

# 1 HEEUP overview

## Introduction

The Home Energy Efficiency Upgrade Program (HEEUP) provided information, a subsidy and a no interest loan to low-income Victorian households in order to increase the uptake of highly efficient hot water systems. HEEUP sought to address capital barriers low-income households face through a no interest loan and a subsidy and to address information and trust barriers through the provision of independent hot water upgrade advice.

HEEUP was officially operational from June 2013 until June 2016. Engagement with households, home energy visits and installation of hot water systems occurred over 22 months between April 2014 and the end of January 2016.

The Brotherhood of St Laurence, a Melbourne-based community welfare organisation, led the HEEUP consortium, which delivered the program. Other members of the consortium were AGL, Monash Sustainability Institute (MSI), Alternative Technology Association (ATA), and the NSW Office of Environment and Heritage (NSW OEH).

## Rationale for the Home Energy Efficiency Upgrade Program (HEEUP)

High energy bills remain one of the biggest cost of living concerns for Australian households. As bills increase so do cases of energy hardship and energy disconnections. Households living on a low-income are particularly vulnerable to high energy bills because they spend more of their weekly income on energy than wealthier households.

Improvements in residential energy efficiency can lower energy bills (see Reardon 2013). HEEUP sought to lower participating households' energy bills by assisting low-income participants to upgrade to more efficient hot water systems.

Hot water systems were chosen because they are one of the biggest energy users in most Australian's homes: on average, they account for 20–25% of the energy used in the home (Reardon 2013). The most efficient hot water systems can lead to big energy and cost savings.

Choosing the best hot water system is however a complex decision, with a host of technology choices. Householders have to consider the upfront cost of the system, which can range from \$1,000 to \$6,500, and then factor in different running costs. Often the information on running costs is not very transparent, or the householder is unsure who to trust. Householders are also largely dependent on plumbers or hot water system providers to advise them on the best upgrades. The plumber or advisor often has a specific interest and/or preference in the type of system installed.

As a result many households end up choosing a like-for-like replacement, or following the recommendation of their plumber. In many cases, this can be a sub-optimal choice for the household.

### Funding and objectives of the LIEEP Program

HEEUP received \$4.5 million in funding from the Commonwealth Government's Department of Energy Efficiency and Climate Change (DCCEE) Low Income Energy Efficiency Program (LIEEP). Following a series of departmental moves, the program was completed under the Commonwealth Government's Department of Industry, Innovation and Science. The objectives for the LIEEP program were outlined by DCCEE (2012, pp. 6–7):

- trial and evaluate a number of different approaches in various locations that assist low income households to be more energy efficient
- capture and analyse data and information to inform future energy efficiency policy and program approaches.

### HEEUP research

HEEUP was run as a trial as part of the Low Income Energy Efficiency Program (LIEEP).

The HEEUP research focused on understanding three distinct but interrelated aspects of the program: the actual energy savings from the different hot water systems; the level of incentive required to get low-income households to upgrade to a more efficient system; and the key lessons for delivering similar types of programs.

The research is important because although hot water makes up a significant component of most households' energy usage there has been little study of programs designed to increase the uptake of more efficient hot water systems in low-income households.

A detailed Data, Collection and Reporting plan (DCRP) was developed by Monash Sustainability Institute and the Brotherhood of St Laurence prior to program delivery.

The research components of the HEEUP program were undertaken by either Monash Sustainability Institute (MSI) or the Brotherhood of St Laurence Research and Policy Centre (RPC). AGL played an important role facilitating access to data and assisting with data analysis.

The key research questions were:

- 1 What change in household energy consumption (also costs and greenhouse gas emissions) occurred?
- 2 What was the optimal level of incentive to facilitate a switch to more efficient systems?
- 3 Did HEEUP shift participants to purchase more efficient hot water systems?

- 4 What were the key lessons from the program? In particular, what enabled or impeded program goals?

Along with the HEEUP consortium research, the DIIS commissioned the CSIRO to undertake an study of all the LIEEP programs. Data from HEEUP was provided to the CSIRO in accordance with the terms of the BSL's contract with the DIIS.

## Who was involved in implementing HEEUP?

### Consortium members

HEEUP was delivered by the Brotherhood of St Laurence and a consortium of groups. The consortium members and their roles are outlined below.

 <p>Brotherhood of St Laurence</p>	<p><b>The Brotherhood of St Laurence</b> led the HEEUP program.</p> <p>The BSL Financial Inclusion team was responsible for all service delivery components, including participant management (recruitment, intake and loans), home visits and data collection, contract and delivery management.</p> <p>The BSL Research and Policy Centre (RPC) was responsible for aspects of the research, managing the relationship with MSI and writing the Annual and Final Reports. RPC also managed the data and transfer to MSI.</p>
	<p><b>AGL</b> utilised its expertise in customer identification and recruitment and facilitated access to energy data (with full prior informed consent from participants). AGL's Smarter Living team were one of the project's preferred hot water system installers.</p>
	<p><b>Monash Sustainability Institute</b> led the analysis of energy bill savings from the hot water upgrades and provided advice and expertise on the data and evaluation components.</p>
	<p><b>NSW Office of Environment and Heritage (NSW OEH)</b> provided a customised version of their hot water assessment tool, which was used in the initial period of HEEUP to assess the optimal hot water upgrade during home visits with participants.</p>
	<p><b>ATA</b> provided advice on technical aspects of hot water system upgrades and recruitment strategies.</p>

### HEEUP governance

HEEUP was managed by the Brotherhood of St Laurence and overseen by a steering committee made up of two Brotherhood of St Laurence representatives and a representative from each other consortium partner (see Appendix B for the steering

committee guidelines). The committee met five times during the set-up and operation of the program.

### Community partners and enabling organisations

Along with the consortium members, the HEEUP program engaged with many community partners and businesses. Significant program partners included:

- Good Shepherd Microfinance, which provided the loans oversight and facilitated BSL delivering no interest loans
- Hume City Council, which recruited community members
- Sanden (heat pump supplier), which partnered in community recruitment and supplied the preferred heat pump model
- Envirogroup (heat pump and hot water installer), which partnered in community recruitment and were a preferred heat pump installer
- Apricus (solar hot water installer), which partnered in community based recruitment activity and were a preferred solar and heat pump installer in the final period
- all Victorian energy distribution companies facilitated access to electricity (United Energy, Jemena, Ausnet, Powercor, Citipower) or gas data (Multinet, Envestra and AGP).

### HEEUP delivery staff and their roles

The HEEUP delivery staff, located in the BSL financial inclusion team, and their roles are outlined below.

**The Energy Engagement Officers (EEOs)** visited clients and provided information including the costs and benefits of hot water upgrades and provide NILS financing. EEOs also ensured all the necessary documentation for participation in HEEUP was complete. The number of EEOs fluctuated between one and five according to demand for home visits.

**The Intake Officer** managed the participant intake process within BSL, responded to enquiries, managed the diaries of the EEOs and oversaw the flow of information between delivery partners. The intake officers also liaised with clients.

**The Loans Officer's** managed financial data, reporting and record management for the NILS component of the program.

**The HEEUP Data Officer** ensured the timely delivery of standardised data to MSI for analysis and upload to CSIRO.

**The HEEUP Project Manager** was responsible for coordination of project functions and components, including delivery staff management, installation partner management, secretariat for Steering Committee, and budget reporting.

## What did the HEEUP trial involve?

The key features of the HEEUP trial are outlined below.

### Eligibility and verification

Eligibility for HEEUP was broadly defined by the federal government's LIEEP program guidelines, which required a focus on low-income Australian households. Interventions could not be made in public housing. The Brotherhood of St Laurence refined the HEEUP eligibility to require *either* criterion 1 *or* criterion 2:

#### **Criterion 1: Concession card (Pensioner, Health Care, Low Income Health Care or DVA Gold card)**

- 1 Primary eligibility: energy bill holder has a concession card and lives in the house; verification required:
  - i. the concession card (same address as the installation)
  - ii. the bill from the house
- 2 Other eligibility: another person living in the home has a concession card (eg. a dependent, partner, housemate); verification required:
  - i. the concession card (with the name and the same address where the installation is taking place)
  - ii. the bill from the house

#### **Criterion 2: Household income threshold**

- 1 Household Income is below \$47,000 (individual) or \$87,000 (couple or dependent children); verification:
  - i. most recent tax return(s) for an individual/couple
  - ii. three months of bank statements

### Installation streams

In practice, The HEEUP trial developed into two primary installation streams:

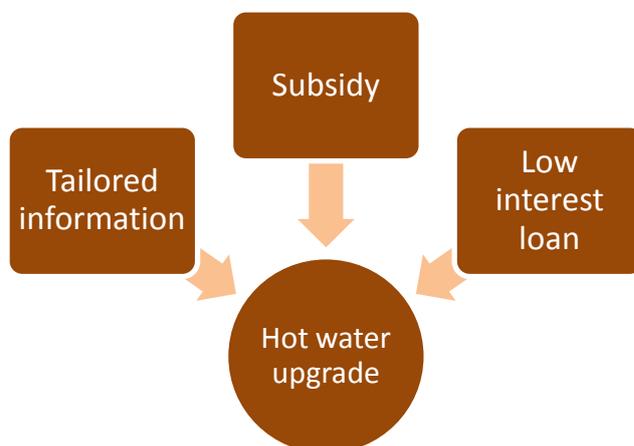
- 1 **Standard installations** offered to low-income owner occupier households (referred to as owner occupier installations)
- 2 Installations in rented properties managed by not-for-profit community housing providers (referred to as **community housing installations**).

In addition there was a limited offer of emergency upgrades to customers who called AGL's call centre needing an **emergency replacement**. Also, there was a small number of **independent installations** were included. In effect there were four installation streams.

The details of these groups are outlined in the following sections.

### HEEUP for owner occupiers

One installation stream was targeted at low-income owner occupier households across greater Melbourne.

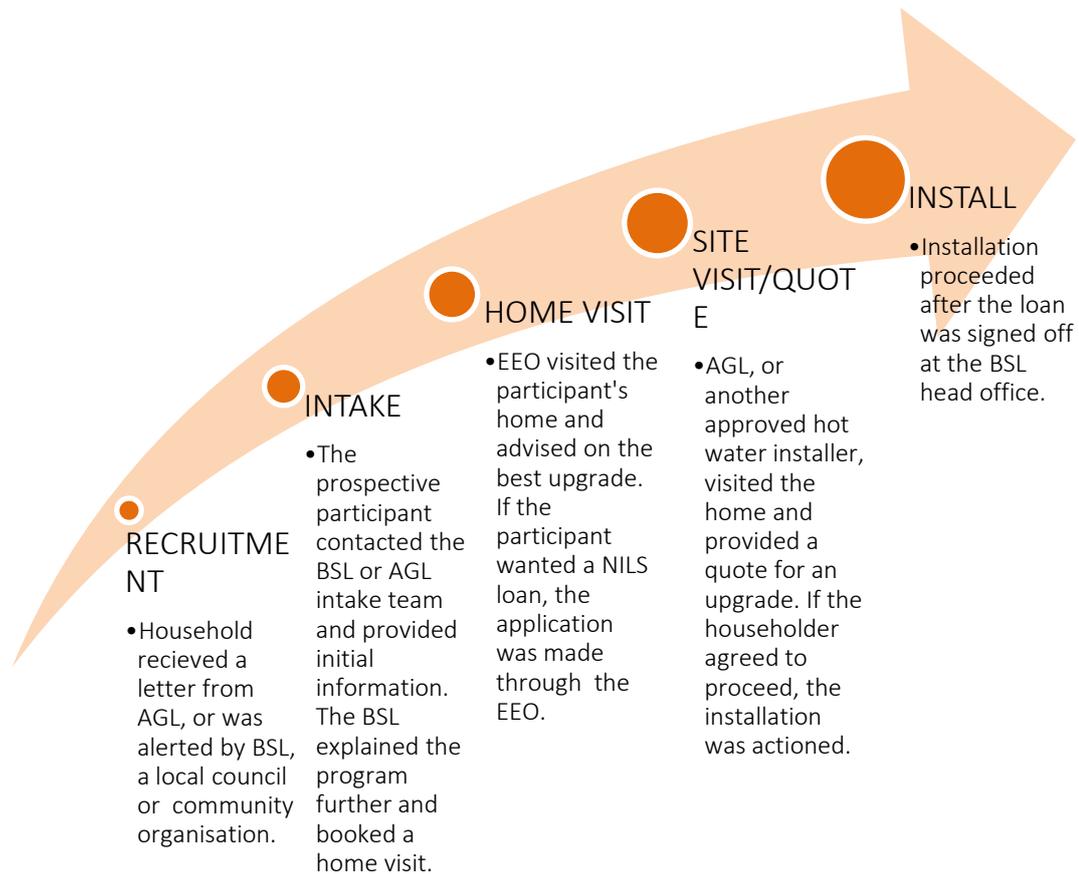


In this stream participating households were provided with:

- 1 **Information on different hot water upgrade options**, which was designed to assist them to assess the costs and benefits of different systems. The information was provided during a home visit from a HEEUP Energy Engagement Officer.
- 2 **Access to a No Interest Loan (NILS)**. Participants were offered a NILS loan to cover the out-of-pocket express, thereby addressing a cost barrier of upgrading to a new, more efficient system. BSL negotiated a modified NILS loan with a limit of \$2,000 rather than the usual \$1,200.
- 3 **A subsidy towards the cost of the new hot water system**. The subsidy was tapered, with the highest support given to higher cost, more efficient upgrades: solar systems or heat pumps, followed by instantaneous gas, and the lowest subsidies given to gas storage systems. Details on the subsidy are provided in Table 1.

**Box 1: HEEUP participant’s journey**

A simplified version of a HEEUP owner occupier participant’s journey is outlined below. At each stage HEEUP or partner organisation staff would seek to engage HEEUP participants and streamline the process, while providing high quality and accurate information.



**Information provided to participating households**

The information in the home visit focused on upgrading to a more productive hot water system rather than behavioural advice on energy conservation. This reflected a program desire to isolate, as much as possible, the energy savings made from the hot water upgrade, rather than behavioural changes.

**Hot water tool (HWT) advice**

During the initial period (until February 2015) participants received advice based on a computerised hot water tool created by the NSW Office of Environment and Heritage. The tool used information on the household’s appliances and water usage pattern, combined with algorithms around hot water consumption of different appliances, to provide a tailored set of recommendations on the costs and benefits of different

upgrades. These recommendations were provided in a letter (see Appendix A), which in most cases was printed on the spot and given to the participant.

#### Energy engagement officers' verbal advice

Later in the program, to speed up the process, advice was provided by the EEOs without using the hot water tool. The EEOs provided direct, less formal advice on upgrades based on a short interview and the likely costs and benefits of the different options.

#### Hot water systems and subsidies on offer

HEEUP provided variable subsidies to assist households upgrade to their preferred more efficient hot water system. During the program there was a series of changes to the subsidies, including the types of hot water systems subsidised, the amount of the subsidy, and the nature of the subsidy (see Table 1). The primary differences were:

- 1 **Hot water systems on offer:** the inclusion of gas storage (4.3 star rating or better) from September 2014 and of heat pumps from February 2015. The addition of heat pumps reflected an interest in other efficient hot water products. Gas storage systems were added to provide some assistance to participants who were adamant a gas storage system was for them.
- 2 **Nature of the subsidy:** changes between a fixed out-of-pocket expense for the household (for example, \$1,200 in the HESS period), to a fixed subsidy with a variable out-of-pocket expense (BSL 1 fixed subsidy and BSL 2 fixed subsidy), and finally a maximum out-of-pocket expense (BSL 3). Changes to the nature of the subsidy reflected both external factors (notably the closure of the HESS program) and the program management team's interest in trialling different approaches to increasing conversion rates.
- 3 **Changes to the amount of the subsidy:** Changes in the amount of the subsidy also reflected external factors and the program management team's interest in trialling different subsidy levels and approaches to increase the conversion rates.

**Table 1: HEEUP program subsidies and out-of-pocket expenses, by date**

Name	Period	Out-of-pocket	Subsidy
<b>HESS program subsidy</b>	1 Apr to 30 Jun 2014	Fixed amount	Variable
Solar gas boosted		\$1,200	Variable
Solar electric boosted		\$1,200	Variable
Instantaneous gas		\$1,200	Variable
<b>BSL 1 Fixed subsidy</b>	1 Sep 2014 to 8 Feb 2015	Variable	Fixed
Solar gas boosted		Variable	\$2,000
Solar electric boosted		Variable	\$2,000

Instantaneous gas		Variable	\$500
Gas storage		Variable	\$150
<b>BSL 2 Fixed subsidy</b>	9 Feb to 30 Apr 2015	Variable	Fixed
Solar gas boosted		Variable	\$2,500
Solar electric boosted		Variable	\$2,500
Heat pump		Variable	\$2,000
Instantaneous gas		Variable	\$500
Gas storage		Variable	\$350
<b>BSL 3 Variable subsidy</b>	1 May to 18 Dec 2015	Maximum	Variable
Solar gas boosted		\$2,000	Variable
Solar electric boosted		\$2,000	Variable
Heat pump		\$1,800	Variable
Instantaneous gas		\$2,000	Variable
Gas storage		\$1,200	Variable

### Recruitment

Recruitment for standard installations used a variety of methods. Table 2 shows the number of installations and the number of expressions of interest from each recruitment source. Over 70% of the households who installed a hot water system were recruited through AGL. The data comes from HEEUP administrative data.

**Table 2: Primary recruitment channels, expressions of interest and installations**

EOI source	Description	Eois	Installations
AGL	Mail-outs to concession clients	1558	392
EnviroGroup	Solar installer contacts with clients	82	54
Word of mouth	Primarily referrals from other clients	54	29
Apricus	Regional visits	30	25
Hume City Council	Community based recruitment by council	67	19
New Gen Solar	Solar installers contacts with clients	10	10
Western Water	Water leaks identified in hot water systems	3	3
BSL	Inquiries direct to the BSL	3	1

No source recorded	Including Sanden recruitment	379	15
<b>All owner occupiers</b>		<b>2172</b>	<b>548</b>

Note: In addition, community housing providers yielded EoIs for 232 homes and 176 installations

### AGL recruitment

AGL was the primary recruitment channel for the owner occupier participants in HEEUP. Their main recruitment method was a series of mail outs to their concession card holding clients. Mail out numbers and areas are detailed in Table 3. The approach letter (see Appendix A for an example) was designed collaboratively by AGL and the BSL.

**Table 3: AGL mailouts, date, number and area**

Date	Area	Number
Jul-14	Mornington Peninsula (including Frankston)	4000
Sep-14	Melbourne North West, North East	14000
Nov-14	Melbourne West, Outer East, South East	50000
Aug-15	Melbourne South, South East, North West, North East	55000
Total		123,000

### Hume City Council

Hume City Council promoted HEEUP through mail-outs and stalls at community events. The mail outs included:

1. 10,000 letters from the Mayor of Hume to all ratepayers
2. Emails to Hume City Council environment lists

### Sanden heat pumps

Sanden heat pump supplier and the BSL undertook recruitment via a series of local newspaper advertisements (see Appendix A).

### Revisiting the HEEUP database – November 2015

As the program drew to a close, 1222 households that had expressed interest in the program (by phone, letter or email) following a letter from AGL but had not decided to install a system were recontacted. A follow-up letter from BSL, marked with the BSL and DIIS logos, was posted to all these households in early November 2015. The letter included a bold red circle advising that HEEUP was to close on 22 November, and that if they were interested in upgrading their hot water service they should contact BSL before then. This reminder letter to a 'warm' audience produced a response rate around 10%; and around 50% of the respondents progressed to installation.

### Regional information seminars

In cooperation with Apricus and EnviroGroup, three information seminars were convened in regional Victoria (Shepparton, Bendigo and Castlemaine). The events featured the promotion of a special deal on Apricus solar systems. The third event in Castlemaine involved more advertising resources and attracted 15 participants, most of whom signed up on the day.

Word of mouth referrals were also generated from the Castlemaine information session and there was a good uptake in the Castlemaine area subsequently. The area may also have a higher general awareness of the benefits of solar.

### Conversion rate of EoIs to hot water installations

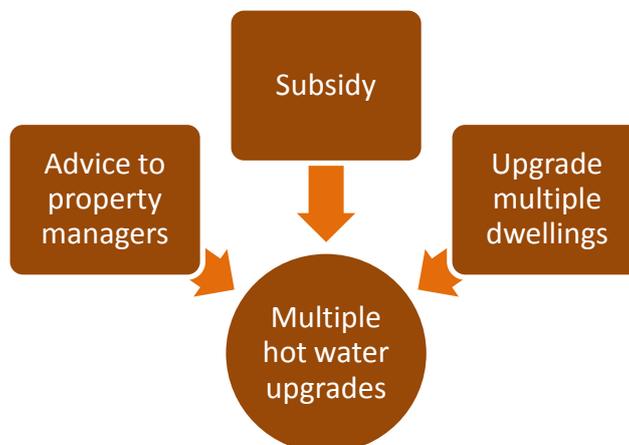
While a close analysis of the conversion rate of EoIs to installations for all sources listed above is not possible due to different approaches used in collecting data, the conversion rates of EoI into installations for the main channels that approach the BSL or AGL directly (AGL, Hume and word of mouth) are instructive:

- 25% of EoIs from AGL recruitment channels resulted in installations
- 28% of EoIs from Hume recruitment channels resulted in installations
- 54% of EoIs who approached the program as a result of word of mouth referrals resulted in installations

## Community housing

The community housing stream begun in early 2015 had two main distinguishing features:

- 1 **Direct engagement with property managers**, which was focused on logistics rather than detailed energy efficiency advice
- 2 A fixed subsidy of \$1100 for hot water upgrades



### Engaging community housing providers

Email was the primary channel used to recruit community housing providers. Initial emails outlining a prospective partnership were followed by phone conversations and in person meetings.

By April 2015 preliminary agreements had been achieved with both Housing Choices Australia and Community Housing Limited, and both these resulted in installations commencing before 30 June 2015. In the second half of 2015 the BSL promoted the HEEUP opportunity to other community housing providers, again through email and telephone calls.

There was a consistent \$1100 subsidy per installation. Limited verbal encouragement was given to the providers to upgrade to the most efficient hot water system possible.

Interest in partnering with BSL accelerated in late 2015. The Community Housing Federation of Victoria sent an email to all of their members and also word spread via the sector's networks.

By the closure of HEEUP, 11 community housing organisations had partnered with the BSL (Table 4). These partnerships resulted in 176 hot water upgrades. Five organisations installed systems in more than 10 dwellings and two organisations account for over 50% of all community housing installations.

**Table 4: Community housing installations by provider**

Community housing provider	Number of hot water installations
CH 1	61
CH 2	33
CH 3	21
CH 4	20
CH 5	14
CH 6	8
CH 7	7
CH 8	6
CH 9	3
CH 10	2
CH 11	1

### Engaging community housing tenants

After the housing provider identified a property they wished to include in the HEEUP offer, the tenants would be asked if they wished to participate and informed of the conditions: that the housing provider paid for the upgrade, but that they would need to agree to an interview and share some data with the Commonwealth. All tenants were offered a \$50 Coles Myer gift voucher for their interview. A BSL Energy Engagement Officer would subsequently contact the tenant and arrange a time to visit and conduct the interview. Where a tenant declined to participate, the provider would not nominate the property for an upgrade.

In some regional locations, to create efficiencies in delivery, BSL adopted a remote survey model: the community housing provider explained the purpose of the survey to the tenants and BSL then sent the survey by email or post.

### Who HEEUP assisted, when and how

#### The HEEUP participants

This section provides key information on the households that installed hot water systems under HEEUP (owner occupiers and community housing tenants)<sup>1</sup>. Appendix E: Demographic and dwelling data provides full demographic, dwelling, energy and hot water information, as well as disaggregated data for each of the main installation streams: standard, community housing, emergency replacements and independent installations).

#### Hot water system

- 81.5% had a hot water system over 9 years old (those with systems under 9 years old were often unhappy with its performance and seeking a change for financial or environmental benefits)
- 9.2% of households had a controlled load electric hot water system (that is, a system on a discrete circuit with a lower rate, sometimes called off-peak)

#### Energy source

- 85% had electricity and natural gas
- 11.6% were electricity only (no natural gas)
- 24% of homes had rooftop photo voltaic

#### Household income

- 72.2% of participating households had an income below \$52,000 per annum
- 88.1% had an income below \$78,000 per annum

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<sup>1</sup> Data was missing for some households on some items (see details in Appendix E)

Tenure

- 56.2% of participants owned their home outright
- 16.9% owned their home with a mortgage
- 21.7% rented their home; all of these were in community housing

Ages of homes

- 69% of homes were over 30 years old

Aboriginal and Torres Strait Islander participants

- 1.3% of participants (10) identified as Aboriginal or Torres Strait Islander people

Employment status

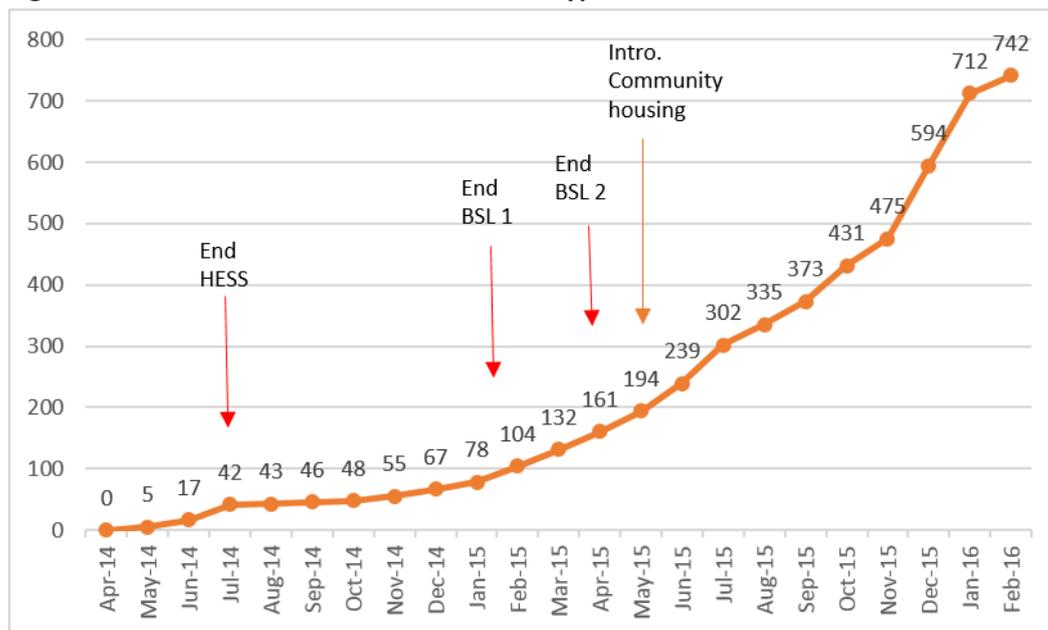
- 62% of HEEUP participants were not in the labour force
- 13% were employed working full time (3.1%) or part time (10.1%)
  - 9.6% were unable to work
  - 5% were engaged in unpaid work (care/home duties)

Timeline of HEEUP installations

Timeline of all installations

As shown in Figure 1, HEEUP program installations began slowly. A brief period of activity under the HESS subsidy (May – end June 2014) was followed by a three-month hiatus. By February 2015 installations had increased slightly, but numbered just 104. In the 12 months from February 2015 over 650 systems were installed.

Figure 1: Cumulative HEEUP installations, all types\*



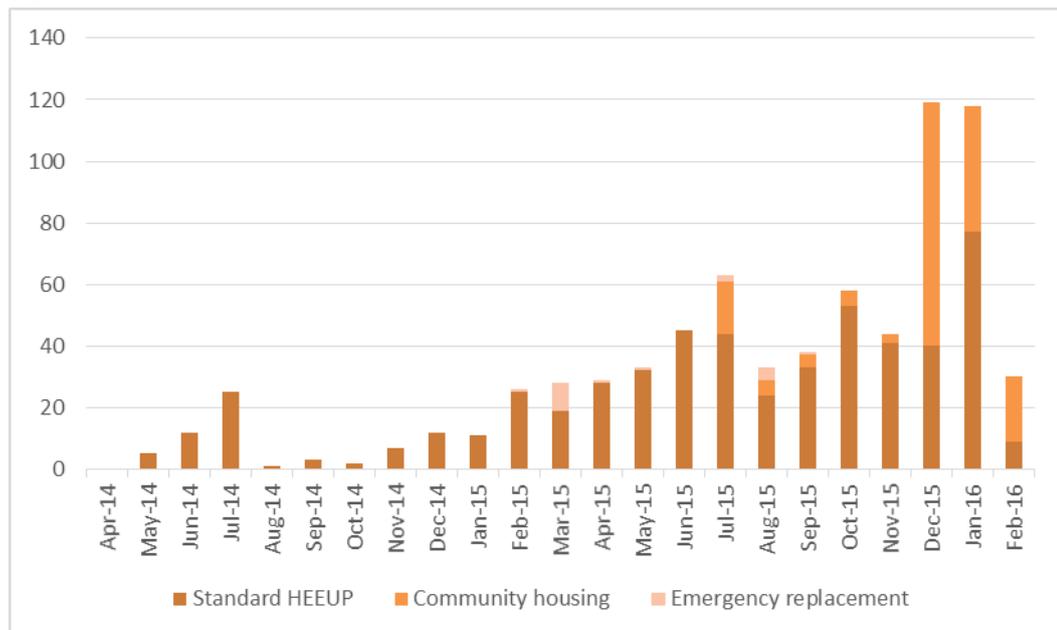
Notes: n=742. \* Independent installations omitted due to a large number of unknown dates, other undated installs also omitted

The HEEUP installation timeline illustrates significant shifts in trajectory over the course of the program. Notable points from the trajectory include:

- acceleration over time
- changing momentum aligned with recruitment activity and changes in the subsidy mix and presentation
- increased activity later in the program with the introduction of the community housing recruitment channel and the final subsidy formulation.

Owner occupier HEEUP installations dominated the installation trajectory until November 2015 (Figure 2). Community housing installations came online from March 2015; however their monthly peaks were in December 2015 and January 2016 as providers sought to finalise their installation pledges before the closure of the program.

**Figure 2: HEEUP installations by stream and per month**



Notes: n=742. \* Independent installations omitted due to a large number of unknown dates, other undated installs also omitted

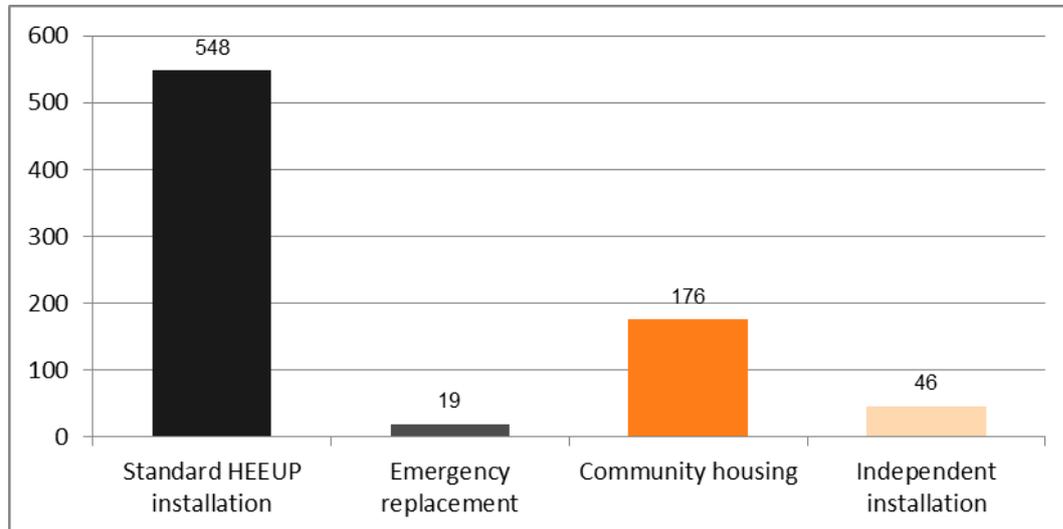
### HEEUP’s installation geography

HEEUP’s standard installations were concentrated in Greater Melbourne and the Mornington Peninsula. A breakdown of all installations by postcode is provided in Appendix E.

### HEEUP by installation stream

Installations for owner occupiers (standard HEEUP installations) were the primary HEEUP activity stream (70.71% of all installations). Community housing accounted for 22.71% of all installations under the program.

**Figure 3: HEEUP installations by primary activity streams**

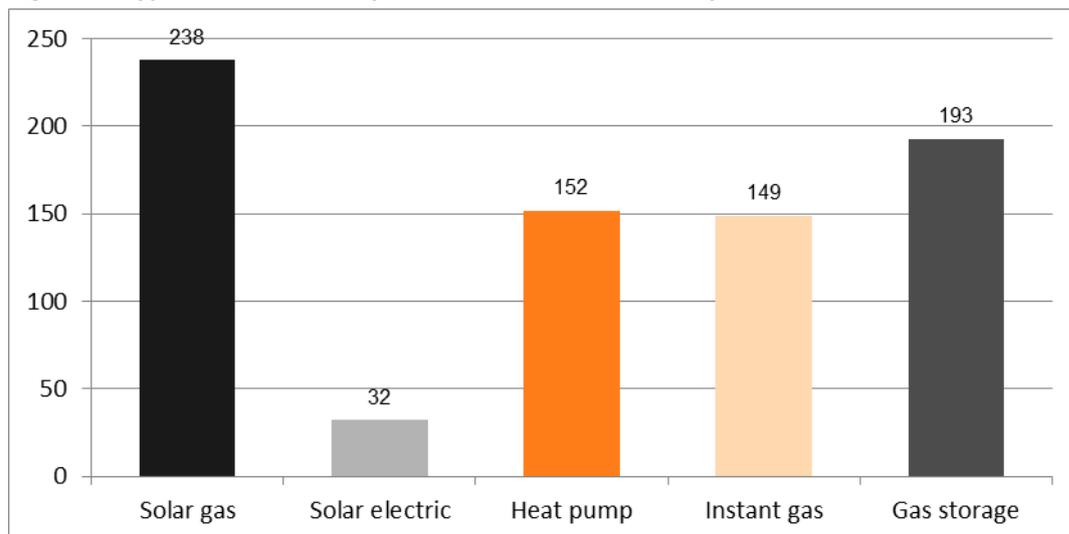


N=789

### Types of installations

Solar with a gas booster was the predominant system installed (31%), followed by gas storage (25.3%), heat pump (19.9%), instant gas (19.5%) and solar electric (4.2%).

**Figure 4: Types of hot water systems installed – all activity streams**

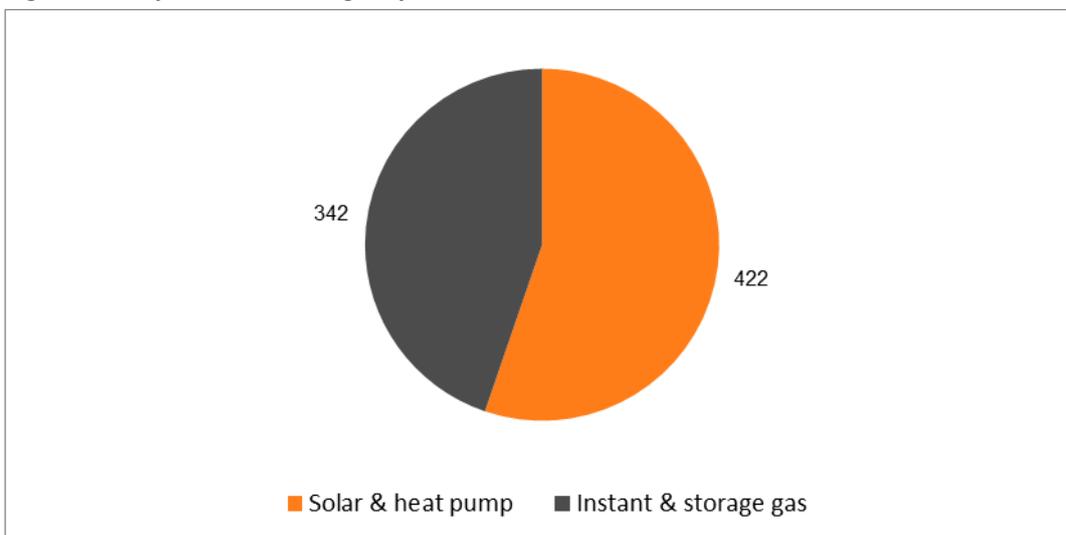


n=764 . Excludes missing data

When grouped together the more efficient systems – solar gas or electric and heat pump – make up 55% of all installations, while instant gas and gas storage make up 45%.

As shown below these figures mask substantial differences in installation types by activity stream.

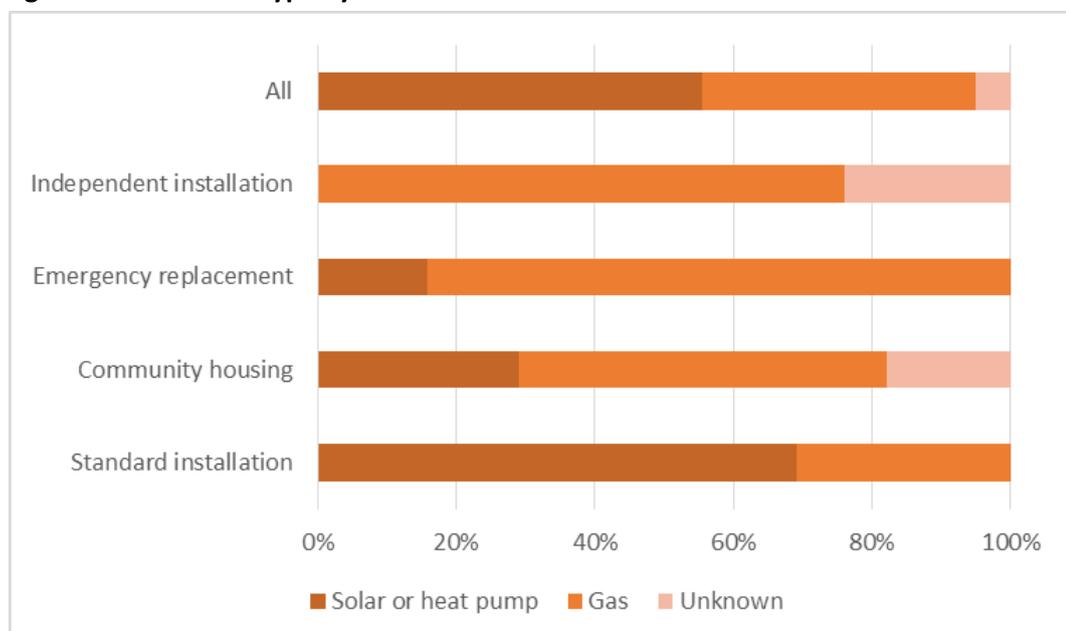
**Figure 5: Major installation groups**



n=764

The type of hot water system installed varied across the installation groups as shown in Figure 6. The standard HEEUP installation group had the highest proportion of the highly efficient systems installed (69%), followed by community housing (29%). Table 5 provides details on the hot water systems installed.

**Figure 6: Installation type by stream**



**Table 5: Installed hot water systems by installation group – number and percentage**

	Standard installation		Community housing		Emergency replacement		Independent installation	
	No.	%	No.	%	No.	%	No.	%
<b>Solar gas or solar electric</b>	251	47%	9	5%	3	16%	0	0%
<b>Heat pump</b>	120	22%	35	23%	0	0%	0	0%
<b>Instant gas</b>	104	19%	39	25%	5	26%	4	9%
<b>Gas storage</b>	61	11%	41	27%	11	58%	31	67%
<b>Unknown</b>	0	0%	27	17%	0	0%	11	24%
<b>Total</b>	536	100%	151	100%	19	100%	0	0%

### Hot water systems and upgrade pathways

Natural gas storage was the most prevalent existing system across all participants and the major installation streams, followed by electric storage and natural gas instantaneous.

**Figure 7: Existing hot water systems – prior to participation in HEEUP**

	All participants		Standard HEEUP installations		Community housing	
	Freq.	Percent	Freq.	Percent	Freq.	Percent
<b>Natural gas (storage tank)</b>	430	56.3	306	57.6	80	46.8
<b>Electric storage (off-peak tariff)</b>	159	20.8	109	20.5	44	25.7
<b>Natural gas (instantaneous)</b>	85	11.1	47	8.9	32	18.7
<b>Electric storage (continuous tariff)</b>	22	2.9	16	3.0	7	2.3
<b>Solar (electric boosted)</b>	11	1.4	10	1.9	1	0.6
<b>Gas unspecified</b>	9	1.2	8	1.5	1	0
<b>Solar (gas boosted)</b>	9	1.2	7	1.3	1	0.6
<b>LPG (instantaneous)</b>	6	0.8	5	0.9	1	0.6
<b>Electric (instantaneous)</b>	4	0.5	3	0.6	0	0.6
<b>Gas storage</b>	3	0.4	3	0.6	0	0.0
<b>Electric unspecified</b>	2	0.3	2	0.4	0	0.0
<b>Electric storage unspecified</b>	2	0.3	2	0.4	0	0.0
<b>Solar (wood boosted)</b>	1	0.1	1	0.2	0	0.0
<b>Missing</b>	21	2.7	12	2.3	4	4.1
<b>Total</b>	764	100.0	531	100.0	171	100.0

**Figure 8: Upgrade pathways – All participants (categories with 5 or more installs)**

Old hot water system	Hot water system upgrade	Frequency	Percent
Natural gas (storage tank)	Solar gas	163	21.3
Natural gas (storage tank)	Gas storage	147	19.2
Electric Storage (off-peak tariff)	Heat pump	76	9.9
Natural gas (storage tank)	Instant gas	65	8.5
Natural gas (storage tank)	Heat pump	51	6.7
Natural gas (instantaneous)	Instant gas	41	5.4
Electric storage (off-peak tariff)	Instant gas	29	3.8
Natural gas (instantaneous)	Solar gas	25	3.3
Electric storage (off-peak tariff)	Solar gas	19	2.5
Electric Storage (off-peak tariff)	Solar electric	18	2.4
Electric Storage (off-peak tariff)	Gas storage	17	2.2
Natural gas (instantaneous)	Gas storage	11	1.4
Missing information on old system	Gas storage	8	1.0
Missing information on old system	Solar gas	8	1.0
Natural gas (instantaneous)	Heat pump	8	1.0
Solar (gas boosted)	Solar gas	7	0.9
Electric storage (continuous tariff)	Heat pump	6	0.8
Electric storage (continuous tariff)	Instant gas	6	0.8
Electric storage (continuous tariff)	Solar electric	5	0.7

**Figure 9: Upgrade pathways – Owner occupier installations (5 or more installs)**

Old hot water system	Hot water system upgrade	Frequency	Percent
Natural gas (storage tank)	Solar gas	157	29.6
Electric storage (off-peak tariff)	Heat pump	50	9.4
Natural gas (storage tank)	Gas storage	50	9.4
Natural gas (storage tank)	Instant gas	49	9.2
Natural gas (storage tank)	Heat pump	46	8.7
Electric storage (off-peak tariff)	Instant gas	25	4.7
Natural gas (instantaneous)	Solar gas	22	4.1
Electric storage (off-peak tariff)	Solar gas	18	3.4
Natural gas (instantaneous)	Instant gas	16	3.0
Electric storage (off-peak tariff)	Solar electric	14	2.6
Missing information on old system	Solar gas	8	1.5
Natural gas (instantaneous)	Heat pump	8	1.5
Solar (gas boosted)	Solar gas	7	1.3
Electric storage (continuous tariff)	Instant gas	5	0.9

**Figure 10: Upgrade pathways – Community housing (5 or more installs)**

Old hot water system	Hot water system upgrade	Frequency	Percent
Natural gas (storage tank)	Gas storage	54	31.6
Electric storage (off-peak tariff)	Heat pump	26	15.2
Natural gas (instantaneous)	Instant gas	21	12.3
Natural gas (storage tank)	Instant gas	16	9.4
Electric storage (off-peak tariff)	Gas storage	12	7.0
Natural gas (instantaneous)	Gas storage	9	5.3
Missing information on old hot water system	Gas storage	6	3.5
Natural gas (storage tank)	Heat pump	5	2.9
Natural gas (storage tank)	Solar gas	5	2.9