4 Discussion

4.1 Council delivery frameworks

Council HACC teams provide a highly effective context to identify, recruit, retain and support low income householders to improve their energy efficiency. They provide good access to client data which can lead to targeted and successful recruitment. The council HACC service environment provides an effective context and tools to retain clients in such a program i.e. a good environment in which to provide communications, visits and support.

If extra resources are provided to Council HACC teams to provide energy efficiency support to low income householders in the future as part of the services offered by HACC teams, they are an existing, trusted organisation that could provide valuable energy efficiency information and advice to low income homes and support/facilitate home retrofit improvement works in them.

Local goods and service providers can be engaged by councils via their purchasing system to provide home retrofit support to householders (this project used local suppliers in approximately 60% of cases e.g. tradespeople, appliances). This was effective in terms of minimising contractor travel times and costs, getting fast service and local access to goods.

Companies with regional/state/national distribution/scale can be contracted by councils at very competitive rates to provide other larger scale (in number) supply of goods and services across the entire project area e.g. in this project over 140 insulation installs, 40+ LED light upgrades, 100+ draught sealing, 10 hot water services, 12 heaters/coolers. This procurement can be replicated in the future by local governments/regional/state based organisations at the relevant scale. Note that providers of basic draught sealing services at affordable/desirable prices are relatively lacking in the private sector marketplace, primarily constrained by travel distances and related costs.

Councils also provided a great environment to host group community support sessions i.e. centralised locations in each council, free/affordable venues, relatively cheap community bus transport options and a non-commercial context for discussion.

4.1.1 HACC teams

The majority of participating councils' HACC teams are already at full capacity in terms of delivering their existing services to clients i.e. home care meals, health, property maintenance etc. From 1 July 2016, the Australian Government will assume full funding, policy and operational responsibility for HACC services for older people in Victoria to form part of the Commonwealth Home Support Program (CHSP), with Victoria continuing to fund HACC services for people aged under 65 years (under 50 years for Aboriginal and Torres Strait Islander people) (DSS 2016).

To facilitate addition of the provision of energy efficiency services by HACC providers to low income earners will require additional/modified resourcing from government i.e. strong organisational leadership to drive the organisational change, staff training and support, communication material, human resource management and additional resourcing.

To ensure that energy efficiency support services are added to future HACC services and available to the low income community, future HACC service providers will need to be

identified. They may from be local government, private or community not-for-profit sectors. Their willingness and capability to provide energy efficiency support services to low income clients will need to be identified and assessed. If their willingness and capability is low, training will need to be made available to increase their capability and willingness to provide energy efficiency support services to clients. This proposed energy efficiency training could be added to the existing DHHS (Vic) training that is offered to HACC staff for free.

The HACC teams indicated they have limited capacity to add energy efficiency support to their existing HACC services, even though energy efficiency services fit very well with the aims of HACC i.e. supporting vulnerable persons to age in place, maintain independence, safety, health, comfort, wellbeing etc. It has become clear that some HACC staff's willingness and/or capacity to provide different (energy efficiency) services is limited/non-existent.

4.1.2 Council processes to determine who is eligible for community support

The project identified that some of this 'low income' HACC client population has the financial capacity to improve elements of their home and make it more energy efficient, comfortable and healthier. The project discovered that anyone with a concession/health benefit/pension card is eligible to receive home and community care. They can be asset rich and may have ready access to cash, but due to the fact they have a low declarable annual income, they are eligible to receive services.

Some participating 'low income' householders, especially once they had a greater awareness of residential energy efficiency and how they can reduce their energy costs (with awareness provided to them by the project), were very forthcoming to spend their own money on energy efficiency upgrades, when the project was only contributing $450 towards works costing them $1000-5000 (ranging from new heaters, blinds, ceiling fans to fridges, TVs and hot water services). This was unexpected and happened late in the project. In late 2015 SECCCA discovered many clients had arranged and had completed many energy efficiency improvements in their homes during the project in the 2nd half of 2015 at their own cost, based on their increased awareness of energy efficiency (assumed as a result of the project).

A recommendation from the project is that, as part of the assessment of clients' eligibility to receive support services from a project like this in the future, both the client's income and the value of their assets and investments are taken into account. This will be critical to ensure that the most vulnerable and those with the lowest incomes and capacity to improve their wellbeing are supported by future programs as a first priority. Those with available funds may just need energy efficiency advice and direction from an existing trusted organisation to trigger them to take actions to improve their energy efficiency.

4.1.3 Benefits of delivering energy efficiency support services through local government

The benefits of delivering energy efficiency support services to low income householders through local government HACC teams include:

- Local governments exist almost everywhere across Australia, so a replicable delivery model is likely to be able to reach the vast majority of the most vulnerable people

- HACC teams have good access to client data so that the most vulnerable people can easily be identified, targeted and be offered/receive services
- Local government coordinated HACC services are generally well respected so their householder recruitment can be effective and efficient and the advice they provide is likely to be trusted and acted upon
- Energy efficiency support services provide progress to existing HACC objectives i.e. support people to age in place, maintain/improve safety in the home (safe indoor temperatures during heatwaves and cold weather), reduce/minimise living costs, improve comfort, reduce cold-related pain/inflammation/stiffness, can lead to more visits from family/friends etc after the home and living conditions are improved, thereby minimising social isolation
- Local governments have a high 'duty of care' to their HACC clients and as such, usually make every effort to ensure these vulnerable clients are supported and protected as much as possible. As a result local government is an excellent organisation/pathway for delivery of energy efficiency support services to low income householders

4.2 Householders

4.2.1 Recruitment

Recruitment via local government HACC service was successful and could be replicated and scaled up for future delivery if local governments were provided with extra resources to do this. The HACC teams provide great access to client data and contact details (within the framework of the Privacy Act) and are a trusted existing organisation to support their low income clients.

The recruitment process that worked was to identify likely eligible householders from the HACC client database, assess them for suitability to participate in the project using the client database and consultation with their existing HACC assessor and carers, send them a personally addressed concise letter describing the project plus a branded flyer, provide a follow up phone call and request a visit to their home. At the home visit the project was described, a brochure and *frequently asked question* sheet was provided plus an *expression of interest* form to be completed and returned. If they were still eligible an A*greement to Participate* form had to be returned and then they were recruited.

4.2.2 Aged, health issues, female and single, with the capacity to learn

The householders had a wide range of circumstances that affected their ability to increase their energy efficiency i.e. they were predominantly aged and had either a chronic or acute health condition with limited capacity to improve their energy efficiency, most but were single females, some were physically and cognitively very able and had a high capacity to plan, organise and arrange their life. When some were presented with information and possible new actions they reported a general increase in awareness and interest in residential energy efficiency. Those with the capacity to learn and adapt will require less support in any future program than householders with high care needs.

A key issue is that each low income household and its occupants need to be assessed for their income, mental and physical health and their capability to manage their lives, lean new things and change behaviours. Each home needs to be audited in relation to energy

efficiency i.e. design, nature and condition of the building envelope and its appliances. Then an Energy Action Plan can be created by an ELO in collaboration with the householder(s).

If an energy efficiency apprentice (relatively low salary cost) accompanies the Energy Liaison Officer, the apprentice can provide some low cost energy efficiency support during the first visit i.e. replace incandescent light globes with LED globes, draught seal external doors, wall vents, gaps between building materials and better insulate the hot water service with insulation for the pressure relief valve and lagging of hot outlet pipes.

For householders with a moderate-high capacity to arrange things themselves, they can be given or pointed to resources, equipment, devices, financing options and rebates by the ELO, that they can then learn about and arrange implementation of energy efficiency/cost saving/comfort improving actions themselves.

Another possible strategy to consider for those who are aged with a low income and a capacity to learn/change, is to support them to rent out their oversized homes and rent/buy for themselves a more energy efficient, comfortable, healthy, suitably sized home.

4.2.3 Some householders require high support to stay or rehouse, free up capital

Other clients needed high levels of support to improve their energy efficiency, age in place and more so, to 'age in another place' i.e. retrofit their existing homes, or relocate and downsize to a more appropriately sized, designed and constructed home that will better provide safer (in terms of hot and cold temperatures), more comfortable, affordable, aging in place. A great opportunity exists to support aged people to age in another (more suitably sized and energy efficient) place, thereby freeing up many large 4-5 bedroom homes for first home buyers, families or investors. This strategy may move low income peoples' money from being tied up in oversized, under-occupied, energy-inefficient homes to more suitably sized affordable, energy efficient, cheaper to live in and more comfortable homes, to the benefit of low income clients and society at large.

4.2.4 Many householders already doing lots

As the householder survey data indicated, this aged, low income segment of the community are generally doing a lot of actions to minimise their energy use and costs. If a similar energy action program to that provided by this project is resourced and provided to low income householders in the future, it will either confirm to householders that they are already doing lots of energy efficiency/cost saving actions, or remind them of actions they knew they about but weren't doing. Some people will be made aware of new actions they could do to increase their energy efficiency.

4.2.5 Improve energy supply plans

One of the new actions householders could do to reduce their energy costs was to investigate their gas and electricity supply contracts, their bills and seek a better deal from the retailers. Prior to the project many clients were not comfortable or aware that they could call their energy retailer and say "would you please look at my energy use over the past year and tell me if you can offer me a better deal" or, use an online portal/website e.g. *SwitchOn*, *Victorian Energy Compare* to find out if a better deal existed, based on their situation. When householders were made aware and/or supported to investigate their energy supply contracts and other deals that were available, some were very happy to get better energy

deals including energy cost savings. Other clients with physical or mental health issues will need one-on-one support to implement this action.

Some examples: *for one householder, Origin has offered her a deal for new users where she will get 50% off energy and gas including the fixed costs for the first 3 months, and then it is still a pretty good deal 28% off electricity and 15% off gas…for the rest of the 12 months. She can then renegotiate after that time. She is delighted!*

Another lady who had been hesitant to ring the energy company AGL in visit 1 and 2 of her energy action intervention decided after the group visit to do so. She gained a significant improvement on her 'pay on time' discount from 7% to 20% for gas and 26 to 28% for electricity. She was delighted.

4.3 Houses

4.3.1 House profile

The age of houses can impact significantly on their energy efficiency and the indoor temperatures in homes. The vast majority of the houses (but not all) in this demographic require predominantly building envelope improvement works (insulation, draught sealing) to improve their energy efficiency and move them towards being safe to occupy in commonly occurring extreme hot and cold weather events. The average of these homes' indoor temperatures are as low as 10.1°C in winter and as high as 30°C in summer. These are not safe indoor temperatures for people with thermo-regulatory health problems, and to try to improve the indoor temperatures with only new heaters/coolers is inefficient use of money. The recurrent operating costs of heaters/coolers in a home with a bad building envelope will be very high/cost prohibitive.

The majority of the houses have four or more bedrooms and are only partially occupied/used. This makes the homes harder to keep in a safe and comfortable temperature range. There are generally only 1 or 2 people living in the majority of homes and approximately only 25% of each home is being used, so the homes are much larger than is required for this demographic. These homes are therefore more expensive to heat and cool than a more suitably sized residence.

4.4 Interventions

The project has identified that targeted energy efficiency retrofits combined with behaviour change measures can deliver significant energy (between 10-11%) and cost savings ($113 /year) in low income Victorian homes. Delivery of either of these interventions on their own is likely to have little or no energy efficiency outcomes respectively – it is critical they are delivered in combination.

Future delivery of energy efficiency support could be provided relatively cheaply at scale using the following model: a skilled ELO and trained energy efficiency apprentice could identify and support 500 council HACC/CHSP clients per year, provide them with up to 3 visits each which includes initial fact finding, home audit, identify client capacity and support needs, a home energy plan, provision of varying levels of information, logistical, basic retrofit and financial support to achieve improved energy efficiency, comfort and reduced energy costs. This is projected to cost approximately $150,000 per year, or an average of $300 per home, plus government energy efficiency rebates (STC's, VEECs etc).

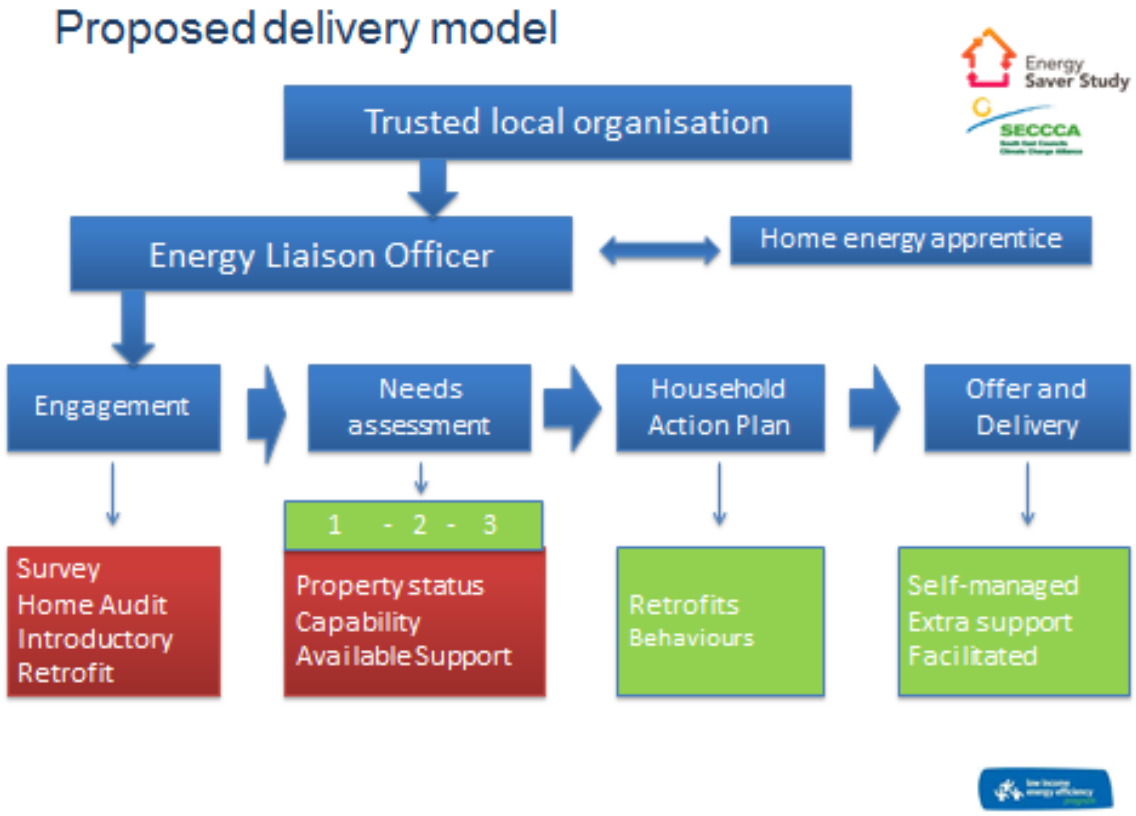

Figure 76: Proposed future energy efficiency support delivery model

A significant challenge for future delivery of the proposed Department of Social Services support services is that the existing HACC delivery model will not exist from 1 July 2016 and will be replaced by the Commonwealth Home Support Programme (CHSP) (Department of Social Services 2015). Future funding of householder support regarding energy efficiency, home safety, comfort, maintenance and modifications could be provided to and via the CHSP providers (which may be wider than local government from 1 July 2016 onwards) as they may determine how the householders' goals (e.g. achieving a safe and affordable indoor temperature, safe affordable lighting etc) are put into practice and are likely to offer home maintenance/modification services (but they will need to be funded by the Australian and/or state governments to do so).

Future providers will need to either make themselves and their staff aware of the goods and services required to deliver residential energy efficiency, safety and client wellbeing, or be trained/supported to do so. This will need to include identifying how a home can be modified and made safe in terms of indoor temperatures, affordable energy bills, satisfactory performance, low operating cost, efficient LED lighting and installation of the related goods and services (LED light globe upgrades, draught sealing, insulation).

Alternatively, for these and other home maintenance/modification services and goods, they may outsource the work to certified contractors (insulation installers, carpenters, electricians, plumbers). The CHSP home modification providers and their sub-contractors will also need to be made aware of the energy efficiency rebates that are available, their scale, eligibility

and associated application procedures and delivery costs. This is so that they can keep the home maintenance/modification works affordable for low income householders.

If CHSP providers are funded to deliver energy efficiency (branded as home safety, maintenance and modifications) support to vulnerable persons, the promotion of the proposed program to the Regional Assessment Services (RAS) and to the My Aged Care call centre staff will be the next priority. Their staff will be the people that ask potential clients questions to determine which services they may need/be eligible to receive. Targeted questions will need to be created i.e. can you keep your home at 16 degrees Celsius or more throughout the year, and below 30 degrees Celsius? If they answer no, then a range of solutions exists i.e. insulation, draught sealing, heater/cooler upgrades/servicing, energy supply contract reviews and improvements etc.

In summary the improvement of existing HACC/future Department of Social Services-funded CHSP home maintenance and modification support services could align with the following existing objectives to be partially covered under existing HACC/future CHSP funding:

- Improve safety, accessibility and independence within the home environment, by minimising environmental health and safety hazards
- Mitigate or remove identified risks to a clients health and safety and/or provide services targeted at maintaining a home environment which supports a client's wellness
- Activities could include tasks such as
    - minor plumbing, electrical & carpentry repairs where client safety is an issue e.g. window furnishings to manage heat transfer and indoor temperature, service heaters/coolers, replace halogen downlights with LED downlights
    - working-at-height related repairs for client health and safety – e.g. roofs, windows, ceilings (insulation, window furnishings, draught sealing to keep indoor temperatures within a safe range of 17-30 degrees)
- The provision and frequency of on-going home maintenance services must directly relate to assessed client need in terms of maintaining accessibility, safety, independence or health and wellbeing and be subject to regular review. They are 'basic' services primarily for function and safety
- To provide home modifications that increase or maintain levels of independence, safety, accessibility and wellbeing.
- Modification services can also assist in creating a home environment that supports reablement and restorative practices i.e. suitable indoor temperatures are achieved to achieve mobility, access for arthritis sufferers for example.
- Services are provided to assist eligible clients with the organisation and cost of simple home modifications and where clinically justified, more complex modifications.

Put simply, include outcomes such as affordable safe indoor temperatures and high quality lighting in the existing safety objectives of the CHSP program and fund it for low income clients.

4.4.1 Home improvements/retrofits

The home improvements that were rated highest by recipients were shade, new heaters and coolers, insulation and draught sealing. This order is in contrast to the home auditors' NatHERS retrofit recommendations, which recommended generally improvements to lighting, draught sealing, insulation, then heating appliances and hot water services in approximately that order depending on the case in question, based on payback period. Shade/window furnishings were not recommended at all by home auditors as it is not recognised by the NatHERS software as effective to improve energy efficiency.

Home retrofits on their own appear to be a somewhat effective intervention to achieve improvements in energy efficiency. The level of effectiveness depends on each house, its age, design, construction materials and condition. The effectiveness is also dependant on the householders' health, education and capacity to operate the house and appliances in it efficiently.

4.4.1.1 LED lighting

Replacement of existing halogen and incandescent lighting with LEDs is an effective way to reduce electricity consumption for lighting. LEDs can also make significant savings in the associated electricity bills and greenhouse gas emissions.

Many clients do not have great trust in the LED marketing and information they receive via cold calling/marketing brochures. When clients were advised and supported to upgrade lights to LEDs through a local council endorsed supplier they welcomed the action, with 50% of clients in the retrofit study groups accepting LED lights to replace inefficient lights. Globes are especially easy to upgrade, with replacement of halogens requiring a licensed electrician.

Many clients commented favourably about the improved performance of the LED lights compared to existing incandescent and halogen lights. LEDs were welcomed especially by clients with poor eyesight.

Offering LED lights through trusted not for profit organisations rather than direct from retailers is an effective way to reduce energy use, cost and greenhouse emissions. It will also provide market access for retailers to low income households and the related economic growth opportunities.

4.4.1.2 Insulation

It is recommended that homes with poor and average condition and/or insufficient ceiling insulation (less than R3.5/4) are actively supported to top up their ceiling insulation. Topping up the missing or existing sub-standard insulation (especially in ceilings where it is critical, plus under suspended floors) can be done for approximately $10-20 per square metre. This is very likely to improve the comfort, health and affordability of low income homes.

With proper installation safety requirements (as per *ICANZ-HandBook-PART-2-Professional-Installation-Guide-V2-November-2013)* and active monitoring of this by regulators, this will be very beneficial for the community at large. All installers are not at present trained or implementing the safety procedures. This needs to be audited and enforced by regulators to manage this risk.

As per the handbook above, some risks identified regarding installation of insulation in this project include, but are not limited to:

1. Training – installers need to trained as per national standards
2. Electrical hazards
    a. before installers begin installing insulation the electricity supply must be turned off, tagged and isolated from access by other people at the switchboard i.e. the electrical isolation procedure implemented. Not all current installers are trained or implementing this procedure
    b. tools/materials that are non-conductive/have insulated handles must be used to move insulation around to minimise electrocution risks. Not all current installers are trained or implementing this procedure
    c. Non-conductive gloves must be worn

3. Working at heights – staff entering the building through the roof need to be trained and implementing working at heights procedures using appropriate equipment. Many installers simply use ladders to access the roof, take sections of the roof off to get insulation inside and try to transfer insulation material up onto the roof and into the ceiling without safety rails, scaffolds, harnesses etc
4. Eye and respiratory protection should be worn to manage risks i.e. safety glasses and dust masks
5. Asbestos – asbestos containing material (ACMs) are commonly found in old homes, especially in roof/ceiling cavities, roofs or in heater flues. To manage this risk, insulation installers need to be taught what ACMs can look like and where they are most likely to occur. Installers need to be on the lookout for ACMs when doing the risk assessment at each site and if they see what may be an ACM, they need to stop work, identify if the ACM is likely to be loose/mobile/friable/in the air – if it is they should stop work, leave the building and get an asbestos management specialist to inspect the possible ACM and they need to take a sample, inspect/test/assess it, identify if it is an ACM and if so, create an Asbestos Management Plan for the site. This can cost approximately $450 per home. If the suspect material is an ACM but is not in a form that is dangerous, the asbestos specialist should provide a document that indicates that it is safe to work at the site and under what conditions/procedures should be followed.

4.4.1.3 Draught sealing

Many but not all low income homes are very draughty (ACH of 10+ $m^3/hr/m^3$@ 50pa) and their draughtiness can often be significantly reduced for between $50 - $2500/home. The draught sealing could either be completed by people that buy the material themselves and do the work too, or by well trained/experienced carpenters, handypersons, or by insulation installers (they fit ceiling fan covers in ceilings whilst installing ceiling insulation, or supply and install covers on their own).

The main draughts that are a priority to seal are external doors, exhaust fans, wall vents, chimneys, holes in walls/floors, gaps between building materials, internal doors between conditioned and unconditioned rooms, windows and above windows by installing pelmets. The priority of these is based on air barrier testing results and comments by specialists in this field. Generally the bigger the air gap in the building envelope, the more important it is to seal.

Many of the clients that received retrofits reported to the project that their comfort increased as a result of retrofits (84% of retrofits included draught sealing). These retrofits generally also included ceiling insulation (89%) but many clients commented specifically about the improvement due to draught sealing as illustrated above. It is possible draught sealing received high praise from householders because it is visible to them and they can directly feel draughts.

4.4.1.4 Internal zoning opportunity

Many of the large homes could be internally zoned to reduce the size of the heated/cooled living areas i.e. install additional doors/partitions between areas. The need/opportunity for zoning was identified and confirmed in the project and was done successfully in up to 5 homes. Zoning modifications are sometimes not practical/affordable due to the old age or design of the home.

Of particular note, the success of internal zoning generally depends on occupants actively managing internal doors/other structures to zone the conditioned spaces. For some low income earners, especially those with mental and/or physical health issues, it may be more effective support to relocate/rehouse them into appropriately sized homes than to introduce internal zoning to the existing home. For people with good health, physical and mental capacity, installing zoning doors is an effective way to reduce the area of conditioned spaces, energy use and cost.

4.4.1.5 Heating/cooling systems

Heating systems in the project's homes were predominantly gas but there are increasingly electric heaters/coolers (split systems) being installed in homes as gas prices rise and split systems become very efficient.

There are 4 arguments to facilitate a change to electricity powered heating systems. Firstly, modern electric split system/reverse cycle electric heaters/coolers are far more efficient than gas heaters (for 1kW of power, 3kW of heating can be produced [300% efficiency] compared to gas heating which is only about 30% efficient).

Secondly the price of gas is increasing relative to electricity. Since at least 2014 the Australian gas market has been exposed to the international market which places a relatively high demand on Australian compressed natural gas. The development of new gas export terminals leads to a tightening of supply. This price effect will depend on how quickly new gas resources are developed and prices change.

Thirdly, if homes change to electric induction cooktops and hot water services as well as electric heaters, they will no longer need to be connected to gas. This will save householders the ongoing gas utility costs.

Fourthly, heat pumps can be either i) entirely powered by solar photovoltaic panels, or ii) powered by grid-connected solar power. This makes them a cheap way to cool houses, as peak cooling demands occur when the sun is shining at its brightest and solar power generation is highest.

In terms of heating and cooling, there is a dominant culture in Australia that has grown up being taught that gas is a clean and cheap way to heat homes. This means many people that have a split system heater/cooler often only use it as an air conditioner/cooler and they

use gas or portable electric heaters to heat their homes. They also don't like the perceived or actual 'cooling' effect of a split system heater blowing convective air on them, especially when only the fan is operating, because the room has reached the temperature that the heater was set to.

Many people tend to use an air conditioner before they turn on a fan, or they don't own a fan. Fans can operate for only 2 cents/hour and are good to use before and with an air conditioner. The project provided pedestal fans to householders to assist them keep cooler for little cost and they were well received.

An education/awareness raising program is required to shift people from gas heaters to electric reverse cycle heaters/coolers, which should highlight appliance lifecycle cost (capital and operating), energy rating labeling, efficiency and effectiveness to condition homes.

In terms of the safety of heaters, this project was a great way to find that:

- faulty gas heaters exist in low income homes. 4 existing gas heaters required replacement for different reasons. The most significant of these was that carbon monoxide produced by 1 heater was causing a client to be drowsy. When the gas wall heater was removed from the wall the plumber discovered a second safety issue. It had burnt thought the plaster wall and cupboard wall behind it and scorched clothes in the cupboard in the abutting room. See Energy Safe Victoria – July 2014 article: *Faulty heater hides burning secret* at www.esv.vic.gov.au

Figure 77: fire damage and burnt clothes found behind a faulty gas wall heater

It was discovered that many heaters and coolers needed servicing i.e. the air intake filters were blocked with dust. A basic heater/cooler service includes this filter cleaning, a carbon monoxide test for gas heaters, cleaning of gas jets and a complete check of the unit. The average price for a service was around $175.

4.4.1.6 Hot water systems

Installation issues, operation of and type of hot water systems have been the main HWS issues that require future attention, noting that hot water is typically 25% of home energy use.

Many HWS are installed without much/any insulation on the pressure relief valve and pipe coming from it, or the hot water outlet pipe. Both can and should be insulated with products that are available in the retail market. Foam 13mm lagging for pipes is readily available at plumbing/hardware stores, but a fit for purpose relief valve cover is at the time of writing only available from one manufacturer. Both should be required for new home and house renovation building compliance certificates.

Operation temperatures of HWS can be set to 60^{o}C or above, but many are set to well over 60^{o}C. This wastes energy and is costly, so HWS maintenance suppliers and installers should test and reset HWS to 60^{o}C.

Many homes had inefficient electric storage HWS. The type of HWS to replace existing HWS with is critical to improving residential energy efficiency. Ensuring replacement HWS are either suitably sized, high efficiency: i) heat pumps ii) continuous gas units or iii) solar units is a reliable way to improve energy efficiency in homes and reduce energy costs. With both the Australian and Victorian governments providing rebates for solar systems (heat pumps and solar hot water panels) new high efficiency HWS that retail for up to $3200 (including installation) can cost only $850 installed at time of writing – the same retail price of a cheap inefficient HWS.

4.4.1.7 Window furnishings

Householders placed a big priority on improving window furnishing to minimise energy movement through windows when negotiating home retrofits. The home audit reports rarely recommended window furnishings, as their impact on the star rating of homes using NatHERS software is relatively low. Nonetheless only 15 window furnishings were done out of over 1000 interventions, or 1%. They included installing external awnings, internal blinds and perforated aluminium foil internally. Clients reported short term positive benefits from window furnishings. They are likely to be very popular if they are supported financially by government and can have a large effect on internal temperatures, heating/cooling costs and householder comfort.

4.4.1.8 Fridges and TVs

A lot of homes had more than one fridge, with those other than the main kitchen fridge often left on all year for social events that are few in number i.e. summer barbeques, birthdays etc. There is a large opportunity to improve energy efficiency by encouraging householders to turn unused/infrequently used fridges off most of the time and just turn on the extra fridges when they are required.

There were still old inefficient TVs in 9% of homes which could be replaced with LED TVs to reduce running costs and energy use.

4.4.2 Behaviour Change

Households which underwent behaviour change only interventions did not show a noticeable improvement in any of the energy efficiency quantitative measures. In contrast, self reported feedback from householders about the targeted behaviour change support they received was very positive and the self-reported number of actions taken to save energy increased during the project.

4.4.2.1 Combination of retrofit plus behaviour change intervention works best

Combining home retrofits plus behaviour change support is the proven way to improve residential energy efficiency in low income homes, based on this trial. Providing behaviour change support piggybacks beautifully on supporting householders with home retrofits. It appears that householders are more empowered to act to improve their energy efficiency when they have something materially new/improved in terms of energy efficiency in their home.

4.4.2.2 Feedback from householders and ELOs was positive

From both the ELOs' and householders' perspectives, the Energy Action Program was effective at increasing the number of actions householders took during the project to improve the energy efficiency at their homes.

Participating householders indicated a high degree of satisfaction with their involvement in the Energy Action Program i.e. it's likely to be politically advantageous for government to provide this support to low income householders. Most (over 70 percent) indicated it improved their understanding of saving energy and that it was useful in helping them reduce their energy consumption. So in a self-reporting sense, the participants thought it was beneficial. The energy efficiency analysis and quantitative outcomes may have been limited in scale due to the pre-existing frugality regarding energy use of the participants. They had a less than average chance of improving their energy efficiency.

4.4.2.3 Increase in the number of energy actions adopted

The Energy Action Program could be delivered in the future to achieve growth in the number of practices householders use to minimise energy usage The action topics likely to be adopted by low income householders include indoor temperature management, appliances, water, lighting and general awareness.

4.4.2.4 Free retrofits a catalyst to action

Householders that receive a free/supported/rebate assisted home retrofit are likely to adopt new energy efficiency actions after they have received something material for nothing. The retrofits appear to be a catalyst that leads to an increase in energy efficiency actions.

4.4.2.5 One-to-one versus Group support sessions

Group support sessions are far more effective use of funding/resources. Many people can be supported at a single event. Peer to peer learning is likely to occur if the ELO facilitator is good at facilitating group learning.

In terms of achieving the desired outcome of householders increasing their energy efficiency in an ongoing manner as a result of the support, this project can not differentiate whether either the one-to-one or group format is more effective. Nor can it prove that newly adopted energy actions will be sustained after the project.

Contemporary behaviour change learnings indicate that peer influence is more likely to influence the majority of people's behaviour rather than getting an expert to tell them what they should do. People are more influenced by personal experience and stories from a person that is similar to them, than by academics or experts. People often value advice or support from someone they already respect or trust.

4.4.2.6 Reflections on EAP design

It was important that the Project Reference and Advisory Group were consulted during the design of the EAP. This highlighted the likely HACC client loss rate and the need for participant retention strategies to keep people participating when possible.

The importance of identifying the householders' values/drivers/priorities was highlighted and built into the EAP design. This was only partially successful, with ELOs reporting that even if they identified a clients future desires or priorities directly or indirectly from the 'cake game', it was sometimes very hard to link this to a relevant energy efficiency action. It was even harder to set up a cause-effect relationship such that if a householder adopted action #1, the result would be some level of progress towards their previously identified value/driver/ priority. An indirect positive outcome of the cake game was that ELOs learnt more about their clients and as a result were sometimes more informed when offering support to clients thereafter.

The strategy of small incremental change was appropriate, so that clients were happy to adopt a comfortable number of actions at a time. The practice of normalising new actions was also appropriate i.e. saying "most people wash their clothes in cold water these days. The washing detergents and the way machines work now mean that you can't see the difference between hot and cold water washing for most situations".

The practice of repeat contact with clients was positive, whether by phone or another visit, to reiterate messages and remind clients of their adopted actions, checking how successful they were at remembering to do them and congratulating clients for doing their adopted actions. The active use of highly visible and interactive fridge magnet by clients also appeared to support this process.

On its own the behaviour change intervention was a qualified success and was highly regarded by clients. Behaviour change (in combination with home retrofits) was a critical element in this and future energy efficiency projects.

4.4.2.7 In-Home Displays

The custom designed In-home displays are a very expensive and ineffective way to improve energy efficiency for this demographic. They have been surpassed (for people with internet access in their homes) by free online energy use data portals created by energy retailers. ELOs and contractor staff reported there were definite waves of enthusiasm and use of these IHDs, a bit like a new toy or other device perhaps. It was definitely not worth the cost of the deluxe IHD hardware and software (over $2000 each) in terms of energy saving during the project.

In terms of learning and future IHD/energy use communication design, custom IHD design and testing as a very valuable exercise for staff and consortium members and project findings. Some of the deluxe IHD hardware and software design features were beneficial i.e. 10” tables, large font, highly visible graphs, large numbers and text and including a clock/time image on the screen as a screensaver function. This clock feature was to encourage regular use of the device, on the premise that users may be more likely to also check their energy use when checking the time.

The standard IHDs are much more affordable, but householders (especially those who are vision impaired) had trouble reading the relatively small screens and others with physical issues had trouble pressing the devices controls and buttons. The Watts Clever IHDs only showed total energy use and not energy use by circuit.

Some people had the computer experience and skills to use the IHDs whilst others did not, even with support from ELOs. Some clients showed the IHDs to their family members including grandchildren so they could see how much the energy use increased when they visited. IHDs (or their more modern, generally accessible, free online equivalent) are a good way to share energy use information with all energy users. For people with access to internet, the most cost effective way to see their real-time energy use is to use their energy retailer’s energy use portal on their own computer/smart device.

4.5 Energy monitoring data

It was a very valuable exercise to collect initially bills, plus later the monitored and distributor energy data. This allowed:

- bills to inform interventions
- comparison between the data sources to ensure they were accurate/similar
- circuit data to be collected to allow collection of particularly lighting circuit data before and following LED upgrades, heating /cooling circuit to compare before/after use
- comparison to be made between mains circuit data and the sum of sub-circuit data

4.5.1 Monitored energy

The process of identifying homes and householders within each study group that were suitable and eligible to receive energy monitoring equipment, installing and maintaining it was significant and costly (over $600,000), but the data and knowledge derived from monitored data has been very beneficial in that:

- monitored data allowed analysis of energy use patterns well before distributor data was requested or available, so the preliminary results of interventions were accessible early
- it allowed the project to identify any unusual energy use patterns, investigate them and if the householder was interested, support the householder to modify energy use or the appliance in some way (depending which study group they were in)
- householders with deluxe IHDs could access their energy use easily if they could operate the device and software

A safety issue was identified during gas energy monitoring equipment installs:

- 12 homes (or 10%) of the 120 homes that received energy monitoring equipment had gas leaks. This was discovered when the gas systems underwent pressure tests as

required by law after gas works. These leaks were fixed or faulty appliances were replaced (3 cooktops and 1 barbeque) for an average price of $2000 per home

A safety issue was identified prior to electricity monitoring equipment installs:

- Asbestos is a material that was used in the creation of many pre-2004 electrical fuse/switchboards and surrounds i.e. most switchboards installed before 1990 are very likely to contain asbestos
- 'Federal' cast-iron switches are present in some homes and contain asbestos
- Houses that appeared to have asbestos containing materials in/surrounding the electrical fuse box/switchboard were excluded from the electrical monitoring component of the study

4.5.2 Distributor data

Distributor data was accessible through the energy distributors and confirmed the monitored data was approximately the same. It required good communications and relationship development between project staff and the distributors to get the data.

Accessing distributor data was much cheaper for the project than monitored data, but required a lot of work checking the format and content of the data to ensure it was correct, liaising with distributors and sensitivity regarding the providers' data management systems, capacities and constraints.

It is recommended that the role and responsibility of energy distributors to record and provide accurate energy use interval data is reviewed nationally in consultation with all stakeholders. It is proposed that clear requirements are put in place via legislation and/or the Australian Energy Regulator that will make it easy for energy users, professionals or researchers to access accurate energy use interval data that is derived from smart meters.

4.5.2.1 Smart meter data

One of the problems with using smart meter data for determining electricity consumption is that for houses with PV the actual electricity consumption cannot be determined. This is because the meter records net energy consumption not gross consumption. During the day when the PV array is generating electricity this is utilised by the house and only the additional electricity that is required from the grid in excess of what the PV array can provide is recorded by the meter. Equally, you cannot determine how much electricity the PV array has actually generated because only the excess electricity that is exported to the grid is recorded by the meter. Analysis of the smart meter data shows that within the cohort of houses in this study, the energy use difference between houses that had PV arrays and those that did not is not large.

Daily gas use data was derived from quarterly billing data i.e. by dividing the total quarterly gas use by the number of days to determine daily use. The real pattern of gas use within each quarter was therefore not available.

4.5.3 Temperature monitoring

The internal and external temperature monitoring exercise was fruitful in answering some important research questions. It showed that retrofits to the building envelope of low income homes improved the indoor winter temperatures. Behaviour change and retrofit interventions also improved the indoor temperature in winter by only 1.6 ^{O}C which was quite surprising,

given that the householders reported they adopted more actions and had greater knowledge due to the behaviour support.

The temperature monitoring identified that summer maximum indoor temperatures are reaching a dangerous 30 ^{O}C at times in summer and in winter, indoor minimum temperatures going as low as 10 ^{O}C. It showed that bedrooms are about 1 ^{O}C cooler in winter compared to living rooms and this puts people with unheated bedrooms into below desirable temperatures in their bedrooms.

The temperature data was also invaluable to the RMIT research project and examination of the relationship between buildings, practices and health.

4.6 Benefits of providing energy efficiency support services to low income people

The benefits and co-benefits of providing energy efficiency support services to low income people include:

- provides progress to existing HACC objectives
- supports people to:
    - age in place
    - maintain/improve safety in the home (safer indoor temperatures during heatwaves and cold weather)
    - maintain/improve comfort in the home
    - reduce/minimise living costs
    - reduce cold-related pain/inflammation/stiffness

Other benefits appear to include:

- can lead to more visits from family/friends etc after the home and living conditions are improved
- can minimise social isolation
- can divert people away from addictions/issues i.e. gambling, alcohol, drugs
- can reduce the likelihood of domestic violence
- can provide a more comfortable/safe workplace for carers, resulting possibly in improved workplace productivity

4.7 Project outcomes

The most significant outcomes for the project included:

Category of intervention and average cost	Outcomes (compared to control study group)
Combination of Retrofit plus EAP ($2885)	From monitored data: • 10% lower total energy use/day (4.36kW) • 13% lower gas use/day (4.8kWh) • 13.1% lower gas bills/day (31 cents/day or $113.15/yr) • 13.0% lower greenhouse gas emissions/day due to gas consumption (0.95 kg CO2-e) • 1.6 °C higher average temperature in living rooms in winter • 22.1% lower electricity use/day for lighting due to LED lighting upgrades (0.21 kWh) • 0.28 kg CO2-e lower GHG emissions/day due to LED lighting From distributor data: • 11.4% lower total energy use/day (4.8kWh) • 18.5% lower gas use/day (7kWh) • 18.6% lower gas bills/day (45 cents/day or $164.25/yr) with a payback period of 17.4 years • 18.5% lower greenhouse gas emissions due to gas consumption (1.39 kg CO2-e) From householders: • Met their expectations • Improved the comfort of their home • Recommend the program to others if delivered in the future • A high degree of satisfaction with their involvement in the Energy Action Program • Most (over 70 percent) indicated it improved their understanding of saving energy • It was useful in helping them reduce their energy consumption • Increase in the number of actions to improve energy efficiency
	From monitored data: • Did not show a statistically significant difference in energy, electricity, or gas consumption, or energy, electricity, or gas bills when compared against the control group. • 1.9 °C higher average temperature in living rooms in winter and householders felt more

Retrofits ($2348)	comfortable • 0.33 kWh lower daily electricity consumption for lighting due to LED upgrades • 35.9%lower electricity use for lighting • 9.5 cents/day ($34.68/yr) lower electricity bills for lighting (9 year payback period) • 0.42 kg CO2-e lower GHG emissions/day due to LED lighting From distributor data: • 7.1% lower total energy use (3.8kWh) with a 7.4 year payback period (savings on energy bills) • 14% lower gas bills/day (87 cents/day or $317/year) • 3.8 kg CO2-e lower GHG emissions/day due to reduced total energy use • 0.96 °C higher temperature in the living room in winter From householders: • Met their expectations • Improved the comfort of their home • Recommend the program to others if delivered in the future
Behaviour change ($711)	• Did not show a statistically significant difference in energy, electricity, or gas consumption, energy, electricity, or gas bills or daily greenhouse gas emissions when compared against the control group. • Did not show a statistically significant difference the average temperature in the living room during the winter months when compared against the control group • Did not show a statistically significant difference in electricity consumption (or electricity bills or GHG emissions) for lighting when compared against the control group From householders: • A high degree of satisfaction with their involvement in the Energy Action Program • Most (over 70 percent) indicated it improved their understanding of saving energy • It was useful in helping them reduce their energy consumption • Increase in the number of actions to improve energy efficiency • Recommend the program to others if delivered in the future

4.8 Cost analysis

4.8.1 Direct Trial approach: cost of delivering the trial approach to a participant

The total Home Energy Audit cost was $313,124 for 320 homes, so the average cost was $978 each. Of these 260 were standard audits (100 points) at $455 each. 60 were high level audits (120 point including measure up, house plan & star rating) at $3250 each.

With the experience that staff have gained from the project, many staff (from SECCCA or local governments) could in 2 hours audit a home, discuss the situation at the home with the householder, recommend retrofit works and likely indicative costs, identify some priority energy efficiency actions and create an Energy Action Plan. If accompanied by an apprentice energy efficiency tradesperson, some basic home retrofit works (LED light upgrades, draught sealing, and HWS insulation) could be provided simultaneously. It is estimated the total cost of the first visit might average $150-200 each. Up to 2 more visits may be required/valuable, taking total cost to $300 per household.

Home retrofit hardware and install cost per participant for 154 homes (6 other participants dropped out of project/didn't want retrofit) had a total cost of $360,000 and an average of $2348 each. In future projects it depends how much the funding organisation is willing to spend on each home. The project identified that some people from the control group and behaviour change groups were happy to arrange home improvement works up to between $500-4800 when an additional $450 for basic retrofit works from the project was contributed as a thank you for their participation.

Coaching and providing education to householders cost over $700 for each client including all the planning and preparation. This could be done for much less in the future as described above with the experience/collateral materials from this project.

Including the project coordination, planning, administration support, energy monitoring and analysis was critical to this as a research project and added considerably to its cost and outcomes.

4.9 Barriers to energy efficiency

Common barriers that stop/limit householders from improving their energy efficiency include:

- low incomes to buy the goods and services required
- age and/or presence of a disability to a point that limits their mobility and access to energy efficiency information, goods and services
- limited awareness of energy efficiency possibilities
- limited English and literacy
- beliefs (cultural, social, political and/or scientific) can result in people placing energy efficiency actions very low on their 'to do' list, or not including energy efficiency actions at all on their list
- tenants living in rented homes usually need approval from their landlord/property manager to undertake works on the home and this approval can be intimidating to seek and/or difficult to get, or is not available at all
- old homes may be inefficiently designed and constructed in terms of energy efficiency

- homes may be poorly maintained i.e. air/water/gas leaks
- home owners may not trust the energy efficiency advice given to them by the private sector or the marketing material they receive
- the energy bills, their contents and/or readability.

4.9.1 How to remove the barriers?

Delivery of future similar but delivery-focussed projects could be successful through not-for-profit organisations with existing connections to the community and well developed rapport with the target audience i.e. local government or non-government community organisations.

The existing Australian and future proposed Victorian energy efficiency rebate schemes could make the cost of energy efficiency goods more affordable, but some critical goods and services that are not eligible for rebates at present could be added to these schemes to make home improvement more affordable for low income people e.g. supply and installation of ceiling insulation and also floor insulation, reverse cycle heaters/coolers, wider varieties of LED lights and draught sealing services. Also the existing rebates could be better publicised and made more accessible e.g. replacing old TVs with LED TVs, heater/cooler duct upgrades, fridge upgrades etc.

Supply of energy efficiency advice by a trusted organisation is required to inform low income householders what they need, where and how to get it, so they are more likely to do home retrofits and actions to improve their energy efficiency. This is especially the case regarding supply of energy efficiency goods and services. This is to make sure householders can make informed choices about what they choose to buy. At present many people are confused or intimidated by the ever changing energy efficiency market place.

Skilled and well educated community engagement staff are required to support householders effectively. Staff need to have good skills in communications, energy efficiency, building design and construction, listening, financial management, people skills and reporting. There is also a role here for multilingual staff to bridge the English language gap in many homes. Staff also need to be aware of (or trained in) renters' rights and the tenancy act, lease conditions and requirements.

4.10 Learnings

The following key learnings were made from the project:

- council HACC/CHSP teams provide a highly effective context to identify, recruit, retain and support low income householders to improve their energy efficiency
- recruitment of low income households through local government HACC/CHSP services is an effective way to engage them in an energy efficiency support project
- the majority of participating councils' HACC/CHSP teams are already at full capacity in terms of delivering their existing services to clients
- HACC/CHSP staff's willingness and/or capacity to provide different (energy efficiency) services is limited/non-existent
- if extra resources (financial, leadership, training) are provided to Council HACC/CHSP teams to provide energy efficiency support to low income householders in the future, they are an existing, trusted organisation that could provide energy efficiency support to low income homes (or possibly to future HACC/CHSP providers)
- councils also provided a great environment to host group community support sessions
- 'retrofit only' or a combination of both 'home retrofit and behaviour change' interventions significantly improve energy efficiency in low income households
- home retrofit interventions alone can increase the temperature and comfort of homes during winter, can improve the energy efficiency of households by 7% and reduce the cost of energy
- behaviour change interventions alone do not improve the energy efficiency of low income households
- LED light upgrades as part of home retrofits alone can improve energy efficiency, reduce lighting costs and greenhouse emissions
- home retrofits often led to improved energy efficiency behaviours that were initiated by the householders themselves
- many people are not aware of the information on their energy bill, cannot either read or understand it and therefore don't use their bills to improve their energy efficiency or costs
- many people are not aware of the opportunity or are too intimidated to contact their energy retailer and negotiate a better energy supply deal, even though this can reduce the cost of their energy bills.

4.11 Frequently asked questions

Which trial approaches worked well?

- Recruiting the high calibre of ELOs (university educated and most had experience in community engagement/support, good people and listening skills)
- Recruiting participants through a known and trusted organisation: local council HACC service
- Completing home energy audits to inform interventions
- Installing energy monitoring equipment to monitor energy use
- The behaviour change 'cake game' provided a fun and non-threatening context for ELOs to get to know the clients
- ELOs identifying householders' priorities/desires/values and then providing relevant support and advice that took these priorities into account to do with energy efficiency

and home improvements. Most householders took the support/advice and received the recommended works.
- LED light upgrades reduced electricity use for lighting by 20-30% per day
- Draught sealing reduced air exchange rate by 28%
- Retrofits increased winter indoor temperatures by 1.9 ^{O}C
- Providing easy to access remote electricity switches for appliances
- Providing easy to read safe temperature thermometers to householders
- Informing householders about the information on their energy bills and about energy supply opportunities (how to get a better deal)

Which trial approaches didn't work well?

- EAP intervention on its own achieved very little by way of quantifiable energy efficiency (maybe didn't have long enough/include summer post-intervention data)
- Retrofit only interventions had qualified success

Why didn't some trial approaches work well?

- Retrofit only interventions were not very successful in terms of some measures (e.g. reducing total energy use) because some householders need behaviour support to achieve significant reductions in energy use

Which recruitment strategies worked?

- Recruiting through a trusted existing organisation
- Having skilled and trained staff undertake face-to-face recruitment discussions with target householders, that had information about previous householder issues from the client database

What difficulties were encountered?

- Involving householders in the project: ELOs needed to develop trust and overcome householder resistance to participate
- The initial home energy audit results were not always accurate and didn't always help the retrofitting process
- ELOs were on a steep learning curve and their employment contracts changed over time
- The project's time schedule was unrealistic/changed/could be revised/improved
- It was a challenge dealing with contractors and tradesmen, especially in vulnerable peoples' homes. Their work was often invasive of people's homes and lives
- The number of visits to homes was too many for many householders
- Some householders weren't computer literate
- Some householders had bad eyesight
- Internal temperature sensors failed to work due to battery issues
- Lots of safety issues i.e. asbestos, working at heights, electrical hazards including isolation procedure prior to insulation installs and using non-conductive/insulated tools, gas leaks, recalled heat exchangers, lone female workers

How were they resolved?

- Some people were allocated to control or other study group with a relatively low number of visits required
- ELOs provided support and training manual to computer illiterate householders

- IHDs were designed with big screens, graphics and text
- Temperature sensors had batteries checked and changed regularly and RMIT student installed additional temperature sensors of a different type.
- ICANZ training and procedures

What were the other results of the trial?

The project identified that:

- many householders are living in homes that are oversized for their needs i.e. many low income, aged, single people and couples are living in 4-5 bedroom homes and they only actively use perhaps 25% or less of the home. This is likely to have significant ramifications for both them and society at large i.e.
    - their homes may be more suited to a family of 3 or more people
    - they may be using more energy than they need to be comfortable
    - their living costs are likely to be higher than they need to be
    - they may suffer greater financial stress than required
    - they forgo heating and cooling in their house, which can lead to unsafe temperatures and them living in possibly unsafe/unhealthy conditions e.g. indoor temperatures below 16-18^{0}C and above 30^{0}C.

- this is likely to be creating a preventable and unnecessary burden on community support offerings i.e. the public health system, social services, families, friends, employers etc
- there is a significant need for more appropriate affordable housing to be available for low income people
- it isn't necessarily the case that it is always best for people to age in the same place
- aging in a 'more suitable place' may improve the quality of some peoples lives i.e. provide/support them moving to a more affordable, comfortable and healthy living situation, which may help them to be comfortable, maintain their health and wellbeing
- many of the participants were socially isolated and may be more able to re-engage socially if they are supported to relocate to more suitably sized homes.
- rehousing support may lead to 'whole of society' benefits including reduced costs for government and householders and may help to manage the demand for community services
- at an onground delivery level, an energy efficiency support services team of 2 staff could be provided to approximately 500 homes per year for approximately $300 per home (plus government rebates for energy efficiency goods i.e. VEECs, STCs). This is likely to have a total cost of $150,000 per year including a vehicle, office support, equipment for 2 staff (one Band 4-6 plus a trainee)
- once the trust of a participant has been gained, they can be supported to, for example, develop pride in their home (see Appendix 18 Case Study), refocus behaviours and address other personal challenges, which in turn can increase their capacity and result in them improving their energy efficiency.

What benefits were generated for consortium members?

- increased knowledge and experience that could contribute to possible future community support programs
- greater awareness of the outcomes and benefits of possible future community support programs including improved energy efficiency, householder wellbeing, safety and comfort, reduced energy costs and improved indoor temperatures
- they have a great network of peers both with their own organisation (councils specifically) and in other organisations (between councils and businesses)
- greater awareness of energy efficiency opportunities, products and services

- Pride within council that they were participating in a project that provided material benefit for their community

What benefits were generated for energy efficiency businesses from the project

- the project prompted additional training of some of their staff (e.g. to meet ICANZ required training)
- generated extra income and business
- led to temporary expansion of businesses i.e. more staff, temporary employment
- businesses received constructive feedback and criticism from energy efficiency expert
- Greater awareness of the benefits of delivering their technical services within a partnership with social service providers

Was it managed internally or were there external organisations involved?

- it was managed internally
- different consortium members were engaged during relevant phases of the trail
- the independent evaluator kept aware of the progress and processes, constantly evaluating and providing feedback during the trial and at key milestones

How did this work and did this approach improve trial outcomes?

- it worked well, both the involvement at relevant times of consortium members and contractors, plus the formative and ongoing evaluation and feedback provided by the evaluator
- this approach definitely improved trial outcomes as it drew on the knowledge and experience of many stakeholders, allowed ideas to be initiated, tested, reviewed and continuous improvement to occur.

What challenges did you encounter in managing your trial?

- The timelines proposed for the trail were an underestimate of the optimum/realistic time required to get the most valuable results from the trial i.e.
  - participant recruitment took longer than the projected 1-2 months
  - delivery of interventions took 10 months compared to projected 4 months
  - installation of energy monitoring equipment took 10 months compared to projected 4 months (delayed by extended recruitment period)
  - draft report date being brought forward to 1 March 2016
  - crucial staff were unavailable for the usual factors, including training and organisational needs, sick leave, annual leave etc. that come with working in diverse settings

- The combination of all these factors resulted in a much shorter time period post-intervention for the project to generate post-intervention data that covered all seasons, fully analyse the data collected and provide the most informed findings and recommendations.

- The possibility and presence of asbestos containing materials (ACMs) in the participating homes required an asbestos risk management plan to be created and implemented in 2 phases of the project i.e.:
  - during the installation of energy monitoring equipment especially in ‘Federal’ electrical switchboards

- contractors/ELOs/other staff identified possible ACMs at homes, representative samples of these materials were safely collected & delivered to a suitable consultant for testing, testing was undertaken, consultant provided test results in a written advice to SECCCA including recommended actions to manage the ACM risk if present. This occurred during the home improvement/retrofit phase of the project in only 4 homes and was not budgeted for.

- Lone worker situations i.e. when and where we had a lone worker visiting homes, especially:
  - when a staff member was providing Basic Home Retrofits alone that required them to get into the ceiling cavity to inspect and/or install Draught Sealing to a ceiling exhaust fan
  - when the participant was a single male who may have previously displayed behaviours which intimidated the ELO. A Lone Worker Procedure/Policy was prepared and implemented to manage this risk.

- Mismatched energy use data was provided to SECCCA by distributors. This error appeared to originate during the transfer of data from retailers and distributors. Due to time constraints it was disposed of.

- LED technology progressed quickly leading to many downlight products becoming available for free due to their eligibility to receive energy efficiency rebates (VEETs). This probably meant that less opportunities to install LED downlights were available than would otherwise have been present.

- The project created 8 energy information sheets but these weren't used much at behaviour change visits due to amount of information that was already being covered in the visit. They will be made available via the project website in 2016 for the general public.

- The project decided to limit is media releases about the project even though media and communication were planned to occur from the project outset. This limit on media material was because SECCCA is an alliance of 8 local governments. For SECCCA to release media material, all participating councils' communications departments have to approve the media content. This limits the possible content in media material to manage all risks to member councils and manage community expectations.

4.12 RMIT Health Study

The findings of the Health Study were interpreted for their implications for the policies and practices of Ageing in Place, carbon mitigation and public health. In order to capture multiple benefits, it is suggested that the attention in residential energy efficiency initiatives should shift from the focus on the stand-alone issue of energy to the systems-approach to housing, energy and health. In particular, it is suggested that initiatives that target energy consumption have to be sensitive to the prevalence of cold homes in Victoria, its causes and its effects.

The finding of voluntary under-heating in this study concurs with the results of other empirical Australian studies. Non-heating of bedrooms, and allowing living room temperatures to drop below recommended levels during the night, seem to be practices that are socially shared. On the premise that exposure to temperatures below certain thresholds

constitute a health risk, especially for older people, this finding may contribute to an explanation for Australia's winter excess death rate, which is surprisingly high considering Australia's temperate climate. Research is needed into epidemiological patterns of indoor cold and health outcomes in Australia and into the ability of common coping strategies to protect from cold related ill health.

The findings of this study also suggest that the combination of a retrofit to the building envelope and the upgrade of the heating system may be more effective in providing benefits in warmth, affordability and householder satisfaction than mere retrofits to the building envelope. However, considering the small sample of households in this study, further work is needed to establish the validity of this hypothesis. The study found that the current residential energy efficiency star rating tool is not equipped to assess this set of criteria or to predict the affordability of achieving adequate temperatures.

The study also highlighted that the prediction of energy savings from retrofits should be sensitive to the contextual determinants of indoor temperatures. This study revealed that the retrofits of fuel poor households may fall short of expectation due to the pre-bound effect. As long as this phenomenon does not lead to increases in overheating, increases in energy consumption should be interpreted as a positive outcome and as being beneficial for householder health.

4.13 Swinburne research: Who influences the householders most?

The Swinburne Masters research has indicated that the relationships of most importance to the low income householders (when they are seeking advice on energy in the home) are partners. Children are the next most important influence, followed by ELOs (from this project) and then friends. This makes partners and children a priority to target and collaborate with in future behaviour change programs regarding energy efficiency for this project's target audience.

The study identified that householders consult children most for advice on energy in the home, followed by members of groups (that householders are themselves members of), then ELOs.

The overall story of Most Significant Change chosen by householders was to manage the use of standby power.

4.14 What were our assumptions?

The following assumptions were made in the design of the project:

Assumptions:	True/false	Facts to support this outcome
Householders that receive behaviour change support will reduce their energy use by an average of at least 10% following this intervention	False	Energy use has on average reduced by 2.8kW/day, or -5.8% per day following interventions in Groups B & C, compared to before interventions.
The project will be able to provide a simple generic package of energy efficiency items/retrofits to each home receiving home retrofits) and that this would be appropriate and agreed to by all the participant householders/owners	False	Houses were each very individual in their specific situation and the proposed interventions that were identified for them; it was determined that each home retrofit package needed to be determined on a case by case basis, to ensure agreement from the owner and so that a high likelihood of improving energy efficiency existed. Many items requested by homeowners were not appropriate.
Providing specifically developed IHDs would be effective to reduce household energy use significantly	False	Households which received IHD interventions did not show a noticeable improvement in any of the measures.
Numerous, competitive, cost-effective draught sealing service providers would be present in the local economy	False	There was a limited range and number of draught sealing contractors that were ready to provide goods and complete installation services over a wide area at scale for a reasonable/affordable cost
Engaging low income householders into an energy efficiency/community support project is effective through local council HACC services	True	The project was able to recruit, engage and retain (90% of those recruited) low income householders through local government HACC services to participate in this energy efficiency / community support project
Assisting low-income households to implement sustainable energy efficiency practices to help manage the impacts of increasing energy prices will be effective/successful	Partially true	From onsite monitored data, households which underwent a combination of retrofit and behaviour change interventions made a mean saving of $113/year (or 13.1%) relative to the control group, reducing their average gas costs/day from $2.37 to $2.05.

		From distributor data, households which underwent retrofit and behaviour change had a mean saving of $164/year (or 18%) from their gas bills relative to control group. Retrofit only interventions made a mean saving off their annual energy bill of $317 (14%) relative to the control group. The participating householders only used an average total of 44.1 kWh/day prior to the interventions, but during winter the average daily was 75.4kWh of which gas consumption contributed about 90% of the total. The average cost of energy was $5.80/day (excluding regular service charges). The average cost/day of residential energy in Victoria is approximately $7.65 (derived form Sustainability Victoria 2014 including inflation) This suggests that low income householders spend approximately 25% less than the general community and hence the capacity to reduce the daily energy use and cost of energy for low income householders was relatively low compared to the general community. Average daily energy costs in the retrofit plus behaviour change study group were reduced following interventions from $5.57/day to $5.27/day, or 5.3%. Average energy use for this group was reduced from 44 kWh to 40 kWh, or by 10%.
Assisting low-income households to implement sustainable energy efficiency practices to improve the health, social welfare and livelihood of low-income households will be effective	Somewhat true	The retrofit interventions eased subjective fuel poverty in winter, increased the average living room temperature by 1.9°C (RMIT study). Lighting interventions reduced electricity use and electricity bills with a payback of about 9 years Households which underwent retrofit only interventions and which received LED lighting interventions made a mean saving in their average daily electricity consumption for lighting of 0.33 kWh, a mean percentage saving in their daily electricity consumption for lighting of 35.9%, a mean saving in their average daily electricity bills for lighting of 9.5 cents, and a mean saving in their average daily GHG emissions for lighting of 0.42 kg CO2-e. Households which underwent a combination of retrofit and behaviour change interventions and which received LED lighting interventions made a mean saving in their average daily electricity consumption for lighting 0.21 kWh, a mean percentage saving in their daily electricity consumption for lighting of 22.1%, a mean saving in their average daily electricity bills for lighting of 6.3

		cents, and a mean saving in their average daily GHG emissions for lighting of 0.28 kg CO2-e.
The LIEEP trial will build the knowledge and capacity of consortium members	True	Consortium members have indicated that their knowledge has increased, their capacity has increased slightly (due to the knowledge increase), but that to include residential energy efficiency support into existing council services (increase councils' capacity) will require a dedicated budget allocation, or strategic decision by each local or other level of government to fund and include residential energy efficiency support in the services offered to low income householders, plus related training, staffing review/changes etc
The LIEEP trial will build the knowledge and capacity of consortium members to encourage long-term energy efficiency among their customers or clients.	Partly true	Potential deliver providers need resources ($ and/or staff) to deliver such an energy efficiency support scheme and although the LIEEP has increased SECCCA members' knowledge of how to deliver such a scheme, and may encourage long-term energy efficiency among their customers or clients, it is unlikely that members will deliver residential energy efficiency support services to ratepayers without additional funding
18% of homes receiving gas related works will require gas repair works	False	Of 120 randomly sampled homes that received a gas pressure test, 12 homes (10%) required gas system repair/replacement of faulty gas appliances
The key to adequate ventilation in homes (in the absence of mechanical ventilation) is assumed to be appropriate occupant behaviour	Somewhat true	In a well designed and constructed home i.e. draught sealed, appropriate occupant behaviour is often the key to adequate ventilation. In contrast, some homes have leaky design/construction/building features i.e. an air exchange rate of 10+/hour that provide ventilation in the absence of occupant behaviour e.g. open chimneys, wall vents, plumbing/electrical wall penetrations or air gaps in the building envelope. These homes need little if any actions to keep them well ventilated. They rather require actions to reduce the ventilation.

Energy efficiency thinking is not in many people's minds – we have to be deliberate and insert it.	False	Most of the Study Group B & C (behaviour change) householders were already doing many actions that reduced their energy use prior to the project i.e. many people already use energy frugally, but this can be motivated by costly energy bills rather than by energy efficiency. Outcomes of improved comfort, health and wellbeing can be used rather than energy efficiency to achieve energy efficiency outcomes.
The fact that energy efficiency saves dollars is not a sufficient driver for people to become energy efficient – there are barriers that must be overcome.	True for some people False for other people	For people with available cash/money to spend with discretion, saving money is not a priority so energy efficiency a relatively low priority For people with little money, reducing costs is a necessity/high priority and being energy efficient is a pathway to reduce energy costs, but this cannot always be achieved due to one or more barriers being present i.e. cost, awareness of opportunities, distrust of providers, lack of energy efficiency literacy
Change is more likely to occur within a context of trust and familiarity	True	This appears to be true in this project. Householders were engaged in the project, changed some of their existing behaviours and adopted new actions even though the ELOs were not their existing direct care worker prior to the project. Householders had a level of trust in the ELOs for possibly a few reasons: i) because ELOs came from council HACC services, which clients had good experiences with previously ii) the existing HACC direct care workers 'facilitated' the initial introduction of clients to ELOs or 'handed them over' iii) the character and training of the ELOs empowered them to develop a good rapport with clients resulting in change.
It is easier to leverage change from an existing relationship than to create a new relationship	True	As above
Householders would prioritise reduced energy bills over comfort	Varies with context	Many householders place comfort as a higher priority than reducing energy costs. Other people prioritise reducing bill costs over comfort. Very subjective.

There would still be safety issues with ceiling insulation and its installation after the previous national program	True	Safety issues still definitely exist with installing insulation in homes i.e. contractors awareness of what they have to do as per ICANZ standards/guidelines, working at heights, training required, electrical isolation procedure, ensuring suitable lighting, PPE, lone worker procedure, asbestos identification and management
HACC would recruit vulnerable households and consider income plus equity/assets to determine eligibility	False	HACC services do not assess client need/eligibility for support based on total income plus assets test; rather eligibility to receive care/ support is based on possession of health care/concession card/social security benefits recipient status

4.16 Budget

A summary of the original and final project budget including LIEEP funding and co-contributions (both in-kind and cash) is provided in Table 47.

The original budget was indicative only and was created prior to many of the project deliverables being contracted to either consortium members or other private providers of goods and services. Variations during the project included:

- Project administration increased as independent auditing was not included originally.
- The coordinator and other staff salary lines were projected originally to continue until August/September 2015 and were extended until June, March and April 2016 respectively after a mid-project review occurred.
- Variations to energy monitoring partner contracts were required to complete the required tasks and minimise the unbudgeted cost of removing monitoring equipment from homes.
- Gas leak faults were less than projected so this money was reallocated within the project where it was required.
- In-home display hardware and software costs varied from planned costs.
- Project development, meeting and training costs were higher than those projected.
- Project staff provided the post-intervention householder surveys to minimise the cost.
- The draught testing and sealing contract was reviewed and partially reallocated within the project.
- Behaviour Change materials (6 x videos) required scripting which was not previously in the budget.
- Less printing was required than planned.
- Less advice than planned was required from Just Change to protect tenants.
- The reference group cost less to support than planned.

Much of the budget was committed to consortium partners and pre-agreed contracts, but variations occurred allowing other unplanned challenges to be addressed safely.

The project was completed on budget.

Table 47: Original and final projected project budget

Expenditure Item	original LIEEP Funding ($)	Actual LIEEP funding expenditure ($)	Activity Generated Income ($)	Actual Other Contributions ($) (in-kind)	Actual Sub-total cost ($)
Salary for SECCCA Executive Officer				77,998	77,998
SECCCA Project administration	249,821	279,749			279,749
Salary for SECCCA Project Coordinator	267,500	331,176		53,447	384,623
Salaries for 14 Aged and Disability Services / Environment Officers				417,205	417,205
Salaries for 7 Energy Saver Direct Care staff and 1 part-time research and training officer	1,042,500	1,079,112			1,079,112

Salary for CSIRO Research Officer and research overheads	855,000	855,000		300,750	1,155,750
120 gas monitoring systems	230,400	269,438			269,438
120 electricity monitoring systems	297,000	366,751			366,751
120 Telstra data plans	65,000	41,851			41,851
Gas pipe repair/replacement works for 60 households	143,000	39,103			39,103
In-home display software	40,000	34,080			34,080
Intellectual property (data collection)				199,994	199,994
In-home display monitors	20,000	48,484			48,484
High level energy audits	58,800	73,245			73,245
Standard energy audits	117,000	118,178			118,178
Star ratings for households	53,500	35,305			35,305
AccuRate Measure-up for households	77,400	86,397			86,397
Project meetings, development and delivery of training program	15,000	31,411			31,411
Assistance in development of householder surveys and software development and use of electronic devices to collect survey responses	10,000	10,000			10,000
Return visit to households to complete 120 Post project surveys	12,000	0			0
Air barrier works (test, seal, retest, and report)	118,200	79,975		57,600	137,575
Full retrofit works	384,000	343,732	12,069		343,732
Basic retrofit works	48,000	55,638	4,464		56,638
Behaviour Change program material	83,930	92,430		19,093	111,523
SECCCA project printing material	20,000	985			985
Salary for Just Change staff member	32,200	16,100		28,300	44,400
Salary for Briar Consulting staff member	156,000	156,000		32,054	188,054
Salary for reference/advisory group consultant	10,000	4,641			4,641
RMIT PhD student				314,951	314,951
Totals (ex GST)	**4,406,251**	**4,448,781**	**16,533**	**1,501,392**	**5,950,173**

NB: The project earned $25,872 from interest payments due to cash held in bank account, plus $4,464 voluntary co-contributions from householders for larger than budgeted retrofit works, plus $12,069 in renewable energy certificates; totalling $42,405.

5 Conclusion

This project has tested and evaluated a range of trial approaches to assist low income households to implement sustainable energy efficiency practices. It has recruited 320 low income householders through local government community care services, retained 299 of them to project end and assisted these households using different combinations of home retrofits, behaviour change and combinations of both to become more energy efficient. The project has captured and analysed pre- and post-intervention data and information. It has determined statistically significant findings regarding energy efficiency, householder-reported feedback and other valuable outcomes. These findings and evidence can be used to inform future energy efficiency policy and programmes.

The project has identified and reported how low-income households have benefited from the range of support services it provided. The project has demonstrated findings of improved indoor temperatures and comfort in winter, optimum ways to improve the draught sealing of homes, as well as some interventions leading to more efficient energy consumption, reduced energy bills and greenhouse gas emissions. The project has contributed to greater knowledge and capacity in the energy efficiency industry including client engagement, services, technology and equipment.

Benefits from the project have included:

- assisting low-income households to implement sustainable energy efficiency practices
- helping households to manage the impacts of increasing energy prices
- improving the energy efficiency of low-income households
- supporting people to:
    - age in place
    - maintain/improve safety in the home (safer indoor temperatures during heatwaves and cold weather)
    - maintain/improve comfort in the home
    - reduce cold-related pain/inflammation/stiffness
    - receive more visits from family/friends etc after the home and living conditions are improved and may minimise social isolation
    - develop pride in their home
- increasing the knowledge, experience and capacity of consortium members to facilitate long-term energy efficiency among their customers or clients e.g. working and sharing information collaboratively with other consortium members to develop a wealth of new knowledge, capacity and experience
- increasing the capacity of Australia's energy efficiency technology and equipment companies by providing opportunities for them to participate in the project e.g. calling for, assessing and awarding competitive works contracts for energy efficiency goods and services.

This success of the project from the householders' point of view in all three intervention groups was demonstrated by their strong endorsement of the Energy Saver Study in the post-intervention householder survey. Over 95 percent of householders would recommend a similar program to others. When asked why they would recommend it, the major reasons given were that the project helped lower energy bills, they enjoyed the visits by project staff to their home, it helps to keep people in their own homes, they trust the home care service and it was awareness raising and educational.

The most significant outcomes for the project were:

Category of intervention and average cost	Outcomes (compared to control study group)
Combination of Retrofit plus EAP ($2885)	From monitored data: • 10% lower total energy use/day (4.36kW) • 13% lower gas use/day (4.8kWh) • 13.1% lower gas bills/day (31 cents/day or $113.15/yr) • 13.0% lower greenhouse gas emissions/day due to gas consumption (0.95 kg CO2-e) • 1.6 °C higher average temperature in living rooms in winter • 22.1% lower electricity use/day for lighting due to LED lighting upgrades (0.21 kWh) • 0.28 kg CO2-e lower GHG emissions/day due to LED lighting From distributor data: • 11.4% lower total energy use/day (4.8kWh) • 18.5% lower gas use/day (7kWh) • 18.6% lower gas bills/day (45 cents/day or $164.25/yr) with a payback period of 17.4 years • 18.5% lower greenhouse gas emissions due to gas consumption (1.39 kg CO2-e) From householders: • Met their expectations • Improved the comfort of their home • Recommend the program to others if delivered in the future • A high degree of satisfaction with their involvement in the Energy Action Program • Most (over 70 percent) indicated it improved their understanding of saving energy • It was useful in helping them reduce their energy consumption • Increase in the number of actions to improve energy efficiency
	From monitored data: • Did not show a statistically significant difference in energy, electricity, or gas consumption, or energy, electricity, or gas bills when compared against the control group. • 1.9 °C higher average temperature in living rooms in winter and householders felt more comfortable

Retrofits ($2348)	• 0.33 kWh lower daily electricity consumption for lighting due to LED upgrades • 35.9%lower electricity use for lighting • 9.5 cents/day ($34.68/yr) lower electricity bills for lighting (9 year payback period) • 0.42 kg CO2-e lower GHG emissions/day due to LED lighting From distributor data: • 7.1% lower total energy use (3.8kWh) with a 7.4 year payback period (savings on energy bills) • 14% lower gas bills/day (87 cents/day or $317/year) • 3.8 kg CO2-e lower GHG emissions/day due to reduced total energy use • 0.96 °C higher temperature in the living room in winter From householders: • Met their expectations • Improved the comfort of their home • Recommend the program to others if delivered in the future
Behaviour change ($711)	• Did not show a statistically significant difference in energy, electricity, or gas consumption, energy, electricity, or gas bills or daily greenhouse gas emissions when compared against the control group. • Did not show a statistically significant difference the average temperature in the living room during the winter months when compared against the control group • Did not show a statistically significant difference in electricity consumption (or electricity bills or GHG emissions) for lighting when compared against the control group From householders: • A high degree of satisfaction with their involvement in the Energy Action Program • Most (over 70 percent) indicated it improved their understanding of saving energy • It was useful in helping them reduce their energy consumption • Increase in the number of actions to improve energy efficiency • Recommend the program to others if delivered in the future

Both qualitative and quantitative data has been collected and analysed statistically to determine the project findings. Participants indicated home improvements completed for them met their expectations, improved comfort resulted from these works and that their personal awareness and activity relating to energy efficiency had increased as a result of the project.

The energy use analysis did not include data from January or February 2016 and is therefore skewed to the autumn, winter, and spring seasons.

It must also be noted that the retrofit and behaviour change study group was more likely to contain households judged as being more able to cope with a high level of interaction. This has the potential to introduce bias into the randomised control process.

Ideas for future research include:

- the collection of a full year's worth of data both pre-intervention and post-intervention to give a more complete assessment of intervention impacts across a whole year with a focus on summer months
- conduct randomised control trials to test the efficacy of different retrofit subtypes
- further exploration of behaviour change subtypes
- epidemiological patterns of indoor cold and health outcomes
- the ability of common coping strategies to protect from cold related ill health
- to establish the validity of the hypothesis that the combination of retrofit of building envelope and upgrade of the heating/cooling system may be more effective in providing benefits in warmth, affordability and householder satisfaction than merely improving the building envelope

5.1 Key learnings

The following key learnings were made from the project:

1. council HACC teams provide a highly effective context to identify, recruit, retain and support low income householders to improve their energy efficiency
2. recruitment of low income households through local government HACC services is an effective way to engage them in an energy efficiency support project
3. the majority of participating councils' HACC teams are already at full capacity in terms of delivering their existing services to clients
4. HACC staff's willingness and/or capacity to provide different (energy efficiency) services is limited/non-existent
5. if extra resources (financial, leadership, training) are provided to Council HACC teams to provide energy efficiency support to low income householders in the future, they are an existing, trusted organisation that could provide energy efficiency support to low income homes (or possibly to future CHSP providers)
6. councils also provided a great environment to host group community support sessions
7. either 'retrofits only' or a combination of both 'home retrofit and behaviour change' interventions can significantly improve energy efficiency in low income households
8. 'retrofit only' interventions achieved a statistically significant energy efficiency outcome of 7% reduction in total energy use based on distributor data (compared to

control group), whilst simultaneously increasing winter indoor temperatures by an average of 1-1.9°C.

9. this project's behaviour change interventions alone did not improve the energy efficiency of low income households
10. LED light upgrades as part of home retrofits alone can improve energy efficiency, reduce lighting costs and greenhouse emissions
11. home retrofits often led to improved energy efficiency behaviours that were initiated by the householders themselves
12. many people are not always aware of the information on their energy bills, cannot either read or understand them and therefore can't use their bills to help improve their energy efficiency or costs
13. many people are not aware of the opportunity or are too intimidated to contact their energy retailer and negotiate a better energy supply deal, even though this can reduce the cost of their energy bills
14. partners, children, family and local government HACC staff are of significant influence regarding energy efficiency for low income householders and are the most likely people that will be asked for energy efficiency advice
15. living room temperatures were found to drop below recommended levels during the night in winter
16. the air tightness of most homes pre-intervention was poor but was generally fair following draught sealing
17. intermittent overheating was common

6 Recommendations

For future policy and program design the project makes the following recommendations:

1. Provide resources to and/or widen the role of organisations that provide community care services as follows:
    a. Educate/inform future CHSP assessment, team leader, direct care and home maintenance workers of the opportunities and benefits to improve the energy efficiency of homes and in doing so, increase their capacity to provide clients with relevant resources and support
    b. Redefine CHSP teams (including Home Maintenance/Modification) roles to include improving energy efficiency (and therein safety) of homes as a core responsibility of supporting the community to age in place
    c. Support CHSP providers to have and provide useful energy efficiency information to clients about how they can improve the energy efficiency at their home, as well as the additional benefits of energy efficiency i.e. reduced energy bills, improved comfort, health and wellbeing
    d. Ensure that as part of the process to identify and support first the most vulnerable, assessment of clients' eligibility to receive support services takes into account the client's current income, the value of their assets and access to cash. This will be critical to ensure that the most vulnerable and those with the lowest incomes and capacity to improve their wellbeing are supported by future programs first as a priority.

e. Support CHSP providers to support clients to do their own home retrofits i.e. CHSP services to:
    i. facilitate clients to get their homes audited with reports provided for free by Archicentre (funded by Victorian DHHS) including a list of the priority actions, costs & benefits
    ii. advise clients of the preferred local suppliers of energy efficiency goods and services
    iii. advise clients of the finance/rebates/loans available to pay for the works/actions and support them to access these
    iv. identify and support clients first who are most vulnerable and have the lowest capacity (i.e. mental, financial, physical)
    v. buy energy efficiency products in bulk and sell them on to clients at relatively low costs
    vi. employ low cost energy efficiency apprentices into their Home Maintenance/Modification teams to provide low cost basic retrofits

2. Balance the effects of home retrofit support programs on summer and winter temperatures including in the residential star rating software
3. Shift the focus of residential energy efficiency policy/programs from the stand-alone issue of energy to the systems-approach of housing, energy and health.
4. Initiatives which target energy consumption need to be sensitive to the prevalence of cold homes in Victoria, its causes and its effects.
5. Provide home retrofits plus behaviour change support to low income households to improve energy efficiency, reduce gas use and greenhouse gas emissions and to make homes warmer and more comfortable during cold weather, as well as cooler and safer during extreme hot weather
6. Support residential lighting upgrades with LEDs to reduce household energy bills, electricity use and greenhouse gas emissions and improve lighting performance for the sight impaired

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