# Power Shift

For Energy Consumers Australia

## FINAL REPORT 2018

# EMPOWERING LOW-INCOME HOUSEHOLDS

## Delving into the Co-Benefits Identified in the Low-Income Energy Efficiency Project Reports

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**Note**

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**About GEER Australia**

The Group of Energy Efficiency Researchers (GEER) Australia comprise researchers and industry partners from across Australia who are committed to driving change in the energy sector towards improved outcomes for Australian households. Its purpose is to improve the energy-related wellbeing in households and communities in Australia, through collaborative research, which achieves practical outcomes and informs future practice and policies. GEER's research and activities thus focus on energy efficiency as it relates to quality of life, health, affordability and environmental sustainability.

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# Executive Summary

## The Low-Income Energy Efficiency Project (LIEEP)

The Commonwealth Government's Low Income Energy Efficiency Project (LIEEP) investigated various ways of supporting low-income households to lower their energy use and bills. While this remained the primary focus, of significance was the findings across most projects of other key benefits experienced by participating households. These additional benefits to saving energy and bills are termed co-benefits.

## Co-Benefits

Co-benefits were identified as valuable improvements for households in addition to energy savings by a majority of LIEEP projects, with 19 projects empirically measuring at least one co-benefit. These 19 projects offered a diverse array of measurement and categorisation methods for co-benefit data capture. They provided both quantitative and qualitative measures of co-benefits in participant households, with 17 projects providing quantitative measures and 5 providing qualitative measures. In addition, many key insights were provided in LIEEP reports by project partners, some of which present unique and sometimes broader co-benefits than those identified by a single household.

The purpose of this report was to unearth the co-benefit findings and insights delineated in each of the 20 LIEEP project reports and to synthesise these findings in terms of household empirical data and broad project learnings. By so doing, the full impact of LIEEP can be better understood, and the full experiences of households before and after receiving an initiative can be realised. Furthermore, this synthesis creates an opportunity for the expansion and re-definition of current definitions of energy efficiency, and exploration of the impacts it may have, not only on householders' bills, but their wellbeing and quality of life.

## Broad Findings

The 20 LIEEP projects targeted eight low-income cohorts, which ranged across six states, one territory and one national study. They trialled a combination of nine different energy savings initiatives to support 32,499 Australian households to reduce their energy use and bills, or improve their well-being. Data providing changes in co-benefits was captured for almost 4875 of these households (15%).

### Qualitative Findings

Five projects conducted qualitative research, which provided evidence of several co-benefits experienced by participating households. In all cases, the co-benefits and improvements expressed by householders were similarly identified in the projects collecting quantitative analysis. Thus 10 co-benefits were validated using both empirical approaches. The co-benefits identified from the qualitative investigations include: knowledge, empowerment, confidence, competency, financial stress, financial control, general stress, perceived control/self efficacy, perceived comfort and thermal

comfort.

## Quantitative Findings

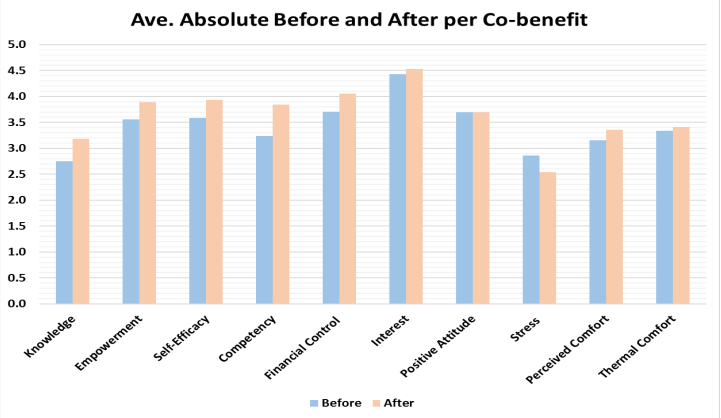
A total of 12 co-benefits were captured by taking quantitative household measures before and after the home initiative that was trialled, most by pre- and post survey comparisons. These co-benefits as they relate to energy efficiency include: knowledge, empowerment, control/self-efficacy, confidence, competency, financial control, interest, positive attitude, financial stress, general stress, perceived comfort and thermal comfort. The areas of most notable improvement were confidence, knowledge, competency and thermal comfort. The initiatives that produced the highest improvement for each of these co-benefits is provided in the Table below, which also presents the region in which the initiative was trialled and the cohort targeted.

## Initiatives that Produced the Highest Improvement in 12 Co-Benefits

| Co-Benefit | Initiative Trialled | Highest Improvement | Region | Low-Income Householder Type |
|---|---|---|---|---|
| Knowledge | HEV | 60% | NT | General |
| Empowerment | HEV | 20% | NSW | Social Benefit Recipients |
| Control/Self Efficacy | HE + Minor Retrofit | 29% | National | General |
| Confidence | HEV + Minor Retrofit + IHD | 238% | VIC | Aboriginal |
| Competency | HEV + Minor Retrofit + IHD | 77% | VIC | Aboriginal |
| Financial Control | Digital Engagement | 33% | National | General / Social Benefit Recipients |
| Interest in EE | Gamification | 15% | NSW | Apprentices/Trainees |
| Positive Attitude to EE | Digital Engagement + Gamification | 24% | QLD | Tenants |
| Financial Stress | HEV | - 9% | QLD | CALD |
| Stress | HEV + Minor Retrofit | - 27% | VIC | Aboriginal |
| Perceived Comfort | Gamification | 38% | NSW | Apprentices/Trainees |
| Thermal Comfort | HEV + Minor Retrofit + IHD | 76% | NT | Tenants |

Details of other initiatives that were trialled (including regions and cohort participants) for each co-benefit are provided within the report. It should be noted that most projects used unique methods of measuring each co-benefit and despite this difference, we combined the results of this work in an effort to ascertain general outcomes. Further, some co-benefits were termed differently but appeared to mean the same thing as defined with reports. In these instances, the co-benefits were united.

The pre and post measures of each co-benefit paint an interesting and somewhat concerning picture of Australian low-income households. Firstly, the pre-measures (indicated in blue in the graph) show that householders feel quite stressed in their home when it comes to energy use (likely due to high bills), experience only moderate levels of comfort and well-being, and have lower than expected levels of knowledge, confidence and self-efficacy in changing their circumstances.




The positive influence of LIEEP efforts are clearly apparent in the orange bars of the graph. For 9 out of 10 co-benefits, significant improvements were made. On average, householders' stress levels dropped, while knowledge, control and well-being measures all improved. Of note is that percentage improvements in co-benefits were consistently higher than percentage reductions in energy consumption per initiative trialled.

## Project Partner Co-Benefit Learnings

From the key learnings section in LIEEP report, project partners shared their insights. In synthesising these findings, three broad areas of co-benefits were extracted, including household co-benefits, broader social co-benefits and consortia co-benefits. These are captured in the Figure below.

**Household Co-Benefits**

- Social Inclusion
- Physical, Mental and Emotional Health and Wellbeing
- Increased Disposable Income
- Quality of Life
- Overcoming Physical Barriers

**Social Co-Benefits**

- Employment Opportunities
- Health Care System
- Building Family Harmony
- English language improvements for CALD
- Unity and Confidence
- Ethical Recycling
- Cultural Awareness and Understanding

**Consortia Co-Benefits**

- Experience
- Network Establishment
- Boost to the Industry

Overall, LIEEP produced many benefits to participating households and to those involved in delivering support to these households. The consortia involved in each project worked together to deliver initiatives to households that would genuinely help improve their situation whilst balancing this social

motivation with the need to also gather robust data that could inform the evaluation of each project and to collectively inform future policy and programs. This combination was an enormous challenge. Numerous insights from this work could yield insightful and useful information to help ensure future programs run even more effectively and efficiently, whilst similarly ensuring that the recipients benefit as much as possible.

# Key Findings/Recommendations

The analysis of co-benefits in LIEEP reports reveals five broad findings which inform key recommendations for future endeavours.

### 1. Low-income households are struggling in many areas due to their energy use and bills

Many LIEEP projects reported the level of co-benefits prior to initiatives being trialled. This data alone paints a picture of the situation low-income households experience prior to receiving support, which likely reflects the situation experienced by low-income households across Australia. Generally, due to current energy use, householders are stressed, lack general and thermal comfort in their homes, are not sure how to manage their energy use, bills or deal with providers, feel out of control and are unsure what to do to improve their situation.

**Key Recommendation:**

Low-income households require direct and immediate support to alleviate their lived experiences and improve the quality of their home life.

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### 2. Residential energy use impacts the well-being of householders broadly, such that many co-benefits can be realised when conducting energy efficiency programs

The improvements in the 12 co-benefits experienced by many household participants in LIEEP demonstrate that improving energy efficiency will improve many control, attitude and well-being factors too. Home energy consumption and bills are thus not isolated from health and well-being for householders.

**Key Recommendation:**

Addressing household energy efficiency and well-being requires a concerted effort across government sectors, including energy, health, education and social services, as well as support agencies and energy providers, such that they work together to alleviate energy poverty and thus address the broader social areas this impacts at the same time.

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### 3. Different types of low-income households will respond best to different types of initiatives

Evidence from LIEEP suggests that low-income households cannot be grouped as one, and that there are unique and distinguishing features that should be considered when designing energy efficiency and other support services. LIEEP identified largely demographic or lifestyle features (*e.g.,* Aged, Tenants, Social Benefit Recipients, *etc.*) but there are likely other characteristics that could be used to further delineate these differences.

**Key Recommendation:**

It is important that the retail, community and government sectors approach low-income households in ways appropriate to their various characteristics when designing programs, products or services to support them (a tailored approach).

**4. Current energy use for low-income households is commensurate with suffering in many areas beyond high energy bills, and adopting energy efficiency behaviours provides only small relief. Providing information to householders is insufficient to alleviate their situation.**

From previous work (see Russell-Bennett, *et al.* 2017) it is evident that high increases in energy efficiency behaviours are commensurate with small to zero changes in energy consumption. The work conducted for this report partially explains this disparity: householders may adjust many behaviours, thereby allowing for an improvement in their thermal comfort (co-benefit) which may not translate to an overall reduction in energy use and bills. This also indicates two possible areas for concern:

1) Many low-income households currently use too little energy to keep warm or cool and thus their comfort, stress and feeling in control of their energy use is compromised;
2) Many low-income households might do a lot around the home to reduce their energy use and bills, but the homes they live in contain energy hungry appliances, are not well insulated and are poorly designed for energy efficiency in the first place, thus their efforts yield inadequate benefits.

**Key Recommendation:**

Urgent work is needed to investigate the quality of housing stock in Australia, starting with government housing and privately tenanted properties. Minimum standards are needed, but before they are implemented, research should be conducted to determine the best implementation strategies to ensure that housing stock improvements do not further compromise low-income households (*i.e.,* home improvement costs do not result in equivocal rental increases, which may force low-income householders to become homeless or increase over-crowding in existing homes).

**5. As a pilot, LIEEP naturally trialled various initiatives which were evaluated using various methods**

The improvements in the 12 co-benefits experienced by many household participants in LIEEP demonstrate that improving energy efficiency will improve many control, attitude and well-being factors too. Home energy consumption and bills are thus not isolated from health and well-being for householders, but a lack of consistency in LIEEP precludes drawing sound conclusions for government or the energy sector to move forward to the extent that is required.

**Key Recommendation:**

Another nation-wide project is needed to extend our understanding of how to support low-income households regarding their energy use and well-being. It should trial the same range of initiatives based on those that worked best from LIEEP, but this time be measured in identical ways. This will allow us to determine the key factors that determine behaviour changes, lower energy use and improved comfort and well-being, and the initiatives that best stimulate these outcomes. It is strongly recommended that such a project be informed and run by people experienced in working with low-income households regarding energy efficiency and in measuring co-benefits.

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# FOREWORD

Energy Consumer Australia's *Power Shift* project helps government and industry deliver services and programs that help vulnerable households manage their energy use effectively. It is funded through a grant from the Commonwealth Government.

*Power Shift* aims to put control back in the hands of consumers, enabling them control over their energy use.

Energy Consumers Australia's starting point was the substantive evidence base built through the twenty pilots of the Low-Income Energy Efficiency Program (LIEEP). The LIEEP pilots trialled 15 unique initiatives, collecting data on nearly 20,000 participants, to identify what was most effective in helping low-income households reduce their energy usage. GEER's meta-analysis of the twenty pilots, Driving Change, published in 2017, lays out a pathway for government, industry or consumer groups on how to recruit, engage and support low-income households in managing their energy more efficiently.

GEER's analysis in Empowering Low-Income Households provides another, equally valuable insight into the benefits of providing consumers with the information and tools to control their energy use.

Energy efficiency programs have traditionally fixed on energy bill savings or reducing emissions as the primary benefits to households. This report underlines the range of other benefits that participants experienced – greater self-confidence and empowerment about energy, reduced financial stress, and improved comfort in their homes.

It also makes clear that low-income households are currently struggling – they are not receiving effective assistance to help them manage their energy, lack confidence in the market and how to deal with energy companies, and are likely to be rationing unsafely.

Information alone won't solve those problems, which is why Energy Consumers Australia has stressed the need for energy solutions that are tailored to household needs, and that improving the energy performance standards of residential housing must be a priority.

We also support the recommendation that we consider shelving the term energy efficiency and replace it with energy management – many low-income households use less energy than the average household, and encouraging further conservation runs the risk of poor health and wellbeing.

Those findings, supported further by *Power Shift*'s Multiple Impacts of Household Energy Efficiency Framework, make clear the value of prioritising programs, information and services delivering energy management for all consumers, and particularly low-income and vulnerable consumers.

Energy management is not only key to ensuring consumers can access affordable energy, but also that Australians are living in safe, comfortable and healthy homes.

**Rosemary Sinclair AM**
**Chief Executive Officer**

# Introduction

## 1. Background

The Commonwealth Government's Low Income Energy Efficiency Project (LIEEP) ran for three years (2013-2016) and involved 20 consortia trialling innovative ways of supporting low-income households to reduce their energy consumption and corresponding bills. Consortia invariably comprised for-profit and/or not-for-profit organisations, community-based organisations, government bodies and research institutes. Designed to overcome the energy barriers experienced by these householders, each project implemented one or several energy efficiency initiatives to a range of participants across the country and evaluated the impact. Apart from positively impacting households by helping to lower bills, LIEEP findings also revealed that benefits beyond lower energy consumption and bills were experienced by many households. These benefits were termed 'co-benefits' and were measured in various ways across the projects.

In response to unearthing these co-benefits, GEER Australia (GEER) was commissioned by Energy Consumers Australia (ECA) to conduct a detailed analysis of the 20 final LIEEP reports to identify and synthesise these co-benefit findings, and provide deeper understanding and insights of each co-benefit experienced by householders. The purpose of this report is to summarise the outcomes of both the measured and non-measured co-benefits referred to in LIEEP reports, and to identify which ones improved the most. We extended this analysis to include geographic and cohort details associated with each co-benefit where possible. The findings reported here will be useful to energy providers, government bodies, community organisations and researchers interested in supporting low-income households in overcoming energy-related hardship. The report is structured into three key sections: an overview of LIEEP project characteristics; co-benefit findings; summative outcomes. The report also discusses identified links between co-benefits, and concludes with suggestions for initiatives that might be best suited to various householder types.

# 2. Data Analysis Method

## 2.1 Data Sources

Each of the 20 LIEEP reports formed the basis of GEER's analysis for this *Power Shift* report. Collectively, LIEEP reports totalled approximately 4000 pages. The research team analysed the reports in-depth to extract key information relating to co-benefits. Specifically, three types of 'findings' were identified in LIEEP reports and thus extracted to form our data base.

1. **Quantified, measured changes in co-benefits** as reported by each project. This involved extracting the measured level of a co-benefit both before and after the project's initiative/s trialled. This step was thus dependent on whether each LIEEP report provided pre-post measures, or, at the least, provided the change from pre-post measures. Here, some reports were omitted due to a lack of information, which may or may not reflect whether the co-benefit was measured as part of that project, or whether the household experienced improvement.

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2. **Qualitative improvements in co-benefits** were extracted from LIEEP reports where qualitative research was conducted. We have used quotes from either the project consortia (general text in reports, especially from 'project insight' sections) or that project's participants (participant quote if provided in the LIEEP report). Both quantitative and qualitative findings are thus captured and reflect the empirical evidence in LIEEP reports.

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3. **Insights gained by consortia as they relate to co-benefits** from which broader co-benefits were identified, even though they were not directly 'measured'. This type of data is considered anecdotal and would require more evidence before determining that the co-benefit actually occurred.

The source of data and the process is captured in Figure 1 in the next section.

The findings reported here are thus a culmination of the findings reported by each LIEEP project, as opposed to the findings from the analysis based on the raw data collected and analysed by each project. Our analysis is thus beholden to the content provided by each report. This distinction is important for three reasons, outlined below.

1. Differences in the way a co-benefit was measured are overlooked for the purposes of this report to allow for comparison and synthesis, despite this breaching rigorous analytical rules. Numerous co-benefits were measured by projects using different measurement scales, and the validity and reliability of these measures were rarely reported.
2. Validation of whether the reported findings accurately reflect the data collected cannot be made.
3. Variations between projects cannot be fully assessed due to the dependency on what was reported, and in some cases, what was omitted.

Notwithstanding these limitations, LIEEP project reports are themselves a rich source of information. Our aim was to put these individual project findings and insights into a single report to meaningfully capture the collective wisdom gained from LIEEP.

## 2.1 Rigorous Process of Analysis

The research team recognised that a rigorous analytical process was essential to ensure that key elements within the data were accurately identified. Consequently, a three step process was undertaken in order to conduct a content analysis of the findings (empirical) and insights (anecdotal) of all LIEEP reports as they pertain to co-benefits:

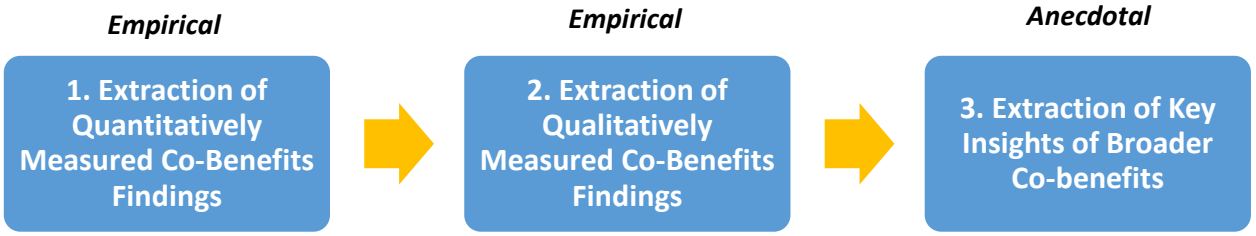



***Figure 1: Process of Data Extraction of Co-Benefits from LIEEP Reports***

Step One – Quantitative Co-Benefits Findings:

A comprehensive excel spreadsheet was developed detailing key findings relating to quantified changes in co-benefits as identified in each LIEEP report. The spreadsheet captured some basic project information (*e.g.,* project, location, sample, initiative/s trialled) and details of the measured changes in how each co-benefit was affected by the energy efficiency initiative/s trialled. It thus captured the level of the co-benefit before the initiative was trialled, and the follow-up measure of that co-benefit after the initiative was trialled to determine the change. For some reports, the pre- and post-initiative measures were not provided, but the change in these measures were provided. In these instances, only the change could be captured in the spreadsheet. One project did not report measuring any co-benefit, though most measured one or a few. As each report was reviewed, the list of co-benefits in the spreadsheet expanded, ensuring that the final list was comprehensive and the findings provided in

each report were accurately reflected. In this way, the LIEEP findings are reported within a structured manner whilst ensuring the integrity of the data.

It is worth noting here that some projects measured similar concepts, though did not necessarily identify them as the same co-benefit. For example, *control* and *self-efficacy* mean similar, though slightly different, things. Where concepts were highly similar, they were grouped as one. In addition, some concepts had commonalities even though they capture different concepts, and were later grouped accordingly. For example, confidence, competency and control were grouped as 'control' type co-benefits, whereas stress and thermal comfort were grouped as 'health and well-being' type co-benefits. The findings of this investigation were then compared by cohort and geographic region to determine whether further patterns in the quantified data could be identified. The results were then grouped in a way to provide useful information for future purposes.

Step Two – Qualitative Co-Benefits Findings:

After extracting the quantitatively measured co-benefits, we turned to extracting the qualitatively measured ones. The LIEEP projects that conducted qualitative investigations usually reported on the findings in a distinct section of the final report. These sections were reviewed and the key findings that related to co-benefits were extracted. Where these findings were consistent with the co-benefits identified from the quantitative extractions, appropriate quotes from the report were extracted. These quotes were either (i) quotes from the participant of the qualitative research for that project, or (ii) text of the report written about the qualitative findings for that project. By so doing, the co-benefits identified from the quantitative measures informed how the qualitative findings were classified. Although the researchers were vigilant about identifying any new co-benefits identified in the qualitative findings, we report that no *new* co-benefits were identified during this step.

Step Three – Key Insights of Broader Co-Benefits:

Most LIEEP reports had a 'key learnings' section or section called 'co-benefits'. These sections were not based on data collected and analysed (considered empirical evidence) but instead reflect the insight of the project partners from their experiences in rolling out their project over three years.

These insights, collectively, provide anecdotal evidence, and though not considered as robust as empirical evidence, nevertheless provide a useful source of aspects that may be worth measuring explicitly in future. They also elaborate on the impact of LIEEP projects which fall beyond the original scope of the project, and thus provide a rich data source in their own right. The relevant sections of LIEEP reports were carefully reviewed where consortia partners shared their observations and insights regarding the project. Numerous new co-benefits were identified during this step that reflect a broader reach than the co-benefits experienced by a single householder.

All phases of data collection and collation required a significant amount of reviewing, data entry, self-editing and cross-checking to ensure accuracy. Two research teams read and reviewed all of the LIEEP reports in full, extracting key information (quantitative and qualitative findings, and key learnings) and entered relevant information into either a spreadsheet or a separate co-benefits database. They double-checked the accuracy of their own entries and then compared their entries with the other team's entries. Where disparities occurred, discussion took place until consensus was reached. This rigorous process allowed GEER to capture data and present key learnings that are both consistent and accurate reflections of the content of LIEEP reports as they relate to co-benefits.

# 3. Overview of LIEEP Projects

Various initiatives were trialled across LIEEP projects to assist household participants to reduce their energy consumption and/or energy bills. Overall, 20 project consortia implemented nine different types of initiatives, either as a single initiative, or as a combination. For example, one project might have trialled gamification, while another might have trialled digital engagement, whereas a third project might have trialled the combination of the two as their 'initiative'. The range of initiatives trialled within LIEEP included:

- **Home energy visits (HEVs):** a personal visit to a person's home to discuss their energy usage, bills, tips, payment and support plans, provider offers and personalised attention.
- **Major retrofits:** involves installing new energy technologies to the dwelling such as insulation and replacement of large appliances (*e.g.,* heating/cooling, hot water systems or refrigerators).
- **Minor retrofits:** involves installing or providing minor energy savings devices, such as replacement of lighting, draught sealing or window coverings.
- **In-home displays (IHD):** provides a real-time measure of energy use in the home to alert householders regarding their real-time usage, spikes and costs via a display or app.
- **Energy efficiency information:** providing information via brochures, pamphlets, stickers, or other print forms.
- **Energy efficiency workshops:** providing energy savings tips or training to small groups of people, usually in public or professional locations.
- **Energy efficiency training:** developing skills and tips with participants and project workers to self-sufficiently promote and engage their families and communities in energy efficiency.
- **Digital engagement:** involved using digital technologies to engage and/or communicate with households regarding energy efficiency, which may involve one-to-one or online communities.
- **Gamification:** using gamification to encourage the practice of energy efficiency behaviours by stimulating participants in a fun way.

While these initiatives were implemented primarily as a means of improving participant's energy efficiency, they resulted in further positive outcomes to participants (co-benefits). Each LIEEP project reported on the specific cohort they targeted, which is presented in Table 1. It is evident that the people in some cohorts could overlap. That is, participants in each cohort could also have been included under a different category in another project. For example, a 'tenant' could also be an aged person, a social benefit recipient, Aboriginal, CALD, or part of the 'general' low-income population. Despite this limitation, Table 1 provides a useful overview of the varied cohorts involved in LIEEP. In total, eight major cohorts were targeted by LIEEP projects. Also presented in this table are the types of co-benefits measured by each LIEEP project. The fewest number is zero, and the maximum number is six. Overall, 17 of the 20 LIEEP projects quantitatively measured and reported on changes in co-benefits, and five projects qualitatively analysed and reported on co-benefits. Only one project did not provide empirical evidence of co-benefits.

As the aim of LIEEP was not to investigate co-benefits, it was interesting to note that 19 projects empirically captured co-benefits in some way. A full list of both quantitatively and qualitatively captured co-benefits for each LIEEP project is provided in Appendix A.

*Table 1: LIEEP Projects, Targeted Cohorts and Type of Co-Benefit Measured*

| Main Cohort Targeted | Project | Project Acronym | Region** | Quant. Measures of Co-Benefits | Qual. Measures of Co-Benefits |
|---|---|---|---|---|---|
| **Aboriginal** | Koorie Energy Efficiency Project | KEEP | VIC | 4 | 5 |
| | Manymak | MM | NT | 0 | 2 |
| **Aged** | Energy Efficiency in the 3rd Age | EE3A | NSW | 3 | 1 |
| | Energy Saver | ES | VIC | 0 | 0 |
| | Glenelg Saves | GS | VIC | 6 | 0 |
| | Green Heart Wisdom | GHW | QLD | 6 | 0 |
| | Innovation and Opportunities in Energy Efficiency for Disadvantaged Members of Our Community (Northern Grampians Shire Council) | NGSC | VIC | 0 | 5 |
| | Switched on Homes | SOH | WA | 4 | 0 |
| **Apprentices / Trainees** | PowerPlay | PP | NSW | 4 | 3 |
| **Culturally and Linguistically Diverse (CALD)** | Bright Actions | BA | QLD | 3 | 0 |
| | Power Saver Project | PSP | NSW | 5 | 0 |
| **General** | Get Bill Smart | GBS | TAS | 3 | 0 |
| | Our Green Home | OGH | National | 3 | 0 |
| | Smart Cooling in the Tropics | SCT | NT | 5 | 0 |
| **New Parents*** | Future Powered Families | FPF | VIC | 4 | 0 |
| **Social Benefit Recipients** | Home Energy Efficiency Upgrade Project | HEEUP | VIC | 1 | 0 |
| | Powerdown | PD | VIC | 4 | 0 |
| | Power Save | PS | NSW | 6 | 0 |
| **Tenants** | Beat the Heat | BTH | SA | 2 | 0 |
| | Reduce Your Juice | RYJ | QLD | 5 | 0 |

* New parents refers to those parents with children under 15 years of age

** LIEEP was targeted to six states, one territory, and one national level, totalling eight geographic regions

LIEEP supported many households in improving their energy efficiency. While the reach was national, it was concentrated on the eastern side of Australia, partly reflecting the population dispersion.

Figure 2 and Figure 3 below display this reach, firstly by project, and then by region.

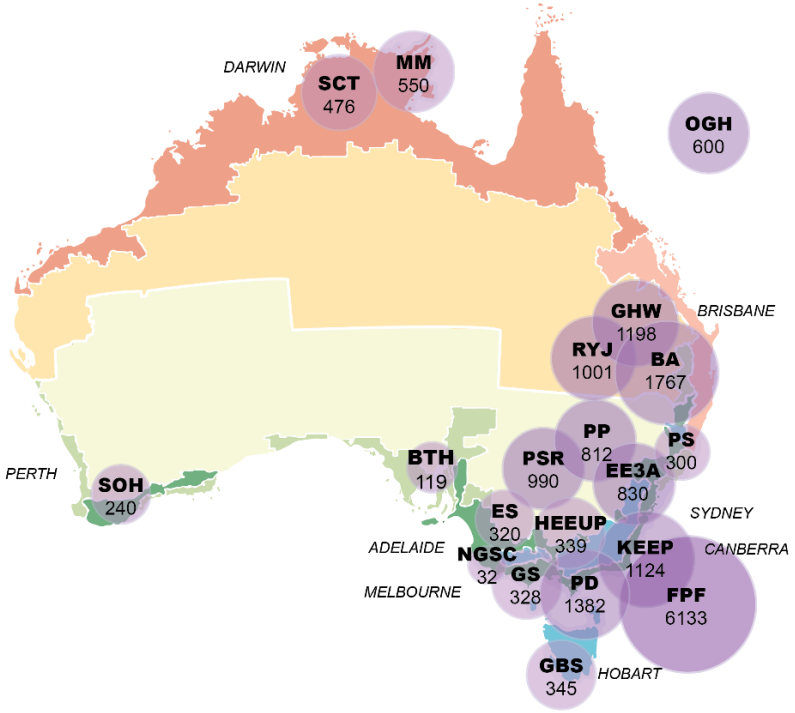



***Figure 2: Households Reached by Each LIEEP Project***

*(Source: Russell-Bennett, et al., 2017)*

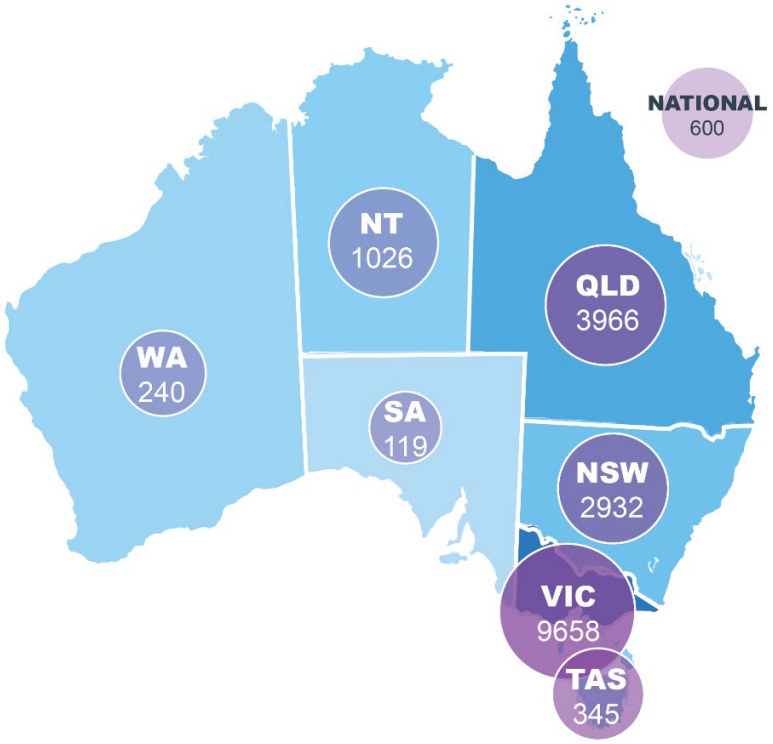



***Figure 3: Total Households Reached Per Region***

*(Source: Russell-Bennett, et al., 2017)*

It is important to acknowledge that the total number of households reached was 32,499. However, only a fraction of useable data on quantitatively measured co-benefits was available at the time LIEEP reports were prepared. For example, a project may have delivered an initiative to 1,000 households, but only collected data for 500, and then only collected changes in co-benefits for 200. There are numerous possible reasons for this disparity. Different initiatives were trialled with different sub-groups in some projects, and so certain features were measured for some participants and not others. For example, a project may have trialled a major retrofit for some households they targeted, and a minor retrofit for the others. If the major retrofit included heating/cooling, then the project may have measured 'thermal comfort' for only those homes receiving heating/cooling upgrades. Another reason for the small proportion of data reported on is the difficulty of obtaining post-initiative measures for some households. For example, obtaining follow-up (post) measures requires re-contacting the household, who may or may not have been available or wished to provide further 'data'. In addition, measuring co-benefits was not paramount for all projects at the start, and became increasingly important as each project progressed. Hence, for some projects, co-benefits may have been measured part way through, thus reducing the available number of participants compared with those in the whole project. Lastly, some projects were still operating at the time of the final report, and so it was not possible to collect all the post-initiative data.

Collectively, the proportion of households that had reportable data was 58% of all participants, and the data available for the purpose of step one that captured measured changes in co-benefits was 15% of LIEEP participants (see Figure 4).

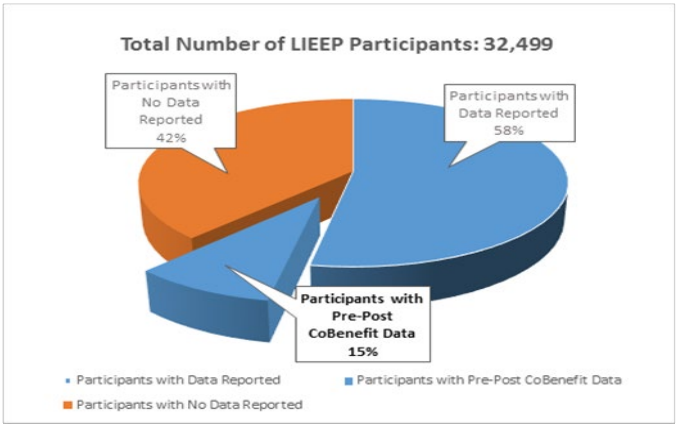



***Figure 4: LIEEP Households Reached and Sample of Available Data***

# Findings

## 4. Analysis of LIEEP Co-Benefits

At the start of LIEEP, projects used reductions in energy use or bills as the sole indicator of the effectiveness of each initiative. Many consortia later found that other factors could be used, in addition, to measure the project's impact. For example, energy efficiency not only had the potential to reduce costs for households, but also realised additional benefits such as boosting householder knowledge and confidence, or empowering them to obtain better deals from their energy providers. As a result, projects began to measure additional positive outcomes delivered, which were described as "co-benefits". So although measuring co-benefits was not initially required by the Government, they were progressively added by many projects which meant that there was some variation in the type of co-benefit measured in each project, and similarly, variation in how they were measured. This variation is also understandable given that different projects were providing energy efficiency initiatives to different cohorts, and they expected them to experience outcomes most relevant to their particular circumstances. Hence, all empirically reported improvements in co-benefits reflect self-reported data captured from participating households (*i.e.,* collected via survey (quantitative) or focus group/interview (qualitative)) and reported upon in each project. All anecdotal data is a compilation of the rich insights expressed by consortia partners in their final report.

### 4.1 Changes in Co-Benefits Identified Empirically

Empirical changes in co-benefits as identified in LIEEP projects are presented in this section. These co-benefits can be broadly categorised into four types:

| **Knowledge** | **Control** | **Attitude** | **Health & Well-being** |
|---|---|---|---|
| The householder believes they have greater k*nowledge* about how to be energy efficient in their homes (dark blue in graphs). | The householder feels some level of c*ontrol* over their energy use or bills (evident by five co-benefits regarding their empowerment, confidence, competency, self-efficacy and financial control, about energy efficiency) (blue in graphs). | The householder's a*ttitude* towards, or interest in, energy efficiency increases as a result of participating in LIEEP (evident from attitude and interest co-benefits) (orange in graphs). | The householder reports an improved sense of comfort or *well-being,* where some aspects are related to health (evident from financial stress, stress, perceived comfort and thermal comfort) (green in graphs). |

### 4.1.1 Quantitative and Qualitative Findings per Co-Benefit

Overall, 17 LIEEP projects quantitatively measured changes in at least one of the 12 co-benefits identified (see Figure 5). The most frequent co-benefits measured were thermal comfort (11 projects), knowledge (10 projects) and financial control (10 projects), where the latter usually referred to the householder 'keeping on top' of their energy bills. Since not every project measured every co-benefit, it is likely that **the results reported in this section under-estimate the true extent of the co-benefit impact of LIEEP**.

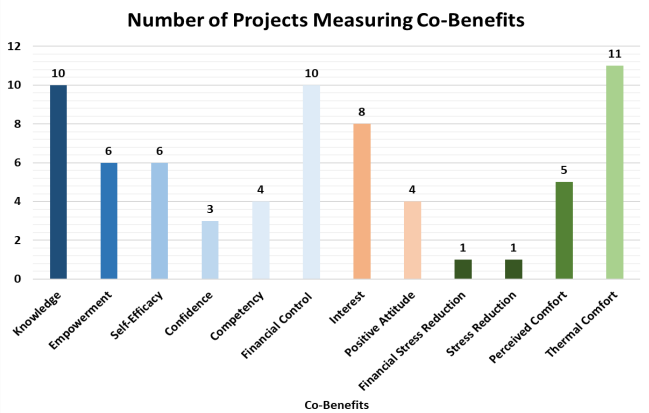



***Figure 5: Number of Projects Measuring Co-Benefits***

For example, not many projects measured changes in stress levels, however, it is likely that many of the participants in the other LIEEP projects also experienced less stress as a result of the support they received from LIEEP as well – it is just that this change was not measured, and thus not captured across all projects. The same scenario applies to all co-benefits and forms a caveat for the way in which some findings are interpreted. A reported finding, or lack thereof, does not necessarily reflect the fuller impact, nor does it necessarily reflect that one cohort experienced a co-benefit more than another. It is therefore probable that households benefited more so that the findings here are able to reflect. We thus tend to repeat "as reported" to remind readers of the limitation and carefulness in which the findings should be interpreted – as understated, not overstated.

In order to fully understand the importance of the relevant co-benefit changes identified in LIEEP projects (and presented throughout the following sections) a measure of the before and after level of co-benefits is needed. As mentioned previously, some projects only reported the 'change' and did not provide the pre- and post-level information. As a result, this section was only able to include 10 of the 12 co-benefits measured. Interpreting the pre-initiative and post-initiative data helps in not only understanding any improvements, but importantly, highlights the lived experiences of many households who are in need of support such as that provided via LIEEP. For example, from Figure 6 below, in viewing the co-benefit levels 'before' the initiative was introduced to the household, it is evident that on average, most low-income households report:

- Only very modest levels of comfort (3.2 and 3.3 out of 5);
- Knowing only a little about how to become more energy efficient (2.7 out of 5);
- Not feeling strongly in control of their household energy use or bills (all *control* variables report within a range of 3.2 and 3.6 out of 5);
- Experiencing mid-range levels of stress (2.8 out of 5) where the latter should, ideally, be zero.

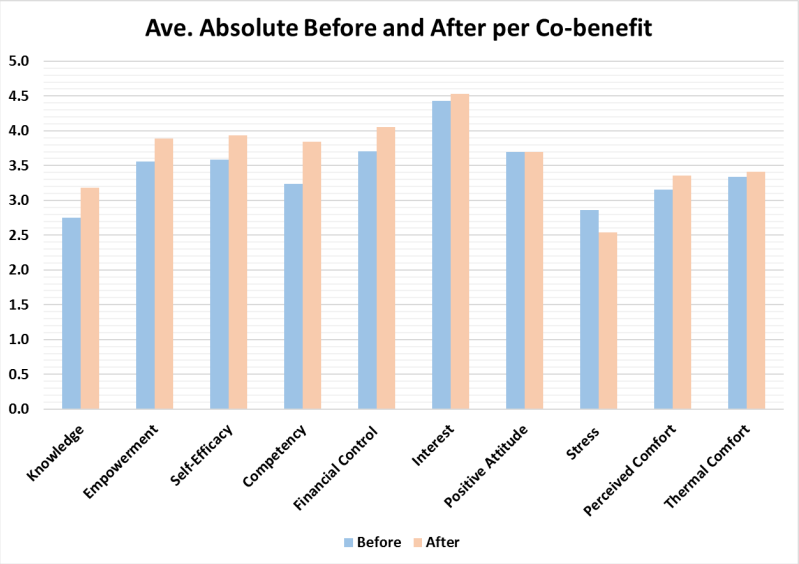



***Figure 6: Average Absolute Before and After Measurement per Co-benefit***

Also evident from Figure 6 is that, on average, household participants experienced an improvement across all co-benefits measured, with the most notable improvements occurring in the *control* co-benefits, followed by improvements in energy efficiency *knowledge* and reductions in energy-related *stress* (improved *well-being*).

The following sections present the empirical changes reported for each of the 12 co-benefits. The first components report on the quantitatively measured changes, first by initiative trialled, then by geographic region, followed by cohort type. The aim is to reveal any patterns of changes in co-benefits based on the initiative, region or cohort. In the first graph presented for each co-benefit, the percentage change pre- to post- initiative trialled is reported, where darker shaded bars reflect density, in that the co-benefit for that initiative trialled was conducted in several projects, while lighter shades indicate that fewer projects measured co-benefits against the relevant initiative. The disparity across these graphs reflects that some projects measured the co-benefit while others did not, and so some regions and cohorts are well represented, some moderately represented, and some not represented at all.

It is worth noting here that an assumption was formed in order to conduct this analysis: that all measures are comparable. This was made to allow the co-benefit changes to be collated and averaged.

The second component provides evidence extracted from the qualitative findings of projects that also captured changes in the co-benefit based on information gained from household participants. These are used to corroborate the quantitative findings of co-benefit changes in LIEEP, and are presented with quotes for each co-benefit where qualitative evidence also exists.

## Knowledge

*Knowledge* about energy efficiency was one of the most commonly measured co-benefits in LIEEP. Half the projects (10) collected quantified knowledge improvements in 4750 households, representing 25% of the total sample of quantitative data appearing in reports (n=18,886). This reflects the highest number of participant responses reported for any co-benefit. Five of eight geographic regions are represented:

| 45% | 29% | 22% | 5% | 2% |
|---|---|---|---|---|
| QLD | NSW | VIC | TAS | NT |

Responses in knowledge improvements were captured for a diverse range of cohorts (six of eight), and not captured for Aboriginal or New Parent cohorts. The following list provides the proportion of each cohort represented, and then the proportion from each geographic region:

| | |
|---|---|
| **Aged:** | 36% from QLD (56%), NSW (31%) and VIC (12%) |
| **Social Benefit Recipients:** | 23% from VIC (78%) and NSW (22%) |
| **Tenants:** | 21% from QLD |
| **CALD:** | 12% from NSW |
| **General:** | 7% from TAS (73%) and NT (27%) |
| **Apprentices and Trainees:** | 1% from NSW |

The projects that most frequently reported improvements in participants' knowledge were those trialling a HEV (3 projects) and a HEV + Minor Retrofit (4 projects) which means the results of knowledge change here are the most reliable. The HEV alone achieved the highest result with a 60% improvement in energy efficiency knowledge (see Figure 7). Generally, HEVs paired with other initiatives produced moderate results (ranging from 19-48%) while digital, gamification and energy efficiency workshops produced the lowest changes in knowledge (5-17%). Numbers in parenthesis after the initiative listed indicates the number of projects trialling that initiative and measuring changes in knowledge.

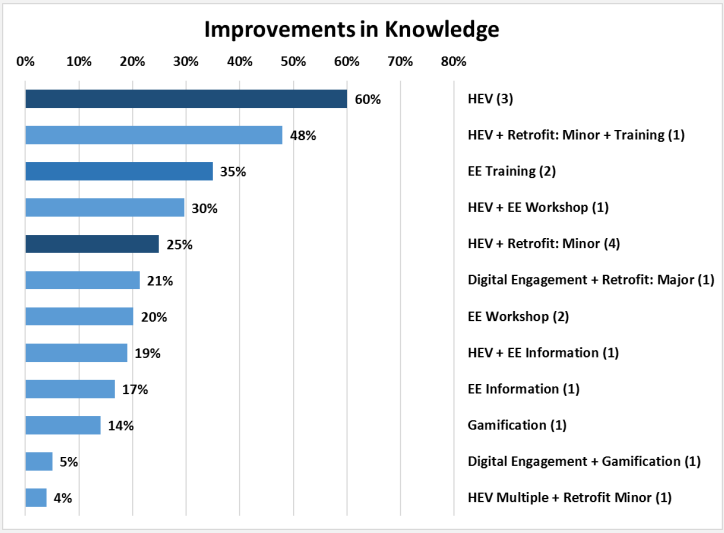



***Figure 7: Average Percentage Knowledge Change per Initiative***

The following graph shows that knowledge was measured in five geographic regions (see Figure 8). The greatest improvement was experienced by participants in the Northern Territory (74% increase), followed by participants in Tasmania (56% increase). Four projects were conducted in NSW, and so the average improvement in knowledge of 38% is both substantial and the most robust outcome. Knowledge was not captured in projects run in WA, SA or nationally, however, it is likely that knowledge was increased for household recipients in these states as well.

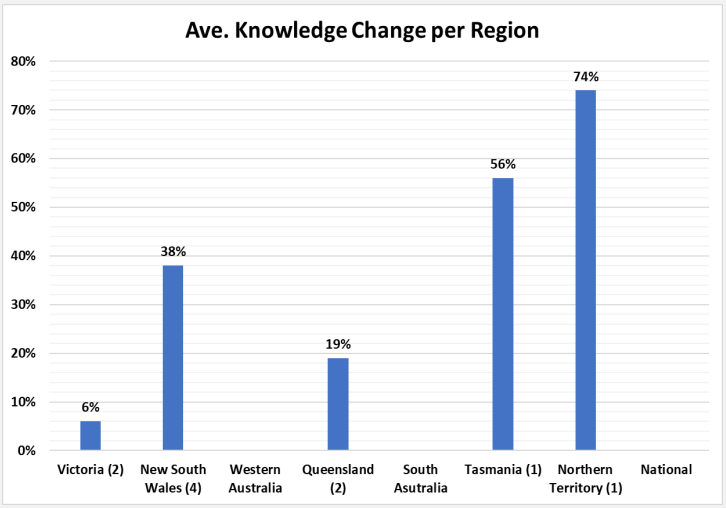



***Figure 8: Average Percentage Change in Knowledge per Region***

The next graph shows that knowledge was a measured co-benefit for six of the eight cohorts that participated in LIEEP (see Figure 9). Two projects targeting the general population reported the highest knowledge change of 61%, with the next highest improvement experienced by CALD (48%) and social benefit recipients (38%). Knowledge was not measured by projects targeting Aboriginal or New Parent cohorts, though, as alluded to previously, it is likely that greater knowledge was experienced by these household participants.

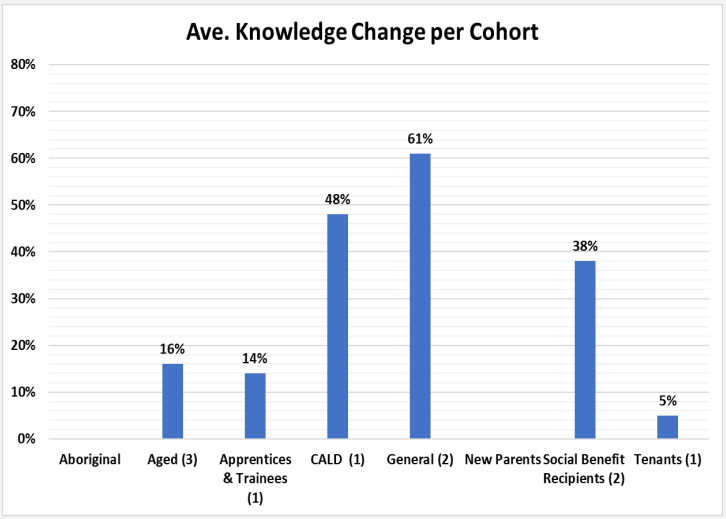



***Figure 9: Average Percentage Change in Knowledge per Cohort***

From the individual LIEEP projects some light can be shed onto the perceived usefulness of energy efficiency knowledge provided by the projects as well as the content and benefits of energy efficiency education. For instance, the following quotes indicate that knowledge related to using energy efficiently was perceived by participants as needed. That is, energy efficiency education meets a need low-income households have as it helped them to understand how power works and the actions they can take to reduce their power usage. Even seemingly simple ways of saving energy were perceived as useful knowledge as many participants were not aware of them:

> "Many principal tenants and householders believe that the education they received provided much-needed knowledge, helped them to better understand the power system and helped them to use less power and save money." (MM, p.257)

> "Just to understand better for example [to] keep the blinds down and the curtain closed when it's hot or when it's too cold." (Participant, NGSC, p.54)

The quotes also suggest that the projects not only enhanced knowledge in how to directly save energy but also indirectly via enhancing financial literacy. Improvements in financial literacy are likely to result in an increased awareness of the linkages between energy usage and costs as increased understanding of the power bills provided a visual pathway to monitoring energy usage and tangible financial incentives for using energy more wisely. Consequently, increasing financial literacy seemed to also enhance two other co-benefits: the level of sense of control or self-efficacy and financial control (see the following sections for details on these co-benefits):

> "During interviews, Aboriginal households' comments reflected this service provision [the home energy visit], as they reported that CDOs [project workers] came to their homes and…taught them useful energy tips…helped them interpret their bills." (KEEP, p.77)

Furthermore, energy efficiency education seems to not only have been useful for participants' personal lives but also for their professional lives as this quote suggests:

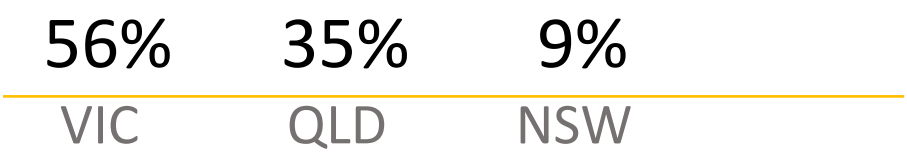
> "Dean found the program to be a source of information for him professionally." (PP, p.96)

***Snapshot on Knowledge***

A home energy visit with minor retrofit is the most effective initiative at increasing knowledge, particularly in more extreme climate zones (very cold or very hot) and for diverse groups. This suggests that participants generally feel they learn the most when having someone visit their home, where tailored, nuanced tips can be proved specifically for each household's energy.

## Empowerment

Five projects chose to measure changes in *Empowerment* as a result of the eight initiatives (collectively) trialled. This generally refers to the feeling of being equipped and strong in dealing with energy-related issues. A total of 2780 household responses were captured for this co-benefit from three geographic regions and two cohorts, representing 15% of the total sample. The geographic regions include:




The three cohorts targeted include:

| | |
|---|---|
| **Aged:** | 42% from QLD (82%) and VIC (18%) |
| **Social Benefit Recipients:** | 40% from VIC (78%) and NSW (22%) |
| **New Parents:** | 18% from VIC |

As presented in Figure 10, a HEV produced the highest change in empowerment of 20%, where this reflects the average reported change across two projects. The next highest improvement was found with a HEV + EE workshop (15%), followed by an energy efficiency workshop alone, which was trialled by three projects which produced an improvement of 14%. The lowest response was reported against EE information, which suggests that the interactive nature of HEVs or EE workshops seems to help participants feel empowered about managing their energy use in the future. It also shows that **being provided with energy efficiency information alone is insufficient and will be unlikely to have the desired outcome**. HEVs and workshops were able to tailor the information provided and give specific behavioural tips to the householder on how to save energy.

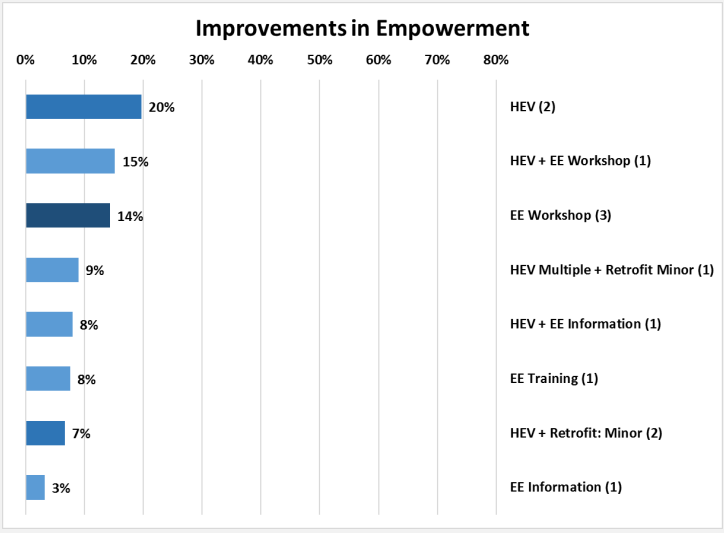



***Figure 10: Average Percentage Empowerment Change per Initiative***

As evident from Figure 11, empowerment was measured in three geographic regions. Participants in NSW report the greatest improvement in empowerment (36%), with smaller improvements reported for those in QLD (9%) and VIC (8%).

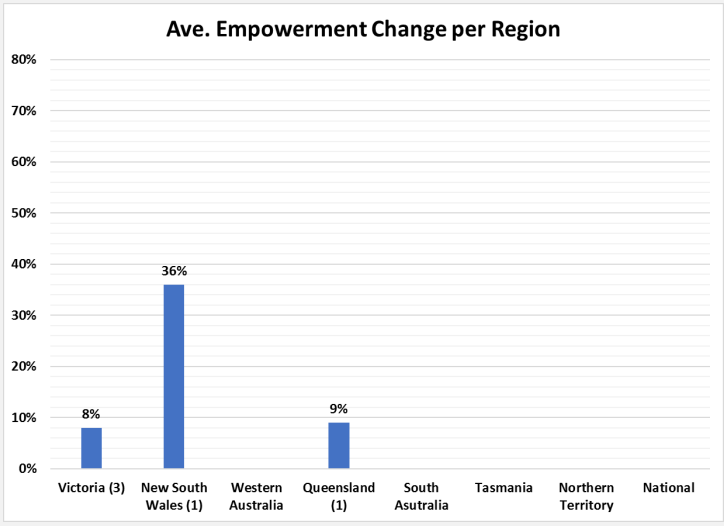



***Figure 11: Average Percentage Change in Empowerment per Region***

The highest changes in empowerment were experienced by three cohorts (see Figure 12): those on social benefits reported an improvement of 18% (average across two projects) and those who are new parents experienced an 11% increase (1 project). The aged also experienced improvements in empowerment of 9% (two projects). This is an example of where a lack of data precludes any comment about whether empowerment increased for other cohorts or in other regions.

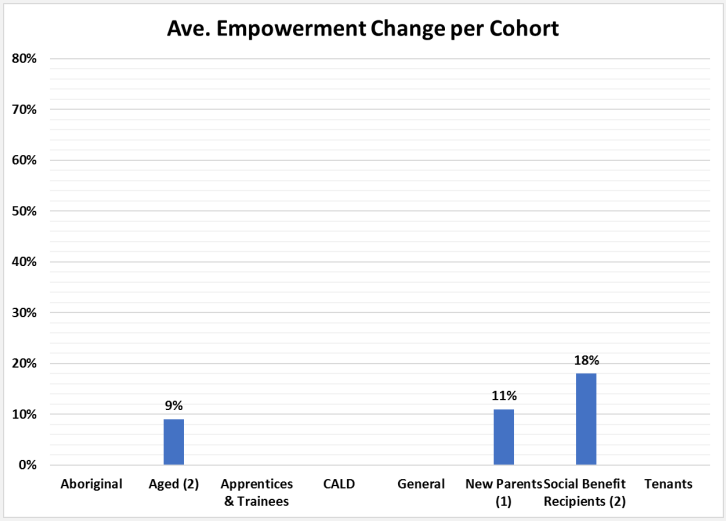



***Figure 12: Average Percentage Change in Empowerment per Cohort***

Some projects reported that involving those from the targeted cohort into the design and implementation of the project, which includes delivering the initiative to the participating household, empowers the participants within a targeted community to use energy more efficiently (*e.g.,* KEEP, BA, MM) as the following quote indicates:

"By … training Aboriginal people to deliver support to Aboriginal households, KEEP enabled self-determination for Aboriginal people, and householders [felt] a greater level of empowerment regarding home energy." (KEEP, p. 105)

Empowerment seems to be the result of increases in knowledge and is especially linked to financial control as this quote from another project suggests:

"[Participants experienced] a feeling of empowerment, regarding the ability to control household energy bills." (PP, p. 80)

***Snapshot on Empowerment***

Providing HEVs or holding energy efficiency workshops to small groups of people encourages optimal levels of empowerment, and appears to work particularly well for social benefit recipients living in NSW.

## Perceived Control/Self Efficacy

Perceived control or self-efficacy was measured in five projects which trialled five initiatives and captured responses from 2088 households. This represents 11% of the total sample. The measures of this co-benefit reflected the householder's feeling of being in control of, or on top of, their energy use and bills. The geographic regions capturing control/self-efficacy include:

| 48% | 27% | 12% | 11% | 3% |
|---|---|---|---|---|
| QLD | NSW | NATIONAL | WA | NT |

The five cohorts targeted include:

| | |
|---|---|
| **Tenants:** | 48% from QLD |
| **CALD:** | 25% from NSW |
| **General:** | 15% from NT (20%) and National (80%) |
| **Aged:** | 11% from WA |
| **Apprentices and Trainees:** | 2% from NSW |

Although all initiatives trialled improved the participant's sense of control (see Figure 13), the HEV + Minor Retrofit is associated with the highest response of 29%. Digital engagement with minor retrofit produced the next highest improvement in control / self-efficacy of 14%, whereas gamification alone had a minor effect (1% increase).

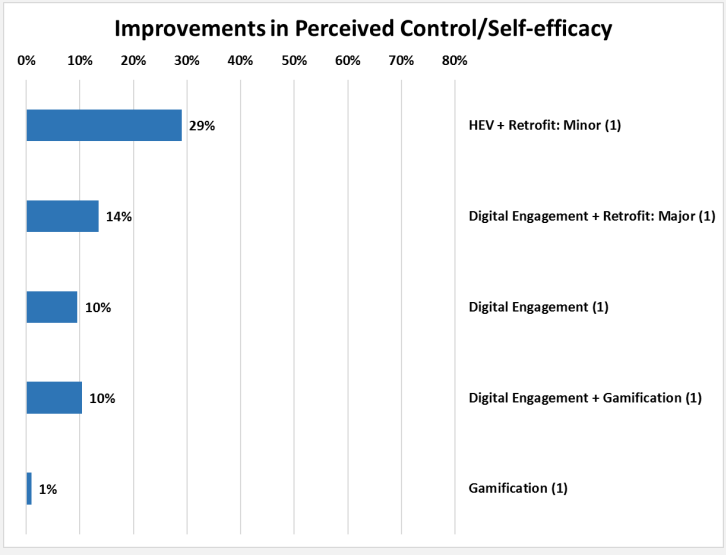



***Figure 13: Average Percentage Perceived Control/ Self Efficacy Change per Initiative***

The changes in perceived control were then explored based on the region in which the project was conducted (see Figure 14). Three consistent changes were reported in NSW, QLD and WA (10%-15% improvement) representing the average finding across four projects measuring this co-benefit. The project targeting the national geographic region reported that participants experienced the highest change in control / self-efficacy of 61%. This figure may be an outlier and be more indicative of the measurement method used than the outcome achieved. The improvement for participants in New South Wales is particularly significant given that two projects targeting different cohorts (Apprentices & Trainees, CALD) produced consistent results (15%).

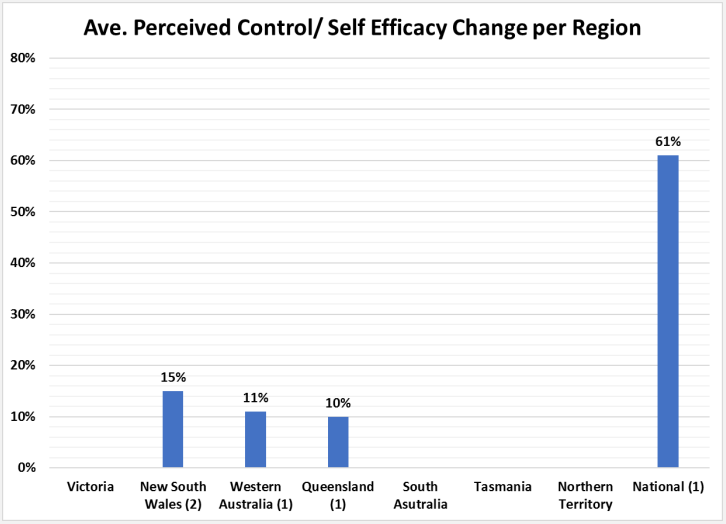



***Figure 14: Average Percentage Change in Perceived Control/ Self Efficacy per Region***

Figure 15 presents the changes in control / self-efficacy for the cohorts where this co-benefit was measured. The responses are quite disparate, where improvements of up to 61% were experienced by the general population, with the next most substantive finding experienced by CALD participants (29%).

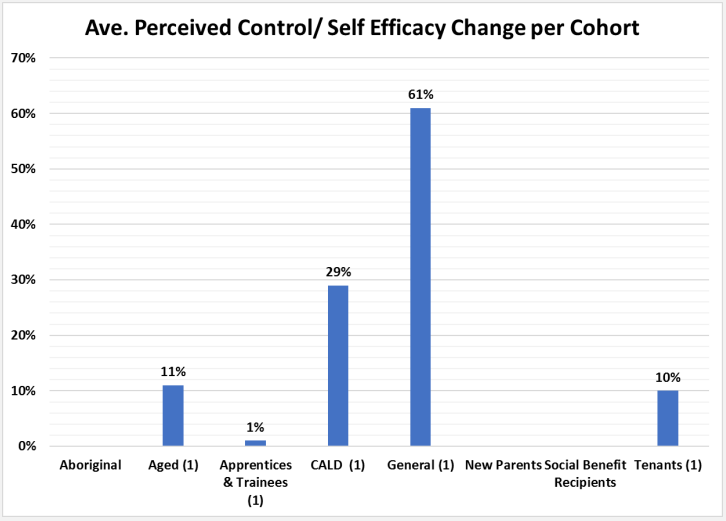



***Figure 15: Average Percentage Change in Perceived Control/ Self Efficacy per Cohort***

Improvements in feeling in control were corroborated by qualitative investigations, as demonstrated in the following report extract:

"The majority of participants reported that they experienced … improvements… [in] their levels of control over energy usage." (NGSC, p. 13)

For some, feeling a sense of control provides 'peace of mind' which alludes to a reduction of stress, which is another co-benefit directly linked with mental and physical health:

"[A participant noted that the project gave him most]…importantly 'peace of mind' [a feeling of being] back under control … I'm very grateful for the involvement." (Participant Quote, NGSC, p. 53)

***Snapshot of Control / Self-Efficacy:***

Visiting the home and providing energy efficiency advice together with minor retrofit is the most effective initiative for increasing perceived control/self-efficacy, particularly for CALD households living in NSW, which may contribute to also reducing stress.

## Confidence

Improvements in the householder's confidence when it comes to implementing energy efficiency changes was measured in three projects which collectively trialled five initiatives. Responses were captured from 839 households representing 4% of the total sample. The three geographic regions include:

| 52% | 27% | 21% |
|---|---|---|
| QLD | VIC | SA |

The three cohorts targeted include:

| | |
|---|---|
| **CALD:** | 52% from QLD |
| **Aboriginal:** | 27% from VIC |
| **Tenants:** | 21% from SA |

Changes in the householder's confidence about energy use shows the highest diversity of responses. One project trialling a HEV + IHD + Minor Retrofit reported an improvement in confidence of 238% (see Figure 16). The same project, trialling a different approach (HEV + Minor Retrofit) achieved 150% improvement in householder's confidence. These very high changes are somewhat matched by a different project trialling the HEV + IHD + Major Retrofit which achieved improved confidence of 80%. The discord in these results occurs with the HEV alone (26%) and HEV Multiple + Minor Retrofit (-7%) where the latter showed a slight drop. This disparity means that results should be interpreted with caution; all trials measuring confidence involved a home visit, whereas the additional components trialled would not logically produce such diverse outcomes.

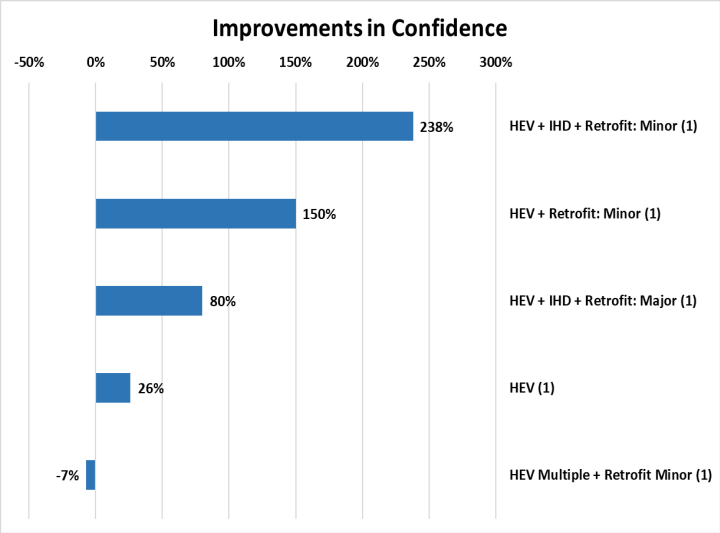



***Figure 16: Average Percentage Confidence Change per Initiative***

In viewing Figure 17 and Figure 18, the cohorts include Aboriginal households in Victoria (127% increase), CALD households in Queensland (26% increase) and tenants in South Australia (80% increase).

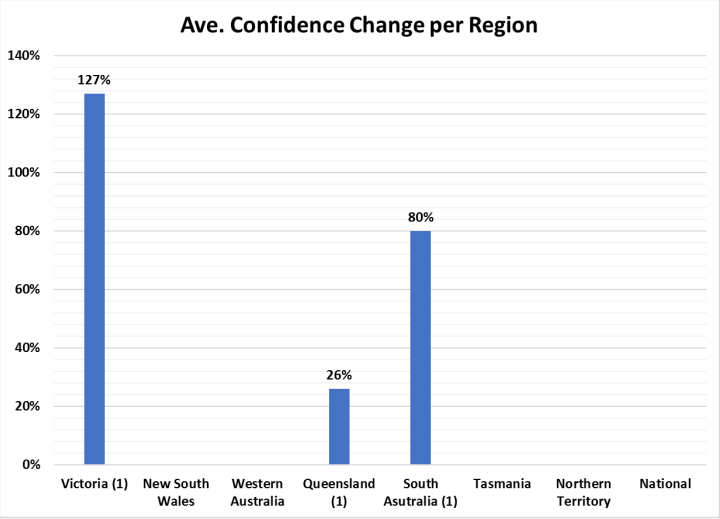



***Figure 17: Average Percentage Change in Confidence per Region***

These graphs also highlight the components of missing information. For example, the confidence levels in other types of households (*e.g.,* aged, apprentices, new parents, social benefit recipients or general) was not measured, and similarly, confidence in households in other parts of Australia (*e.g.,* NSW, WA, TAS, NT, National) was not captured. This means that changes in householder co-benefits across households and geographic regions per initiative trialled cannot be fully gleaned from LIEEP data for 'confidence'.

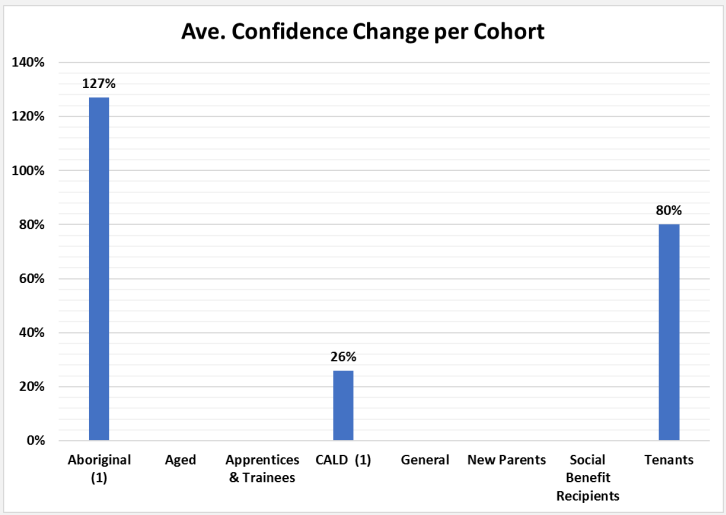



***Figure 18: Average Percentage Change in Confidence per Cohort***

Accounts identified in the KEEP project report imply that increases in participants feeling confident about being able to manage their energy usage and to negotiate prices and payments with energy providers is linked to levels of knowledge. The accounts also reveal that increases in confidence might raise the willingness of people to engage in actions that reduce their energy usage:

"We explain the bill to people so they can get it, they understand, and they feel more confident about managing it themselves." (KEEP, p. 73)

"Overall, as a result of KEEP home visits, Aboriginal households became increasingly willing to reduce their energy usage and showed marked improvement in their confidence around energy and in dealing with the energy sector." (KEEP, p. vi)

***Snapshot of Confidence:***

The full impact of confidence as a result of LIEEP initiatives trialled is unclear. However, it appears that a visit to a home to provide energy efficiency advice and tips, together with a minor retrofit is particularly helpful to Aboriginal, CALD and tenant households.

## Competency

Collectively, 2260 household participants were asked to reflect on how competent they felt about implementing energy efficiency activities or devices in their homes, or in dealing with energy providers, tariffs and bills. Four projects trialling 10 initiatives measured this co-benefit, which captured 12% of the total sample. The two geographic locations where this co-benefit was measured include:

| 73% | 27% |
|---|---|
| QLD | VIC |

The four cohorts targeted include:

| | |
|---|---|
| **Tenants:** | 44% from QLD |
| **Aged:** | 29% from QLD |
| **Social Benefit Recipients:** | 18% from VIC |
| **Aboriginal** | 9% from VIC |

The results fall into two groups: the first range produced results from 48-77% increase, where a HEV + retrofit or Major Retrofit produced the strongest increases in competency. A HEV + IHD + Minor Retrofit delivered the highest increase to participants' energy efficiency competency of 77%. The second group of results showed lower changes, ranging from 3-15% improvements (see Figure 19). The lowest change occurred with a HEV + EE Information of 3%. Since a HEV was the initiative trialled within both groups of results, it is difficult to understand the disparity in responses. For example, it is unclear as to why an HEV alone, compared with an HEV with retrofit, produced such significantly different levels of competency in the household. This disparity could reflect variances in the way the co-benefit was measured, rather than depict the effectiveness of the initiative.

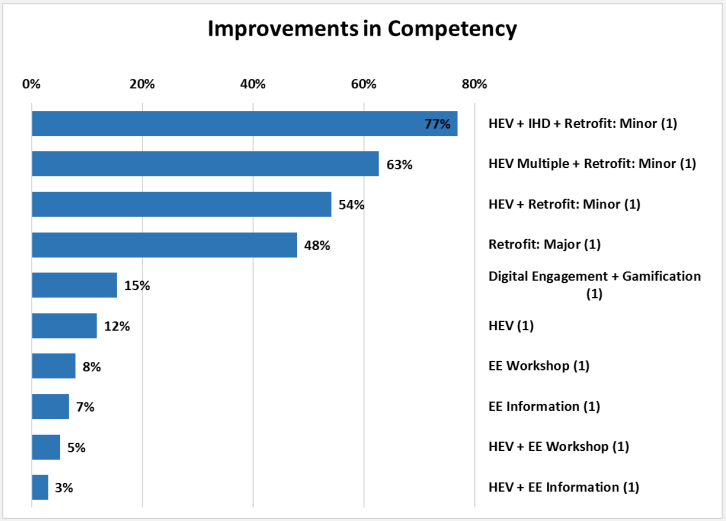



*Figure 19: Average Percentage Competency Change per Initiative*

From Figure 20, it can be seen that competency was measured in only two states, with an average improvement occurring in Victorian households of 61% (2 projects) and in Queensland of 8% (2 projects).

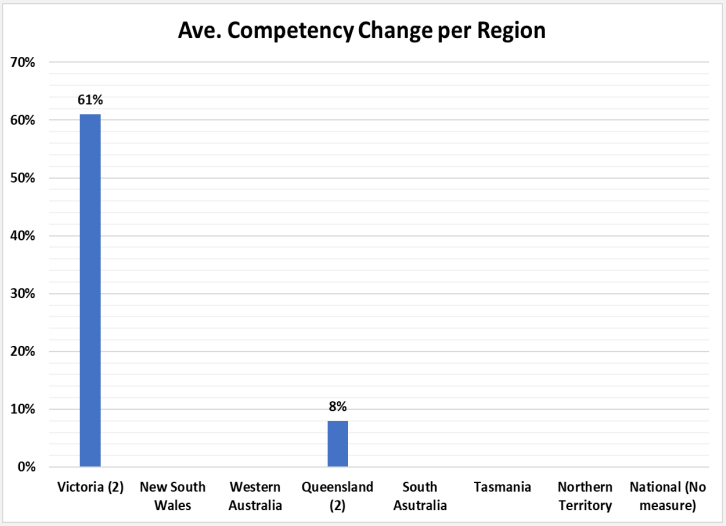



***Figure 20: Average Percentage Change in Competency per Region***

The strongest result for improved competency was experienced by Aboriginal households in Victoria who reported an average increase in competency of 65%, followed by social benefit recipients, also in Victoria, who experienced an average increase of 48% (see Figure 21). Tenants experienced a 15% increase while aged households experienced an average 7% increase. The higher results for Aboriginal and social benefit recipient households could reflect that these households were unaware of the entitlements available to them regarding energy assistance and so yielded the highest improvement upon receiving support.

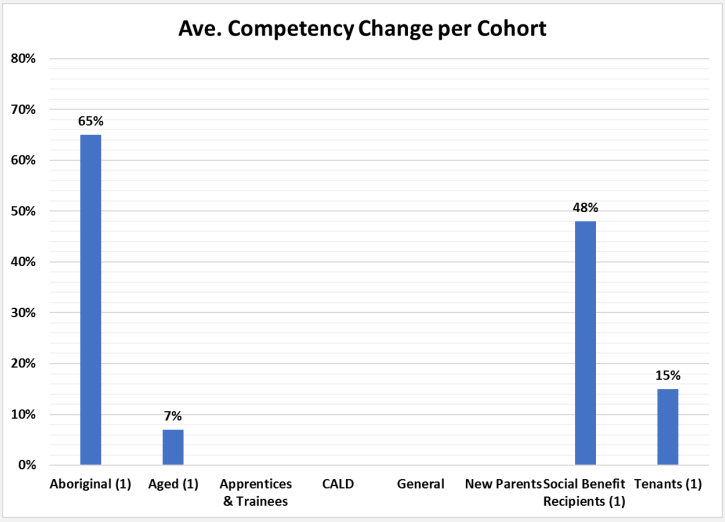



***Figure 21: Average Percentage Change in Competency per Cohort***

The report from the NGSC project suggests that the knowledge of energy usage and ways of saving energy enabled householders to reflect on and become aware of how they use power and how they could save power:

> "…both participants and carers reported improvement in their awareness and understanding of home energy use and ways to save energy." (NGSC, p.68)

Another report shows that knowledge and support in applying their newly acquired knowledge increased people feeling more capable to take actions that they were unable to perform before and improved belief that they would be able to perform these actions successfully. It is likely that feeling competent contributed to feeling a sense of control:

> "As one person put it, the most beneficial support they received from the HV was: 'the ability to negotiate a late bill'" (KEEP, p. 77)

***Snapshot of Competency:***
Efforts to improve competency are most notably achieved for Aboriginal and Social Benefit Recipient households who receive a home energy visit where they learn about bills, providers, entitlements, support plans and energy efficiency tips around the home, together with minor retrofits.

## Financial Control

Ten projects trialling 12 initiatives measured the sense of financial control experienced by 4216 householders, which represents 22% of the total sample. The responses for this co-benefit are quite robust in terms of diversity of cohort types and geographic regions. Respondents came from seven of the eight geographic regions as follows:

| 18% | 17% | 6% | 6% | 5% | 1% |
|---|---|---|---|---|---|
| NSW | VIC | TAS | NAT | WA | NT |

The six cohorts targeted include:

| | |
|---|---|
| **Aged:** | 33% from QLD (69%), WA (16%) and VIC 15%) |
| **Tenants:** | 24% from QLD |
| **General:** | 13% from National (45%), TAS (44%) and NT (11%) |
| **CALD:** | 12% from NSW |
| **New Parents:** | 12% from VIC |
| **Social Benefit Recipients:** | 6% from NSW |

The range of responses per initiative trialled is from -10% to 33% change in financial control. From Figure 22, it is evident that digital engagement solicited the largest improvement of 33%. The most frequently trialled initiative was a HEV + Minor Retrofit (3 projects) which returned an average increase in the householder's sense of financial control by 22%. It is unclear as to why digital engagement for two projects produced a much higher improvement in financial control than digital engagement with major retrofit. It is also unclear as to why digital engagement + gamification produced a reduction in financial control (n=1001 in one project). Once again, this could be partly due to the diversity of how co-benefits were measured from project to project.

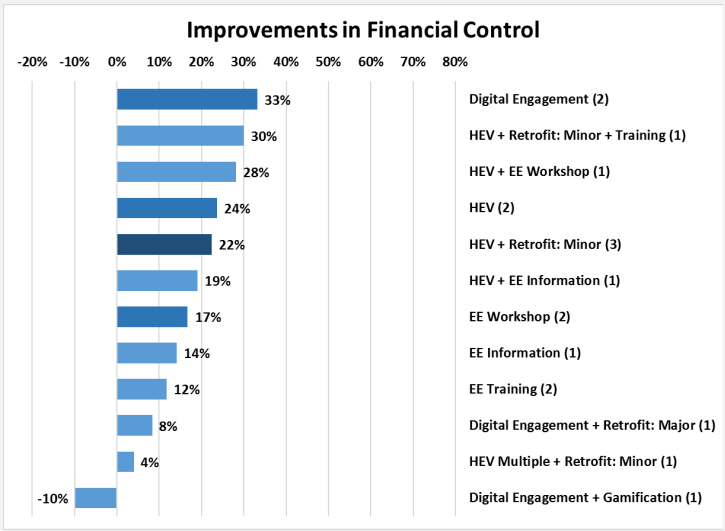



***Figure 22: Average Percentage Financial Control Change per Initiative***

Changes in financial control were captured across most regions in Australia (see Figure 23) where the national level project produced the highest change of 90%. Also substantive were the average increases reported in NSW of 37% and Tasmania of 23%. Although the figures listed above show that the NT obtained 2% of the responses of the total captured for improvements in financial control, it was not possible to display the responses of these figures in Figure 23 because the change in this co-benefit was not included in the LIEEP report.

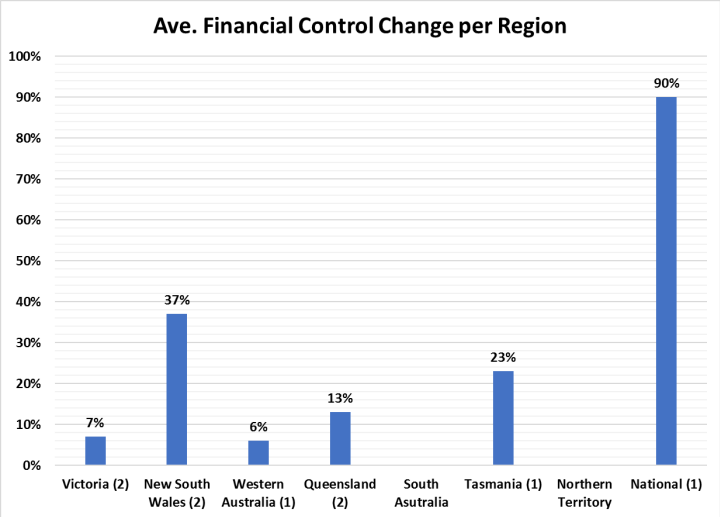



***Figure 23: Average Percentage Change in Financial Control per Region***

Higher levels of financial control were experienced by a number of cohorts where the general population and social benefit recipients experienced the greatest average improvement of 40%, followed by CALD participants with a reported 34% improvement (see Figure 24). Of interest is that a reduced feeling of financial control was reported for the tenants cohort (one project) in Queensland which trialled digital engagement and gamification. It is possible that these 'young renters' became more aware of their expenditures as a result of the gamification and digital engagement, whereas they may have been previously less aware due to having bills directly debited from their bank accounts. This increased salience may have prompted an adjustment in their survey responses reflecting less control, rather than becoming 'more aware of' the need for financial control.

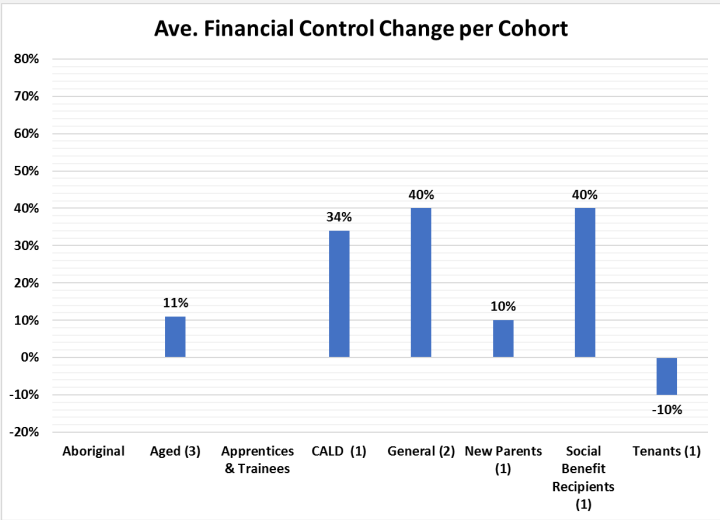



***Figure 24: Average Percentage Change in Financial Control per Cohort***

With 12 projects measuring changes in this co-benefit across numerous regions and cohorts, the results synthesised here are among the most reliable in this report.

Whilst some projects did not quantitatively measure financial control, qualitative findings suggest that for some participants, gaining more knowledge about managing money as well as realising the linkages between saving power and saving money was not only a critical component of energy efficiency education but also led to participants feeling more in control of their finances, as depicted by the following quotes:

> "[A participant learned] how to go about doing the right way of spending my money and always be alert and aware [about power and water use]." (Participant, MM, p. 174)

> "[Manymak has] also helped us, bringing us the message and helped us how we are going to save money and power." (Participant, MM, p. 173)

Given that low-income households commonly struggle to meet household bills, and that this struggle can have a spill-over effect in many other areas of life, such as health and well-being, competency and self-efficacy, this co-benefit is of critical importance.

***Snapshot of Financial Control:***

A diversity of householders in various regions experienced more financial control as a result of LIEEP, particularly if they received *Digital Engagement* and more commonly, a HEV. Given the positive response across cohorts and the nature of digital technologies, scaling up for broader, low cost reach, may help improve the financial control across many low-income households in Australia. It appears that reassurance, reminders and demonstration may well align with obtaining improvements. Further research is needed to clearly determine whether gamification would help or hinder this outcome.

## Interest in Energy Efficiency

Responses from 3542 households, representing almost 19% of the sample, were obtained regarding the householder's general interest in energy efficiency. A total of eight projects attempted to capture changes in this co-benefit. The geographic locations where interest was measured include:

| 44% | 27% | 22% | 7% |
|---|---|---|---|
| VIC | QLD | NSW | WA |

The five cohorts targeted include:

| | |
|---|---|
| **Aged:** | 40% from QLD (69%), VIC (15%) and WA (16%) |
| **Social Benefit Recipients:** | 31% from VIC (78%) and NSW (22%) |
| **CALD:** | 14% from NSW |
| **New Parents:** | 14% from VIC |
| **Apprentices and Trainees:** | 1% from NSW |

The strongest improvement of 15% in interest was experienced by participants receiving a gamification initiative (Figure 25). This was followed closely by an EE Workshop which resulted in a 12% increase in interest for three projects. A HEV + Retrofit: Minor provided a 5% increase in participants' interest, also across three projects, while the remaining initiatives produced very minor changes. Improvements in 'interest' were the least affected by the initiatives trialled in LIEEP.

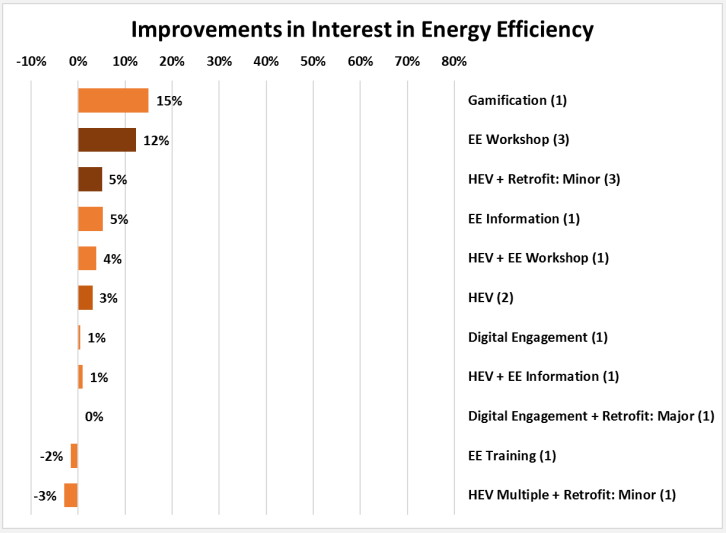



***Figure 25: Average Percentage Interest in Energy Efficiency Change per Initiative***

Similarly, compared with changes in other co-benefits, the change in level of interest was rather low across three geographic regions in which this co-benefit was measured (3-8%) (see Figure 26).

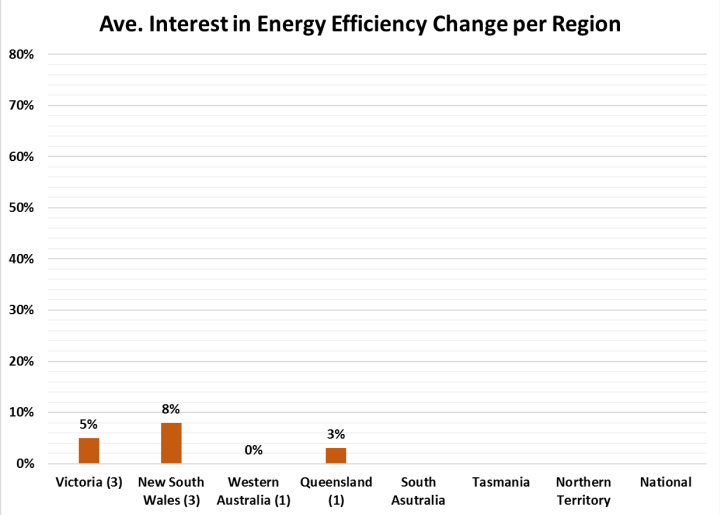



***Figure 26: Average Percentage Change in Interest in Energy Efficiency per Region***

Cohorts reveal minor improvements in interest, with the aged experiencing the lowest levels (1%) and Apprentices/Trainees experiencing the highest levels (15%) (see Figure 27).

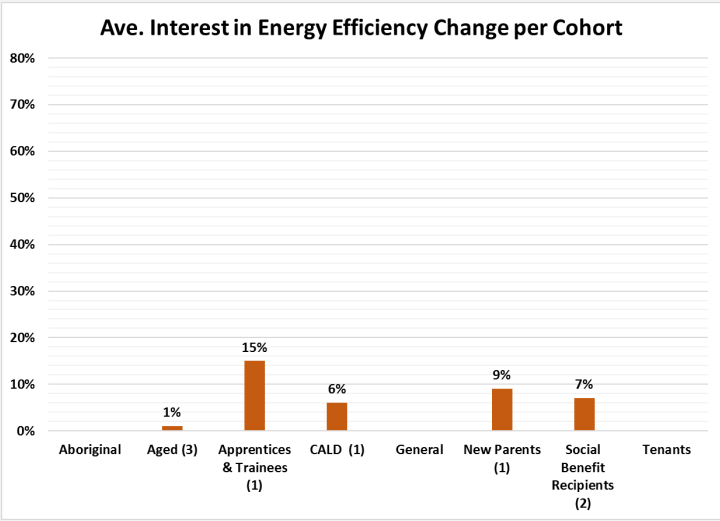



***Figure 27: Average Percentage Change in Interest in Energy Efficiency per Cohort***

None of the reported qualitative findings reveal a specific improvement in participant interest in energy efficiency. This is not surprising, because it was rarely the aim for any of the LIEEP projects. Furthermore, the qualitative work conducted tended to focus more on experiences reported by participants, who are unlikely to be cognisant of being 'more interested' in the topic.

***Snapshot of Interest:***

Improving householders' interest in becoming more energy efficiency produced among the lowest changes in LIEEP. The strongest result was reported with gamification to apprentices and trainees, whereas most householders interest increased by less than 10%, regardless of cohort or region.

## Positive Attitude

Slightly different from 'interest', having a positive attitude towards energy efficiency means the person is likely to adopt behaviours necessary to manage their energy use and/or lower their bills more readily. Some can have interest in learning how to lower a bill, but a positive attitude will assist them in achieving this, and is likely linked with feelings of competency, confidence and empowerment. Four projects captured responses regarding this co-benefit from a total of 2240 households, representing 12% of the sample. The breakdown of responses by region is as follows:

| 46% | 45% | 9% |
|---|---|---|
| NSW | QLD | VIC |

The three cohorts targeted include:

| | |
|---|---|
| **Tenants:** | 45% from QLD |
| **Aged:** | 33% from NSW (72%) and VIC (28%) |
| **CALD:** | 22% from NSW |

One initiative stood out as returning the highest improvement in householders' positive attitude: Digital Engagement + Gamification, with an increase of 24% (see Figure 28). Whether this would hold across other cohorts or regions is worthy of further exploration, and cannot be determined by this data.

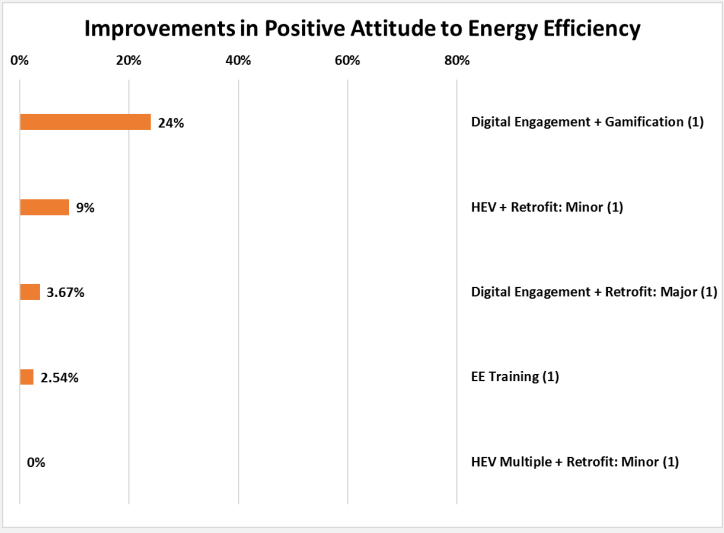



***Figure 28: Average Percentage Positive Attitude to Energy Efficiency Change per Initiative***

When broken down by region, the Victorian project (which targeted the Aged) shows no change in response of householders regarding their attitude to energy efficiency. Two projects in NSW showed an average increase of 5%, although the average increase for the aged cohort was very minor, reflecting a similar result as that in Victoria. Since Digital Engagement + Gamification was trialled in Queensland, it is no surprise that the highest response was experienced by householders in this state (see Figure 29) and for tenants (see Figure 30).

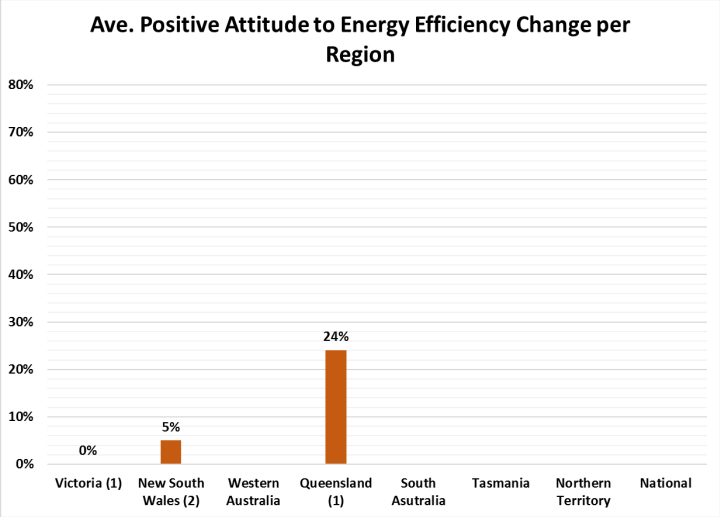



*Figure 29: Average Percentage Change in Positive Attitude to Energy Efficiency per Region*

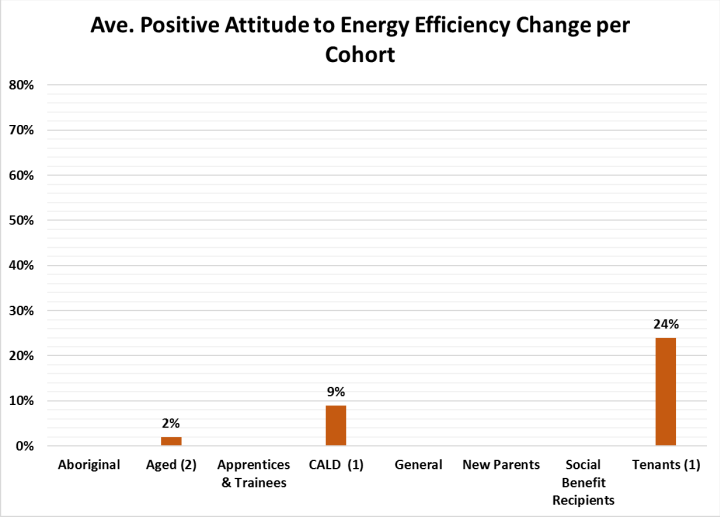



*Figure 30: Average Percentage Change in Positive Attitude to Energy Efficiency per Cohort*

None of the projects that conducted qualitative investigations reported on improvements in attitude.

***Snapshot of Attitude:***

Building household positive attitude to energy efficiency occurs with the Digital Engagement + Gamification initiative, particularly effective with younger tenants and in Queensland. The aged appear to not improve their attitude. Few projects measured this co-benefit, and thus few cohorts and regions are represented in the findings.

## Financial Stress Reduction

Financial stress was measured by one project against one initiative, and received 436 responses representing 2% of the sample. The CALD participants located in Queensland experienced a 9% reduction in financial stress, typically related to bills (and experiencing bill-shock). Given that this co-benefit was only measured in one project, we combined financial stress with stress (also measured in only one project) to produce a more synthesised overview.

## Stress Reduction

Stress (alone) was captured by one project that targeted Aboriginal households in Victoria, and obtained 193 responses representing 1% of the sample. In combination, financial stress and stress were captured in the following two regions:

| 69% | 31% |
|---|---|
| QLD | VIC |

The two cohorts targeted include:

| | |
|---|---|
| **CALD:** | 69% from QLD |
| **Aboriginal:** | 31% from VIC |

It is highly likely that a reduction in stress was experienced by many LIEEP participants due to the initiatives, and support, they received. However, this concept was not commonly measured.

Three initiatives were associated with a reduction in stress, with a HEV + minor retrofit having the strongest impact, reducing stress by 27% (see Figure 31). This was followed by a HEV + IHD + minor retrofit which was associated with a 19% reduction in stress. Interestingly, multiple HEVs was associated with a stress increase of 16%, which is difficult to explain. It is likely the sample responding to this initiative for stress reduction was small, and skewed the result.

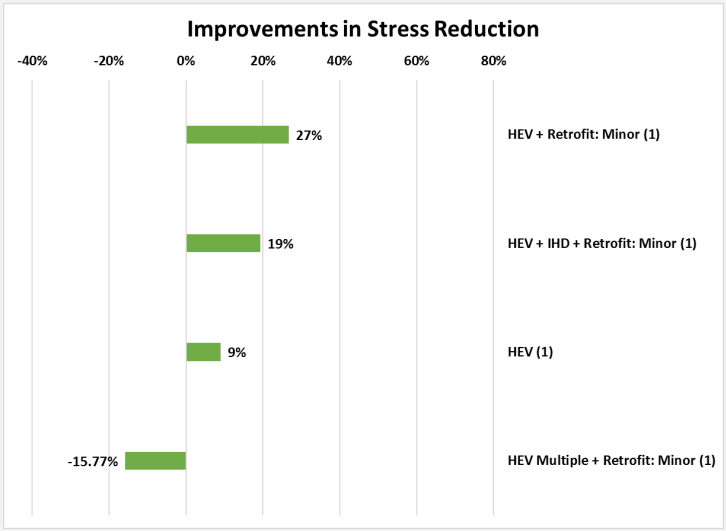



***Figure 31: Average Percentage Stress Reduction Change per Initiative***

The average stress reduction for Aboriginal households was 10% and for CALD households, 9% (see Figure 32 and Figure 33). Of concern is that stress regarding household energy and bills was high to begin with, where from Figure 6, we see that pre-initiative stress levels for these cohorts was approximately 2.8 on a 5-point scale, suggesting that most households are experiencing moderate levels of stress about their energy and bills. The results also indicate that Aboriginal and CALD households experience similar stress levels and respond to initiatives to reduce their stress in a similar way. All initiatives trialled involved a HEV, which is highly interpersonal. More evidence is needed in future to determine whether similar (or better) results can be obtained with a more technologically based initiative (*e.g.,* digital engagement or gamification).

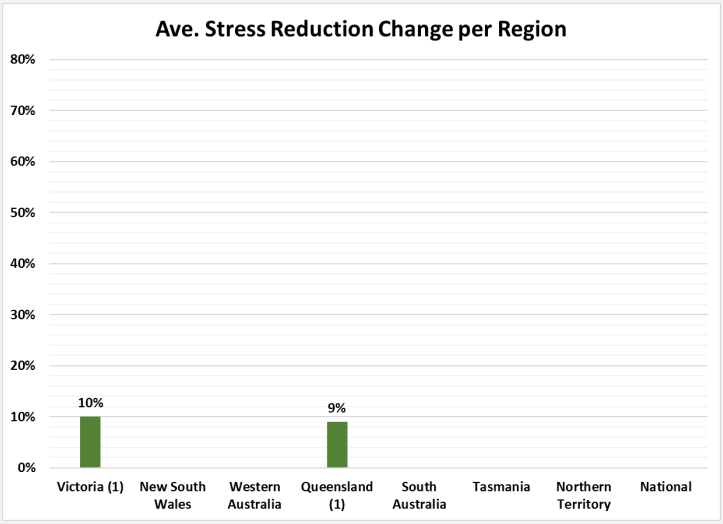



***Figure 32: Average Percentage Change in Stress Reduction per Region***

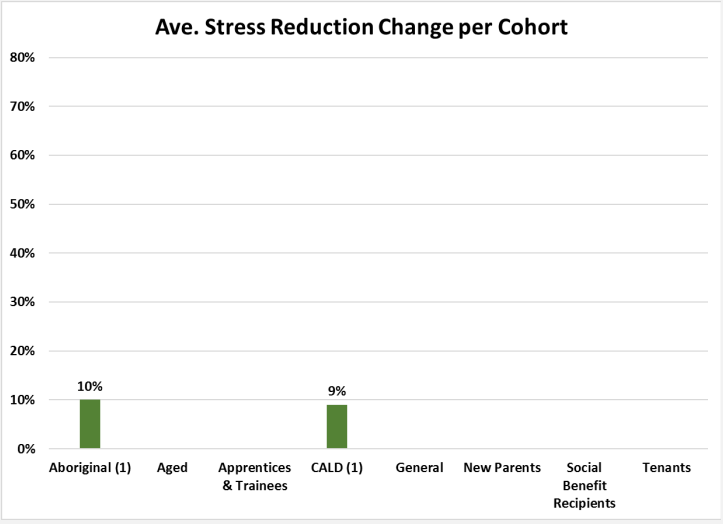



***Figure 33: Average Percentage Change in Stress Reduction per Cohort***

Two projects captured the experience of households in terms of stress reduction, and provide some insight into why this may have occurred. For instance, accounts from the KEEP and EE3A reports suggest that feeling more in control of their overall financial situation, as a result of the initiative trialled, helped the householder to take the actions necessary to reduce their energy usage, which translated into people being less anxious and able to relax more. As a result, their health and quality of life improved, as illustrated by the following extracts:

"When the KEEP CDO [project worker] checked in with Rick at the three month review point, Rick was more relaxed, happier and healthier. He had not only managed to sustain his hardship payments, but he'd also implemented the energy saving tips and had noticed a reduction in his energy use and bills. As a direct result of KEEP's intervention, Rick was more in control of his financial situation." (KEEP, p. 75)

"Renee indicate[d] that previously she would move around and stand in the dark while her dog went outside. Less anxious [now] about the energy use she can put on the light and see what is happening." (EE3A, p. 184)

***Snapshot of Stress:***

The combined results indicate that householders experience reasonably high levels of stress due to energy bills, and experience a reduction in stress in sync with feeling more in control and more relaxed due to a HEV. Reductions of around 10% were experienced for Aboriginal and CALD householders, however, it appears that stress was reduced for many other participants too. More research is needed to determine the prevalence of householder stress and the methods of helping to reduce it.

## Perceived Comfort

While perceptions of comfort in the home most probably refer to thermal comfort, the general nature of the 'comfort' questions for projects measuring this co-benefit encouraged us to keep this separate from the specific 'thermal comfort' responses. Overall 1036 responses were obtained from five projects, representing around 6% of the sample. The following regions were targeted:

| 67% | 27% | 6% |
|---|---|---|
| VIC | NSW | NT |

The five cohorts targeted include:

| | |
|---|---|
| **New Parents:** | 48% from VIC |
| **Social Benefit Recipients:** | 24% from NSW |
| **Aboriginal:** | 19% from VIC |
| **General:** | 6% from NT |
| **Apprentices and Trainees:** | 4% from NSW |

The initiative associated with the largest improvement in perceived comfort was gamification, captured by one project, where participants experienced a 38% increase (see Figure 34). The next highest improvement for householders was experienced by those receiving an Energy Efficiency Workshop (25% improvement) and HEV (20% improvement). Other initiatives produced lower responses, although the standout result occurred for HEV Multiple + minor retrofits, where householders report a reduction in perceived comfort of -33%. This result reflects responses from the same cohort as those reported for stress, above, where the sample was small and produced unexplainable results (KEEP). All initiatives trialled regarding perceived comfort targeted only one cohort, so further work is needed to determine which initiatives would help improve perceived comfort beyond those reported here.

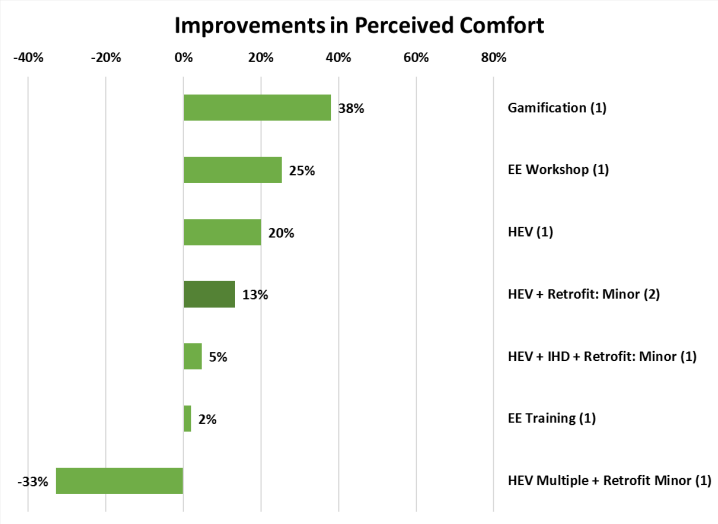



***Figure 34: Average Percentage Perceived Comfort Change per Initiative***

From Figure 35, it appears that householders in NSW experience high levels of improved comfort compared with Victorian householders, 29% and 4% respectively. However, the Victorian figure is skewed by the small Aboriginal sample responding to survey questions regarding their perception of comfort in the home. Some disparity among the figures recorded here warrants further explanation. One Victorian project did not provide the number of respondents and one project in the NT did not provide the change in perceived comfort. Hence, the total Victorian numbers provided above are lower than the number of households that responded, but we have no way of determining what this new figure should be. Further, no result can be provided for the NT and so is not represented in Figure 35.

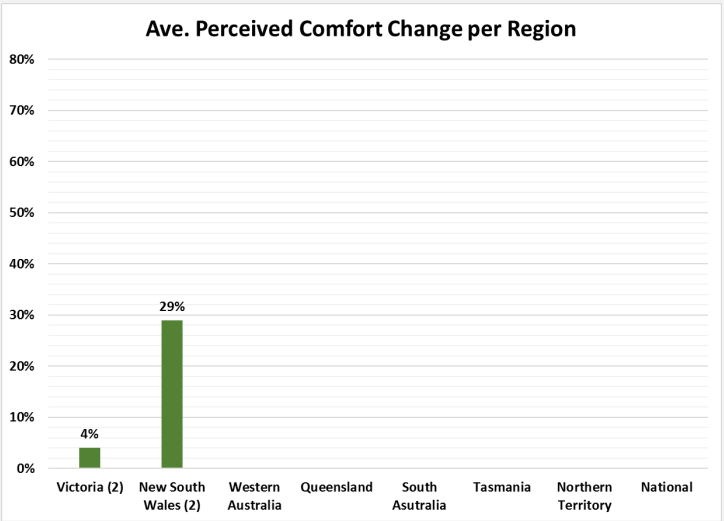



***Figure 35: Average Percentage Change in Perceived Comfort per Region***

The cohort reporting the highest improvement in comfort was with those receiving gamification as the initiative trialled, wherein apprentices and trainees experienced a 38% improvement (see Figure 36). The next highest improvement was experienced by social benefit recipients whose responses indicate an average improvement of 20%. The one project that measured comfort levels for Aboriginal participants showed a decrease of -5%.

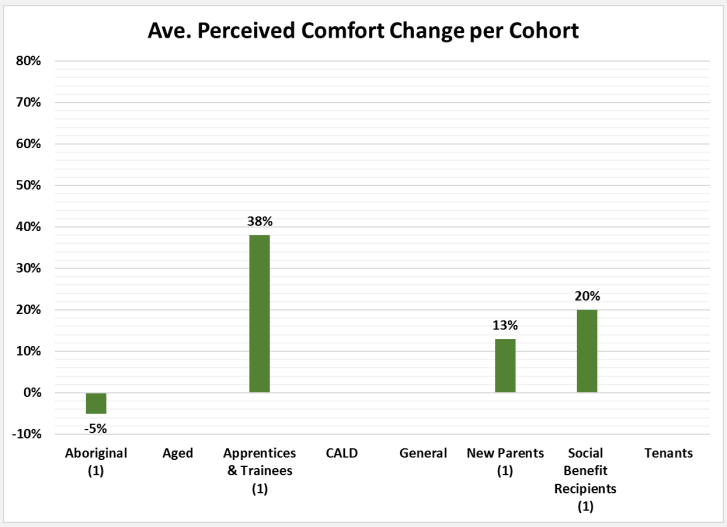



***Figure 36: Average Percentage Change in Perceived Comfort per Cohort***

Only one project reported on qualitative findings regarding perceived comfort. The quote from a participant, shown below, implies that people knowing more about how to be more energy efficient increases their awareness of how they use energy and empowers them to use less. Using less energy does not only mean that people save money but they also have more money available to spend on other aspects of life that make them more comfortable:

> "We're very power conscious now, after spending a lot of time with Kevin explaining everything to us now, and that's the main thing … The house is more efficient, and it has been a win all around, and it has been a great project to have this for her, and from all of you, all of the money and everything to help her save money. And make her life more comfortable. It has made a massive difference... That's the most important thing, comfort." (Participant, NGSC, p.51)

The inter-relatedness between various co-benefits means that enhancing energy efficiency for a householder will not only reduce their energy use and bills, but is also likely to create positive impacts (co-benefits) in a wide variety of areas of people's life, creating "a win all around". It appears that for participants of NGSC, at least, feeling more comfortable in the home was experience by many:

> "The majority of participants … felt that their homes were generally more comfortable." (NGSC, p.32)

***Snapshot of Perceived Comfort:***

The greatest improvement in perceived comfort was achieved via Gamification, although the more frequently trialled HEV + Minor Retrofit also produced meaningful improvements. Improved energy efficiency affects numerous co-benefits, somewhat captured by the qualitative research gathered.

## Thermal Comfort

Due to potential heat and cold stress, thermal comfort is arguably one of the most important co-benefits that householders might experience. Along with stress, thermal comfort is a closer indicator of related health consequences of being too cold in the home, having mould, or becoming overly hot. This importance was somewhat reflected by LIEEP projects, where this co-benefit was quantitatively measured in all 8 regions, as depicted below, where 4470 responses were obtained reflecting 24% of the sample.

| 31% | 25% | 18% | 9% | 7% | 5% | 3% | 2% |
|---|---|---|---|---|---|---|---|
| QLD | VIC | NSW | NAT | TAS | WA | NT | SA |

Initiatives were trialled for five cohorts across these seven regions as follows:

| | |
|---|---|
| **Aged:** | 43% from QLD (50%), NSW (28%), WA (11%) and VIC (11%) |
| **Social Benefit Recipients:** | 25% from VIC (22%) and NSW (78%) |
| **General:** | 17% from National (56%) and TAS (44%) |
| **CALD:** | 10% from Queensland |
| **Tenants:** | 2% from SA |

No data was provided in the report regarding thermal comfort for new parent, Aboriginal or apprentices/trainee households. Further, the number of respondents was not provided for the NT, so no percentage could be included in the figures above, and yet, the change in thermal comfort was provided, so this figure has been included in Figure 37.

The responses to changes in thermal comfort were quite varied. The initiative associated with the highest improvement of 76% was a HEV + IHD + Minor retrofit (see Figure 37). The next highest improvement was for a HEV and Minor retrofit where the average improvement reported for three projects was 43%. Unexpectedly, a HEV with Energy Efficiency workshop, or EE workshop alone reduced householder's perception of thermal comfort (-15% and -4% respectively). It is possible that these householders became more aware of their comfort levels after receiving the initiative and responded to survey questions accordingly.

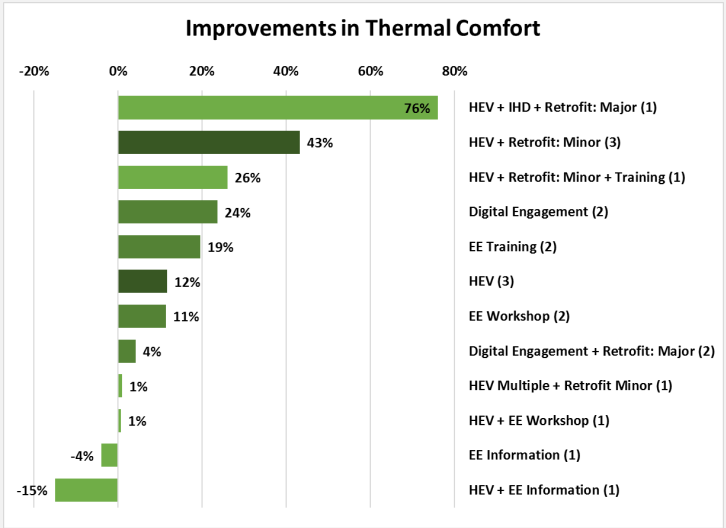



***Figure 37: Average Percentage Thermal Comfort Change per Initiative***

Consistent with the varied responses per initiative, the results per region were also varied. Thermal comfort improvements were the highest in the NT (87%), followed by SA (76%), national (57%) and Tasmania (33%) cohorts (see Figure 38). Improvements were much lower in other regions, showing a spread between 2%-8% improvements.

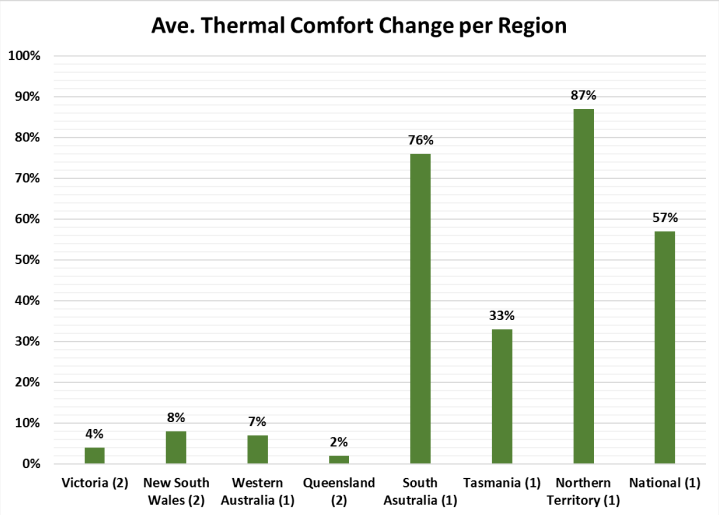



***Figure 38: Average Percentage Change in Thermal Comfort per Region***

The highest average improvement in thermal comfort was experienced by tenants at 76% (see Figure 39), although this represents results for only one project. The next highest average improvement was experienced by the general population (across three projects) of 49%. This result is significant as it spans three projects and shows a high, and reliable, response. Very low levels of improvement were reported for Aged participants (2%) and moderate improvements for CALD participants (10%). Thermal comfort was not captured quantitatively for Aboriginal households, apprentices and trainees or new parents.

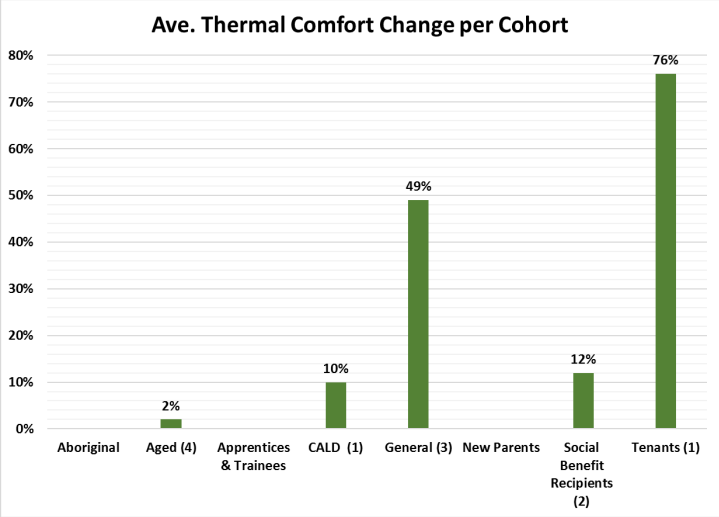



***Figure 39: Average Percentage Change in Thermal Comfort per Cohort***

Despite the frequency with which thermal comfort was measured quantitatively, only one project reported qualitative findings. Notwithstanding this difference, it appears that participants of the NGSC project reveal that upgrades to the home, particularly in terms of heating, cooling and draft sealing, helped improve thermal comfort and encouraged the householder to adopt new energy efficiency behaviours which combined, helped to improve the thermal comfort of their home. The quotes below also suggest that improved thermal comfort helps improve general comfort overall, indicating the importance of this co-benefit:

> "The majority of participants reported that they experienced moderate to significant improvements in thermal comfort at home due to the energy efficient upgrades installed, which allowed them to engage in new energy efficient behaviour." (NGSC, p.13)

> "The main outcomes [for me was]… the heating and the cooling and particularly the elimination of the drafts, 'cause if the wind was coming from the north around the front door it used to just blow a gale because there was quite a gap there.. And I've got to be honest. This year I reckon the house has been more comfortable than it has [ever] been and I've been here for 42 years." (Participant, NGSC, p.53)

***Snapshot of Thermal Comfort:***

Thermal comfort was the most widely measured co-benefit, and appears to improve mostly as a result of a HEV and minor retrofit, particularly for tenants and the general population in very cold or very warm climates.

### 4.1.2 Section Summary of Empirical Changes in Co-Benefits

Across LIEEP projects, the changes in many co-benefits were investigated either quantitatively, qualitatively or both. Most projects measured a quantitative change in at least one of the 12 co-benefits identified (17 projects) and five captured improvements in nine co-benefits. Together, these results indicate that **addressing energy efficiency in the home is going to have numerous, and much needed, additional benefits for the householder beyond energy use, especially as they struggle with energy bills emotionally and psychologically**.

The initiatives that were associated with the highest improvement for each co-benefit are illustrated in Figure 40 below. The co-benefits in circles with a solid outline indicate the co-benefit was measured quantitatively as well as qualitatively, while those with dashed lines reflect co-benefits measured solely by quantitative means. No co-benefits were identified in the qualitative findings, as reported, that were not captured quantitatively. As stated previously, it is important to note that individual projects varied in their endeavors to capture co-benefits and the methods they used to gather data. It is evident that different initiatives seem to produce different optimal changes in co-benefits, although this is dominated by initiatives comprising a HEV, as this was the most frequently trialled initiative type across projects.

These findings are interesting, though should be interpreted as indicative rather than being descriptive of what works with who, and where. Thus, the impact of LIEEP on co-benefits, as reflected in this report, are likely to under-estimate the many co-benefits experienced by participating households, as these results reflect only those co-benefits that were measured. Future research would need to establish whether similar co-benefits are experienced by all cohorts across all regions of Australia.

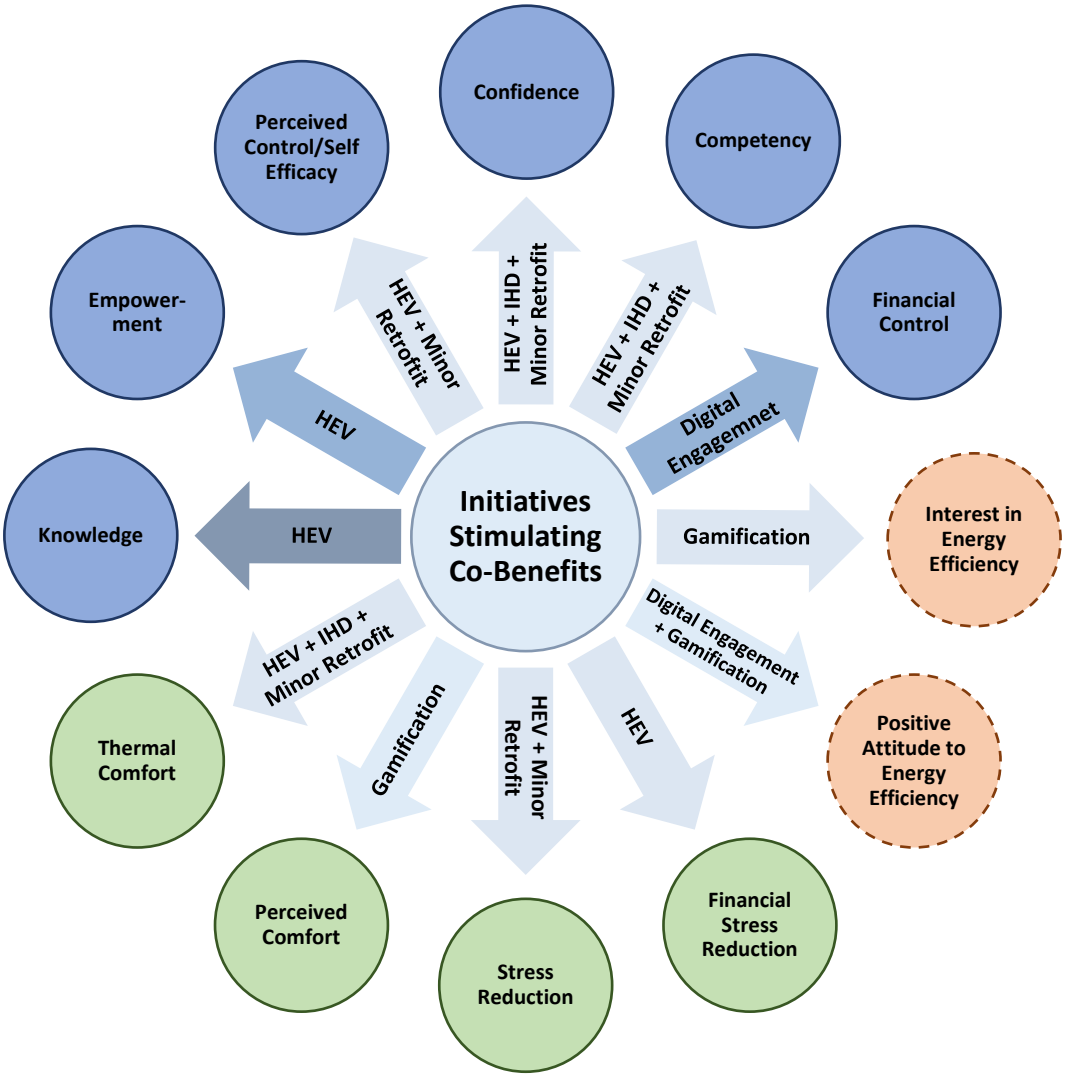



***Figure 40: Initiatives Associated with the Highest Quantitative Improvement in Each Co-Benefit***

Note 1: continuous circle lines indicate the co-benefit has been captured both quantitatively and qualitatively, and the dashed lines indicate the co-benefit has been captured solely by quantitative measures
Note 2: Darker arrows indicate multiple projects produced the highest average improvement (3+ projects)

Although the relationship and progression between co-benefits was not measured in LIEEP and thus we cannot report on this relationship based on empirical findings, individual project findings collectively provide some indicative evidence of the links between initiatives, co-benefit outcomes, cohorts and regions. First, the links between initiatives and co-benefit outcomes is provided in Figure 41. The arrows between co-benefits forms our suggestion of how the co-benefits might be logically linked.

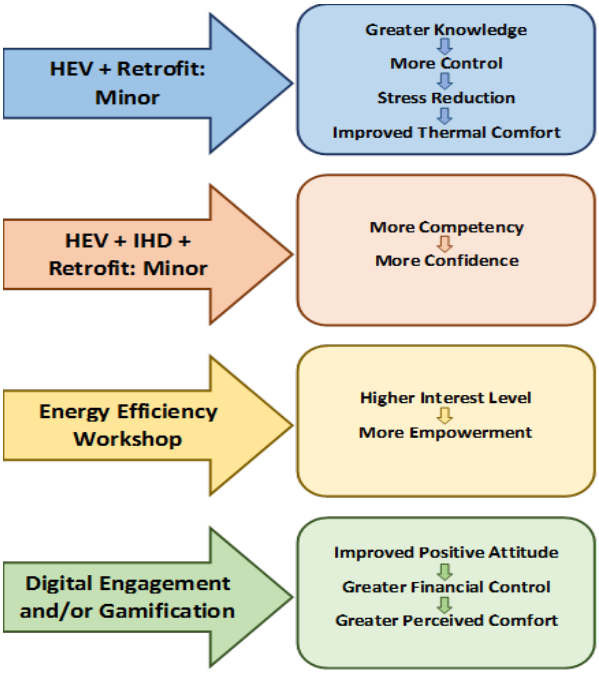



***Figure 41: Linking Initiatives with a Process of Co-Benefit Improvements***

In synthesising the links above, we next combined 12 co-benefits into four groups (as described at the start of this report) to form a progression from one broad area to the next (see Figure 42).

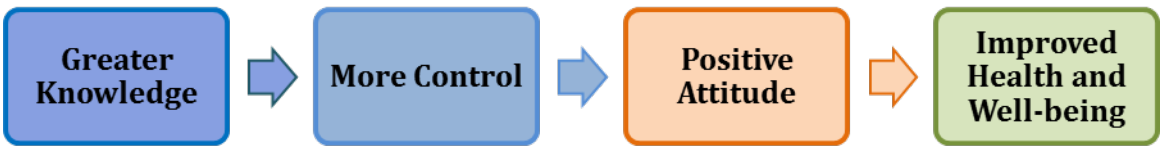



***Figure 42: The Broad Link between Energy Efficiency Co-Benefits***

## 4.2. Changes in Co-Benefits Identified by Observation or Experience

LIEEP projects captured and reported upon deep insights regarding household energy use, bills and co-benefits, but they also contain rich insights by each project consortia from their 2-3 year involvement in rolling out and evaluating their individual project. Most reports articulated these rich insights in a 'key learnings' or separate 'co-benefits' section which captured consortia observations and experiences. These insights provide a greater understanding of why co-benefits may/may not have been experienced by householders (barriers or keys to experiencing co-benefits), as well as the broader reaching, non-measured co-benefits, such as those that might affect society at large. Lastly, there were benefits experienced by consortia members themselves. These areas are described below:

| | |
|---|---|
| **Barriers to experiencing co-benefits:** | Factors that limited the scope and efficacy of initiatives impacting co-benefits and their outcomes. |
| **Key factors for experiencing co-benefits:** | Factors that facilitated the effective delivery of initiatives impacting co-benefits and their outcomes. |

| | |
|---|---|
| **Broad, non-measured co-benefits**: | Co-benefits that were experienced by participants or others but were not measured in projects, but were observed or inferred by consortia. |
| **Benefits to consortia**: | Co-benefits experienced by consortia or project members from their involvement in a LIEEP project. |

### 4.2.1 Barriers to Experiencing Co-Benefits

While many co-benefits were delivered to participants across the LIEEP projects, there were a number of barriers that limited the capacity of initiatives to generate significant co-benefit impacts. While increases in household energy co-benefits may have been recorded, these did not always result in behavioural changes. Indeed, co-benefits were measured using participants' self-reported perceptions of the benefits they received.

**Data Collection Limitations:** Although the LIEEP projects were generally implemented over a period of around three years, limitations around post-initiative data collection means that it is unclear whether participant co-benefits are likely to last in the long-term. The longevity of the project's impact is therefore hard to conclude.

**Variation in Project Design:** Evaluating the co-benefits provided by energy efficiency initiatives can be a difficult task given that the benefits are highly subjective and there was significant variation in project design.

**Trust:** Wariness of promotional materials and difficulties in establishing relationships of trust inhibited increases in energy efficiency knowledge for some participants. For example, projects targeting aged participants had some difficulties during the recruitment phase due to resistance to promotional materials or flyers. Future projects should take this into account during the design process and consider engaging consortium partners with strong ties to the community.

**Subjectivity of Thermal Comfort:** The extent to which participants are thermally comfortable at a given temperature varies according to the cohort and outdoor temperatures. For example, aged participants were seen to be less comfortable at temperatures that might otherwise have been considered within the thermal comfort range. This means changes in thermal comfort are dependent on subjective factors.

**Finances and Living Conditions:** Although a number of co-benefits were achieved, the capacity of participants to capitalise on them was, in many cases, limited by contextual factors such as their finances and living conditions. For example, while a participant may be aware of energy efficiency ratings, they may not have been able to take advantage of this knowledge by purchasing a new appliance (*i.e.,* if they were tenants, or if they had insufficient funds to do so). Their housing conditions can also have a significant effect on their ability to receive co-benefits. For instance, some participants were highly disadvantaged because they lived in old caravans, which were not thermally efficient.

**Relationships with Energy Providers:** Weak or negative relationships with energy providers hindered the development of competency, confidence and empowerment among participants, particularly the elderly and culturally diverse. This had a negative effect on participants' ability to experience these co-benefits more fully.

### 4.2.2 Key Factors for Experiencing Co-Benefits

The LIEEP reports also highlighted a number of factors that can assist project consortia to deliver energy efficiency initiatives in a way that successfully achieves co-benefits for participants.

**Strong Community Ties**: In order to deliver co-benefits, it is important to leverage existing community ties. Projects with strong community links were able to effectively establish relationships of trust and build a rapport with participants at the outset of the project. This facilitated high levels of engagement and cooperation, which meant that participants were more willing to take initiatives on board. For example, Aboriginal participants are often reluctant to allow strangers into their homes (KEEP, MM), particularly for research projects, given their long history of being the subjects of major studies and in some cases, being exploited while receiving few lasting benefits (Guillman *et al* 2016) (this situation partly motivated the AIATSIS principles to ensure research with Indigenous communities benefits Indigenous communities). A trusting relationship is therefore especially important to generate engagement.

**Recognising Links between Co-benefits**: When evaluating the extent to which co-benefits were delivered in a project, it is important to note that many of them are interconnected. For example, some projects observed that increases in knowledge could result in higher levels of confidence and empowerment through increases in awareness of alternative energy providers and rebate schemes.

**Tailoring Initiatives to Community Context**: The efficacy of project initiatives in delivering a range of co-benefits to participants was highly dependent on the consortia's ability to tailor the initiative to a particular type of participant's needs.

**Project Consortia**: The project consortium plays a major role in the successful recruitment and delivery of energy efficiency initiatives. Consortium members have the capacity to make a meaningful contribution to the project through their network, community ties and/or industry knowledge/experience.

**Discouraging Inefficient/Unhealthy Energy Conservation Strategies**: It is important that project consortia understand that many participants will already have tried to reduce their energy bills prior to their participation in the project by being thrifty. That is, by conserving energy in impractical or unhealthy ways, often to the detriment of their quality of life, health and wellbeing. A popular method of conserving energy is reducing the use of heating and cooling systems in extreme climates. This can often result in a failure to maintain healthy, comfortable temperatures in the home, which is crucial to health and wellbeing. This demonstrates that higher energy use can lead to greater thermal comfort, whilst energy conservation can reduce comfort and health.

### 4.2.3 Broad, Non-Measured Co-Benefits

While a number of co-benefits were achieved by initiatives across the projects, there were also a number of non-measured co-benefits to participants. It should also be noted that the extent to which some of the co-benefits delivered across the projects will have a lasting impact on participants is difficult to determine, particularly when we consider future variations in carbon emissions and electricity prices. Non-measured co-benefits delivered by LIEEP are as follows:

**Social Inclusion**: The LIEEP program provided significant social benefits to a range of communities across the country. Many participants enjoyed the social engagement that came with home visits and workshops as they made participants feel valued, included, supported and part of "something bigger". Elderly people who can sometimes suffer from social isolation found the social contact with project workers and fellow participants particularly rewarding. In some cases, participants' friendships with project workers or fellow participants lasted beyond the scope of the project.

> "You can feel isolated at times so it's great that people came into the home and chatted about electricity and involved me." (Participant, GHW, p.65)
>
> "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." (FPF, p.10)

**Greater Unity & Confidence:** Community members' involvement in the projects both as participants and employees increased community unity and confidence. Indeed, LIEEP expanded the community's capacity to be energy efficient and community pride increased due to the new skills learned. For example, the Switched on Homes report noted that the predominantly aged community it targeted noticeably "pulled together" to improve their energy efficiency as a result of the project's initiatives. This unity and confidence will have a ripple effect as community members will continue to assist each other in choosing appropriate appliances, and in adopting energy efficient consumption practices in the future.

> "On behalf of the members of the Probus Club of Glen Severn Inc. I wish to thank you most sincerely for talking to our group on Power Save. Your talk was most interesting and all members went home more informed on how to save money on their electricity accounts. Once again thank you for giving up your time to speak to our Club [sic]." (Participant, PS, p.59)
>
> "The community pulled together in response to peak load SMS and turned off their appliances. Households without rooftop solar-PV played a large part in this, with 45-51% of these households reducing electricity consumption after receiving an SMS" (SOH, p.4)

**Improved Health & Wellbeing:** LIEEP achieved a number of flow on benefits to participants' health and wellbeing. For example, many participants had previously used their heating rarely because they worried about the affordability of their energy bills. As a result, many of their homes had high moisture levels and surface condensation particularly around cold window surfaces. This can cause mould spores, which can have a negative effect on our immune health and lead to respiratory problems such as asthma. Thus, learning how to heat their house both effectively and efficiently had major health implications for householders. Similarly, participants living in a hot climate were able to find some relief from the heat as they learned how to cool their houses down efficiently and had more personal

'energy' in their day to day lives as a result.

> "It is evident that health and wellbeing are integrally tied to energy consumption and bills such that for some, [poor] home energy use can lead to health and wellbeing declines, and [addressing] health and wellbeing issues can lead to higher energy use and/or bills." (KEEP, p84)

> "Other benefits included an improvement in the health and wellbeing of those participants with summer heat-related health problems as a result of improved cooling." (NGSC, p14)

> "… one participant described how high energy bills led him to financial and emotional distress, while other participants and/or carers highlighted how improved energy efficiency and thermal comfort has improved wellbeing of households who have limited mobility and/or specific health conditions (i.e. respiratory difficulties, summer heat-related illness and winter cold related illness)." (NGSC, p51)

**Increased Disposable Income:** Many participants received long-term and in some cases, far-reaching financial benefits across the projects. Those who received new energy efficient modifications or appliances, in particular, were able to significantly reduce their energy bills and sustain these savings. These households not only experienced a significant reduction in their energy bills, but also spent this surplus on other essentials, thus improving their comfort and lifestyle.

> "An additional benefit from implementing such tips is the savings on bills. Many households expressed they were saving, for example, one said "…my bills have dropped $300 - $350". For any household experiencing a bill reduction, their disposable income will increase, allowing them to spend funds on other areas, including essentials such as food." (KEEP, p.100)

> "Changes in energy consumption assessed across the program are relatively small. Since people with low incomes targeted in this program are paying up to 7% of their disposable income on household energy costs (per ABS data from 2009-10), even small reductions could be expected to have benefits for them." (GHW, p.101)

**Improved Physical and Mental Health:** Further physical and mental health benefits were achieved as a result of the savings participants made on their energy bills. A number of participants were able to purchase more efficient energy appliances with the money they saved on their bills. Some purchased larger refrigerators, which allowed them to buy groceries in bulk and store perishable food items, such as meat, fresh for longer. This prevented people from getting sick and allowed them take advantage of supermarket specials and save a significant amount of money. Other participants purchased a larger washing machine, which meant that they could wash their clothes less often, enabling them to reduce their water usage and use this extra time on other activities. In addition, refugees whose claims for residency were being processed were able to buy laptops. This helped to ease their feelings of boredom and loneliness during this period because they could practice their computer skills and contact family and friends all over the world using Skype.

> "[In the case of a pregnant woman] The EPW [project worker] calculated for the woman, the consumption of electricity as well as the amount of cold water to use the washing machine, compared to the amount of hot water she was using by washing clothes in the bath tub, wringing out the washing and then carrying it to the washing line, which could also impact her health of herself and her unborn child. The calculations showed that washing the clothes in the washing machine and using cold water was significantly cheaper and produced less strain on her body than doing the washing in the bath tub using hot water. Both the woman and husband were pleased to hear the result." (BA, p.98)

> "Really … we are much better off. It was costing about $7.00, nearly eight bucks a day with wood, but it worked out to $5.70 with the power, (…) but that's for everything….So it was a hell of a saving. And my health, and I don't feel like [getting] wood in and stack wood and wheel it in from over here into the shed." (Participant, NGSC, p.40)

**Enhanced Quality of Life:** While thermal comfort captures a number of aspects relating to quality of life, it does not capture all of them. For example, many participants benefited from receiving new energy appliances such as a hot water system, which allowed them to have hot showers. This was a real luxury for many low income earners. A further example was Aboriginal participants in KEEP finally being able to leave their lights on at night without worrying about their energy bills. This meant that their children could do their homework in the evening. There was also a large reduction in disconnections across the projects.

> "The [reverse cycle] system, definitely [improved levels of comfort], because we haven't burned wood at all … And we haven't got the ash of wood and fire ash. So it's definitely improved … the air quality." (Participant, NGSC, p.40)
>
> "While looking at Rachel's appliances the KEEP CDO [project worker] found Rachel's fridge wasn't operating properly, the refrigerator section was too cold and the freezer section was too warm, so Rachel was recommended for a new fridge through the Refrigerator Replacement Program. Rachel was overjoyed with the support she received through the KEEP program and was very grateful she was in a more secure financial position after her home visit." (KEEP p.11)

**Overcoming Physical Barriers:** The projects assisted individuals in overcoming physical as well as cost barriers to energy efficiency. For example, project workers installed shade sails and cleaned fans for individuals who could not carry out these tasks themselves.

> "I was very pleased when they changed all my light bulbs. We did a lot of cleaning that day. Because as he got them down, I had to clean them all...All the shades, before they went back up, they were disgusting. Especially the one in the kitchen, because that one collects all the bugs. I'd kept looking at it, 'oh, I must do that one day, must do that one day.' Well when you've got a fellow going up ladder to change the lightbulb, we will just do the cleaning while you're here. So he had to help me by cleaning up as well. So that was very good as well." (Participant, EE3A, p.148)
>
> "Receiving power boards and hand held showerhead makes it easy for my body and shower has saved water plus makes it easy to clean shower recess." (Participant, GHW, p.54)

**Referral to Additional Services:** The program assisted participants in accessing a number of welfare services by referring them to specialist community agencies for additional support. Some participants were not aware of services such as No Interest Loan Schemes and energy concessions prior to their participation in LIEEP. In addition, project workers assisted participants by contacting/interacting with their landlords and/or energy companies.

> "… anecdotal reports from CSPs suggest that the home visits provided the opportunity for participants to be referred to other community service providers/agencies for support. These referrals would provide further assistance to participants, potentially furthering their capacity to stay at home longer and more comfortably." (GHW, p.75)

> "Upon Lilly's return, the KEEP CDO [project worker] followed up with a Utility Relief Grant to cover all Lilly's bills and a referral to a financial counsellor to review her situation and support her to put strategies in place so she didn't fall behind in her utility payments again. Lilly wept again, this time with gratitude for the assistance KEEP and Koorie Connect had provided in helping her through an extremely difficult and stressful time." (KEEP, p.iii)

**Further Employment Opportunities:** Many inexperienced individuals were given employment opportunities in the LIEEP program which allowed them to build their skills and capabilities. They gained training and experience in delivering energy efficiency initiatives in major government projects that provided positive outcomes to participants and hopefully the broader community. A number of these workers came from low socio-economic, disadvantaged backgrounds and this experience helped not only to boost their financial independence, but also their confidence, social skills and links with specialist agencies and the community. Many of these workers obtained similar work at the conclusion of LIEEP and gained further qualifications.

> "…the project provided short-term employment opportunities for approximately 90 Yolŋu [people] across the six communities, with more than 25,000 hours of paid employment and training…employment provided additional income for YEEWs and their kin, potentially easing household pressures." (MM, pp.189-190)
>
> "[The project provided] Casual employment for at least 12 people within Rokeby and Clarendon Vale…Employment for 53 project staff, totalling 15 FTE years at Sustainable Living Tasmania…Casual employment for 4 project staff totalling 3.7 FTE years at UTAS." (GBS, p.27)

**Reduced Burden on the Health Care System:** By assisting households across the country to efficiently achieve ambient temperatures in their home, the LIEEP program improved participants' health, which, if implemented on a larger scale, could help to ease the strain on the public healthcare system.

> "The Get Bill Smart project significantly improved thermal comfort. This included reductions in window condensation, draughts and improvement of time spent in the thermal comfort zone. Households also increased their knowledge and ability to manage their homes effectively (Table 7-22). In physiologically uncomfortable situations (such as we commonly saw in GBS participant houses), improvements to thermal comfort can support improvements to health. Indeed, health impacts of thermal comfort improvements may outweigh the energy and water savings discussed above by orders of magnitude." (GBS, p.107)
>
> "The legacy of the project will continue beyond the writing of this report. The new local knowledge about comfort and housing performance with regards to the climate will provide the baseline for ongoing research into the health and built environment requirements for a changing Top End climate." (SCT, p.2)

**Building Family Harmony:** Families benefitted from participating in the project by learning about energy efficiency and co-operating to put these new learnings into action. Their success in increasing their energy efficiency and household comfort boosted harmony within the household as family members argued less about the use of appliances, thus decreasing their stress levels and improving their relationships.

> "A range of benefits have been identified for program participants. These include… Improved relationships within the household through engaging everyone in energy saving initiatives." (PP, p.96)

> "An example of this was when one lady excitedly and proudly told the EPW at the beginning of her home visit that she had already taken the information from the workshop home and shared and implemented the learnt tips with family members. As a result their energy bill reduced by $50." (BA, p.80)'

**Improving English Language Skills for CALD People:** Participants from Culturally and Linguistically Diverse (CALD) backgrounds were able to improve their English language skills as a result of participating in LIEEP. Indeed, Energy Efficiency workshops and home visits gave them an opportunity to practice speaking English. This was particularly valuable for participants who were not normally able to socialise with other individuals or communities such as refugees who were waiting to be settled in the country.

> "An unexpected achievement of the project was to have energy-efficiency terminology embedded in the English language courses as part of the TAFE curriculum. This was achieved by partnering with the local TAFE colleges and providing a list of commonly-used words prior to the workshop. This allowed a greater learning outcome on two fronts and improved participants' understanding from the workshops." (BA, p.82)

**Encouraged Ethical Recycling:** Many of the projects recycled old appliances ethically, which meant that significant amounts of waste were diverted from landfills.

> "Reducing waste going to landfill - by recycling old appliances and packaging, BoysTown diverted 64,064kg of waste from landfill. Table 15 presents a summary of the waste that was diverted from landfill. This included polystyrene, cardboard, plastic and appliance components. The disassembled steel, plastic, copper and circuit boards of the old appliances were recycled through certified recyclers. Almost all components of the old appliances were recycled." (GHW, p.76)

**Building Cultural Awareness and Understanding:** The projects gave consortia the opportunity to build their cultural awareness and understanding. Consortium members who provided assistance to Aboriginal people and those from a culturally and linguistically diverse (CALD) background gained a greater understanding of other cultures through their engagement with both project partners (including specialist agencies) and participants. In essence, members of both cultures benefitted from this cultural exchange and it is hoped that this invaluable experience will help them to bridge any remaining cultural divides within the community in the future.

> "[Benefits include] Increase in experience and expertise in: Yolŋu educating Yolŋu, in language…Yolŋu conducting research with Yolŋu, in language…Yolŋu working together in partnership with non-Indigenous people." (MM, p.190)

> "From the evaluation of the shared-leadership model used in KEEP, together with feedback from project partners and the CDO focus group, it is clear that while some cultural divides remain, both Aboriginal and non-Aboriginal people involved in KEEP now feel a greater understanding of each other's cultures. This means that a two-way cultural exchange took place during the life of KEEP which will stand all parties in good stead for working in future cross-cultural collaborations…. Further, non-Aboriginal people involved in KEEP were able to learn

more about the cultural history of Australia, and benefit from learning about Aboriginal Peoples in Victoria, and in general." (KEEP, p.104)

### 4.2.4 Benefits to Consortia

Consortia members themselves felt they experienced 'benefits' from working on their LIEEP project and being part of a national program.

| | |
|---|---|
| **Experience:** | Consortium members gained valuable experience in designing and implementing large-scale projects and energy efficiency initiatives. Their knowledge of energy efficiency, training energy efficiency staff and their overall ability to promote energy efficient behaviours in the community increased significantly. |
| **Network Establishment:** | The LIEEP project forums provided consortia with an excellent opportunity to network and exchange ideas with individuals running similar and very different projects. This allowed them to discover new approaches to research design, data management and collection. |
| **Boost to the Industry:** | The LIEEP program provided a boost to the energy industry by employing energy experts/specialists to provide energy assessments and tips as well as make modifications and installations of energy appliances. A range of energy monitoring equipment was also purchased across the projects. |

### 4.2.5 Section Summary

Numerous factors were identified that form barriers or facilitators to households experiencing co-benefits associated with energy efficiency initiatives. The barriers include:

- Data collection limitations
- Variation in project designs
- Trust with strangers or energy providers
- Subjectivity of thermal comfort
- Finances and living conditions
- Relationships with energy providers

The facilitators of improved household co-benefits as they relate to energy efficiency include:

- Having strong community ties
- Recognising links between co-benefits
- Tailoring initiatives to the community context
- Project consortia networks and knowledge

- Discouraging poor energy conservation practices

With regard to the co-benefits identified from consortia rich insights, these are captured in Figure 43 below and grouped according to whether the co-benefit is a household or community benefit (*e.g.,* social inclusion), a broader social benefit or benefit to the consortia members.

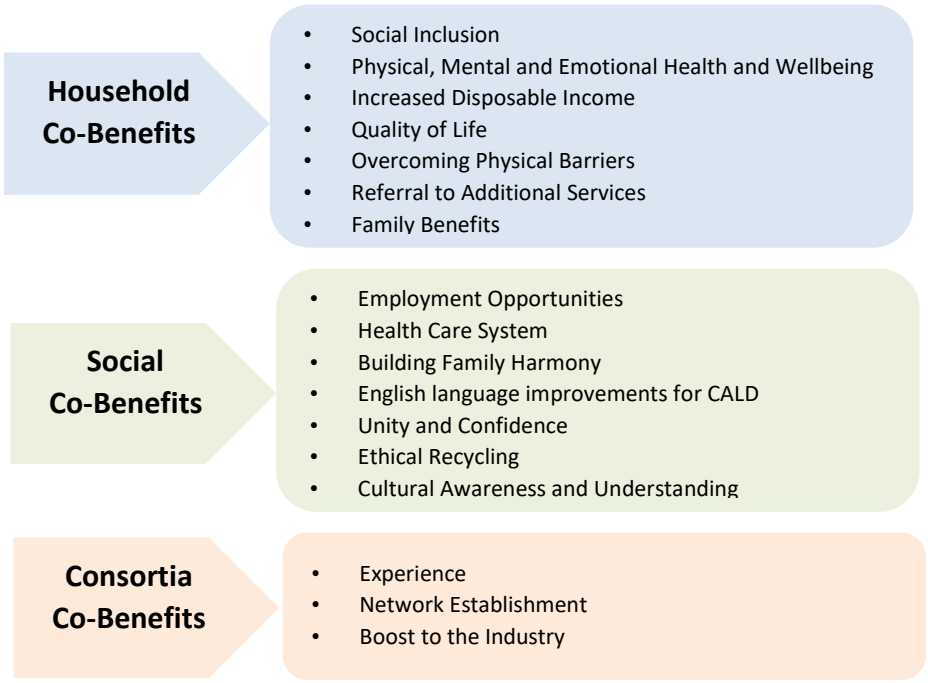



***Figure 43: Co-Benefits Drawn from Consortia Insights (Non-Measured)***

Recommendations

# 5. Change in Terminology

From the analysis of the co-benefits experienced as a result of LIEEP, it is clear that efforts that focus solely on reducing household energy use may miss the mark. The term "energy efficiency" tends to refer to ways to reduce energy use, which broadly focuses attention on appliance performance. For example, significant improvements in appliances that use less power means that households can update their appliances and reduce their energy use and bills. The more recent term, "energy productivity", attempted to extend this meaning to focus on using energy to achieve more. This similarly focuses attention on appliance performance but also focuses on the behavioural aspects of energy users. For example, by carefully using energy in the home, more activities in the home that use energy can be done. Hence, installing an "energy efficient" heater can be even more productive if the householder sets the thermostat low, which may enable them to run their next dryer cycle 'for free'.

However, this improvement inadequately captures the heart of the problem experienced by many low-income households. LIEEP findings reveal many associated factors experienced by households when it comes to how they use energy.

The first associated factor relates to capacity:

**Tenants**: high-use energy appliances, such as heating and cooling, are usually fixed in homes, and if the property is tenanted, it is beyond the scope of tenant to update fixed appliances with more energy-efficient products.

**Funds**: due to having a low income, householders are unable to afford to buy energy efficiency appliances, particularly large ones that might strongly affect household energy usage. Further, other products such as insulation are costly, despite the forthcoming energy savings they allow.

**Current low consumption levels**: The success of energy efficiency strategies is relative to current energy use. For example, lower energy use could turn the home from cold in winter to freezing if the heating is already used to a minimum to keep bills down.

The second associated factor relates to capability, or knowhow:

**Selecting appropriate appliances**: the market for appliances, and information about the energy efficiency of each, is profuse and complex and requires sufficient knowledge to make wise product selections. Given the low levels of energy efficiency knowledge found with LIEEP participants (displayed in Figure 6) it is unlikely that low-income householders will be suitably equipped to select appropriate appliances for their home (even if they could afford them).

**Complex sector**: with tariffs, peak loads, varied pricing, a highly competitive industry and invariably unhelpful call centres (see comments from householders in KEEP, for example), low-income householders risk disconnecting with the sector and 'giving-up' on trying to find ways to reduce their bill. Some LIEEP participants faced imminent disconnection due to an inability to pay, and rarely had the knowhow on how to seek support for their situation. Although there are many support offerings in the sector, these are generally poorly understood by those who most need them. Overall, the industry is currently not consumer friendly, an issue that is exacerbated with those experiencing vulnerability.

To incorporate these aspects into an energy term that encourages households, government regulators and energy providers to seek improvements and energy-related co-benefits, the quality of comfort, health and well-being within the home must be the primary objective. Accordingly, if households optimise energy use they may; use less energy; use the same amount of energy to do more; or use more energy to ensure their health, comfort and quality of life aspirations are achieved. We therefore believe that the term "**energy management**" incorporates the important components of energy efficiency and energy productivity, but usefully steers attention away from using less energy *per se*, to using energy in a way that minimises bills without compromising other 'quality of life' co-benefits.

# 6. Conclusion and Recommendations

The primary aim of LIEEP was to support low-income households to improve their energy efficiency, thereby helping to lower their energy bills. In addition, the findings of the 20 projects were to be used to inform government policy and the energy sector on how to support these households into the future.

The success of LIEEP was much wider than originally anticipated. Apart from generally lowering energy use and bills, low-income households experienced many more benefits as a result (termed co-benefits). The findings of this report attest to the substantive improvements in 12 co-benefits, evidenced by quantitative pre and post measures captured by 17 projects, and validated by qualitative insights captured by five projects. Further, key insights by those involved in the projects and in delivering services to households provide anecdotal evidence of the broader reaching benefits of the Commonwealth program.

Overall, the analysis of co-benefits in LIEEP reports conducted for this report reveals many findings. These can be grouped into five broad categories which inform key recommendations for future endeavours. These are listed below.

1. **Low-income households are struggling in many areas due to their energy use and bills**

Many LIEEP projects reported the level of co-benefits prior to initiatives being trialled. This data alone paints a picture of the situation low-income households experience prior to receiving support, which likely reflects the situation experienced by low-income households across Australia. Generally, due to current energy use, householders are stressed, lack general and thermal comfort in their homes, are not sure how to manage their energy use, bills or deal with providers, feel out of control and are unsure what to do to improve their situation.

**Key Recommendation:**

Low-income households require direct and immediate support to alleviate their lived experiences and improve the quality of their home life.

2. **Residential energy use impacts the well-being of householders broadly, such that many co-benefits can be realised when conducting energy efficiency programs**

The improvements in the 12 co-benefits experienced by many household participants in LIEEP demonstrate that improving energy efficiency will improve many control, attitude and well-being factors too. Home energy consumption and bills are thus not isolated from health and well-being for householders.

**Key Recommendation:**

Addressing household energy efficiency and well-being requires a concerted effort across government sectors, including energy, health, education and social services, as well as support agencies and energy providers, such that they work together to alleviate energy poverty and thus address the broader social areas this impacts at the same time.

3. **Different types of low-income households will respond best to different types of initiatives**

Evidence from LIEEP suggests that low-income households cannot be grouped as one, and that there are unique and distinguishing features that should be considered when designing energy efficiency and other support services. LIEEP identified largely demographic or lifestyle features (*e.g.,* Aged,

Tenants, Social Benefit Recipients, *etc.*) but there are likely other characteristics that could be used to further delineate these differences.

**Key Recommendation:**

It is important that the retail, community and government sectors approach low-income households in ways appropriate to their various characteristics when designing programs, products or services to support them (a tailored approach).

**4. Current energy use for low-income households is commensurate with suffering in many areas beyond high energy bills, and adopting energy efficiency behaviours provides only small relief. Providing information to householders is insufficient to alleviate their situation.**

From previous work (see Russell-Bennett, *et al.* 2017) it is evident that high increases in energy efficiency behaviours are commensurate with small to zero changes in energy consumption. The work conducted for this report partially explains this disparity: householders may adjust many behaviours, thereby allowing for an improvement in their thermal comfort (co-benefit) which may not translate to an overall reduction in energy use and bills. This also indicates two possible areas for concern:

- Many low-income households currently use too little energy to keep warm or cool and thus their comfort, stress and feeling in control of their energy use is compromised;
- Many low-income households might do a lot around the home to reduce their energy use and bills, but the homes they live in contain energy hungry appliances, are not well insulated and are poorly designed for energy efficiency in the first place, thus their efforts yield little benefit.

**Key Recommendation:**

Urgent work is needed to investigate the quality of housing stock in Australia, starting with government housing and privately tenanted properties. Minimum standards are needed, but before they are implemented, research should be conducted to determine the best implementation strategies to ensure that housing stock improvements do not further compromise low-income households (*i.e.,* home improvement costs do not result in equivocal rental increases, which may force low-income householders to become homeless or increase over-crowding in existing homes).

**5. As a pilot, LIEEP naturally trialled various initiatives which were evaluated using various methods**

The improvements in the 12 co-benefits experienced by many household participants in LIEEP demonstrate that improving energy efficiency will improve many ***control***, ***attitude*** and ***well-being*** factors too. Home energy consumption and bills are thus not isolated from health and well-being for householders, but a lack of consistency in LIEEP precludes drawing sound conclusions for government or the energy sector to move forward to the extent that is required.

**Key Recommendation:**

Another nation-wide project is needed to extend our understanding of how to support low-income households regarding their energy use and well-being. It should trial the same range of initiatives based on those that worked best from LIEEP, but this time be measured in identical ways. This will allow us to determine the key factors that determine behaviour changes, lower energy use and improved comfort and well-being, and the initiatives that best stimulate these outcomes. It is strongly recommended that such a project be informed and run by people experienced in working with low-income households regarding energy efficiency and in measuring co-benefits.

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# Appendix A: Co-Benefits Captured per LIEEP Project

| No. | Project | Quantitatively Measured Co-Benefit(s) | Qualitatively Measured Co-Benefit(s) |
|---|---|---|---|
| 1 | Beat the Heat | Confidence, Thermal Comfort | - |
| 2 | Bright Actions Project | Confidence, Financial Stress Reduction, Thermal Comfort | - |
| 3 | Energy Efficiency in the 3rd Age | Knowledge, Positive Attitude to Energy Efficiency, Thermal Comfort | Stress |
| 4 | Energy Saver Study | - | - |
| 5 | Future Powered Families | Empowerment, Financial Control, Interest in Energy Efficiency, Perceived Comfort | - |
| 6 | Get Bill Smart | Knowledge, Financial Control, Thermal Comfort | - |
| 7 | Glenelg Saves | Knowledge, Empowerment, Financial Control, Interest in Energy Efficiency, Positive Attitude to Energy Efficiency, Thermal Comfort | - |
| 8 | Green Heart Wisdom | Knowledge, Empowerment, Competency, Financial Control, Interest in Energy Efficiency, Thermal Comfort | - |
| 9 | Home Energy Efficiency Upgrade Project | Competency | - |
| 10 | Innovation and Opportunities in Energy Efficiency for Disadvantaged Members of Our Community | - | Knowledge, Perceived Control/ Self Efficacy, Competency, Perceived Comfort, Thermal Comfort |
| 11 | Koorie Energy Efficiency Project | Confidence, Competency, Stress Reduction, Perceived Comfort | Knowledge, Confidence, Empowerment, Competency, Financial Stress Reduction |
| 12 | Manymak | - | Knowledge, Financial Control |
| 13 | Our Green Home | Perceived Control/Self Efficacy, Financial Control, Thermal Comfort | - |
| 14 | Powerdown | Knowledge, Empowerment, Interest in Energy Efficiency, Thermal Comfort | - |
| 15 | Powerplay | Knowledge, Perceived Control/Self Efficacy, Interest in Energy Efficiency, Thermal Comfort | Knowledge, Empowerment, Financial Stress Reduction |
| 16 | Power Save | Knowledge, Empowerment, Financial Control, Interest in Energy Efficiency, Perceived Comfort, Thermal Comfort | - |
| 17 | Power Saver Project | Knowledge, Perceived Control/Self Efficacy, Financial Control, Interest in Energy Efficiency, Positive Attitude to Energy Efficiency, | - |
| 18 | Reduce Your Juice | Knowledge, Perceived Control/Self Efficacy, Competency, Financial Control, Positive Attitude to Energy Efficiency, | - |
| 19 | Smart Cooling in the Tropics | Knowledge, Perceived Control/Self Efficacy, Financial Control, Perceived Comfort, Thermal Comfort | - |
| 20 | Switched on Homes | Perceived Control/Self Efficacy, Financial Control, Interest in Energy Efficiency, Thermal Comfort | - |
| | **Total Projects** | **17** | **5** |