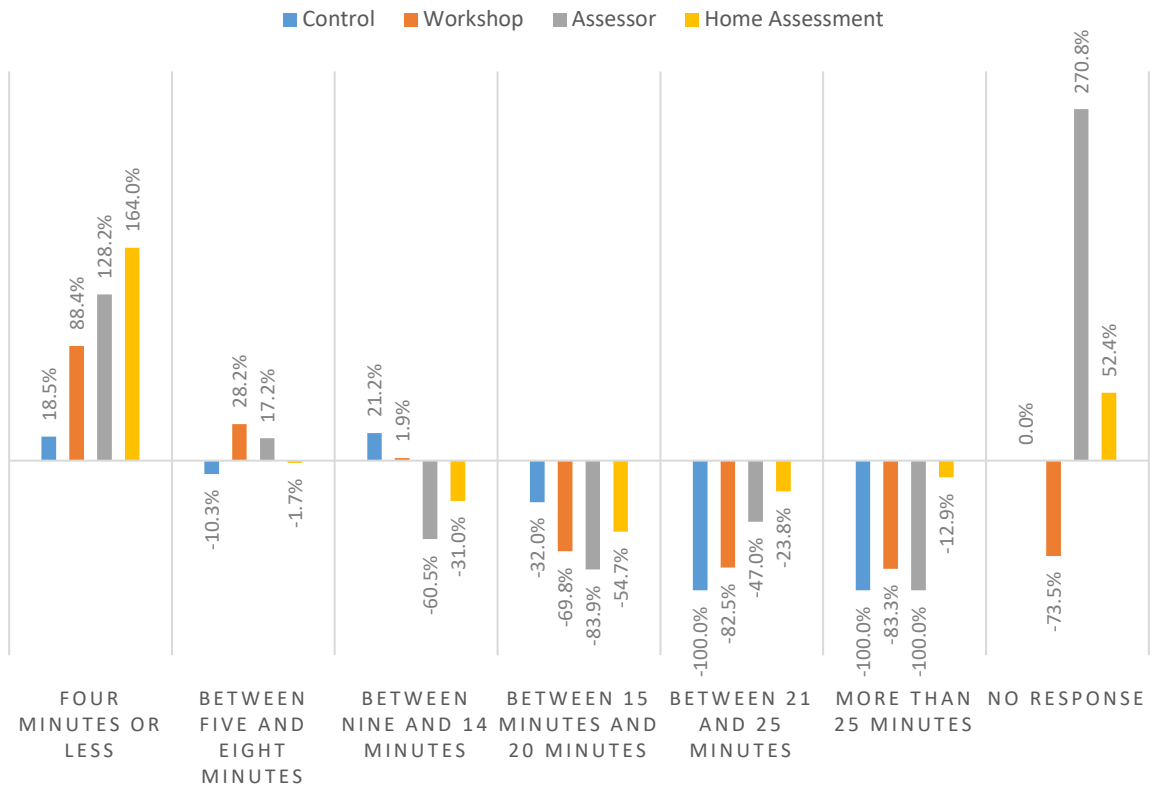

Figure 9 Change in shower times

Water saving showerheads

Participants all reported increased confidence in being able to identify low-flow showerheads, with the rates of 'I don't know' responses falling by between 23 percent for the home assessment group and 50 percent for the assessor group. All groups except the control group reported reduced incidences of non-water-saving showerheads.

Table 11 Change in frequency of shower heads

	Shower head type		
	Water saving	**Non-water saving**	**I don't know**
Control	-0.8%	16.9%	-29.9%
Workshop	23.0%	-9.5%	-49.4%
Assessor	40.2%	-28.7%	-49.7%
Home assessment	15.4%	-13.6%	-22.7%

3.4.6 Voluntary household modifications

FPF collected information from households about the extent to which they had voluntarily undertaken modifications to their home to improve energy efficiency, either prior to or during the project. Household characteristics analysed included: possession of solar panels, purchase of GreenPower, installation of insulation, purchase of energy efficient white goods, purchase of energy efficient heaters or coolers, possession of awnings or external window shading, draught-proofing and the installation of heavy curtains and internal blinds.

Some questions were removed from the survey as the project progressed, in an effort to reduce survey length in response to participant feedback.

There was insufficient data collected from participants on which to base valid conclusions about these measures, as a consequence of many participants failing to respond to these questions. When participants did respond, the majority reported no installations or purchases (See Appendix C: Energy Behaviours).

3.5 Households with young children

Households with children between zero and three years had an average of 3.4 people living in their households, while households with children aged four to fifteen had an average of 4.2 people.

Minor differences were observed between these two groups. Households with older children reported higher frequency of 'always turning off heaters overnight', but also higher frequency of 'heating unoccupied rooms'. Conversely, households with younger children reported higher percentages of high heater temperatures and number of rooms heated. There were small differences in cooling between both parties (see Appendix D: Householders energy use behaviours: age of oldest child comparison).

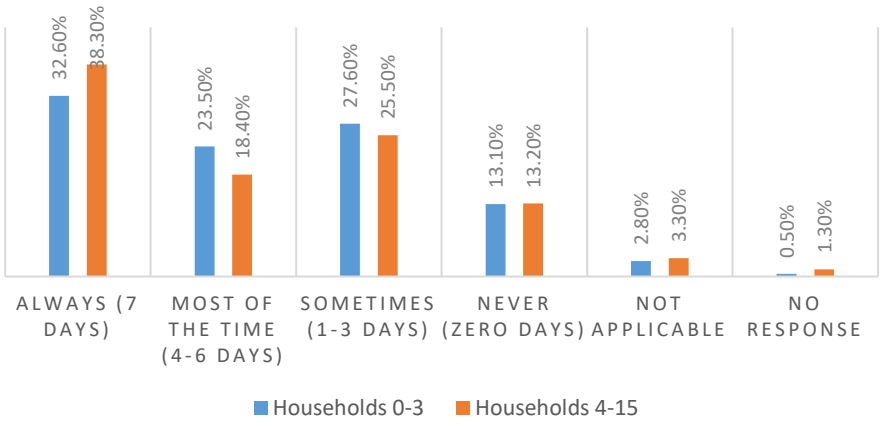

Figure 10 Turning off heater overnight frequencies

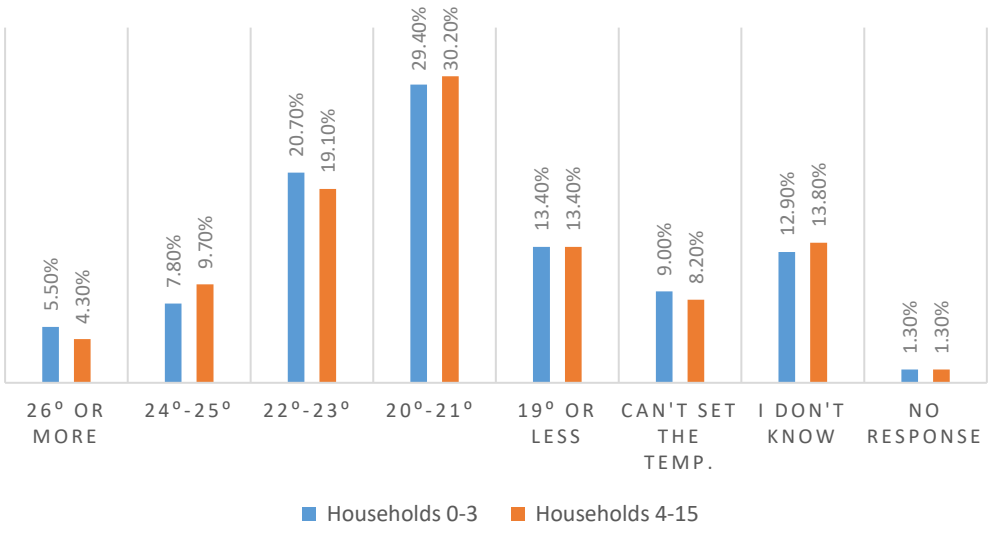

Figure 11 Frequency of temperature of heater

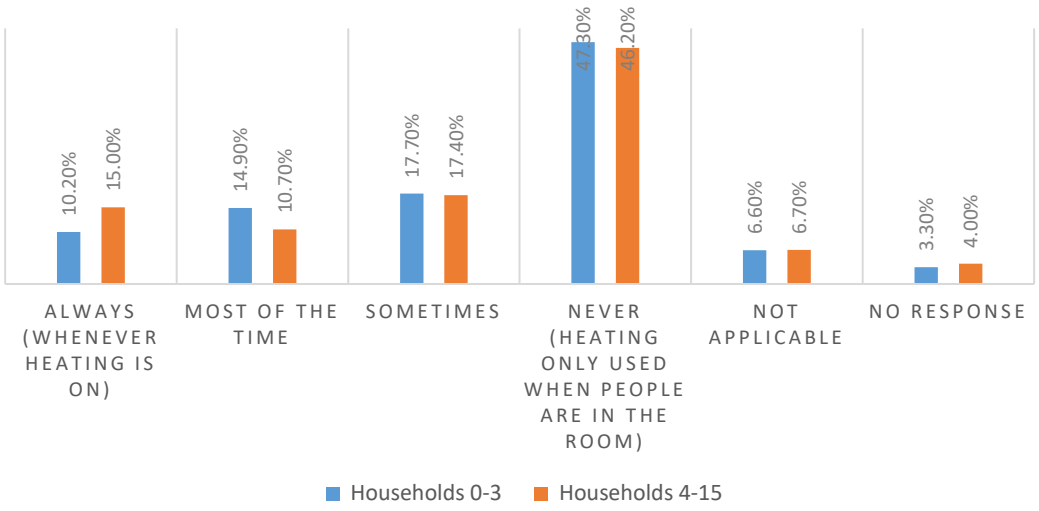

Figure 12 Frequency of heating unoccupied rooms

Furthermore, there were minor differences between the two groups in their use of standby power controllers, the number of refrigerators they owned, and their use of cold and hot water in the washing machine. Householders with younger children reported greater use of the dryer in winter (8.9 percent using it four to six times a week). Surprisingly householders with older children report greater use of the dryer in summer (1.7 percent compared to 0.9% use it seven or more times a week). See Appendix D: Householders energy use behaviours: age of oldest child comparison.

3.6 Retrofit products

All participants received a retrofit kit, with kits varying across project years and intervention types. Year one assessors and home assessment recipients received a roll of draught seal tape, a draught snake, a shower timer and a thermometer, and a choice of a water saving showerhead, a Heatermate, a standby power controller or a draught kit consisting of a draught seal for the bottom of a door, gap filler and a gap filler gun.. In year two the kits were simplified, in response to feedback from FPF project officers that the high number of choices in the kits were causing confusion for participants, and that participants weren't interested in products which were perceived as hard to install, like the showerhead, under door draught seal and gap filler. A decision was taken to prioritise the distribution of those products which had proven most popular, and hence were most likely to be used in the home.

In year one, workshop participants were provided with a retrofit kit consisting of a shower timer, draught seal tape, a draught snake and a thermometer. In years two and three they were given a shower timer, thermometer and stickers. Some participants reported not receiving retrofit kits. Workshop participants were most likely to report this, which may indicate lost or forgotten items left at the workshop venue, or simply forgetting what they had received 6-12 months ago. Shower timers and thermometers were the items most likely to still be in use at follow up across all interventions, while stickers were the least used at follow up (see Appendix E: Retrofit kit usage).

Table 12 gives follow-up data on if each retrofit item was received (effectively if they remembered receiving it), and of those that did, whether it is still in use. Baseline quantities are taken from

baseline surveys but are conservative estimates as some participants did not record their selection nor provide follow up responses. Standby controllers were the most popular item, followed by draught seal tape and Heatermates. All products continued to be utilised at rates of between 70% and 90 percent at follow up.

Table 12 Draught snake usage

Draught Snake	Assessors	Households
Response	**Follow up**	**Follow up**
Yes	88.8%	78.6%
No	11.2%	21.4%
Use- Yes	92.6%	92.3%
Use- No	7.4%	7.7%

Table 13 Retrofit products selection and use

Retrofit Product	Assessors		Home Assessments	
Standby Power Controller	**Baseline**	**Follow up**	**Baseline**	**Follow up**
Yes	96	76.9%	1858	55.7%
No		45.7%		44.3%
Use- Yes		85.2%		78.2%
Use- No		14.8%		21.8%
HeaterMate				
Yes	35	44.9%	523	34.6%
No		55.1%		65.4%
Use- Yes		82.4%		69.3%
Use- No		17.6%		30.7%
Draught Seal Tape				
Yes	37	58.5%	906	43.1%
No		41.5%		56.9%
Use- Yes		75.0%		73.3%
Use- No		25.0%		26.7%

3.7 Long term behaviour changes

Follow up surveys were sent to year one participants in year three of the project, and 78 responded. FPF was not designed as a longitudinal study and hence the results are indicative rather than statistically valid. All survey responses were self-selected and hence indicate general trends concerning the participants who responded to the year three surveys.

There was little difference in results at the three year follow ups compared with follow ups at six to twelve months across energy saving behaviours (see Appendix F: Longitudinal energy saving behaviours). This suggests that those participants who did respond, had been able to maintain their energy saving behaviours. The noteworthy differences were observed for shower durations and

cooling appliance temperatures. According to the surveys, year one participants' showers had got even shorter by year three .

Table 14 Year one participants shower time frequencies across three years

Response	Baseline	Follow up	Year 3 3ollow up
Four minutes or less	9%	24%	22%
Between five and eight minutes	26%	31%	47%
Between nine and 14 minutes	30%	29%	14%
Between 15 and 20 minutes	21%	9%	14%
Between 21 and 25 minutes	5%	1%	0%
More than 25 minutes	6%	1%	1%
No Response	3%	4%	1%

There was an observed decrease in energy-saving behaviours related to the use of cooling appliances, with higher frequencies of thermostats being set at the lower temperature range of 22-23 degrees at three year follow up (24%). This may be attributed to higher than average summer temperatures. Energy saving behaviours related to heating appliances increased, with year one participants reporting increased frequency of low heater temperatures in longitudinal responses.

Table 15 Year one participants cooling temperatures across three years

Response	Baseline	Follow up	Year 3 follow up
28 degrees or higher	2.2%	1.3%	0.0%
26-27 degrees	2.6%	14.1%	5.1%
24-25 degrees	10.4%	7.7%	11.5%
22-23 degrees	18.5%	16.7%	24.4%
21 degrees or lower	34.5%	24.4%	28.2%
I don't have or don't use an air conditioner	17.4%	25.6%	16.7%
I don't know	12.6%	6.4%	11.5%
No Response	1.7%	3.8%	2.6%

Retrofit products may have assisted energy saving behaviours. Reported high usage rates of showerhead, gap filler and door snakes corresponded with increases in draught proofing and instalment of water saving showerheads. The table below is taken from the long term follow up data, where participants were asked if they received the retrofit item, and of those that reported receiving it, whether or not they used it.

Table 16 Retrofit product longitudinal usage

Retrofit product	Yes	No	Use- Yes	Use- No
Future switch	60%	40%	61%	39%
Heatermates	25%	75%	43%	57%

Showerhead	49%	51%	91%	9%
Shower timer	71%	29%	73%	27%
Gap Filler	39%	61%	94%	6%
Draught Seal Tape	30%	70%	86%	14%
Door Snake	72%	28%	93%	7%
Thermometer	58%	42%	81%	19%

3.8 VEET installations

In years two and three participants (but not the control group) were offered the opportunity to have energy-saving products (such as efficient lighting, low-flow shower heads and standby power controllers) installed in their home at no cost through the VEET scheme. FPF partnered with four VEET installers to undertake these installations. There was general interest in VEET products. However, due to problems with the VEET scheme, this resulted in only 5% of interested people ever having an installation booked (see table). FPF ceased referring participants to VEET providers part way through year three. See Section 5.2.7 Relationship with VEET installers for further details.

Table 17 VEET installer's interaction with interested participants

VEET Outcome	Response
No contact	61.68%
No Installer available	15.05%
Rung, no answer	5.72%
Booked	5.08%
Unable to contact	2.59%
Already Installed	1.57%
Not interested	1.48%
Language barrier	1.20%
Customer to call back	1.11%
Call back	1.02%
Not required	0.65%
No show	0.55%
Other	0.46%
Answering machine	0.46%
Rung, left message	0.37%
Not eligible	0.37%
Customer moving home	0.37%
Rental property	0.28%

Table 18 VEET products installed

VEET products	Quantity
LED Downlights	14
CFL's	81
Low Flow Shower Heads	19
Door Seals	48
Standby Controllers	4

In Home Display	0
Chimney Balloon	7
Wall Vents	5

3.9 Changes in attitudes

An increase in positive attitudes to saving energy was reported across all intervention groups. However, the amount of increase did not differ significantly between groups, suggesting that the type of intervention had similar impacts on attitudes.

Table 19 shows that all participants were more likely to strongly disagree with the negative statements relating to comfort, effort and quality of life at follow up compared with the baseline results. This has been interpreted as representing an increase in positive attitudes across all intervention groups.

Table 19 Year two and three changes to energy saving attitudes: A.

Average response. Rating scale 1- strongly disagree to 5- strongly agree	**a) Energy efficiency is too much hassle.**	**b) Energy efficiency means I have to live less comfortably.**	**c) My quality of life will decrease when I reduce my energy use.**	**d) Energy efficiency will restrict my freedom.**	**e) Energy efficiency is not very enjoyable.**
Control	2.21	2.31	2.01	2.00	2.35
Workshops					
Baseline	2.33	2.33	2.16	1.99	2.16
Follow up	2.06	2.14	2.04	1.70	1.94
Assessors					
Baseline	2.25	2.23	2.18	2.15	2.18
Follow up	2.13	2.02	2.06	1.92	1.96
Home Assessments					
Baseline	2.63	2.56	2.67	2.60	2.63
Follow up	2.57	2.64	2.36	2.46	2.53

This conclusion is supported by the results of survey questions which tested participants' positive attitudes to saving energy (see Table 20). All interventions reported higher rates of positive attitudes to energy saving compared with control participants.

Table 20 Year two and three changes to energy saving attitudes B.

Average response	How do you rate your energy efficiency behaviour? 1= strongly disagree, 5= strongly agree	How empowered do you feel in relation to your energy consumption? 1= not empowered, 5=very empowered	How interested are you in conserving energy in the home? 1=not interested, 5=very interested	How in control of your finances do you feel? 1=not in control, 5=very in control	How comfortable does your home feel? 1=not comfortable, 5=very comfortable
Control	3.08	3.00	3.87	3.53	4.01
Workshops					
Baseline	3.19	3.14	3.81	3.43	3.87
Follow up	3.60	3.64	4.43	3.91	4.26
Assessors					
Baseline	3.42	3.68	4.45	3.68	4.00
Follow up	3.98	3.96	4.38	3.88	4.08
Home Assessments					
Baseline	3.19	3.22	3.86	3.53	3.62
Follow up	3.63	3.46	4.28	3.93	4.06

3.10 Employability

Assessors were asked to evaluate the training in terms of its impact on their confidence in obtaining employment. Thirty percent of participants responded. At time they received the training, 19 percent reported engagement in part time work, 11 percent were engaged in further education and 10 percent were unemployed and seeking employment. However, because of low response rates to employment-related questions in the follow up surveys, there was insufficient data to analyse the longer impact of FPF on employment.

Table 21 Changes to employment status

Employment status	Baseline	Follow up
Employed- part time	19%	11.10%
Other	15%	0%
Unemployed- looking for full time work	12%	2.80%
Studying to help you get a job or a better job	11%	2.80%
Unemployed- looking for part time work	10%	0.90%
No (for people who were just asked if they're employed or not)	7%	N/A
Employed- full time	6%	3.70%
Conducting unpaid work (carer/home duties)	6%	3.70%
Yes (for people who were just asked if they're employed or not)	5%	N/A
Other- studying	5%	1.90%

Not stated/no Response	2%	73.10%
Employed- away from work (e.g. on maternity leave)	1%	0%

Similarly, with assessor employment status, there was insufficient data to compare the impacts of FPF on employability of assessors. However, some assessors indicated that they did experience increases in confidence and communication skills.

Table 22 Changes to confidence of employability

Confidence of employability scale	Baseline	Follow Up
5	30%	0.0%
4	54%	5.6%
3	14%	3.7%
2	9%	0.0%
1	2%	0.0%
Not stated/no response	37%	90.7%

"Self-development is important- how to talk to people, more confident and less shy" Assessor, focus group feedback.

3.11 Qualitative results

3.11.1 Most Significant Change

'Most significant change' evaluation methodology was utilised to collect qualitative data on the impacts of the project. Thirteen assessors were interviewed to identify and relate the most significant change which had occurred for them as a consequence of participation in the project. Home assessment recipients were not interviewed due to time and budget constraints. The following are extracts from the selected interviews which demonstrate the range of responses and extent and depth of changes experienced.

Chris*, Narre Warren South, Vic
Chris has found changing her habits has improved her quality of life and brought the family together. Mornings and getting ready for school have been easier and more enjoyable without turning on the heater, *"It's actually been really nice because in the mornings we will all sit around [dressed] and have milos together instead of staying in our pyjamas in a really warm house…'* Changing her heating habits has also had beneficial effects for her relationship with her Husband, *'When the kids are in bed there is no need for the heater to be on. It's just my husband and I awake. That's the only time we have together so we just grab a blanket and cuddle on the couch and it's much nicer"*

*Names have been changes to protect assessors' privacy

Tamera*, Werribee, Vic

Tamera and her family moved to Australia 10 years ago. Tamera has spent much of that time at home;
"10 years, I not work just sitting at home".
Tamera has enjoyed meeting new people though FPF.
"Now I go out, I meet with you and I meet with other man, Richard, now I know Australian man and Australian woman".
She has been proud to work and to be able to show her children. *"You gave me certificates and I am very proud of them…especially my daughter she said, 'mamma you're working, you have certificate''.*

*Names have been changes to protect assessors' privacy

Mary*, Strathdale, Vic

Mary was already interested in sustainability before joining FPF. She found it inspiring to meet and talk to people who shared her passion for energy efficiency;
"It has just spurred me on to do more and spread the word more. That's been really good".
Mary feels FPF increased of her confidence and helped her build connections within the sustainability movement. She has been attending meetings about building design in her local area and applying the knowledge she learned to FPF;
"If people thank about the size of their house and how much heating they are using…hopefully they who use this info for the way they build their house".
She hopes that these relationships will lead to a future career in building design.

*Names have been changes to protect assessors' privacy

3.11.2 Focus groups

The project also conducted focus group discussions for assessors to complement and build upon the data collected through the most significant change stories. Nineteen assessors volunteered to participate in the focus group and self-selected group discussions. Despite self-selection of groups, the three groups comprised a representative sample of participants in terms of the trainer, languages spoken and suburb. Focus groups followed a structured program to ensure that groups responded to the same questions and discussions followed similar paths so as to provide consistent and comparable data.

Dominant participants can sometimes overtake focus groups and unintentionally influence other participants to give normative or consensual responses. FPF mitigated this effect by ensuring that all participants responded by directing questions to less engaged participants. Focus group data cannot be generalised across the FPF population as the responses are specific to individual participants' experiences. However, focus group data can provide a useful basis on which to build understanding and gain insights into how assessors perceived FPF[11].

Focus group data was analysed using key word methodology. Significant words or phrases were categorised into groups and their frequency analysed. Focus group comments were overwhelmingly positive (71 percent positive compared with 29 percent negative). The largest number of positive comments related to co-benefits of participation, followed by information provided by the project. Comments on program design were almost evenly split between positive and negative, with surveys attracting the next highest level of negative comments. Assessors were disappointed with the

[11] Smithson 2000, Using and analysing focus groups: limitations and possibilities. *Int. J Social Research Methodology,* 3(2).

unreliability of VEET installers, the requirement to network in order to recruit households for home assessments, and the need to ask personal questions. Assessors were particularly uncomfortable about asking for household income and energy billing information. Assessors commented on the lack of post-training support and the need to formalise assessor training with identification tags and certificates. For additional focus group feedback, see Section Appendix G: Focus group feedback)

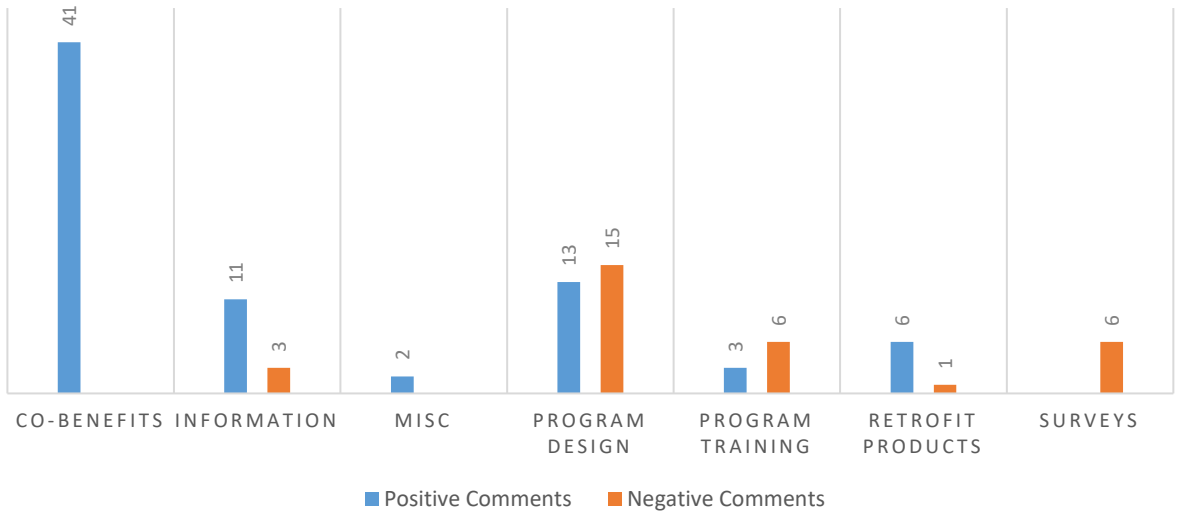

Figure 13 Positive and negative focus group feedback

Behaviour change and social outcomes such as connecting with the community, building new friendships and the ability to help others were identified as the main positive outcomes of the project. Behaviour change responses included taking shorter showers, changing heater temperatures and setting the washing machine to the cold cycle.

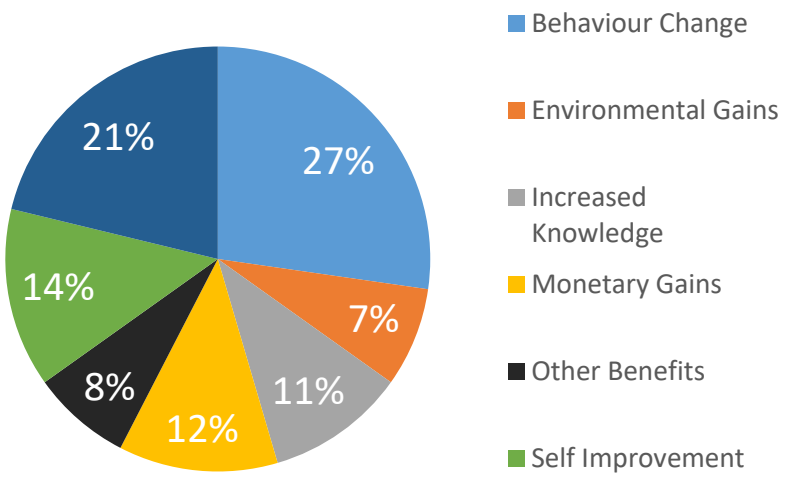

Figure 14 Assessor focus group positive responses

4 Financial analysis

4.1 FPF budget

The Future Powered Families project was delivered within budget.

Project delivery targets were amended to reflect changes in participant eligibility criteria and recruitment milestones, with recruitment distributed through the year.

Changes to LIEEP staff greatly reduced salaries expenditure, although this saving was offset by increases in contractor cost, retrofit products and meeting and events cost. Overspend in the meeting and events expenditure is largely attributed to increased assessor trainings, and subsequent child care and interpreting costs.

The increase in home assessments completed translated into increased administrative cost, with high numbers of small payments to assessors being the main contributor. Furthermore, in order to complete the final audited financial report, additional funding has also been committed to the administration budget.

An unanticipated office cost - Office Equipment - was added to the budget line. This cost included resources for the regional project officer, staff phone costs and postage. Additional resources required by the remotely-located regional project officer comprised hire of office space, storage costs, laptop and off-site printing. As LIEEP staff were required to travel and work remotely in delivery of FPF, reimbursement of personal phone use by staff was included upon commencement of project delivery. Though postage was originally included in administration cost, the large volume of follow up surveys and parcels posted exceeded Environment Victoria's postage budget. As FPF letters and parcels constituted a significant proportion of Environment Victoria's total postage costs, this expenditure was added to the FPF budget.

Table 23 FPF Expenditure

	Code	Budgeted Expenditure: Original	Budgeted Expenditure: Amended March 2015	Committed funding
Salaries	402	$774,000	$823,316	$737,397.00
Administration	444	$320,000	$335,000	$380,850.00
Payment for assessors, data collection, home assessor follow ups and training budget	270	$340,000	$297,353	$284,135.64
Research, data collection and analysis	272	$80,000	$103,208	$104,290.45
Retrofits products	298	$240,000	$183,600	$198,297.97
Meetings and events, inclusive of steering meeting	264	$12,000	$24,926	$44,408.71
Travel and accommodation	262	$30,200	$15,197	$ 28,799.00
Materials, inclusive of design and print	282	$7,000	$ 20,600	$8,717.37
Advertising and promotions	278			$946.43
Office equipment: office support for regional project officer, postage, banking and credit cards, and telephone costs.	244			$12,506.76
Total		$1,803,200	$1,803,200	$1,800,349.33
Underspend				$2,850.67

In-kind contributions to FPF amounted to $255,844.75. The unanticipated increase in number of workshop participants, and the corresponding contribution of volunteers largely contributed to this figure. Original project design envisaged ecoMaster contributing to staff home assessment training. However their support was reduced when it was evident that participants required relatively low levels of technical knowledge in order to do the home assessments. No in-kind support for material storage was required as retrofit products were purchased on an as need basis and were stored at the Environment Victoria office (see Appendix H: In-kind contributions).

4.2 Cost-benefit analysis

A cost-benefit analysis of the project was undertaken to calculate and compare the costs of delivery relative to the benefits. The analysis has been based on data which could be practicably collected by the FPF project.

Costs of delivering the three types of project intervention (workshops, assessor training and home assessments) which were used in the calculations are outlined in Appendix I: Cost benefit calculation.

Project effectiveness were defined in terms of quantifiable, monetary benefits of saving energy, ie. bill savings achieved by householders as a consequence of participation in the project. Project

benefits were defined as the reduction of daily average energy consumption. To be conservative, benefits have only been defined as one year of bill savings. However based on the long term follow up data collected, it is likely that participants will continue saving on their bills for a significantly longer period.

These savings were calculated from the estimated difference between post-intervention energy bills of participating households and how much their bills would have been if they had not taken part in the project. This latter amount was calculated from their baseline consumption plus the increase in consumption observed in the control group. St Vincent de Paul Society's Victorian Tariff-Tracking Project, Workbook 3 Electricity Market Offers July 2010- July 2015 was used to calculate annual electricity cost. In additional to a fit with available FPF data, this model was chosen due to six years of available energy tariff data across ninety percent of Victorian energy retailers.

The tariffs are not intended to be used to accurately reflect true cost of electricity cost due to the complexity of the Victorian electricity network and variety of pricing plans available to consumers. Rather the model is a useful tool to track general trends and cost of electricity.

As FPF electricity consumption data was collected over an average of 564.79 days (see Section 3.2 Electricity data analysis), 2014 and 2015 energy bill costs were used to calculate ratios. FPF was unable to collect sufficient electricity consumption data from workshop participants and consequently a cost-benefit analysis of workshop participants is not available (see Section 3.2 Electricity data analysis). Energy consumption data was adjusted to account for the observed increase in energy consumption by control participants.

We have assumed that participants are on a market rate as many would have not been signed with energy retailers prior to the introduction of the Victorian energy market. For simplicity, we have assumed that participants are contracted on a fixed rate with no seasonal or usage variability. The estimated average daily electricity usage was calculated inclusive of weather and delay in observed energy behaviour changes. Workbook calculations are based on published rates only and do not include concessions or discounts.

This cost-benefit analysis does not account for gas and water consumption, impact of solar panels or hot water systems, participants moving residences, or non-quantifiable project outcomes. Cost effective ratios were also calculated for the project. Cost effective ratios represent the difference in cost between two interventions divided by the difference in their impact or benefit. Cost effective ratios of less than 1 represent a feasible project, i.e the value of the benefit or impact is greater than the cost of delivering the project.

Table 24 Cost-Benefit Ratios

Intervention	Cost Effective Ratio (cost divided by one year of bill savings)	Cost Benefit Ratio (cost per kWh/day saved)*
Workshop participant	N/A	N/A
Direct Cost	N/A	N/A
Trial Cost	N/A	N/A
Total Business	N/A	N/A
Total Trial	N/A	N/A
Assessor participant		
Direct Cost	$259.33/$155 = 1.67	$259.33/1.514 = 171.28
Trial Cost	$862.01/$155 = 5.56	$862.01/1.514 = 569.36
Total Business	$1437.75/$155 = 9.28	$1437.75/1.514 = 949.63
Total Trial	$1462.33/$155 = 9.43	$1462.33/1.514 = 965.87
Home Assessment participant		
Direct Cost	$53.24/$96 = 0.55	$53.24/0.94 = 56.59
Trial Cost	$59.16/$96 = 0.62	$59.16/0.94 = 62.88
Total Business	$67.09/$96 = 0.70	$67.09/0.94 = 71.31
Total Trial	$85.17/$96 = 0.89	$85.17/0.94 = 90.53

*Assessors are saving 1.5137 kWh/day. The cost has been divided by 1.5137 to give the cost per kWh/day saved. The same has been done with assessed households.

According to these calculations, home assessments are cost effective at all levels, while assessors are not. However the two are interdependent – home assessments cannot happen without assessors and assessors have no role without home assessments. Nevertheless, assessors would only need to maintain their reduced consumption for a year and a half for the direct cost of their participation to be cost effective, which the long term data suggests is entirely possible. If water and gas bill savings were included, assessors would reach cost effectiveness even sooner.

Relative to comparable projects, Future Powered Families had a low cost relative to its benefits. However it should still be noted that the benefits were greater than those included in the calculation. Where interventions have broader benefits for households or wider society, an analysis

based on a single measure such as bill savings will tend to under-estimate benefits, and hence deliver a poorer cost-benefit ratio.

There is also ample evidence of a positive relationship between building quality, levels of comfort experienced by inhabitants, and health outcomes. For example, the heatwave in southeast Australia in late January 2009 is estimated to have caused 374 excess deaths,[12] while a recent international study concluded that more people die from the effects of chronic cold in Australia than in Sweden.[13]

Poor quality housing is a significant contributor to these weather-related adverse health impacts, which disproportionately affect low-income and disadvantaged households.[14] Low-income and disadvantaged households are more likely to live in more heat-vulnerable areas and to suffer from chronic health conditions, which not only contribute to higher energy usage but can be exacerbated by unhealthy living conditions.[15] Conversely, improvements in home comfort resulting from efficiency upgrades can have positive impacts on health and well-being. For example, New Zealand's home insulation program delivered net benefits of $1.2 billion, largely through savings in hospitalisation costs and reduced mortality rates for vulnerable groups.[16]

The FPF project was not designed or intended to deliver retrofit upgrades to participants' homes to improve efficiency. However, draught-sealing tape was provided in the kits provided to workshop and home assessment participants. If applied correctly, this product should have delivered improvements in home comfort, although the project did not collect data on the extent to which this product was used.

However, as participants did report increased levels of comfort in their homes at the end of the project (see Table 20, p. 33), it can be concluded that the project had some positive impacts on health and well-being for participants. Therefore, while these additional benefits cannot be quantified, it can be concluded that their exclusion has led to an under-estimation of the overall benefits of the project.

4.3 Co-benefits

Co-benefits of the project relate to beneficial outcomes which have occurred as a consequence of implementation of the project, such as new or enhanced relationships, skills development or wider economic benefits.

FPF worked with 201 organisations, created eleven new employment positions, supported one student intern and employed four contractors. Three LIEEP staff attended energy efficiency training, five attended behaviour change workshops and two attended professional development sessions.

FPF supported 18 businesses and ordered 36,047 retrofit products valued at $198,298. FPF contributed $43,409 to local economies across metropolitan Melbourne, the Wimmera, the Latrobe

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[12] Hennessy, K. 2014 "Explainer – what are heatwaves?" CSIRO, https://blogs.csiro.au/climate-response/stories/explainer-heatwaves-in-australia/

[13] Barnett, A. 2015 "Cold weather is a bigger killer than heat – here's why" at http://theconversation.com/cold-weather-is-a-bigger-killer-than-extreme-heat-heres-why-42252

[14] ACOSS 2013, "Energy efficiency and people on low-incomes", Australian Council of Social Service

[15] Barnett, G. et. al. 2013, "Pathways to climate adapted and healthy low-income housing", National Climate Adaptation Research Facility, Gold Coast

[16] Grimes, A. et. al. 2011, "Cost benefit analysis of the Warm Up New Zealand: Heat Smart Programme", Ministry of Economic Development, http://sustainablecities.org.nz/wp-content/uploads/NZIF_CBA_report2.pdf

Valley and Central Victoria through expenditure on venue hire, catering, interpreters and child care workers (see Appendix K: Local industry engagement).

FPF increased the capacity of the energy efficiency industry by training 392 participants in home assessments. Over a two-year period, assessors saved $60,760 and home assessment recipients saved $$414,912 on their electricity bills – a total of $951,344 across all participants. FPF further supported participants with $249,849 in honorarium payments (see Appendix J: Co-benefit calculations).

As a result of reported reductions in shower duration, 45.5 ML water and 708 tonnes CO2e were saved per year. A total of $115,581 per year was saved on water bills (see Appendix J: Co-benefit calculations).

FPF increased social connections and resources of community groups by participants attending 'bring your bills days', training community organisation staff, and developing energy saving learning materials for adults and children.

And lastly, the peer-to-peer learning model employed by the FPF project had important capacity-building impacts for the individuals and communities who participated. FPF assessor training not only provided opportunities for learning and helped to enhance financial literacy, but also the development of social connections and the creation of opportunities for assessors to contribute to their community. Assessors reported FPF participation had created opportunities to teach, learn from others, engage with the children and adopt leadership roles within their communities. These enhanced skills and relationships should build the capacity of these communities to respond to other challenges in future.

5 Discussion

5.1 Intervention effectiveness

FPF was delivered to a total of 6,133 participants, speaking 139 languages, across 15 municipalities in metropolitan Melbourne and Central Victoria. A total of 392 participants were trained in home energy assessments, 4,322 householders received home energy assessments and 1,233 individuals attended an energy saving workshop. Environment Victoria worked with 201 cooperating organisations to recruit and deliver the project.

5.1.1 Energy saving workshops

The lack of comprehensive electricity consumption data for workshop participants makes it difficult to draw conclusions about the effectiveness of workshops on energy saving behaviour change.

FPF was unable to collect complete survey data sets due to a high rate of non-response to survey questions at both baseline and follow up surveys, and low rates of consent to collect electricity consumption data via NMI numbers among workshop participants. These issues are discussed in greater detail later in the report in 5.3.5 Collecting National Meter Identification numbers.

It was assumed that workshop participants would demonstrate the least change in behaviour as they had the least interaction with FPF facilitators. This was reflected by observed energy saving behaviour changes, which were smallest for this group across all categories. Workshop participants were most receptive to messages relating to the use of standby controllers, switching appliances off at the power point, shorter showers and washing in cold water. This may suggest that the benefit of these behaviours are widely known.

Workshop participants received retrofit products, yet only a few participants recalled receiving these products at follow up. Of those who did remember, a high percentage reported continued usage.

Reactions to the workshops were mixed. Some participants favoured the interactive, monetary-based (ie. focused on money-saving opportunities) sessions while other participants were dissatisfied with workshop content and length. Playgroup participants were also displeased with having reduced time to interact with their children. This suggests that while targeting pre-existing gatherings (e.g. playgroups) is an effective recruitment strategy, care needs to be taken to ensure the 'add-on' activity of an energy saving workshop does not overshadow or jeopardise the primary purpose of the gathering.

> *"Made me realise how much I'm spending on energy when i can save so easily"*
>
> Workshop participant

Though insufficient electricity consumption data was collected from energy workshop participants to validate their effectiveness, workshops did present us with an opportunity to engage with a wide range of community members. Community members expressed concerns about high and unaffordable energy bills, with many participants voicing concerns about continuing financial difficulties despite their participation in energy retailer hardship programs. Workshop participants commonly cited problems with hardship program payment plans, particularly the difficulty of paying off debts while continuing to incur high bills.

However, while the abovementioned data gaps limited the analysis of energy consumption impacts, they provided a useful insight into the relative effectiveness of different interventions in terms of participant engagement. Where engagement with participants was 'light', ie. contact of only a few

hours in a group workshop setting with no peer-to-peer communication, participants appear to have been insufficiently motivated or engaged with the project to invest the time and effort in completing a survey and providing the NMI number that would have provided consent for electricity data to be collected from retailers. However, as discussed below, where a peer-to-peer model was employed and more time and effort was invested in providing tailored advice via a personalised home assessment, participants were sufficiently motivated to complete baseline and follow up surveys.

5.1.2 Assessor training

> *"I like this survey because…I save energy…[it's] not only my interest, even government encourage me… it is rewarding in giving ability to save money"*
> Assessor

It was anticipated that assessors (participants trained in home energy assessments) as a consequence of their extended exposure to content and support from trainers, would achieve the greatest reduction in energy consumption and greatest degree of behaviour change. However, while assessors did demonstrate consistent behaviours that aligned with FPF content[17], the resulting reduction in energy consumption by this group was not statistically significant. Nevertheless, this outcome was in contrast to control participants who actually increased their energy consumption (see Table 4, p.**Error! Bookmark not defined.**).

The observed lack of significant reductions in energy consumption by the assessor group may be attributed to two circumstances: 1) possession of energy saving information prior to assessor training and 2) exhaustion of 'low hanging fruit' energy saving options.

Participants self-selected for assessor training and hence assessors with existing energy saving knowledge may have been more inclined to participate in the project. Furthermore, as home assessments were tailored to be basic, replicable and easy to implement, the training received by assessors may not have provided additional knowledge. Assessors consumed the least amount of energy at baseline and follow up (7.1 kWh/day), which is significantly less than control participants and the Victorian average of 23.8 kWh per day[18].

Assessors' low energy consumption may additionally identify limits to basic home assessments. Space heating and cooling and water heating comprises 48 percent of Victorian residential energy consumption. [19] Simple energy saving behaviours target which these uses such as shower duration, thermostat settings for heating and cooling and draught proofing were emphasised in home assessments. Assessors may have exhausted these 'low hanging fruit' options in their homes, meaning that more substantial energy interventions may be required to achieve additional savings.

The recruitment, training and support of assessors requires substantial investment of resources. Therefore, from the perspective of energy consumption reductions alone, a cost-benefit analysis of the assessor intervention suggests that assessors did not provide value for money.

However, a broader assessment of the merit of assessor training should also consider the benefits reaped by households which received home assessments, such as bill savings and improved comfort, health and well-being.

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[17] For example, reducing heater temperatures to a range of 18-20 degrees, reducing the heating of unoccupied rooms, reducing shower times, and increasing frequency of turning off appliances at the power point.
[18] Sustainability Victoria (2014), Victorian Households Energy Report.
[19] Sustainability Victoria (2014), Victorian Households Energy Report.

There is also anecdotal evidence of additional co-benefits, beyond energy saving, accruing from the assessor training. Women in CALD households, in particular low-income households with young children where males are the principal wage-earners, do not generally control the household finances. Taking into account differences between cultural groups and within communities, women commonly do not pay the household bills and hence may not be aware of the cost of goods and services such as utilities and rent. With women making up approximately 70 percent of the FPF assessor population, the FPF project contributed to an increase in financial literacy among participating women. These women reported greater understanding of energy bills, awareness of energy retailers, and understanding of household energy consumption. While FPF did not directly measure the financial literacy of participants, assessors did report greater consciousness of energy costs and consumption.

Moreover, FPF assessor training not only provided opportunities for learning and energy saving, but also the development of social connections and the creation of opportunities for assessors to contribute to their community. Assessors reported FPF participation creating opportunities to teach, learn from others, engage with the children and adopt leadership roles within their communities. Furthermore, the peer-to-peer learning model assumed that assessors would network solely within their own communities. However, some assessors surprisingly reached out to other cultural groups and consequently expanded their social networks.

> *"Helps to connect with others from different cultures. Provides reason to talk to others"*
>
> *"Being a leader"*
>
> *"…I became more concerned about the environment and felt more empowered to share with others"*
>
> Assessor

5.1.3 Home assessments

Home assessments provided householders with a personalised understanding of their energy use behaviours and tailored advice about energy saving options in their own homes. Home assessments consistently reported increases to energy saving behaviours across categories, which was reflected in an observable decrease in energy consumption (see Table 4, p.17).

The substantial number of home assessments delivered by assessors (an average of 11 assessments each) and the significant reduction in energy consumption achieved demonstrates the impact of peer-to-peer learning in reaching CALD communities and disengaged individuals. The assessors were critical to the success of home assessment because of their ability to surpass cultural and language barriers. Assessors provided information in a non-formal social environment, highlighting the importance of face-to-face interactions and the ability to demonstrate concepts to householders.

> *"He was very approachable and friendly; don't think this representative could be improved"*
>
> Householder

Provision of retrofit products, the energy saving plan, clear monetary outcomes, visual stimuli for elected behaviours (stickers to turn off switches and shower timers), and collaborative learning through sharing of personal stories collectively acted to motivate energy saving and provide indirect feedback to sustain changes in behaviour.

5.1.4 Householders with younger children

As discussed earlier, the eligibility criteria governing the FPF program were amended in year two, raising the age limit of an eligible household's youngest child from 3 years to 15 years. This change

enabled a comparison between households with younger children (0-3 years) and householders with older children (4-15 years).

It was assumed that householders with young children would have limited time to access information, and hence content was tailored to be simple, quick and easy. In addition, it was expected that energy bills in households with older children would continue to increase as the children became older.

However, households with younger children achieved a ten percent reduction in energy consumption while households with older children reduced their energy use by four percent (see Table 5, p.17). This would suggest that despite limited spare time, householders with younger children have the ability to reduce their energy use when material is presented in an easy and efficient manner. There were minor differences between the two groups' energy saving behaviours. Heating and cooling presented the most change, with householders with older children reporting more efficient heating practices (Figure 10 p.27, Figure 11 p. 27, Figure 12 p. 28, Appendix D: Householders energy use behaviours: age of oldest child comparison).

The project results showed that households with older children consumed less energy than those with younger children at both pre-intervention and post-intervention (see Table 5, p.17). This was unexpected given that it was assumed an increase in household size and energy demand from older children would lead to higher energy consumption. The results suggest that it is more likely that there is higher energy use when children are younger, due to increased appliance use as a result of more time spent at home during the day. Households with older, school-aged children are more likely to spend less time at home, as parents may return to employment or study and school children engage in more out-of-home activities on weekends.

5.1.5 Long-term outcomes

A survey of year one participants at 18 to 24 months after engagements assessed the durability of elected energy saving behaviours. With the exception of air conditioning temperatures, which may have been affected by higher than average summer temperatures, participants generally maintained energy saving practices or improved practices (see Section 3.7 Long term behaviour changes).

FPF was not designed as a longitudinal study, hence conclusive statements about the impact of the project on long-term behaviour change cannot be made. However, data which was collected indicated that energy saving behaviours were maintained at periods of up to two years after the intervention.

5.2 Project management

Notwithstanding some early challenges and delays in delivery of FPF, the project met its articulated targets and objectives. FPF met workshop delivery targets ahead of schedule and exceeded target numbers of assessor and home assessment participants. Some of the challenges are as outlined below.

5.2.1 Changes to staff

There were a number of changes to Environment Victoria LIEEP staff during the life of the project, which resulted in minor delays in project recruitment and delivery. To alleviate the impact of staff loss and prevent the disruption of project momentum, detailed recruitment and relationship notes

were collected and transferred to new LIEEP staff. Detailed project procedure records were maintained to ensure the continuity of the project.

5.2.2 Dealing with contractors

Contractors were employed to assist in project delivery. Contractors employed to replace departing staff were seamlessly integrated into the project, which contributed to a smooth transition between staff. Contractors were given detailed project procedure manuals and flexibility to complete tasks in a timely manner in collaboration with Environment Victoria management.

ecoMaster, a commercial provider of home and business retrofit solutions, was contracted to provide staff training, while Swinburne University collected and analysed electricity data. *ecoMaster* and Swinburne University collaborated with Environment Victoria and worked to address challenges as they arose. *ecoMaster* provided detailed comments on retrofit products and home assessment standards, while Swinburne University worked with Environment Victoria to build a statistically robust project.

FPF introduced BDC Market Intelligence, a social and marketing company, to assist in the recruitment of control group participants. Due to a high level of ineligible participants, BDC Market Intelligence was not able to meet targets. As a result, Environment Victoria expended additional resources to recruit control participants. This required the redirection of staff resources from other tasks such as documentation of 'most significant change' stories and supporting cooperating organisations– tasks which would have helped to expand FPF's project depth.

5.2.3 Increase in home assessments

As a result of the successful recruitment strategies and the strength of the peer-to-peer model, the number of assessors trained exceeded project targets. It was anticipated that each assessor would complete between eight and sixteen home assessments. However, with delays between training and completion of home assessments, and some variation in the number of home assessments completed per assessor, predicting the total number of home assessments which would be completed by a given number of assessors became a challenge.

Consequently, home assessments were closely monitored to ensure that retrofit products distributed and payments to assessors did not exceed the budget. As assessors had been given an understanding of the possible maximum number of home assessments they would be paid for, several assessors were dissatisfied when it was announced the project would close three months ahead of schedule. This dissatisfaction was managed by honouring completed home assessments, allowing booked home assessments to proceed, and establishing a submission date. Where assessors were not appeased by this solution, trainers continued to work with individual assessors to resolve matters in a way which met assessor expectations while ensuring total number of assessments remained within budget (Table 23 p.38).

5.2.4 Survey collection and analysis

FPF developed and distributed surveys to collect baseline and follow up data from participants. However, a range of issues affecting participant response rates were encountered throughout the trial.

Key issues included:

- less than 100 percent return of surveys by assessors from home assessment participants;

- some participants' failure to attempt or fully complete surveys,
- provision of incorrect personal information.

Delays between completion of home assessments and the submission of surveys initially hindered the early detection of potential problems with assessors not submitting surveys for all assessments. FPF addressed this issue by requiring assessors to complete home assessments in lots of eight, As a result, assessors were required to submit surveys from all eight assessments before moving on to complete additional assessments.

Some workshop participants did not complete surveys. This was likely due to time constraints, and levels of engagement not being sufficient to encourage participants to invest the necessary time and effort. To increase workshop survey collection, FPF provided group surveys, provided surveys to participant groups prior to workshops, and provided translated surveys. These issues are discussed in further detail in Section 6.4 Surveys.

The project encountered problems with incomplete surveys across all interventions. However, this issue did not become apparent until the end of the program when the process of analysing survey data began. As a result, some surveys had to be removed from the data set, and this consequently reduced the robustness of results. This was a particular issue for the workshop interventions, where there was a high rate of incomplete survey responses. However sufficient surveys were collected for the assessor and home assessment intervention to support data analysis.

Numerous participants were hesitant about completing surveys due to privacy concerns. FPF staff addressed these concerns by explaining the confidentiality boundaries of the trial. In cases where this did not allay concerns, participants were permitted to complete the surveys using an alias. This was an attempt to collect as much survey data as possible. However, it meant that FPF was unable to collect follow up survey from these participants because of a lack of personal details.

5.2.5 Collecting National Meter Identification numbers

In accordance with the funding agreement and the Data Collection and Reporting Plan, electricity consumption data was only collected from householders who had provided written consent with valid National Meter Identification (NMI) numbers. Consent forms were sent to relevant electricity retailers for electricity consumption data. Requests for the collection of consumption data were limited to households which had not moved residence and had a smart meter.

Few difficulties were encountered in gaining consent for data collection from home assessment recipients, as the trust built between assessor and householder facilitated agreement. This one-to-one approach allowed participants to directly ask questions and provided an opportunity for trainers and assessors to directly address concerns.

Consent from workshop participants was the most difficult to obtain. Workshops were conducted in one hour sessions, in which facilitators and participants had little opportunity to develop trust. Additionally, workshop participants consistently failed to bring their energy bills to workshops and hence were unable to provide billing details on the day. FPF trialled a range of measures to address these issues but with little success.

Workshop participants were encouraged to complete their billing details during workshops with staff following up with participants to obtain their NMI number. Participants were phoned and posted consent forms. Participants often did not answer calls, requested a call back followed by no response or did not have their NMI when contacted. Participants additionally often experienced

difficulty finding the NMI on their bills. When consent forms were posted, an energy billing guide with the location of the NMI was also included. However few workshop participants returned the consent forms.

Prize draws were also offered to workshops participants who returned completed consent forms. Initially, participants were offered a $50 prize draw, which was increased incrementally to $100 and $200. The offer of $100 and $200 prize draws resulted in one participant response per draw.

'Bring your bills' workshops provided the ideal setting to deliver energy saving workshops while ensuring that participants brought their bills to complete the consent forms. Workshops were reframed to provide general energy saving information with the opportunity to receive personalised advice on bills. However, group facilitators (e.g. playgroup coordinators) often forgot to remind participants to bring their bills or if reminded, participants forgot on the day.

By year three, gift vouchers were offered to all workshop participants with completed consent forms. Project officers offered a $10 gift voucher during workshops, and participants were additionally contacted directly after the workshop with the offer. However only three in one hundred participants responded. With continued unsuccessful efforts to gather workshop consent forms, it was therefore decided to cease actively pursuing workshop NMIs as it would be highly unlikely to retrospectively collect sufficient NMIs. As a result, FPF was unable to statistically validate workshop qualitative data.

When requesting electricity data information, the project experienced substantial delays from energy retailers. Energy retailers either did not respond to numerous information requests, did not provide data in a timely manner or provided the incorrect data in the incorrect format. This led to data analysis and reporting delays.

5.2.6 Recruitment and retention strategies

FPF staff worked closely with consortium members, local councils, community organisations and community groups to recruit participants for workshops and assessor training. Building relationships with each organisation was a resource intensive exercise with project officers expending considerable time promoting FPF through numerous networks and meeting with groups to find willing participants. Despite being demanding, the delivery of FPF to over 5,000 participants is a testament to the importance of allowing time to develop relationships and incorporate them into project planning.

Using organisations' existing groups and networks, FPF delivered energy saving workshops to groups with a high proportion of parents with young children. These workshops returned a range of participant eligibility percentages, and consequently a large number of workshops were delivered in order to meet project targets. This increased the cost of retrofit products as all workshop participants received retrofit products.

Assessors were recruited from workshops, advertising or promotion through community organisations. Assessors also recruited participants for training through their existing networks. If the recruitees completed the training and a minimum of six home assessments, the referring assessor was paid $25. Financial incentive was the most effective assessor recruitment strategy as FPF staff recruitment resources were reduced.

Home assessment households were recruited by assessors through their own community networks. Promotion of home assessments via less personal means such as flyers and community notice

boards was less effective, as householders generally did not wish to have a stranger in their home and assessors preferred to visit households they knew.

In order to maximise retention of assessors, FPF staff called assessors regularly to check on home assessment progress, met with them individually when progress wasn't evident, acted to address concerns or problems arising and created opportunities for group learning, feedback and motivation.

5.2.7 Relationship with VEET installers

Participants (but not the control group) were also offered the opportunity to have further home energy-saving products (such as efficient lighting, low-flow shower heads and standby power controllers) installed in their home at no cost. These products were to be supplied and installed via the Victorian Government's Victorian Energy Efficiency Target (VEET) scheme. However, very few VEET installations occurred as a consequence of a FPF involvement (see section 3.8 VEET installations), largely because of challenges in engagement with VEET accredited installers.

Initially, the FPF project partnered with a single VEET installation business. However as the project progressed, this installer was unable to meet increasing demand, failing to contact participants and book instalments in a timely manner. The dispersal of residences over a large geographic area further hindered the installer's ability to service participants.

FPF attempted to address the growing number of participants wanting VEET products by partnering with a relatively well-resourced VEET installer. However, problems remained as participants continued to report no contact from VEET providers. Upon communication with the installer, it became evident that the inability to supply VEET product was due to the small profit margin for free VEET products. While the VEET installer had committed to installations for all interested participants in metropolitan Melbourne, it became apparent that a minimum number of VEET product replacements were needed per house (that would ensure profitability). Hence, participants requesting an unviable number of products, or residing in an area with few other requests (which would have improved economies of scale), were unlikely to be contacted.

It is also possible that households with limited or no English may have interpreted VEET calls as unsolicited telemarketing, particularly if there had been a lengthy delay between the assessment and follow up, and consequently decline the instalment. Regional householders were additionally restricted as numerous VEET installers did not operate in regional areas.

Over the length of the project, four different VEET companies were engaged, but none were able to deliver on their promises of installing products for anything other than a handful of interested households.

To address this issue, we sent letters or text messages to all participants to apologise for the lack of contact from installers and to encourage them to contact the installer directly to arrange appointments. FPF did not follow up with participants to gauge if this approach was successful.

5.2.8 Role of consortium members

Environment Victoria was the lead agent with consortium members acting in a steering committee capacity. Consortium members provided direction based upon their knowledge of the community and area of expertise. Councils provided advice on working with Maternal Child and Health nurses, ecoMaster provided advice on residential retrofit products, and Swinburne University provided advice on data collection and analysis. Swinburne University and ecoMaster were also sub-contracts - Swinburne University to gather and analyse the electricity retailer data, and ecoMaster to train

year one staff and advise on retrofit products. It was originally anticipated that ecoMaster would deliver detailed residential energy efficiency training. However when it became evident that the level of training exceeded the community's requirement, the training was adjusted accordingly.

All consortium members participated in the steering committee in year one. Commitment to FPF varied with each consortium member; some members rarely attended any meetings whereas other members were very committed, regularly attending meetings and contributing invaluable advice. Changes to consortium members staffing further affected the steering committee with some replacement of steering committee personnel or loss of position when no replacement was unavailable. Despite these changes, sufficient members were retained in order for consortium meetings to continue.

5.2.9 Working with the Department and CSIRO

Over the three years of the project, changing circumstances required some adaptation to the project, particularly a change in eligibility criteria for participants (as discussed in Section 1.4.1 Program evolution and adaptation).

Environment Victoria acknowledges that changing the hypothesis of a trial project such as FPF could jeopardise validity of outcomes. However, Environment Victoria felt that continuing the project in its original form or alternatively ending the program prematurely as recommended by the department, would have left a gap in the provision of critical energy efficiency services to low-income and disadvantaged communities. Environment Victoria and the department were eventually able to reach agreement on adapting the project in a way which met both organisations' needs. Changing the project criteria to adapt to changing circumstances resulted in FPF successfully engaging a larger number of participants and enabling a richer data analysis than would have been possible under the original project criteria. This outcome, despite taking some time to achieve, demonstrates the value of both parties taking a collaborative and adaptive approach to resolving problems.

Throughout the project, departmental staff rigorously kept Environment Victoria accountable to the FPF contract. While the importance of accountability cannot be underestimated, it often was at the expense of taking an adaptive approach when problems arose. Over several periods, FPF participants, community organisations and consortium members suggested improvements to the project. But with several months to negotiate contract variations, these changes were not able to be incorporated into the project in a timely manner.

Delays in responding to milestone reports can also have implications for cash flow for small organisations such as Environment Victoria. A fixed timeframe for milestone report responses and payment schedules would alleviate cash flow issues for future projects. Environment Victoria acknowledges that timely responses depend to a large extent on resourcing levels within the department, and that greater resourcing for similar projects in future would be desirable.

CSIRO's input to the data collection scheme added robustness to the data analysis and was welcomed. However, the fact that CSIRO was not involved in original program design, and their feedback on FPF's Data Collection and Reporting Plan was not received until four months after the start of data collection, added to complexity in project delivery. It would have been beneficial to have had the data schema in place during the project planning phase and prior to delivery.

5.2.10 Compliance and risk

The FPF project adhered to the *Privacy Act 1988* and the LIEEP Funding Agreement. All assessors were provided with a certificate upon completion of training. Assessors were additionally registered as an Environment Victoria volunteer and therefore covered by insurance during home assessments. Surveys were stored at the Environment Victoria office with FPF soft data stored on secure servers. Participant identities were hidden by allocating unique identifying and dwelling numbers. FPF ceased to contact participants when requested to do so, and any identifying documents were shredded in accordance with privacy requirements.

To manage risk, FPF employed an adaptive management approach, regularly assessing the project and addressing problems as they arose. When the FPF project was unable to engage with Maternal and Child Health nurses, the project focused on engaging groups likely to have a high proportion of parents with young children, so as to increase project diffusion. Workshops were shortened in response to community members voicing concern about workshop duration and format. Additionally, energy efficient information was reframed to emphasise increased comfort for children, for example the need to minimise drastic temperature differences between inside and outside to reduce likelihood of illnesses.

FPF worked closely with CALD communities and organisations to build strong relationships and understanding of CALD community priorities. FPF ensured that where possible, translated content was available and the project was delivered in a culturally appropriate manner (for example ensuring a female facilitator delivered a workshop to an Urdu women's group).

To minimise potential occupational hazards, assessors were given training on home assessment risk and potential responses to hazards (e.g. being aware of small children in the home, toys, faulty appliances and prioritising personal safety). Retrofit products provided to assessors were simple to install and did not require technical skills or installation tools, for example standby power controllers and draught seal tape.

6 FPF learnings

The following section discusses learnings which have are derived directly from FPF results, and identifies specific opportunities for improving the design and delivery of similar programs in future. These learnings have come from project participants (workshops, assessors and householders), cooperating organisations and FPF project officers' feedback.

6.1 Specific barriers and solutions

The major challenges and resolutions throughout delivery of FPF are summarised as:

Table 25 FPF Challenges and solutions

Challenges	Solutions
Overcoming sales perceptions: suspicion that anyone talking to them about energy wants to change their energy retailer.	Reinforce volunteer status, name badges for assessors and certificate for assessors. Use of own community members to bridge language and suspicion enables more effective collection of survey data.
Recruiting and training eligible participants	Use existing assessors' networks to recruit and train participants. Initially this yielded a small amount of referrals. Assessors were the provided with a $25 incentive to refer their family and friends. The incentive resulted in increased recruitment with a significant amount of assessors being recruited through this method
Retention of Assessors. A small number of assessors did not complete any home assessments. Reasons varied from changes in personal circumstances, starting full-time employment, lack of sufficient networks to find eligible participants, and loss of contact.	Provided recruitment strategies during training sessions and structured one on one post-training review sessions with each assessor. Ongoing support through phone calls, emails and face-to-face meetings should be regularly scheduled between the assessor and their trainer.
Restricted time with existing groups to engage parents	Design programs to fit into existing groups or activities, for example playgroups, English classes, mother's groups etc. These groups have well established networks and regular members that will allow projects to engage with their targeted participants in a timely manner. However programs will need to be flexible and adaptable to adjust to group differences, for example time variations, group dynamics, group demographics etc.
Reluctance to provide electricity data consent	Where possible, use non-intrusive measures such as electricity data from the distributor.
Participants with limited English language	Provide translators during trainings. Translate materials and use visual cues to enhance comprehension. Design material without

	assuming that participants are able to read spoken languages.

6.2 Data collection and measurement

FPF's decision to solely capture electricity consumption information was due to the relative ease and accessibility of that data. However this design limited FPF's ability to truly capture energy efficiency, as well as project savings and benefits.

Some 83 percent of Victorian households are connected to the gas mains, of which 97.1 percent of gas is used for household heating and water heating[20]. Victoria experiences cooler conditions than warmer conditions, therefore making gas a significant contributor to winter energy costs. Given reported decreases in heating temperatures and reduced and shower durations, not capturing gas usage reductions reduced the impact of FPF. Similarly, water saved from reduced shower durations signifies potential savings in water usage and water billing that was not captured.

Obtaining NMIs for electricity data was very difficult. Where relevant gas and water device numbers and consent can be collected without a lot of extra effort, for example when an assessor is already in the home and collecting an NMI, this should be considered. Gas and water data is valuable, but its collection should only be attempted by a project which has both the time and resources for collecting these numbers and consents, for the time consuming work of contacting retailers, and for analysing data which will often only come as quarterly figures.FPF measured energy saving through reduced average daily energy consumption. Many participants were unaware of their energy consumption and where to find the information on their energy bills. Consequently, participants were unaware of whether their usage would be considered efficient. When householders compared their own usage to others, high energy households were motivated to learn from and compete with low energy-using households.

Anecdotal feedback from community members indicated that total billing amount (i.e. financial cost) was more commonly used as an indicator of energy saving impacts, rather than actual consumption (as measured in kWh). However, as energy bills comprise a number of components including fixed supply charges and variable tariffs, changes in usage patterns do not directly correlate with changes in the total bill. Relying solely on energy bills to measure energy saving behaviours will therefore not capture the full impact of behaviour changes. As a consequence, participants can become demotivated to continue energy saving behaviour when their energy bills do not reflect their expectations.

Data collection and measurement recommendation

- In addition to electricity data, include the collection gas and water billing data, where the project has the resources to do this
- Emphasise average daily energy consumption
- Provide energy usage goals

[20] ABS, 2014, Environmental Issue: Energy use and Conservation, http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/4602.0.55.001main+features1Mar%202014

6.3 Assessor training

Training was usually two 4 hour sessions, but where participants weren't able to commit to this, it was run as one 8 hour session. It was conducted in an informal, conversational style. Training sessions were held in locations that were convenient for the majority of trainees, often close to public transport or within walking distance as some participants did not drive or were uncomfortable travelling to new environments. Child care and interpreters were provided when required, and culturally appropriate catering was provided where possible.

Participants reported that the training sessions were too long and should be shortened. Long training sessions were compounded by the participants' lack of familiarity with classroom environments and consequently their difficulty with maintaining concentration. Trainers attempted to respond to assessors' comments by the incorporation of regular breaks and the use of interactive activities to alleviate some of the loss of concentration. However due to the large quantity of content to be delivered, it was not possible for facilitators to shorten the training sessions. It was also very difficult to get assessors to commit to training over three sessions, and where this was offered there would inevitably be people who would miss one session and need to catch up.

Participants were provided with handouts and factsheets during training sessions. The large amount of content to be delivered resulted in a large number of handouts, which at times left participants feeling confused and overwhelmed by the material. The majority of handouts were available only in English. This restriction, coupled with a lack of images and illustrations, reduced the effectiveness of the handouts for participants with limited English. Participants reported that the use of PowerPoint would have helped to overcome language barriers and improved their understanding of the materials.

The training provided an opportunity for facilitators and assessors to build rapport, resulting in the increased engagement with the program as demonstrated by the high rates of consent provided for electricity data collection. This rapport enabled facilitators to provide assistance throughout the program. Training in group settings extended this rapport between assessors, resulting in mutual support during trainings sessions. Despite the relationship between assessors and trainers, 18.9 percent of assessors did not complete any home assessments. Causes included changes in employment (obtaining full-time employment), changes to personal circumstances, difficulties recruiting eligible households and lack of post-training communication.

Training recommendations

- Where possible, training programs limited to two to three hour sessions to retention attention of participants.
- In order to capture the diverse learning styles of participants, utilise written, visual (PowerPoint) and auditory (videos) materials in trainings.
- Include hands-on activities to ensure that participants comprehend concepts and become familiar with retrofit products
- Provide translated handouts with illustrations of key concepts and targeted behaviours.
- To increase home assessments per assessor, complete a home assessment as part of the training

6.4 Surveys

The inclusion of a long survey was a barrier to participants' engagement with the project. The survey was particularly inappropriate for short workshops, where participants were commonly unaware of the workshop or the group coordinator (e.g. playgroup coordinator) did not advise participants of the survey prior to the workshops. The fact that many participants had not self-selected to attend the workshops further added to their reluctance to complete surveys.

Furthermore, many participants were unable to independently complete the surveys due to their low levels of English literacy. Even when surveys were translated, the lack of direct translations for some key terms (such as solar panels) created confusion for participants, while the length of the survey continued to represent a barrier to completion.

Lastly, assessors were uncomfortable with asking questions relating to personal circumstances such as income. Some assessors did not understand why we included questions relating to attitudes, and hence did not prioritise the collection of data on those issues they did not consider significant.

Survey recommendations

- Limit survey length to one or two pages in workshops
- Clearly mark voluntary questions
- Provide translated surveys

The surveys were too long and language is too complicated. Even with the translated surveys, the workshop was not an appropriate setting. A 1 page survey would be more appropriate in this environment. English language teacher.

6.5 Energy action plan

The energy action plan provided participants with a tool for energy specific information and actions, coupled with associated dollar savings. Participants responded positively to the energy action plan, liking that the plan acted as a reminder tool in their busy schedules. Participants emphasised the importance of having dollar figures for each action as a motivator for energy saving.

Translated energy action plans enabled broad participation in the project. Despite translations, some participants (particularly CALD participants) found the energy action plan too wordy and poorly translated. Pictures accompanying actions would have aided in solidifying comprehension of recommended behaviours, particularly for newly arrived migrants who may not have been familiar with some of the actions. However there is a trade-off between adding pictures and fitting in enough words, as the energy action plan attempted to fit the most important suggestions on one page, so that it could be read when stuck to a fridge.

The energy action plans were designed to be placed in a communal living area to facilitate the spread of behaviour change throughout the household and establish new norms of behaviour. FPF did not report against the use of the energy action plan in follow up surveys and hence the impact of energy action plans needs to be further explored.

Energy action plan recommendations

- Consider including icons or pictures to accompany specified behaviours
- Determine frequency of Energy Action Plan use in follow ups (if this can be done without making follow up surveys too long)

6.6 Energy saving workshops

> "*Bit patronising, and took up some of my valuable and limited play time with my son",* Workshop participant.

Once-off energy saving workshops were delivered to a range of groups and classes. Regardless of eligibility, all participants in the group or class were welcome to participate in the workshops. Workshops provided a good opportunity to convey simple energy saving messages in a relatively short time, promote and recruit assessor training, and provide access to a large number of participants. Adult English classes were particularly successful as participants were accustomed to a learning environment. Teachers who indicated an interest incorporated energy saving workshops into the class and hence ensured the continuation of the conversation and learning.

Parent groups and playgroups were not ideal for the delivery of workshops due to the limited time available to engage with parents. Some participants were displeased with the workshop as it intruded on their time with their children. The environment with children additionally posed challenges as parents' attention was often diverted and noise from children made it difficult for parents to hear and concentrate.

The significant quantity of workshop content did not fit with environments with young children. Due to time constraints, not all planned workshop material was delivered. Workshop content was adjusted to gain the interest of parents and demonstrate impact of energy efficient behaviours.

Workshops required substantial amount of resources, which often did not yield beneficial outcomes. Project officers utilised significant resources, building relationships prior to booking workshops. When workshops were organised, eligible participants were often present in low numbers. Although low-income areas were selected to increase the chances of engaging participants who were eligible to participate, the presence of mixed income groups and parents with older children made determining eligibility prior to workshops problematic. Playgroups often consisted of eligible participants, however parents' attention was limited due to the need to supervise their child. When a playgroup coordinator was present, they were often unable to fully supervise the children for the full workshop duration.

Once-off workshops did not enable a rapport to be developed, which made the task of gaining consent for the collection of electricity information data and follow up surveys challenging. Incentives such as prize draws and gift vouchers increased response rates. However the low responses and continued difficulties collecting electricity information data suggest that one contact does not establish sufficient rapport to develop trust.

The project experimented with different workshop formats and lengths, but had no success in getting existing groups to agree to a series of workshops instead of a one-off session. However this could be explored further with groups other than playgroups and mothers' groups. Another option would be to have repeat contact with individual participants via other means, such as phone calls to offer tailored energy advice.

Energy saving workshop recommendations

- Facilitate a range of workshop lengths and content to suit a variety of group types
- Where possible, consider two or more short workshops focused on energy behaviours and activities. This will enable formation of relationships and possibly an increase in follow up responses and electricity data collection
- Continue working with group facilitators to encourage the continuation of energy saving discussions after the workshop
- Continue working with English classes

6.7 Home assessments

Home assessments were conducted by FPF trained energy assessors. Home assessments allowed participants to receive simple and practical, low-cost energy saving information in the comfort of their homes. Using the peer-to-peer model, assessors were able to utilise their existing networks to engage with a large number of householders. CALD assessors were particularly effective networkers; the majority of home assessments were conducted in CALD households.

Assessors reported a variety of difficulties with home assessments. Surveys were too long and some questions were inappropriate (e.g. age of householder). Some assessors reported that householders did not allow them enough time to conduct more than the minimum home assessment.

Assessors from non-CALD backgrounds reported difficulties recruiting eligible homes to complete the home assessment. Assessors were given three months to complete home assessments. However, as many assessors took longer than this period to complete (or at times commence) home assessments, trainers expended significant amounts of time pursuing assessors for paperwork.

Home assessment surveys were done on paper (rather than online tools). This was a deliberate decision, as attempting to supply equipment and IT support to such a large and diverse group of assessors would have been extremely complicated. However paper surveys created a backlog of data entry and subsequent delays in data processing. It also increased the probability of data entry errors.

Home assessment recommendations

- Provide greater assessor support post-training to maintain their motivation.
- Give the option of completing home assessment surveys online to assessors who have their own equipment and sufficient IT skills
- Support renters by empowering them to approach their landlords regarding energy efficiency changes

6.8 Retrofit products

Retrofit products are an effective tool for addressing barriers to saving energy. Thermometers aided in dealing with non-temperature controlled heaters and coolers, timers measured shower duration and stickers helped remind participants of energy saving behaviours. Shower timers and thermometers were popular retrofit items with a minimum of 70 percent of participants who reported having received them reporting ongoing usage. Energy saving stickers were the least popular item.

Standby power controller devices (FutureSwitch or Eco Switch) were the most popular retrofit product accepted by assessors and home assessment participants, despite some participants already owning one. It is assumed this is because some participants may have viewed SPCs as a more technologically advanced object, and hence chosen it based on its perceived desirability rather than household need.

Participants reported difficulties with the use of Heatermates, particularly selecting heating mode and setting room temperatures. Issues with Heatermates were addressed by providing simple instructions and hands-on training for assessors.

Draughts account for about 25 percent of winter heat loss and 12 percent of summer heat gains in Victorian homes. Caulking, sealing gaps and cracks can reduce air leakage by 21 percent[21]. Although draught seal tape was the product with the greatest potential to reduce energy costs, it was not as favoured by participants as standby power switches. Participants' lower demand for draught-sealing tape may be attributed to a perceived lack of value and uncertainty about applicability. Gap filler was supplied in year one, but had a very low take up rate, seemingly because it was seen as too much effort to use.

Retrofit product recommendations

- Place greater emphasis on the importance of draught proofing in trainings
- Do not include standby power controllers
- Greater training on use of Heatermates
- Mandatory provision of draught tape for each householder

6.9 Cooperating organisations and recruitment

FPF collaborated with a variety of organisations throughout all stages of the program. These partnerships were instrumental to the success of FPF and assisted in all levels: connecting to community groups, promoting through networks, recruiting assessors and workshops, and providing feedback when working with specific community groups. The process of recruiting cooperating organisations demanded significant resources, often involving cold calling organisations, following up with program officers, and experiencing long delays in responses.

Flyers were used to promote the program. Flyers were placed in local council e-newsletters, community notice boards and distributed through community groups. Flyers were useful in communicating the project to community organisations, but were generally ineffective in converting

[21] Sustainability Victoria 2014, Victorian Households Energy Report

community members to participants. Few participants responded to flyers, possibly due to the lack of face-to-face interaction and their unfamiliarity with Environment Victoria as an independent organisation.

Cooperating organisations and recruitment Recommendations

- Network with a variety of organisations to facilitate promotion and engagement beyond traditional partnerships
- Visiting organisations and groups for one-to-one conversations breaks downs barriers and enables personalised recruitment
- Flyers were generally ineffective in recruitment of participants. Where possible, face-to-face interactions delivers outcomes

6.10 VEET products

FPF worked with four VEET installers to encourage participants to take up free energy saving devices under the VEET program. Unfortunately none of the VEET installers were able to deliver products in a timely manner, if at all. This reflected poorly upon FPF, with some participants becoming disengaged with the project. FPF did not enter into a contract with the VEET installer and hence, although they had stated that they would contact participants, they were not contractually obliged to provide the free energy saving devices.

Failure to deliver VEET products was due to a variety of reasons:

- Low profit margins in the VEET scheme meaning that installers didn't bother contacting participants unless they wanted numerous VEET items and/or were close to other households wanting items;
- Poor communication from VEET installers, who failed to communicate above requirements and most of whom failed to report extremely low installation rates except when explicitly asked by Environment Victoria;
- Lack of a local VEET installer, particularly in regional areas;
- Low English skills on part of householder;
- Householder did not respond when VEET installer called;
- VEET installer no longer provided specific energy saving devices.

Upon consistent failures to connect participants with VEET providers, we asked participants to directly contact the organisations to arrange for the VEET products to be installed. Some participants received this advice six months after initial engagement, and some even a year later. Due to this significant delay, participants either lost interest or forgot that they requested installations. We did not follow up with participants if direct contact achieved greater success in booking VEET replacements.

VEET installer recommendations

- Ensure that organisations understand the operation and capacity of the VEET providers prior to undertaking a partnership
- Clarify minimum number of VEET products for a call out

6.11 Barriers facing renters

Throughout the course of the project, participants of all groups reported that it was difficult to communicate with landlords. Participants expressed dissatisfaction with their limited capacity to make energy saving changes and hesitation in regards to creating conflict with landlords. Renters' apprehension was particularly evident when participants refused VEET products if landlord permission was required.

Future projects could provide training on communicating with landlords. However it should be noted that other organisations (e.g. the Alternative Technology Association) have found renters in general struggle to get basic household repairs done and are very reluctant to approach landlords about anything "extra" like energy issues. Newly arrived renters with limited English, especially in tight rental markets like Melbourne, are even less likely to be willing to "rock the boat".

"I'm currently renting. I do not have much choice". Home Assessment Recipient

Rental barrier recommendations

- Provide information on rights of renters and on which actions they can take without their landlord's permission
-

7 Conclusion

FPF trialled and demonstrated approaches to embedding energy saving behaviours in households of new parents. FPF engaged 6,133 participants across 15 municipalities in metropolitan Melbourne, the Wimmera, the Latrobe Valley, Geelong and Central Victoria to take up energy saving behaviours over a three-year period. A total of 392 participants were trained in home energy assessments, 4,322 householders received home energy assessments and 1,233 individuals attended an energy saving workshop.

New parents commonly are time poor due to extensive resources required to parent young children. Consequently new parents often do not have the time or motivation to access energy efficient information.

Traditional forms of educational programs typically have limited resonance with low-income and CALD households, particularly if they are not designed to address the specific barriers preventing these groups from participating. Such barriers typically include language (low English proficiency), literacy (including low literacy in first language), lack of access to or proficiency in the use of online tools and resources, cost/affordability, cultural differences (including food preferences, wariness of government/official services based on negative past experiences), family responsibilities (particularly care for young children), distance (including cost and difficulty of travel), gender roles and reluctance to access services in unfamiliar or intimidating settings.

The FPF trial demonstrated that information must be relevant and be presented in a manner which appeals to new parents. When directed to marginalised and disadvantaged groups, it is essential that information is premised on empowering householders to take up energy saving actions. Furthermore, it is essential that participants are provided with tools to address potential barriers and challenges to creating sustained change.

Home assessment recipients significantly reduced their energy consumption, demonstrating the effectiveness of peer-to-peer home assessments as an innovative energy efficiency tool compared with 'lighter' interventions such as once-off workshops and the over and the provision of retrofit products alone. Peer-to-peer home assessments further highlight the effectiveness of face-to-face interactions in engaging CALD communities by overcoming language and cultural barriers.

Participants who underwent assessor training did not achieve statistically significant reductions in energy use. This result may be due to their low baseline energy use prior to training and the likelihood that, as people motivated enough to self-select for assessor training, they had already implemented many of the cheap and easy energy-saving behaviours promoted through the FPF program.

This points to the limits of behaviour change intervention alone in the absence of physical improvements to the home (i.e. installation of energy saving retrofit products such as efficient lighting, draught proofing etc.). Workshop participants demonstrated the smallest degree of change across energy saving behaviours, although the lack of quantitative data collected from workshop participants prevents conclusive statements being made about whether observed behaviour change translated into reduced energy use.

Both households with young children (0-3 years) and older children (4-15 years) achieved reductions in energy consumption. Households with younger children reduced their energy use by 10.78 percent, while households with older children reduced their energy use by 4.40 percent. This would suggest that despite limited spare time, householders with younger children have the ability to reduce their energy use if provided with tailored information and adequate tools.

Though attempts were made to ensure data robustness, insufficient electricity consumption data was collected from workshop participants. Furthermore, the removal of incomplete control group surveys reduced confidence in conclusions drawn from control group behavioural responses. Where sufficient energy consumption data was available, it acted to mitigate self-reporting biases and incomplete survey responses. Further long-term analysis is required to measure the longitudinal outcomes of FPF.

The project exceeded its targets in terms of program delivery, and achieved demonstrated changes in energy use behaviour by participants. However the impact of behaviour change programs such as FPF on specific measures of energy affordability such as cost savings can be more difficult to quantify.

Nevertheless, key conclusions from the Future Powered Families program can be summarised as follows:

- Behaviour change programs, which are designed to specifically target the barriers preventing households from implementing energy saving actions within their homes, can be effective in achieving statistically significant reductions in energy consumption;
- A peer-to-peer learning model is an effective way of addressing the key barriers preventing culturally and linguistically diverse (CALD) communities and other disadvantaged or time-poor households (such as low-income households or young families) from accessing energy saving information.
- Home energy assessments, coupled with peer-to-peer learning is an effective tool in delivering personalised information to householders, particularly disadvantaged or 'hard to reach' groups.
- Behaviour change is a necessary but not sufficient tool for achieving significant and sustained reductions in energy consumption. Once the 'low hanging fruit' or the cheap and easy changes in behaviour have been implemented, there is limited scope for achieving significant further reductions through behaviour change alone. This was demonstrated by the relatively small reductions achieved by the assessor group of participants;
- Achieving further sustained savings through the widespread installation of energy-saving retrofit products in the home depends on there being a seamless process (imposing very little time and monetary cost to the householder) linking the behaviour change program with follow up retrofit installation;
- Programs such as FPF, based on community development principles, can deliver important co-benefits which go beyond the primary energy-saving objectives. By integrating community participation and support for individual development, there is anecdotal evidence that FPF contributed to improved financial literacy, the development of friendships beyond cultures and an increase in community networks of assessors. We conclude that these project outcomes contributed to building the capacity of participating communities to tackle future challenges.

8 Future policy and program opportunities

These findings of the Future Powered Families project have implications for a number of policy issues beyond the scope of this behaviour change trial. These issues should be considered in the

delivery of future policies and programs to promote energy conservation amongst low-income and disadvantaged groups.

These policy issues are discussed in terms of further opportunities for assisting low-income and disadvantaged groups manage their energy use, and suggestions for future resource efficiency programs.

8.1 Program accessibility

The *Future Powered Families* project engaged 'hard to reach' groups such as families with children under the age of 15 and newly arrived migrant households from culturally and linguistically diverse backgrounds. These groups were identified as being unlikely to be reached by mainstream efficiency awareness programs, and hence were in need of a targeted approach.

The FPF project demonstrated that improving accessibility is key to successfully engaging people in behaviour change programs. The FPF project enhanced accessibility by systematically identifying and addressing the barriers preventing access to mainstream services,[22] thereby providing dignity and allowing people to feel comfortable to attend the workshops (assessor training and energy-saving workshops).

Future community awareness and education programs should not assume that all community members have an equal opportunity to participate, and be designed to explicitly identify and address the barriers that prevent some members of the community from accessing resources. Accessibility is enhanced through:

- Adopting a peer-to-peer learning model. Training people to teach their friends and family helps to overcome trust, language and cultural barriers, as information communicated by peers has greater credibility and resonance. Peer-to-peer learning helps to shift social norms, working to perpetuate the spread of behaviour change messages through the target community beyond the life of the program intervention;
- Providing child care that is culturally sensitive (e.g. allowing people to select their own child carers or using providers from within participants' own community);
- Providing catering and ensuring that it is culturally sensitive and appropriate;
- Providing interpreters;
- Having written materials translated into relevant languages;
- Using graphics and images to cater for low literacy levels (including being aware that people are not necessarily literate in their own spoken language)
- Going to participants rather than asking participants to come to an unknown location; and
- Valuing participants' time and contribution by providing rewards, incentives and nominal payments.

[22] For example: https://aifs.gov.au/cfca/publications/are-disadvantaged-families-hard-reach-engaging-disadva

8.2 Energy bill comparisons

Maintaining motivation is a critical factor in successful behaviour change programs. People need to see the impact of their actions, and for that impact to be commensurate with effort in order to feel motivated to continue.

The energy saving workshops delivered through FPF emphasised the potential monetary savings to be made by reducing energy consumption. For many participants this provided sufficient motivation for them to act on the advice they were given.

However, many low-income participants in FPF were already low consumers of energy and so the potential savings were limited. The relatively high proportion of fixed charges within electricity bills also reduced the scope for reductions to translate into meaningful bill savings.

It therefore may be useful for future programs to consider additional and complementary forms of motivation. For example, the format of energy bills could be changed to indicate a target use, similar to the 'Target 155' schema recently re-introduced for water bills in Victoria,[23] to give households a better sense of where they sit on the spectrum of energy use. Anecdotal feedback from FPF participants indicated that many households were unaware of how their usage compared with others, and that discovering their usage was relatively high helped to motivate action. The current bill format, which provides only a comparison with average usage in the area does not provide sufficient motivation for action, as in many areas this average is likely to be higher than it should be.

The energy usage target should be based on a baseline per house plus a usage amount per person to take into account differences in household size.

8.3 Comprehensive, integrated behaviour change and retrofit programs

The FPF project has demonstrated that behaviour change is a necessary but not sufficient tool for achieving significant and sustained reductions in energy consumption. Once the 'low hanging fruit' or the cheap and easy changes in behaviour have been implemented, there is limited scope for achieving significant further reductions through behaviour change alone. This is particularly relevant where poor quality housing is a dominant factor contributing to high energy use.

Consequently, future programs targeting energy hardship in low-income groups should build on the success of behaviour change programs such as FPF, but go further to support the installation of relatively low cost/high impact measures such as insulation, efficient lighting and draught-proofing.

There are numerous examples of successful household retrofit programs in place around the world, including:

- The Warm Up New Zealand programs have installed insulation in more than 275,000 homes since 2008, delivering net benefits of $1.2 billion, largely through savings in hospitalisation costs and reduced mortality rates for vulnerable groups;[24]
- Germany's CO2 Building Renovation Programme has provided very low interest loans to fund the efficiency refurbishment or construction of more than 3.8 million homes since 2007;[25]

[23] http://www.vic.gov.au/news/target-155.html
[24] Energy Efficiency and Conservation Authority, at https://www.eeca.govt.nz/about-eeca/our-goals-and-progress/#residential

- The California FIRST program in the US offers low-cost finance through a Property Assessed Clean Energy (PACE) scheme to residential property owners to fund efficiency upgrades.[26]

However, as has been demonstrated by the difficulties encountered by FPF in engaging with the Victorian Energy Efficiency Target (VEET) scheme, it is critical that retrofit programs integrate seamlessly with behaviour change programs so as to minimise the cost and time barriers to householders.

To maximise effectiveness and ensure government investment delivers highest impact outcomes, future efficiency programs should be designed to deliver a comprehensive and integrated suite of services:

- Completion of a home assessment delivered via a trained assessor or self-assessment tool;
- Use of the resulting energy saving plan by householders and landlords to access low-cost finance for retrofitting works, or in the case of eligible homeowners (low-income, elderly, retailer hardship customers etc) to access free retrofits (funded through schemes such as VEET, government-retailer co-finance arrangements, or other innovative financing models such as Environmental Upgrade Agreements);
- Delivery of programs in partnership with local organisations (such as local government and community organisations) and with local businesses. This aims capitalise on existing trusted relationships and expertise, maximise economies of scale by limiting geographic area, and ensure timely program delivery.

More detail on how comprehensive, integrated retrofit programs could be delivered so as to achieve a widespread improvement in the efficiency of our building stock and a sustained reduction in energy use, is outlined in Environment Victoria's recent publication "Six Steps to Efficiency Leadership".[27]

8.4 A role for improved standards

Behaviour change programs such as FPF are most effective where households have the adaptive capacity to use the new information to address a problem with payment or high usage.

However, those households who cannot afford to upgrade their appliances or make other energy saving improvements such as low-income households and renters, have limited adaptive capacity to reduce their consumption without assistance.[28] In these situations, behaviour change programs are a necessary but not sufficient response to problems with payment.

Feedback from participants in the FPF project indicated that a major barrier preventing renters from taking action to save energy was fear of approaching landlords to request (even small) changes to make the property more energy efficient or sustainable. However, the low rates of participation by

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[25] German Federal Ministry for Economic Affairs and Energy, CO2 Building Renovation, http://www.bmwi.de/EN/Topics/Energy/Buildings/kfw-programmes.html

[26] CaliforniaFIRST, https://californiafirst.org

[27] Environment Victoria (2015) "Six Steps to Efficiency Leadership: The path to energy and water efficient homes and businesses", at http://environmentvictoria.org.au/efficiency-leadership

[28] ESC (2015b) *Supporting customers, avoiding labels. Energy Hardship Inquiry Draft Report*, Essential Services Commission, September 2015, p. 79

landlords in recent schemes such as the federal Home Insulation Program – even when participation came at zero cost – is evidence that landlords currently have little incentive to voluntarily invest in efficiency improvements to their properties.[29]

Effectively addressing the 'split incentive'[30] facing renters and landlords requires the introduction of minimum standards at the point of lease, combined with the establishment of complementary financing mechanisms to enable landlords to meet standards. The minimum standard should initially be set at a relatively low and achievable level (thus requiring upgrade of only the worst-performing properties) but should progressively increase over time to ensure all renters benefit. Proactive steps would need to be taken to protect tenants from unreasonable rent increases, and appropriate enforcement mechanisms would need to put in place to ensure compliance.

This policy shift is being strongly advocated by key groups representing renter and low-income groups, such as the Tenants Union of Victoria and the Victorian Council of Social Service, as part of the Victorian government's current review of its residential tenancy legislation.[31]

8.5 Programs for people before they reach financial hardship

The incidence of energy hardship (difficulty paying bills or rationing) has been steadily increasing in Victoria over the past five years (from 24,122 in 2009-10 to 33,673 in 2013-14). Disconnections for non-payment, as well as the average debt on entry (to the hardship program) have also been increasing.[32]

While the FPF program did not specifically collect financial data from participants, anecdotal feedback indicated that many participating households were experiencing hardship but were receiving little practical assistance to reduce energy use. The FPF results demonstrate that low-income households consume significantly less energy than average and yet still experience energy-related financial stress.

Without intervention to increase the capacity of hardship customers' to pay (through increased financial assistance), and/or reduce consumption (through retrofitting and appliance replacement), energy hardship and disconnection rates are likely to continue to worsen.

However, current hardship programs provided by Victoria's energy retailers focus primarily on providing assistance (payment plans) to customers once they are in difficulty, rather than proactively addressing the underlying causes of their inability to pay at an earlier stage.

The recent Victorian government inquiry into energy retailer hardship programs concluded that "By the time many customers are admitted to a hardship program, it is too late. Their indebtedness is irretrievable."[33] The Inquiry has recommended that retailers make available a wider range of forms

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[29] Lovering, M 2013, 'Can low-income tenants rent an energy efficient home?', AHURI Evidence Review 040, www.ahuri.edu.au/housing_information/review/evrev040

[30] Renters have little incentive to invest in upgrades because of limited and insecure tenure and will not reap the benefits of improved asset value, while landlords have little incentive to install measures which support efficiency because they are not responsible for paying utility bills.

[31] See http://fairersaferhousing.vic.gov.au/public-submissions/documents

[32] ESC (2015a) *Inquiry into the Financial Hardship Arrangements of Energy Retailers. Our Approach*, Essential Services Commission, March 2015, p. 34

[33] ESC (2015b) *Supporting customers, avoiding labels. Energy Hardship Inquiry Draft Report*, Essential Services Commission, September 2015, p. iii

of assistance for customers experiencing payment difficulty, including improved information services to assist with energy use self-management.[34]

While providing assistance for customers in temporary hardship is an appropriate role for retailers, tackling chronic unaffordability and the underlying causes of high usage should be a responsibility shared with government.

Future efficiency programs should be targeted towards preventing people reaching a state of hardship in the first place, rather than focusing primarily on assisting people through payment plans once they are experiencing difficulty.

Government should explore opportunities for partnering with retailers to co-finance comprehensive efficiency and renewable energy retrofits for customers experiencing or at risk of hardship.[35]

[34] ESC (2015b) p. 108

[35] Environment Victoria (2015) "Six Steps to Efficiency Leadership: The path to energy and water efficient homes and businesses", at http://environmentvictoria.org.au/efficiency-leadership

9 Appendices

Appendix A: Cooperating organisations

Action on Disability within Ethnic Communities Inc. (ADEC)
Albanvale Community Centre
Alexander Magit Playgroup
Alexander Magit Pre-school
AMES Box Hill
AMES Footscray
AMES St Albans
AMES Werribee
Anglicare Broadmeadows
Anglicare Hall Yarraville
Arabic Welfare Inc.
ASHE Shepparton - Academy of Sport Health and Education
Association of Havaras in Victoria
Australian Vietnamese Women's Association
Australian Mesopotamian Women Association
Ballarat Secondary College
Ballarat TAFE
Banksia Gardens Community Services
Banyule Community Health
Baptcare Bendigo
Barwon Child, Youth & Family
Bayside Children's Centre
Belvedere Community Centre
Bendigo Community Health
Bendigo Karen Community
Bendigo Neighbourhood House
Bendigo Sustainability Group
Bendigo TAFE
Berry St, Saver Plus, Casey and Cardinia
Berry St, Saver Plus, Dandenong
Berry St, Saver Plus, Frankston
Bethal Primary School
Boori Children's Centre Epping
Braybrook Community Centre
Brimbank City Council
Brimbank Melton Community Legal Centre
Brotherhood of St Laurence
Campbellfield Heights Primary School
Carringbush Adult Education
Carrum Uniting Church
Castlemaine Community Church
Castlemaine Community House
Central Victorian Greenhouse Alliance
Charles La Trobe College
Children's Protection Society
City Life Church Wantirna South
City of Casey
City of Greater Dandenong
City of Whittlesea
Clarinda Community Centre
Clayton Women's Friendship Café
cohealth
Community West
CUAC - Consumer Utilities Advocacy Centre
Dandenong Primary School Hub
Dandenong West Primary School Hub
Darebin Council
Darebin Emergency Relief Network
Darebin Ethnic Communities Council
Darebin Youth Services Northland
Delacombe Learning & Education Centre
Diversitat
Djerriwarrh Community and Education Services
Doveton College
Drummond Street Services
Duke St Community House
Eaglehawk Community House
East Africa Women's Foundation
ecoMasters
Elizabeth Drive Maternal & Child Centre
Encompass Church
Epping Views Primary School Playgroup
Family Care, Shepparton
Fawkner Community House
Fawkner Primary School
Federation College
Federation University, Ballarat
Footscray Community Legal Centre Inc.
Frankston City Council
Frankston Women's Friendship Café
Geelong City Council
Gembrook Playgroup
Gladstone Park Primary School
Good Shepherd House
Goulburn Ovens TAFE
Hampton Park Women's Friendship Café
Happy Families Playgroup Banyan Fields
Haven Home Safe
Heathcote Community House
Highway Christian Church
HIPPY Frankston

Hobsons Bay Council
Holy Child Primary School
Holy Eucharist Primary School
Hume City Council
Iramoo Community Centre
ISIS Primary Care
Jan Wilson Community Centre
Jesuit Community College Flemington
Kangaroo Flat Community House
Keon Park Maternal & Child Centre
Keysborough learning centre
Keysborough Primary Hub
Kildonan
Kingston City Council
Knox emergency relief network
Lahinch St Maternal & Child Centre
Lalor Library
Lalor Living and Learning
Lentara Uniting Care Sunshine
Little Apples Playgroup
Lyndhurst Secondary College
Mackillop Family Serves Epping North
Mackillop Family Services Footscray
Maldon Neighbourhood Centre
Maribyrnong City Council
Meadow Heights Learning Centre
Meadow Heights Primary School
Melbourne City Mission
Melbourne Polytechnic Broadmeadows
Melbourne Polytechnic Collingwood
Melbourne Polytechnic Epping
Melbourne Polytechnic Preston
Melton City Council
Melton Shire Maternal and Child Health
Melton South Community Centre
Merinda Park Community Centre
Merri Community Health Services Ltd.
Migrant Information Centre Eastern Melbourne
Migrant Resource Centre North West Region
Mill Park Library
Mission Australia, Dandenong
Moe Maternal and Child Health Centre
Moreland City Council
Morwell Maternal and Child Health Centre
Mt Alexander Shire Council
Mt Alexander Sustainability Group
Mt Carberry Children's Centre
AMES- The Multicultural Hub
New Hope Foundation Werribee
Nhill Kindergarten
Nhill Neighbourhood House
Noble Park Community Centre
Noble Park Primary Hub
Old Church on the Hill, Bendigo
Olympic Adult Education
Orwell St Community Centre
Phoenix Youth Centre
PRACE Preston
Preston Neighbourhood House
Redwood Community Centre
Reservoir 3 Maternal & Child Centre
Riviera Playgroup Seaford
Roxburgh Park Primary School
Salvation Army Gower Street Preston
Salvation Army, Sunshine
Shire of Mornington Peninsula
Sisterworks
Spectrum Migrant Resource Centre Sunshine
Springside Children's Community Centre
Springvale Indo-Chinese Association
Springvale Rise Primary School Hub
Springvale Services for Children
Springvale Women’s Friendship Café
St Aydan’s Church
St Albans Heights Primary School
St Domenic Primary School
St Marks Primary School
St Martin de Pores Catholic School
St Mary's The Ancient Church of the East
St Peters Primary School Epping
Stevensville Primary School
Sustainable Futures Australia
Swinburne Croydon
Sydenham Neighbourhood House
Tarcoola Pre-school
The Grange Community Centre
The Smith Family
Thomastown Library
TLC Church Bayswater
Traralgon Maternal and Child Health Centre
Tweddle Child and Family Health Services
UnitingCare ReGen
Upper Plenty Regional Libraries
Upper Yarra Family Centre - Yarra Ranges
VICSEG New Futures
Vietnamese Carer Support Group
Warburton Christian Playgroup
West Footscray Neighbourhood House
West Sunshine Community Centre
Westall Kindergarten
Western Community Legal Centre

Westvale Community Centre
Whittlesea Community Connections
Whittlesea Library
Women's Health North
Woodend Neighbourhood House
Wyndham Community and Education Centre
Wyndham City Council
Wyndham Park Community Centre
Yarra City Council
Youth Resource Centre, Hoppers Crossing

Appendix B: Balanced panel model

$$\boldsymbol{Y_{it} = \alpha_i + \rho Y_{it-1} + \beta_1 Max_t + \beta_2 Min_t + \beta_3 {Max_t}^2 + \beta_4 {Min_t}^2}$$
$$\boldsymbol{\beta_5 DC_{it} + \beta_6 DH_{it} + \beta_7 DA_{it} + \varepsilon_{it}}$$

Y_{it} is the observed daily power consumption for household *i* at time *t*.
α_i controls for the individual household fixed effect.
ρY_{it-1} accounts for temporal dependence in the data.
Max_t and Min_t are the maximum and minimum temperature at time *t*.
${Max_t}^2$ and ${Min_t}^2$ are their squared values respectively.
DC_{it}, DH_{it}, and DA_{it} are dummy variables that indicate the intervention groups (Control, Household assessment and Assessor training, respectively) for household *i*.

Appendix C: Reported energy behaviours

Does your heating system allow you to heat some rooms and not others?

2013-2015 Control	Baseline
Yes, I can heat some rooms and not others	3.1%
No, my heating system heats most of house or none of it	6.3%
I don't know	0.8%
No response	89.8%
2013-2015 Workshops	**Baseline**
Yes, I can heat some rooms and not others	5.5%
No, my heating system heats most of house or none of it	4.8%
I don't know	1.3%
No response	87.7%
2013-2015 Assessors	**Baseline**
Yes, I can heat some rooms and not others	11.2%
No, my heating system heats most of house or none of it	7.6%
I don't know	2.4%
No response	78.7%
2013-2015 Households	**Baseline**
Yes, I can heat some rooms and not others	7.2%
No, my heating system heats most of house or none of it	7.2%
I don't know	4.5%
No response	81.1%

How often does this include cooling rooms with no-one in them at the time?

2013-2015 Control	Baseline	Follow up	Percentage Change
Always (whenever cooling is on)	14.8%	No data	
Most of the time	1.9%		
Sometimes	18.5%		
Never (cooling only used when people are in the room)	40.7%		
Not applicable	16.7%		
No Response	7.4%		
2013-2015 Workshops			
Always (whenever cooling is	4.8%	13.3%	175.2%

on)			
Most of the time	5.3%	0.0%	-100.0%
Sometimes	12.8%	13.3%	4.4%
Never (cooling only used when people are in the room)	20.7%	33.3%	61.0%
Not applicable	10.6%	6.7%	-36.9%
No Response	45.8%	33.3%	-27.2%
2013-2015 Assessors			
Always (whenever cooling is on)	3.5%	0.0%	-100.0%
Most of the time	1.8%	0.0%	-100.0%
Sometimes	8.8%	0.0%	-100.0%
Never (cooling only used when people are in the room)	18.4%	13.4%	-27.1%
Not applicable	4.4%	1.5%	-66.0%
No Response	63.2%	85.1%	34.7%
2013-2015 Households			
Always (whenever cooling is on)	4.7%	Do not have 2013 data, small follow up sample size	
Most of the time	2.1%		
Sometimes	5.0%		
Never (cooling only used when people are in the room)	16.5%		
Not applicable	4.0%		
No Response	67.7%		

Use of dryer

Dryer Usage	Winter		Summer	
2013-2015 Workshops	**Baseline**	**Follow up**	**Baseline**	**Follow up**
Seven or more times a week	4.7%	0.0%	2.5%	0.0%
Four to six times a week	4.3%	4.6%	1.2%	0.8%
One to three times a week	12.8%	20.0%	4.8%	4.6%
Less than once a week	9.8%	9.2%	12.1%	13.8%
I don't have or use a tumble dryer	57.2%	63.1%	65.5%	77.7%
No Response	11.2%	3.1%	13.8%	3.1%
2013-2015 Assessors	**Baseline**	**Follow up**	**Baseline**	**Follow up**
Seven or more times a week	1.1%	0.0%	1.1%	0.0%
Four to six times a week	3.2%	1.0%	2.2%	0.0%
One to three times a week	5.8%	10.4%	4.5%	4.2%
Less than once a week	7.9%	8.3%	10.7%	8.3%
I don't have or use a tumble dryer	66.7%	70.8%	72.5%	79.2%
No Response	15.3%	9.4%	9.0%	8.3%
2013-2015 Households	**Baseline**	**Follow up**	**Baseline**	**Follow up**
Seven or more times a week	2.0%	0.9%	1.5%	0.9%

Four to six times a week	6.7%	2.1%	2.8%	1.2%
One to three times a week	11.0%	15.5%	5.8%	6.1%
Less than once a week	8.1%	7.6%	11.7%	8.8%
I don't have or use a tumble dryer	67.2%	64.3%	72.9%	72.9%
No Response	4.9%	9.5%	5.3%	10.1%
2013-2015 Control	**Baseline**	**Follow up**	**Baseline**	**Follow up**
Seven or more times a week	1.8%	0.0%	0.6%	0.0%
Four to six times a week	6.0%	7.7%	0.0%	0.0%
One to three times a week	24.4%	21.2%	9.5%	7.7%
Less than once a week	8.3%	13.5%	14.9%	19.2%
I don't have or use a tumble dryer	45.8%	51.9%	61.3%	67.3%
No Response	13.7%	5.8%	13.7%	5.8%

Replacing electric hot water

This question was removed in project year two.

2013-2015 Control	**Baseline**	**Follow up**
Yes	9.3%	Insufficient sample size
No	72.2%	
I Don't know	1.9%	
No Response	16.7%	
2013-2015 Workshops	**Baseline**	**Follow up**
Yes	0.4%	Insufficient sample size
No	8.2%	
I Don't know	3.8%	
No Response	87.7%	
2013-2015 Assessors	**Baseline**	**Follow up**
Yes	1%	No data
No	22%	
I Don't know	5%	
No Response	73%	
2013-2015 Households	**Baseline**	**Follow up**
Yes	1.3%	No data
No	21.3%	
I Don't know	4.3%	
No Response	73.3%	

Installed insulation

2013-2015 Control	Baseline	Follow up
Yes	11.1%	12%
No	70.4%	67%
No response	18.5%	8%
I don't know		13%
2013-2015 Workshops	**Baseline**	**Follow up**
Yes	1.3%	12.3%
No	11.1%	66.2%
I don't know		10.8%
No response	87.6%	10.8%
2013-2015 Assessors	**Baseline**	**Follow up**
Yes	4%	25.0%
No	24%	61.5%
I don't know		11.5%
No response	72%	2.1%
2013-2015 Households	**Baseline**	**Follow up**
Yes	2.60%	20.4%
No	30.20%	51.5%
I don't know		21.3%
No response	67.20%	6.7%

Purchase of energy efficient white goods

2013-2015 Control	Baseline	Follow up*
Yes	16.7%	4.8%
No	63.0%	61.9%
I don't know	0.0%	14.3%
No response	20.4%	19.0%
2013-2015 Workshops	**Baseline**	**Follow up (2013 only)**
Yes	1.5%	20.0%
No	4.1%	66.7%
I don't know	0.9%	13.3%
No response	93.4%	0.0%
2013-2015 Assessors	**Baseline**	**Follow up**
Yes	1.7%	16.7%
No	9.6%	66.7%
I don't know	0.3%	0.0%
No response	88.5%	16.7%
2013-2015 Households	**Baseline**	**Follow up**
Yes	1.9%	5.3%
No	10.6%	75.4%
I don't know	0.0%	14.0%

No response	87.5%	5.3%

*Small sample size

Installations of more efficient heater or cooler

2013-2015 Control*	Baseline	Follow up
Yes	7%	5%
No	64%	62%
I don't know	0%	14%
No response	29%	19%
2013-2015 Workshops	**Baseline**	**Follow up**
Yes	0.2%	6.7%
No	3.8%	86.7%
I don't know	1.4%	6.7%
No response	94.5%	0.0%
2013-2015 Assessors	**Baseline**	**Follow up**
Yes	1%	17%
No	4%	83%
I don't know	0%	0%
No response	95%	0%
2013-2015 Households	**Baseline**	**Follow up**
Yes	0.1%	8.8%
No	2.3%	84.2%
I don't know	0.4%	5.3%
No response	97.3%	1.8%

*small sample group

Installation of Awnings *small sample group

2013-2015 Control	Baseline*	Follow up
Yes	9.3%	No data
No	70.4%	
I don't know	0.0%	
No response	20.4%	
2013-2015 Workshops	**Baseline**	**Follow up**
Yes	0.8%	No data
No	5.4%	
I don't know	0.5%	
No response	93.2%	
2013-2015 Assessors	**Baseline**	**Follow up**
Yes	1%	No data
No	10%	
I don't know	0%	
No response	88%	
2013-2015 Households	**Baseline**	**Follow up**
Yes	1.5%	No data
No	11.4%	

I don't know	0.0%	
No response	87.1%	

Purchase of Green Power

2013-2015 Control	Baseline	Follow up
Yes, 100%	3.0%	6%
Yes, 75%	3.0%	2%
Yes, 50%	1.8%	4%
Yes, 25%	3.0%	2%
No	50.0%	62%
I don't know	26.8%	19%
No response	12.5%	6%
2013-2015 Workshops	**Baseline**	**Follow up**
Yes, 100%	2.1%	2.3%
Yes, 75%	0.7%	0.8%
Yes, 50%	0.9%	3.1%
Yes, 25%	0.9%	1.5%
No	31.8%	58.5%
I don't know	24.6%	32.3%
No response	39.0%	1.5%
2013-2015 Assessors	**Baseline**	**Follow up**
Yes, 100%	3.1%	9.4%
Yes, 75%	1.1%	1.0%
Yes, 50%	0.8%	0.0%
Yes, 25%	2.8%	2.1%
No	53.9%	62.5%
I don't know	24.2%	24.0%
No response	14.0%	1.0%
2013-2015 Households	**Baseline**	**Follow up**
Yes, 100%	1.3%	2.2%
Yes, 75%	1.5%	1.8%
Yes, 50%	1.2%	0.9%
Yes, 25%	0.9%	0.9%
No	61.0%	52.9%
I don't know	24.0%	38.2%
No response	10.1%	3.1%

Possession of solar panels

2013-2015 Control	Baseline	Follow up
Yes	15.6%	23.1%
No	58.3%	73.1%
I don't know	0.0%	0.0%
No response	6.0%	3.8%
2013-2015 Workshops	**Baseline**	**Follow up**
Yes	12.4%	13.1%
No	52.9%	83.8%
I don't know	4.1%	1.5%
No response	25.9%	1.5%
2013-2015 Assessors	**Baseline**	**Follow up**
Yes	13.1%	19%
No	63.5%	76%
I don't know	3.1%	2%
No response	13.8%	3%
2013-2015 Households	**Baseline**	**Follow up**
Yes	9.1%	9.8%
No	65.1%	84.0%
I don't know	5.6%	3.1%
No response	10.0%	4.0%

Frequency of installation of heavy curtains or blinds

Control	Baseline	Follow Up
Yes	11.1%	34.6%
No	66.7%	51.9%
I don't know	0.0%	7.7%
No response	22.2%	5.8%
Workshops	**Baseline**	**Follow Up**
Yes	1.6%	30.8%
No	4.5%	51.5%
I don't know	0.8%	6.9%
No response	93.1%	10.8%
Assessors	**Baseline**	**Follow Up**
Yes	2.2%	41.7%
No	9.3%	47.9%
I don't know	0.0%	6.3%
No response	88.5%	4.2%
Households	**Baseline**	**Follow Up**
Yes	2.1%	34.1%
No	10.9%	43.3%
I don't know	0.1%	16.2%
No response	86.9%	6.4%

Draught proofing changes

Control	**Baseline**	**Follow Up**
Yes	9.3%	26.9%
No	68.5%	57.7%
No response	22.2%	7.7%
I don't know		7.7%
Workshops	**Baseline**	**Follow Up**
Yes	1.7%	38.5%
No	10.5%	44.6%
No response	87.8%	14.6%
I don't know		2.3%
Assessors	**Baseline**	**Follow Up**
Yes	4%	77.1%
No	25%	20.8%
No response	71%	2.1%
Households	**Baseline**	**Follow Up**
Yes	3.2%	59.1%
No	24.5%	25.3%
No response	72.2%	5.5%
I don’t know		10.1%

Appendix D: Householders energy use behaviours: age of oldest child comparison

Number of rooms usually heated baseline frequencies

	Households 0-3	Households 4-15
Bedroom	28.8%	22.5%
Bathroom	3.3%	2.9%
Kitchen	5.9%	6.4%
Dining room (where you eat meals)	10.4%	10.3%
Living room/lounge room (where you relax, watch TV or read a book)	33.1%	34.1%
Other rooms	1.1%	0.9%
All the rooms in the house are heated	15.4%	21.3%
None of the house is heated	1.9%	1.6%

Temperature of air conditioner or cooler baseline frequencies

	Households 0-3	Households 4-15
28 degrees or higher	3.20%	2.90%
26-27 degrees	2.40%	2.30%
24-25 degrees	7.60%	8.90%
22-23 degrees	17.60%	17.90%
21 degrees or lower	30.20%	30.40%
I don't have or don't use an air conditioner	26.20%	21.50%
I don't know	11.60%	14.50%
No Response	1.20%	1.60%

Number of rooms cooled baseline frequencies

	Households 0-3	Households 4-15
Bedroom	22.40%	19.10%
Bathroom	1.50%	1.00%
Kitchen	5.10%	5.40%
Dining room (where you eat meals)	8.80%	8.50%
Living room/lounge room (where you relax, watch TV or read a book)	34.10%	35.60%
Other rooms	1.00%	0.60%
All the rooms in the house are cooled	10.00%	15.80%
None of the house is cooled	17.10%	14.10%

Cooling rooms unoccupied rooms baseline frequencies

	Households 0-3	Households 4-15
Always (whenever cooling is on)	0.70%	0.60%
Most of the time	0.30%	1.10%

Sometimes	0.00%	1.20%
Never (cooling only used when people are in the room)	3.10%	2.20%
Not applicable	1.70%	1.20%
No Response	94.20%	93.80%

Turning off appliances at the power point baseline frequencies.

	Households 0-3	Households 4-15
Always (7 days)	27.40%	29.20%
Most of the time (4-6 days)	27.90%	25.00%
Sometimes (1-3 days)	19.60%	19.10%
Never (Zero days)	17.40%	18.60%
Not Applicable	4.20%	3.90%
No Response	3.50%	4.20%

Using standby power controllers baseline frequencies,

	Households 0-3	Households 4-15
Yes, I use these devices on most of our TVs and desktop computers	17.50%	16.20%
Yes, on some TVs and/or desktop computers	11.90%	14.00%
Yes, on other appliances	1.10%	1.80%
No	52.20%	52.30%
I don't know	11.10%	10.50%
No Response	6.20%	5.20%

Number of running fridges, freezers, mini bars, etc. baseline frequencies.

	Households 0-3	Households 4-15
Combined fridge/freezer	77.50%	73.90%
Separate fridge	10.50%	11.60%
Separate freezer	10.60%	13.20%
Other (e.g. mini bar, beer cooler)	1.50%	1.30%

Temperature for clothes washing baseline frequencies

	Households 0-3	Households 4-15
Cold water	48.20%	47.70%
Warm water	44.90%	46.50%
Not applicable	5.50%	3.70%
No Response	1.30%	2.10%

Dryer in winter baseline frequencies

	Households 0-3	Households 4-15
Seven or more times a week	0.70%	0.70%

Four to six times a week	8.90%	6.10%
One to three times a week	11.00%	11.20%
Less than once a week	7.90%	8.40%
I don't have or use a tumble dryer	67.10%	68.40%
No Response	4.50%	5.30%

Temperature for clothes washing baseline frequencies

	Households 0-3	Households 4-15
Cold water	48.2%	47.7%
Warm water	44.9%	46.5%
Not applicable	5.5%	3.7%
No Response	1.3%	2.1%

Dryer in summer baseline frequencies

	Households 0-3	Households 4-15
Seven or more times a week	0.90%	1.70%
Four to six times a week	3.30%	2.70%
One to three times a week	6.90%	5.40%
Less than once a week	11.80%	11.60%
I don't have or use a tumble dryer	72.20%	73.00%
No Response	4.80%	5.60%

Minutes in the shower each day baseline frequencies

	Households 0-3	Households 4-15
Four minutes or less	9.70%	9.70%
Between five and eight minutes	42.60%	42.40%
Between nine and 14 minutes	26.70%	27.50%
Between 15 minutes and 20 minutes	13.90%	12.50%
Between 21 and 25 minutes	3.10%	2.70%
More Than 25 minutes	1.70%	2.30%
No Response	2.30%	2.80%

Number of showerheads baseline frequencies

	Households 0-3	Households 4-15
Water saving	48.50%	51.80%
Non-water saving	37.40%	33.90%
I don’t know	14.10%	14.30%

Appendix E: Retrofit kit usage

These tables are taken from follow up surveys and show what percentage of participants reported receiving each retrofit item, and of those which received the item, what percentage were still using it. All participants should have received a shower timer and thermometer, while stickers were introduced part way through the project. Participants reporting not having received a shower timer or thermometer may simply have forgotten, or this could be due to problems such as assessors getting confused about which items to give out to households.

Shower Timer

2013-2015 Workshops	Follow up
Yes	84.0%
No	16.0%
Use- Yes	75.0%
Use- No	25.0%
2013-2015 Assessors*	**Follow up**
Yes	90.9%
No	9.1%
Use- Yes	92.6%
Use- No	7.4%
2013-2015 Households	**Follow up**
Yes	78.9%
No	21.1%
Use- Yes	80.7%
Use- No	19.3%

*reduced sample size

Thermometer

2013-2015 Workshops	Follow up
Yes	79.2%
No	20.8%
Use- Yes	68.1%
Use- No	31.9%
2013-2015 Assessors	**Follow up**
Yes	87.8%
No	12.2%
Use- Yes	87.5%
Use- No	12.5%
2013-2015 Households	**Follow up**
Yes	74.3%
No	25.7%
Use- Yes	87.5%
Use- No	12.5%

Stickers*

2013-2015 Workshops	Follow up
Yes	46.6%
No	53.4%
Use- Yes	60.0%
Use- No	40.0%
2013-2015 Assessors	**Follow up**
Yes	81.3%
No	18.8%
Use- Yes	68.8%
Use- No	31.3%
2013-2015 Households	**Follow up**
Yes	40.2%
No	60.7%
Use- Yes	50.0%
Use- No	50.0%

*small sample size for all interventions

Appendix F: Longitudinal energy saving behaviours

Baseline refers to initial surveys completed, follow up refers to surveys completed six to twelve months after the baseline survey, and year three follow up refers to surveys completed by year one participants in project year three.

Turning heaters off overnight in winter

Response	Baseline	Follow up	Year 3 Follow up
Always (7 days)	48.5%	52.6%	55.1%
Most of the time (4-6 days)	15.9%	14.1%	16.7%
Sometimes (1-3 days)	24.7%	25.6%	19.2%
Never (zero days)	7.9%	5.1%	5.1%
Not applicable	1.7%	1.3%	3.8%
No response	1.2%	1.3%	0.0%

Temperature of heater

Response	Baseline	Follow up	Year 3 Follow up
26 degrees or higher	5%	5%	1%
24-25 degrees	13%	4%	5%
22-23 degrees	20%	14%	17%
20-21 degrees	32%	38%	40%
19 degrees or lower	13%	26%	24%
I can't set the temperature of my heater	8%	9%	10%
I don't know	8%	1%	3%
No response	2%	3%	0%

Heating Empty Rooms

Response	Baseline	Follow up	Year 3 Follow up
Always (whenever heating is on)	14%	14%	12%
Most of the time	6%	4%	5%
Sometimes	17%	19%	23%
Never (heating only used when people are in the room)	46%	53%	50%
Not applicable	9%	6%	9%
No Response	8%	4%	1%

Average number of rooms heated and cooled

FPF did not include this question in year one.

Average number of rooms cooled	Baseline	Follow up	Year 3 Follow up

Workshop	N/A	N/A	2.9
Assessor	N/A	N/A	2.7
Home Assessment	N/A	N/A	2.2

Average number of rooms Heated	Baseline	Follow up	Y3 Follow up
Workshop	N/A	N/A	2.4
Assessor	N/A	N/A	2.7
Home Assessment	N/A	N/A	3.6

Turning off appliances at the power point

Response	Baseline	Follow up	Year 3 Follow up
Always (7 days)	29%	40%	40%
Most of the time (4-6 days)	17%	23%	24%
Sometimes (1-3 days)	26%	23%	24%
Never (Zero days)	23%	8%	9%
Not Applicable	1%	1%	3%
No Response	3%	5%	0%

Using standby controllers

The range of this questions was changed in year two and three, hence have been omitted from the FPF final report draft.

Response	Baseline	Follow up	Year 3 Follow up
Always (7 days)	25%	40%	31%
Most of the time (4-6 days)	10%	9%	13%
Sometimes (1-3 days)	15%	17%	15%
Never (Zero days)	34%	19%	29%
Not Applicable	11%	14%	6%
No Response	6%	1%	5%

Number of fridges and freezers

Response	Baseline	Follow up	Year 3 Follow up
Combined fridge/freezer	73%	67%	68%
Separate fridge	10%	11%	13%
Separate freezer	15%	19%	16%
Other (e.g. mini bar, beer cooler)	2%	4%	3%

Temperature of washing machine

Response	Baseline	Follow up	Year 3 Follow up
Cold water	55%	63%	67%
Warm water	41%	35%	28%
Not applicable	1%	0%	5%
No Response	3%	3%	0%

Dryer in winter

Response	Baseline	Follow up	Year 3 Follow up
Seven or more times a week	3%	0%	0%
Four to six times a week	4%	6%	1%
One to three times a week	18%	27%	28%
Less than once a week	2%	0%	0%
I don't have or use a tumble dryer	6%	44%	41%
No Response	67%	23%	29%

Dryer in summer

Response	Baseline	Follow up	Year 3 Follow up
Seven or more times a week	1%	0%	0%
Four to six times a week	2%	0%	1%
One to three times a week	7%	8%	9%
Less than once a week	4%	0%	0%
I don't have or use a tumble dryer	16%	67%	56%
No Response	70%	26%	33%

Showerheads

Response	Baseline	Follow up	Year 3 Follow up
Water saving	55%	75%	81%
Non-water saving	31%	21%	14%
I don’t know	13%	4%	5%

Household size

No data collected for follow up due to incomprehensible data

	Baseline	Year 3 Follow up
Year one participant	3.7	4.1

Installed insulation

Response	Baseline	Follow up	Year 3 Follow up
Yes	13%	9%	14%
No	78%	87%	71%
I don't know	0%	0%	10%
No response	5%	4%	5%

Installed curtains and blinds in the last year

Response	Baseline	Follow up	Year 3 Follow up
Yes	17%	22%	46%
No	70%	65%	45%
I don't know	0%	10%	5%
No response	13%	3%	4%

Draught proofed

Inclusive of draught snake, use of gap seal tape or gap filler.

Response	Baseline	Follow up	Year 3 Follow up
Yes	18%	36%	47%
No	62%	63%	40%
I don't know	0%	0%	5%
No response	20%	1%	8%

Purchase of GreenPower

Response	Baseline	Follow up	Year 3 Follow up
Yes, 100%	1%	1%	3%
Yes, 75%	1%	4%	4%
Yes, 50%	2%	1%	4%
Yes, 25%	1%	0%	0%
No	62%	51%	59%
I don't know	22%	37%	27%
No response	11%	5%	4%

Installation of solar panels

Response	Baseline	Follow up	Year 3 Follow up
Yes	5%	17%	28%
No	25%	72%	71%
I don't know	0%	3%	1%
No response	70%	9%	0%

Appendix G: Focus group feedback

Selected comments from assessor focus group

Topic	Positive	Negative
Retrofit products	Free samplers- retrofit	Give more shower timers- 2
	Being able to shower people with gifts	
	Timer makes people more disciplined	
	Shorter showers- shower timers	
	Free stuff	
	Future Switch- "there is a switch they gave me- automatic switch on microwave"	
Information	Education e.g. length of shower can save energy. Energy saving measures was new info	More advice from solar
	Price comparison is excellent- how much money you save in $$	More advice on retrofitting- light/water
	“Helpful and useful advice”	Could explain what type of advice provided
	Learnt about switching off appliances	
	Put off buying some new appliances e.g. dryer	
	“Getting more knowledge about how to create money by saving energy”	
	Pleased about advice to use cold water in washing machine, changing thermostat in fridge	
	“More knowledge to save energy, in my culture, we live in developing country. After training, I learnt I can save $ from turning power off”	
Program design	Changing habits- simply things	VEET- “parents giving me a call- shower people haven’t been coming”
	Developed like a good habit	VEET- “no one told us that if you have more than 10 downlights, it’s free. It changed during the program
	"With parents, when we shed for bills, sometimes they didn't have it. But now they don't need to so they feel more comfortable…"	Connecting with people
	"People like it when they get hard copies of how	Asking to see electricity bills

	things are going"	
	"Hard copies make it easier to explain things better"	Conditions (criteria) all very restrictive to finding participants
	"After 1 or 2 (home visits), I feel like I could go quickly"	Need ID (name card, photo) showing organisation, should be part of training- or certificate
	“Telling the kids use saving $ if shorter showers”	Can EV provide a list of houses that meet the criteria & EV contact prior to visit (by phone)
	“Able to reduce shower time to less than 4 mins by using shower timer product”	Cold calling was difficult- some people didn’t have own networks, makes it harder
	“To save money and make changes”	Asking people if they have a concession card- some were embarrassed to acknowledge
	“My children became more responsible about energy saving after explained energy saving tips at home and that’s wonderful so they can use these tips in the future when they’ve their own families”	"Once we didn't need to get numbers from people for electricity bill. Most people clammed up. Most people’s husbands deal with the bills. Most people ask what you are selling."
	“Saving energy is saving money. For me everyone switch off the button at home always”	More media-publicity might help recruitment
Surveys		Clients often have low education and struggle to fill out survey- needs to be simplified
		Questions about heating- difficult/didn’t suit their homes because was ducted heating & couldn’t change their temperatures
		Some questions were too personal- people were worried about sharing information and signing doc- suspicious about what will happen with their info
		Worried about six month follow up, privacy worries and unknown people calling them
		People concerned about providing info from their bills- thinking info share with energy providers
Assessor Training	Program training is effective to actually reduce energy use	“Telling people that I’m there to give them advice, even people with specialised training”
	Training was a lot of fun. Felt well trained. I	ID or certificate not provided

	assessed a friend I know quite well. The questionnaire is excellent. Either I'm preaching to the choir, but…the money works for a lot of people, but not for the extremely lazy. Maybe the conversation has to be about environmental sustainability"	
	"Get together with trainer informally, face-to-face. You feel encouraged, motivated"	Training could remind participants how to use networks
		"We would like to get together again, seen how things were going"
		"Would of like a refresher training"
		"Sometime in between, would like to talk to trainer"
Co-benefits	Helped make new friends- if helping people with good info then they think you are a good person	
	The diverse multicultural groups	
	Worked with friends and family. People were really pleased	
	Changes in own family	
	Socialised my life- now know more than 30 new people	
	"I found friends from other countries. Most of my friends are very happy to know how to save energy"	
	"Socialised any life in this multicultural country and connected me a lot of people. Knew about saving energy that is very useful for our environment and the resources of country to change any energy budget and have money"	
	"Friendship and fellowship...helping other people"	
	"In my country, did admin job. In this country I did not have opportunity, but this job is great. Made me feel good"	
	Getting to meet neighbours	
	"I really enjoyed being able to help others, help the environment. Like to share with my friends. I really enjoyed it all round"	
	"More consciousness re: home management reinforced by visiting others"	
	"Confident I'm saving energy- community work	

	make me feel empowered. Save, empower quality of life improved. Visiting people-empower people"	
	"…I became more concerned about the environment and felt more empowered to share with others"	
	"Before I was just a user, now I am a helper"	
	"Self-development is important- how to talk to people, more confident and less shy"	
	"Being a leader"	
	"Being inspired by others who are already saving"	
	"Chance to strengthened networking skills, community service"	
	Example for children if you change your behaviour	
	"Saving power means saving money as a result you will be happy about your bills"	
	"$$ makes a difference"	
	"Provides income which adds importance"	
	"Saving water"	
	"Learning and understanding about climate change e.g. carbon footprint"	
	"Think more about looking after the environment for future Australians. Making positive contributions"	
	"This program will help you to build up a good hobbies"	
	"Underfloor insulation. I had fun. My bills are much cheaper, not sure why, but something happened"	
Misc	People very happy that the government is supporting programs to save energy and money	
	Low-income families really benefit	

Appendix H: In-kind contributions

Nature of support	Budgeted	Actual
Data analysis	$18,800	N/A
Training home assessors	$90,000	N/A
Major partners' time and services, attendance of meeting and assistance in networking opportunities	$22,000	$9,680.00
Meetings and venues	$62,210	N/A
Volunteer participants: attendance in energy saving workshops, trainings and home assessments	N/A	$211,435.00
Materials storage	$13,200	N/A
Donated retrofit products	N/A	$3,374.75
Other		
Free advertising in newsletters	N/A	$1,000.00
Flyers on display in childcare centres, community centres and community organisations	N/A	$3,000.00
EV staff and volunteers: general administrative duties such as data entry and filing, packing retrofit products for trainings and packing envelopes for postage.	N/A	$10,155.00
Total, excluding GST	**$206,210**	**$255,844.75**

Appendix I: Cost benefit calculation

The following data was taken from the electricity consumption data:

	Control	Households	Advisers	Workshop participants
Average kWh/day at baseline	11.165	9.523	8.1032	N/A
Average kWh/day at follow up	11.871	9.187	7.102	N/A
Percent change	6.32%	-3.53%	-12.36%	N/A

The control group increased its electricity use by 6.32% and households decreased it by 3.53%. This means that households would otherwise probably have increased their usage, so they are using 9.88% (6.32% + 3.53%) less than otherwise. This is:

kWh/household/day saved= 9.523x 9.88%= 0.9408

Similarly, as we have matched the control group participants to households in terms of demographics, we can assume that assessors are using 18.68% (6.32% + 12.36%) less than otherwise. This is:

kWh/assessor/day saved= 8.1032x 18.68%= 1.5137

Cost effective calculation:

The amount of money saved by participants is the difference between the amount they were paying for bills at follow up and the amount they would have been paying if they had not taken part in the project. This latter amount is calculated from their electricity consumption at baseline plus a 6.32% increase, as it is assumed that if they had not taken part they, like the control group, would have increased their usage.

In Victoria, electricity tariffs depend not only on which electricity retailer the home is with, but also which distributor. The St Vincent de Paul Society's Victorian Tariff Tracking Project, Workbook Three calculates annual bill costs for each electricity and distributor combination for 2014 and 2015 rates. Savings at 2014 rates and savings at 2015 rates were added together then divided by two to give an annual saving.

At follow up, assessed households were using 9.187kWh/day. Using the workbook, 9.187 kWh/day worked out to following combined 2014 and 2015 bill cost:

	AGL	Origin	Energy Australia	Red Energy	Simply	Lumo	Alinta
Citipower	$2,480	$2,363	$2,414	$2,059	$2,304	$2,413	$2,388
Powercor	$2,832	$2,833	$2,794	$2,395	$2,818	$2,763	$2,729
Sp Ausnet	$3,098	$2,951	$2,974	$2,557	$3,169	$2,985	$3,044
Jemena	$2,910	$2,834	$2,776	$2,380	$2,830	$2,876	$2,863
United Energy	$2,666	$2,723	$2,592	$2,221	$2,688	$2,699	$2,590

If they had not taken part in the project, it is assumed that these households would have had their baseline electricity consumption (9.523 kWh/day) plus a 6.3% increase, bringing them to 10.123 kWh/day. Over 2014 and 2015, this would have cost them:

	AGL	Origin	Energy Australia	Red Energy	Simply	Lumo	Alinta
Citipower	$2,653	$2,524	$2,579	$2,193	$2,457	$2,578	$2,551
Powercor	$3,032	$3,033	$2,992	$2,558	$3,015	$2,955	$2,920
Sp Ausnet	$3,306	$3,149	$3,184	$2,728	$3,388	$3,187	$3,260
Jemena	$3,107	$3,034	$2,975	$2,537	$3,017	$3,071	$3,062
United Energy	$2,852	$2,919	$2,776	$2,370	$2,869	$2,883	$2,772

The amount saved is what their usage would have been minus what it was:

	AGL	Origin	Energy Australia	Red Energy	Simply	Lumo	Alinta
Citipower	$173	$161	$166	$134	$153	$165	$162
Powercor	$200	$200	$198	$162	$197	$192	$191
Sp Ausnet	$207	$198	$210	$171	$219	$203	$216
Jemena	$196	$200	$198	$157	$187	$195	$200
United Energy	$186	$196	$183	$149	$180	$184	$182

Results were then weighted by distributor, based on information from the electricity consumption data on what proportion of participants were with which distributor. For example, because 2.92% of participants were with Citipower, the AGL saving with Citipower has been multiplied 0.0292. When all of the AGL figures are weighted and then added, this gives a total AGL saving weighted by distributor.

	Distribution proportion	AGL	Origin	Energy Australia	Red Energy	Simply	Lumo	Alinta
Citipower	0.0292	$5	$5	$5	$4	$4	$5	$5
Powercor	0.4831	$97	$97	$96	$78	$95	$93	$92
Sp Ausnet	0.17	$35	$34	$36	$29	$37	$34	$37
Jemena	0.2342	$46	$47	$46	$37	$44	$46	$47
United Energy	0.083	$15	$16	$15	$12	$15	$15	$15
Total	*1.000*	*$ 198*	*$ 198*	*$ 198*	*$ 161*	*$ 196*	*$ 193*	*$ 196*

This has then been averaged across the seven retailers to give a saving of $191 over two years, or $96 per year, for each household assessment.

Assessor results underwent the same process, giving savings of:

	AGL	Origin	Energy	Red	Simply	Lumo	Alinta

			Australia	Energy			
Citipower	$279	$260	$267	$216	$248	$267	$262
Powercor	$323	$323	$319	$262	$318	$310	$308
Sp Ausnet	$334	$320	$339	$276	$353	$327	$348
Jemena	$317	$323	$320	$254	$302	$315	$322
United Energy	$300	$316	$296	$241	$291	$297	$294

These were then weighted using the same process as for household assessments, to give a saving of $309 over two years, or $155 per year.

Workshop Cost-Benefit Costing

Level 1: Direct Approach	**Calculations**	Cost
Workshop printing	0.09c for a side of colour and 0.009 for a side of black and white.	$ 0.25
Retrofit products	Sticker, shower timer, thermometer	$ 6.01
Recruitment of workshops (also including networking for workshops that never eventuated)	using randomly selected workshop- 7 emails and 1 phone call, min 2 calls not returned, 11 participants and 6 eligible	$ 3.05
Workshop delivery, inclusive of transport cost		$ 17.25
Total		$ 26.56
Level 2: Trial Component		
Level 1		$ 26.56
Data processing	Estimated 11 hrs for 100 surveys	$ 2.75
Promotions (flyers, printing, distributing)	0.09c for a side of colour. Distribution for 10 mins per flyer	$ 4.89
Follow up surveys	70c postage, printing and time. Assuming takes 1 day to send 380 follow ups	$ 2.51
VEET follow ups	Per text, estimated that it takes 1.5hrs to send 150 text	$ 0.66
Total		$ 37.37
Level 3: Trial Business		
Level 1 and 2		$ 37.37
Org support (rental space, IT, payroll, legal, volunteers insurance, office utilities etc.)	Breakdown percentages, trainings 60%, WS 30%, HH 10%	$ 61.52
Total		$ 98.89
Total Trial		
Levels 1 to 3		$ 98.89
Project mgmt. cost (including consortium, milestone reporting, engaging with contractors etc.)	20% workshops, 20% adviser and 10% home assessments, 20% control group, HR 20%	$ 18.02
In-kind cost	Promotional material	$ 6.57

Total		$ 123.48

Assessor Cost-Benefit Costing

Level 1: Direct Approach	Calculation	Cost
Recruitment	Estimated 3 times 10 min calls	$ 14.38
Recruitment- payments	Average payment for all assessors	$ 10.43
Training - PO time	Average 8 hrs for trainings, averaged 4.69 attendees per workshop	$ 49.04
Travel time to and from training	27 training events. Average 2hr travel + 1hr set up & pack up each. 27*3=81 /76 adviser = ~1hr/adviser	$ 28.75
Material resources (e.g. printing survey cost)	Average single sided survey 8 pgs., 22 black & white, 20 coloured, certificate cost 0.63, folders 1.37	$ 6.68
Catering	Budgeted $10 per head ($15 for central Vic). Average $9.	$9
Child care	Est. 50% will need childcare. Child care est. cost $100. Average no. training participants is 4.69	$ 10.66
Venue hire	cost between 20-30 per hr. Average 4.69 attendees per training	$ 42.64
Support of volunteers (meetings, text, phone calls, process of surveys)	Estimated 2 hrs support	$ 57.50
Retrofit items		$ 30.25
Total		$ 259.33
Level 2: Trial Component		
Level 1		$ 259.33
Home assessment payments	Average of 10.7 HH per adviser	$ 535.00
Data entry	Estimated 11 hrs for 100 surveys	$ 2.75
Phone cost		$ 4.26
VEET follow ups	1.5hrs to send 150 text	$ 0.66
Follow up surveys	70c postage, printing and time. Assuming takes 1 day to send 380 follow ups	$ 2.51
Support of volunteers (meetings, text, phone calls, process of surveys)	Estimated 2 hrs support	$ 57.50
Total		$ 862.01
Level 3: Trial Business		
Level 1 and 2		$ 862.01
Org support (rental space, IT, payroll, legal, volunteers insurance, office utilities etc.)	Breakdown percentages, trainings 60%, WS 30%, HH 10% of 356000	$ 575.74
Total		$ 1,437.75
Total Trial		
Level 1 to 3		$ 1,437.75
Project mgmt. cost (including consortium, milestone reporting, engaging with contractors etc.)	20% workshops, 20% adviser and 10% home assessments, 20% control group, HR 20%	$ 18.02
In-kind cost	Promotional material	$ 6.57
Total		$ 1,462.33

Home Assessment Cost-Benefit Costing

Level 1: Direct Approach	Calculation	Cost
Home assessment delivery (including time required to fill in the surveys)	Recommended time 1 hr of volunteer rates	$ 25.00
Retrofit products	Based on average cost of eco switch, future switch, draught tape or heatermate	$ 27.99
Materials- paperwork	8 pg. survey, 2 recommendation sheet	$ 0.25
Total		$ 53.24
Level 2: Trial Component		
Level 1		$ 53.24
VEET follow ups	1.5hrs to send 150 text	$ 0.66
Follow up surveys	70c postage, printing and time. Assuming takes 1 day to send 380 follow ups	$ 2.51
Data entry	Estimated 11 hrs for 100 surveys	$ 2.75
Total		$ 59.16
Level 3: Trial Business		
Level 1 and 2`		$ 59.16
Org support (rental space, IT, payroll, legal, volunteers insurance, office utilities etc.)	Breakdown percentages, trainings 60%, WS 30%, HH 10% of 356000	$ 7.93
Total		$ 67.09
Total Trial		
Level 1 to 3		$ 67.09
Project mgmt. cost (including consortium, milestone reporting, engaging with contractors etc.)	20% workshops, 20% adviser and 10% home assessments, 20% control group, HR 20%	$ 3.48
In-kind cost	home assessment range from 15 mins to 1hr, 30 mins is medium	$ 12.50
In-kind cost	volunteers packing bags	$ 2.10
Total		$ 85.17

Appendix J: Co-benefit calculations

Electricity bill amount saved

Assessors are saving $155 per year on their electricity bills and home assessment recipients are saving $96 (see Appendix I – Cost Benefit Calculation).

$155/assessor x 392 assessors = $60,760 combined assessor saving per year

$96/home assessment recipient x 4322 home assessment recipients = $414,912 combined home assessment saving per year

If we conservatively assume that savings are only maintained for two years, this gives a total saving for the project of:

($60,760 + $414,912) x 2 = $951,344.

Water saved

Based on survey responses, the possession of water saving and old shower heads is as below. Low flow showerheads use 9L per minute and older style showerheads use up to 20L per minute[36], but we will assume 15L per minute to be conservative.

	Workshops		Assessors		Home Assessment	
Shower Head	**Percentage**	**Average Flow (L)**	**Percentage**	**Average Flow (L)**	**Percentage**	**Average Flow (L)**
Water Saving	59.10%	5.319	62.90%	5.661	59.30%	5.337
Old	33.10%	4.965	31.80%	4.77	29.80%	4.47
Total Weighted average flow (L/min)		10.284		10.431		9.807

Weight average of time saved in the shower:

Workshop= 2.51 mins/day
Assessor= 3.68 mins/day
Home Assessment= 1.84 mins/day

Weighted average litres saved:

Group	L/min X mins/day	L/participant/day saved	L/participant/year
Workshop	10.284 X 2.51	25.80	31809.19
Assessor	10.431 X 3.68	38.42	15061.50
Home Assessment	9.807 X 1.84	18.00	77799.24
Total			**45,504,521.35**

45.5 ML water saved per year, or 18 Olympic swimming pools (one Olympic swimming pool uses 2.5 ML of water).

Carbon emissions from shorter showers

In Victoria, 66.2% use gas to heat water, 28% use electricity to heat water, and 7.8% use solar to heat water[37].

[36] www.savewater.com.au/how-to-save-water/in-the-home/bathroom, accessed 10/12/14.
[37] http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/4602.0.55.001main+features1Mar%202014, accessed 15/3/2016

Water has a specific heat capacity of 4.19 kJ, meaning it takes 4.19 kJ to heat one kilogram of water (one litre) by one degree. Assume that the water is being heated 25 degrees, from 15 to 40 degrees[38]:

4.19 kJ/degree x 25 degrees = 104.75 kJ to heat one litre, assuming no efficiency losses

So the weighted energy saved per day:

Workshop: 25.80 L/participant/day X 104.75 KJ = 2702.362 KJ/participant/day

Assessor: 38.42 L/participant/day X 104.75 KJ = 4024.725 KJ/participant/day

Home Assessment: 18.00 L/participant/day X 104.75 KJ = 1885.578 KJ/participant/day

For gas hot water:
According to Sustainability Victoria, 1 GJ of mains gas in Victoria produces 51.7 kg CO2 equivalent.[39]
3,900 kJ = 0.00390 GJ

	Participant Total	Percentage[40]	Number of gas users
Home Assessment	4322	66.20%	2861.164
Assessor	392	66.20%	259.504
Workshop	1233	66.20%	816.246

	KJ/participant /day	GL/participant/ day saved	kgCO2e/participant/ day	kgCO2e/group/day
		KJ/participant/day divide by 1000	GL/participant/day saved X 51.7	kgCO2e/participant/da y X no. gas users
Workshop	2702.362	0.002702	0.139712	114.03946
Assessor	4024.725	0.004025	0.208078	53.997147
Home Assessment	1885.578	0.001886	0.139712	278.92
Total				446.96

For electric hot water

According to Sustainability Victoria, 1 kWh of electricity produced in Victoria produces 1.444 kg CO2 equivalent[41]. 1 kWh = 3,600 kJ

3,600 kJ = 1.444 kgCO2e so 3,900 kJ/household/day = 1.56 kgCO2e/household/day

	Participant Total	Percentage[5]	Number of solar hot water users
Home Assessment	4322	28%	1210.16
Assessor	392	28%	109.76
Workshop	1233	28%	345.24

[38] www.hotwaterexperts.com.au/Uploads/Images/rheem-instant.pdf, *accessed 21/3/16.*
[39] Sustainability Victoria, 2002, Energy and Greenhouse Management Toolkit: Module 3 – Calculating Energy Use and Greenhouse Gas Emissions, Victorian Government, Melbourne
[40] ABS 2014, Environmental Issues: Energy Use and Conservation, http://www.abs.gov.au/ausstats/abs@.nsf/mf/4602.0.55.001, accessed 26/3/2016
[41] Sustainability Victoria, 2002, Energy and Greenhouse Management Toolkit: Module 3 – Calculating Energy Use and Greenhouse Gas Emissions, Victorian Government, Melbourne

	KJ/participant/day	kgCO2e/participant/day	kgCO2e/group/day
		[KJ/participant/day saved]/3600 X 1.44	kgCO2e/participant/day X no. users
Workshop	2702.362	1.083947	915.27602
Assessor	4024.725	1.614362	177.19235
Home Assessment	1885.578	0.756326	915.27601
Total			**1466.69**

For Solar users

A properly designed and installed SWH should use at least 50% less electricity/gas in actual operation than a water heater that uses conventional electric resistance or gas heating to supply the same amount of hot water.[42]

	Participant Total	Percentage	Number of Solar users
Home assessment	4322	7.80%	337.116
Assessor	392	7.80%	30.576
Workshop	1233	7.80%	96.174

	KJ/participant/day	kgCO2e/participant/day	kgCO2e/group/day
		KJ/participant/day	kgCO2e/participant/day X no. users
Workshop	2702.362	0.069856	6.7183365
Assessor	4024.725	0.104039	3.1811008
Home assessment	1885.578	0.048742	16.431773
Total			**26.33121**

Total

Savings from gas users + savings from electricity users + savings from solar users = 446.96 kgCO2e/group/day + 1466.69 kgCO2e/group/day + 26.33121 kgCO2e/group/day=

1939.98 kgCO2e saved per day=
708091.6018 kgCO2e saved per year=
708.0916018 tonnes CO2e per year for all of project

Money saved from water bills

Average price per unit taken from published rates of City West Water, South East Water and Yarra Valley Water July 2015 onwards was $2.51 per kL or $0.00251 per L. Given the estimated water consumed for shorter showers, we have assumed that is unlikely that households will consume more than 440 litres per day.

[42] ABS 2014, Source of energy used by household

Given estimated 45.5 ML water saved per year, amount saved on water bills from taking shorter showers:

45,504,521.35 L/year X $0.00251= **$115,581 per year**

Appendix K: Local industry engagement

Criterion 1: Communication Strategy

FPF worked closely with consortium members to connect with targeted community groups. Consortium members connected FPF with relevant services such as maternal child and health centres, community organisations such as school community hubs, and local council network such as the Fawkner Service Providers Network to promote and recruit participants. Due to the selective focus of FPF, consortium members and cooperating organisations were deliberately chosen due to their client base, programs and geography. For example Spectrum Migrant services were chosen due to their training and employment programs for CALD communities and their recognition as a well-known and respected organisation within targeted community groups.

FPF additionally promoted and recruited through local neighbourhood houses, community organisations and local volunteering agencies. Flyers were designed in conjunction with Environment Victoria's internal communications department and distributed by postage or directly to each organisation.

Criterion 2: Opportunities through all tiers of supply and in all stages of the project

In all supply and purchasing decisions, Australian companies that are locally based and contributed to the community were prioritised. Consortium members were invited based upon their experience and knowledge with targeted communities. Child care and catering services were selected upon their knowledge of communities and availability. For example, accredited child care workers that speak the child's language were employed and preference given to catering services that provide training to local community: Asylum Seeker Resource centre and Rosewall Neighbourhood Centre Inc. Where this was not possible, FPF utilised locally run cafes or stores to provide catering: Café Community, L K Fruits & Vegetables and Foodworks Cheltenham etc. All venues were hired through local councils or neighbourhood houses. Postage was conducted through Australia Post.

Criterion 3: Key equipment and products

In provision of FPF retrofit products and VEET services, Australian businesses with pricing aligning to budget targets were selected. Businesses engaged to provide retrofit products

Company	Australian Business	Products purchased	Quantity ordered
Cubic Promotions	Yes	Bags	3840
EnviroSax	Yes	Bags	840
Masters	Yes	Draught Snakes	1650
Mitre 10	Yes	Draught Snakes	840
Eaglehawk Community House Inc	Yes	Draught Snakes	50
Yororalla	Yes	Draught Snakes	1450

ecoMasters	Yes	Draught Tape	1576
Energy Seals	Yes	Draught Tape	1000
Carbon Reduction Industries	Yes	EcoSwitches	2310
Barney's Print Management	Yes	Energy saving stickers	6250
Future Range	Yes	Future Switches	1170
Altro Engineering Pty Ltd	Yes	Future Switches	70
ecoMasters	Yes	Gap Sealer	170
Heatermate Controllers	Yes	Heatermates	1550
Cubic Promotions	Yes	Shower Timers	7260
Printapromo	Yes	Shower Timers	840
EcoVantage	Yes	Showerheads	101
Technitherm	Yes	Thermometer	5080
Total			36,047

Three VEET providers were selected to provide VEET services to FPF participants. VEET providers were selected based on the VEET products they provided and their ability to reach large areas. FPF provided VEET providers with the opportunity to contact householders whom were already informed of services available to them, saving VEET providers' promotion and recruitment costs. FPF provided Homelab with the large majority of its clients using this referral system.

VEET provider	Australian business	No. of participants referred
Homelab	Yes	514
Watts Green	Yes	72
Energy Makeovers	Yes	391
Aussie Greenmarks	Yes	18
Total		995

Criterion 4: Procedures and resources

Due to the scale of the project, we did not place supply orders to tender. In selection of businesses, we prioritised Australian businesses. Where possible, we prioritised locally based businesses as they employed local staff and thus contributed to the local economy. In circumstances of small scale orders, for example catering, we engaged with a varied of businesses to ensure that other businesses were allowed the opportunity to provide their services.

Location	Business
Wyndham	Raffael's Café
	Cakebread Catering
	Hoppers Kebab House Authentic Turkish
	Bubba Pizza
	Café QB
Dandenong	Chelsea Green Grocer
	Woolworths
	Bakers Delight Chelsea
	Piehouse
	Foodworks Cheltenham
	IGA Chelsea Heights
	Encore Pizza Noble Park
	Temptation Bakeries

Appendix L: FPF languages spoken

Aasaw Hah	Afar	Albanian
Amharic	Arabic	Assyrian
Assyrian Neo-Aramaic	Bahasa	Balochi
Bangla	Barisailla	Basheto
Bengali	Bhutan	Bosnian
Bulgarian	Burmese	Caldan
Cambodian	Cantonese	Cebuano
Chaldean	Chaldean Neo-Aramaic/ Chaldean	Chin
Chin Falam	Chin Haka	Chin Lautu
Chin Matu	Chin Mizo	Chinese
Comorian	Croatian	Czech
Dakar	Dari	Denga
Dinka	Dutch	English
Ewe	Farsi	Fijian
Filipino*	French	Fulami
Ghaldean	Gio	Greek
Gujarati	Ha	Hararian
Hazaraghi	Hezar	Hindi
Hindko	Hmong	Horr
Hungarian	Indonesian	Italian
Japanese	Kannada	Kayahli
Karenni	Khmer	Khua Bung
Kinyarwanda	Kirundi	Kiswahili
Korean	Krio	Kurdish
Kuwait	Lai Hol	Lao
Lautu Hollh	Lawtu	Le Tale Holh
Lebanese	Lopit	Macedonian
Madi	Malay	Malayalam
Mali	Maltese	Mandarin
Maori	Mara Chin	Marathi
Matli	Nepali	Neur
Nuer	Odia	Oromo
Pashto	Persian	Pikan
Polish	Portuguese	Punjabi
Rajasthani	Rohingya	Romanian
Russian	Saho	Samoan
Serbian	Sindhi	Sinhala
Sinhalese	Somali	Spanish
Sri Lankan	Sudanese	Sullk
Swahili	Tagalog	Tamil
Tedim	Telugu	Thai
Tibetan	Tigre	Tigrinya
Tiwi	Tok Pisin	Tongan
Turkish	Ukranian	Urdu
Uyghur	Vietnamese	Zoi Phei
Zomi	Zophei	Zotung

*Filipino is not a language, however in absence of specified language, it has not been removed