Social Policy and Research Centre

Enabling electrification

Addressing the barriers to moving off gas faced by lower-income households

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Brotherhood of St Laurence
Working for an Australia free of poverty

THE UNIVERSITY OF MELBOURNE

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This report was written by Dr Sangeetha Chandrashekeran and Dr Julia de Bruyn (Life Course Centre) and David Bryant and Damian Sullivan (Brotherhood of St. Laurence).

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The extended version of the research report is available on request. Please email Sangeetha Chandrashekeran at sangeetha.chandra@unimelb.edu.au or Damian Sullivan at dsullivan@bsl.org.au

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Summary

Shifting households from carbon-intensive natural gas to less carbon-intensive fuels like renewable electricity is becoming a priority as the imperative to decarbonise accelerates. Little attention has been paid to date to the equity implications of the 5 million households on the gas network in Australia disconnecting from gas and converting their homes to all-electric. This report draws on surveys and focus groups with households facing energy stress to understand their attitudes to disconnecting from gas, and to identify the barriers and enablers to the change. Most participants supported the transition from gas, but few had electrified appliances, most commonly due to barriers such as cost or renting their home. These insights will be important to ensuring an equitable planned transition to electric homes in Victoria and other jurisdictions.

Research approach

We studied households in Victoria, the state which has the highest prevalence of residential gas use in Australia and where plans for an economy-wide transition away from fossil gas are underway. We conducted an online survey, which received 236 responses, and in-person and online focus groups with 34 people. We invited households that had received energy-related support from the Brotherhood of St. Laurence, a social justice organisation based in Melbourne, as well as lower-income households from Melbourne's Burmese community. Most of our respondents used gas (88%), reflecting its prevalence in Victoria.

Our survey collected information on people's housing, energy use and preferences (e.g. gas versus electric cooking), access to government energy programs, and opinions on electrifying their homes. In our focus groups, we asked people how they feel about shifting from gas, their priorities and challenges for energy use in their homes, their ability to electrify, and what support they need to do so.

Findings

Most participants supported the transition from household gas

Participants in our study expressed a high level of support for a transition away from household gas and toward cleaner energy sources in Victoria. Around half of our respondents indicated strong support and more than two-thirds indicated some level of support. Support was greater with higher levels of education, but there was no significant difference by capacity to meet heating and food costs, financial stress, housing tenure, location or age.

Tenure is a key factor in electrification

Housing tenure emerged as a clear differentiating factor. Not owning a home was one of the most reported barriers to electrification, alongside upfront costs. Many renters reported poor housing conditions and an unwillingness to raise improvements with their landlord out of fear of rent increases or eviction. Home ownership was associated with higher awareness of Solar Homes, the Victorian Government's support program for solar installation. More generally, home owners were able to exercise a greater degree of control over upgrades compared with renters who typically face a low level of involvement or consultation in decisions made by their rental or housing provider.

Energy preferences were mixed and linked to current usage

Respondents considered electric appliances to be safer and better for the environment, while gas appliances were considered to perform better for heating and cooking. Respondents' preferences for gas or electric appliances were strongly linked to their existing usage. For example, a preference for gas heating was more than twice as common among households who had gas heating. This may represent a status quo bias, so it is possible that exposure to equivalent electric appliances would reduce attachment to gas appliances.

Most people preferred gas cooktops over electric ones, because of the perceived speed, ease and flexibility of cooking with gas, although few participants had experience of induction stoves. People who spoke a language other than English were significantly more likely to prefer gas heating and gas hot water.

Cost saving and environmental benefits drive electrification

Only one in ten surveyed households had replaced gas appliances with electric ones within the past five years, suggesting support for the transition in principle has not been translated into action on a large scale. Among those who had switched, the main reasons were lower running costs and environmental benefits.

Awareness of electrification programs lags behind that of other schemes

Participants showed high awareness and uptake of state government payments to assist with energy costs (e.g. the Power Saving Bonus and energy concessions). By contrast, far fewer people knew about or had used three programs that could support electrification:

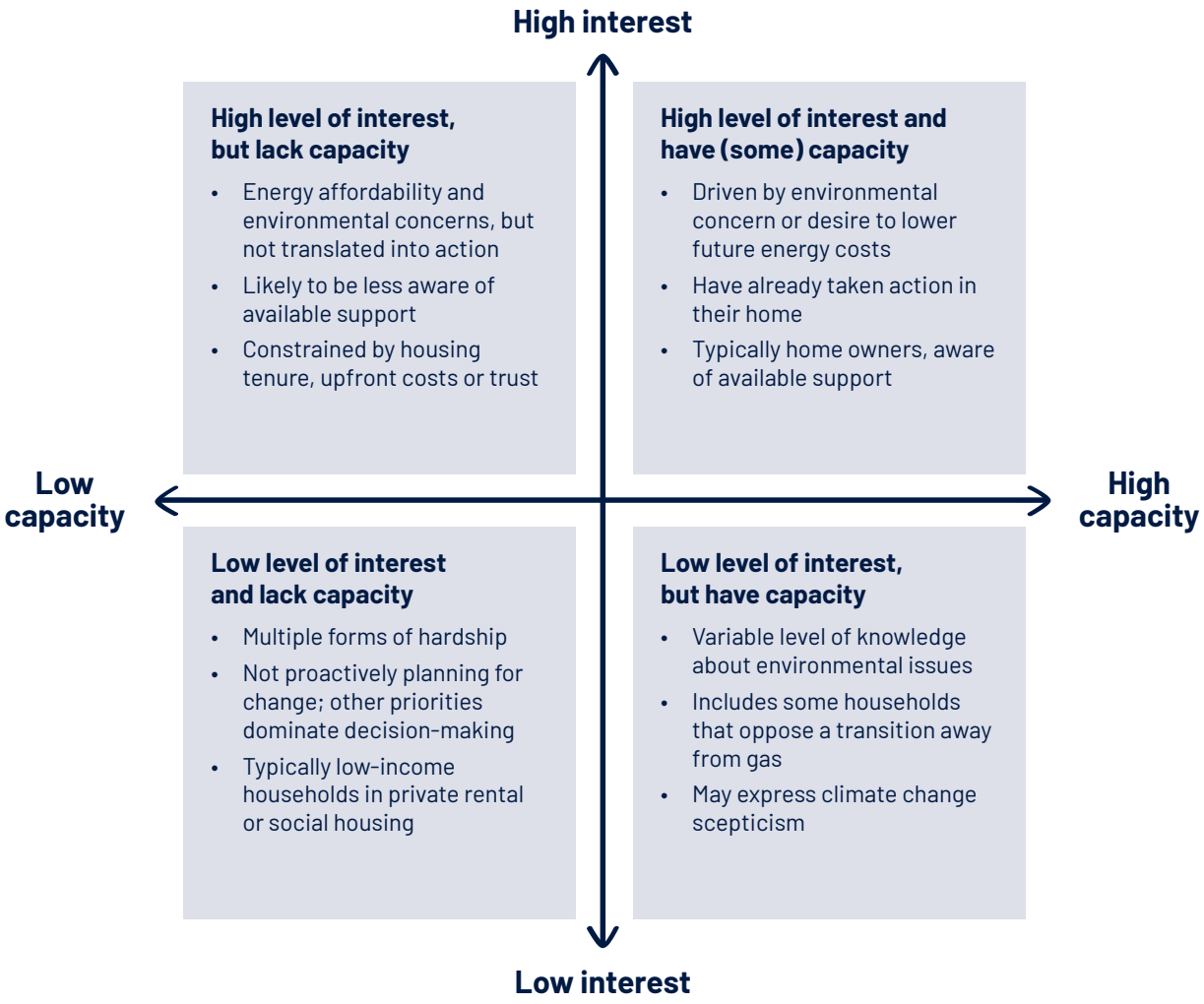
- One in three people had heard of the Victorian Energy Upgrades (VEU) Program and the Home Heating and Cooling Upgrades (HHCU) Program (since discontinued).
- Awareness of the Solar Homes Program was almost twice as high, at 58%, as of the HHCU (targeted at lower-income households). Awareness of Solar Homes Program was higher among male participants (66% vs 56% among women), those over 60 years of age (74% vs 43% among younger people), those living in their own home (77% vs 38% among private renters), and those unable to heat their home or struggling with food costs in the past year (71% vs 44% among others).

Not owning a home was one of the most reported barriers to electrification, alongside upfront costs. Many renters reported poor housing conditions and an unwillingness to raise improvements with their landlord out of fear of rent increases or eviction.

Households' capacity and interest vary

We identify four categories of households, based on interest in, and capacity for, electrification (Figure 1). **Interest** describes how strongly people feel about the need to shift away from gas. **Capacity** refers to how readily people can make the required changes. Interest and capacity differ depending on home ownership, financial position and household characteristics (e.g. families with children, people with disability, age).

Figure 1 A matrix of consumer types, differentiated by interest in, and capacity for, electrification



Implications

Key points with implications for policy from this study include:

Multiple stressors

- Households facing barriers to electrification also experience many other financial challenges and may therefore be unable to prioritise electrification even if they have the necessary information and inclination. Alongside policies to promote electrification, a comprehensive effort is needed to reduce poverty, including adequate income support, and providing access to decent, secure, and affordable housing.

Information and knowledge

- Lower-income households lacking information may be deterred by the perceived risks of electrification, which could be partly addressed by information provision and financial assistance.
- More evidence-based information on the benefits of electric versus gas appliances will aid household decision making.
- Awareness of existing electrification programs is fairly low, despite high support for the transition from gas. Better targeted promotion of programs, as well as broader information provision on electrification, could assist.
- Trusted advice and one-on-one guidance are needed to support households to electrify; and they must be tailored to financial circumstances. Tradespeople and retailers should also be supported to provide accurate information about electrification.
- A plan for the future of the residential gas network will increase certainty for households and industry.

Tenure and control

- A strategy to support renters and rental providers to electrify (including minimum standards for energy efficiency and improved tenure security) is essential to overcome split incentives.

Capital and finance

- Addressing capital barriers is vital to household electrification, ideally through means-tested electrification-specific rebates and, where appropriate, loans.

Rooftop solar and energy efficiency

- Access to solar panels is a key step for electrification, but renters and lower-income households will need more assistance to get started.
- Energy efficiency upgrades, which maximise the benefits and reduce the payback period for new technologies, need to be integrated in supports for lower-income households to electrify their homes.

Inclusive planning processes

- The voices of those facing major barriers to electrification need to be heard and better included in the planning for this change.

Tradespeople and retailers should also be supported to provide accurate information about electrification.

1 Electrification and lower-income households in Victoria

Our research focuses on people experiencing, or vulnerable to, energy hardship, as well as a wider group of households in Victoria that lack key resources or capabilities to electrify their home.

There has been little research exploring the capacity of households with limited economic resources to electrify their home. Low-income households spend a larger proportion of their income on energy bills, compared to higher-income households – despite using less energy and spending less in dollar terms (ACOSS & BSL 2018). A poorly managed transition away from gas risks exacerbating disadvantage, but on the other hand there is scope to reduce energy hardship through effective policy, regulatory and market actions.

Victoria is an important place for this study because it has the highest level of residential gas use in Australia, with around 73% of households connected to the reticulated gas network (ESC 2023; ABS 2021) (there are also some bottled gas users). Many Victorian households rely on gas for heating, hot water and cooking. Gas makes up a large proportion of household energy consumption, and gas consumption (including commercial and industrial as well as residential) contributes around 17% of the state's greenhouse gas emissions (Victorian Government 2022:3).

As part of its commitment to net zero greenhouse gas emissions by 2050, the Victorian Government is planning a transition away from natural gas. Its Gas Substitution Roadmap has highlighted the role that will be played in electrification by Victorian households replacing gas appliances with electric ones, for heating, cooking and hot water.

Electrification presents upfront costs, such as new appliances and, in some cases, wiring upgrades and other building modifications. For those willing and able to make these changes, there are long-term economic benefits. Government analysis estimates a typical Victorian household could reduce its annual energy costs by $1,020 by replacing gas heating, cooking and hot water systems with electric ones – and by $1,250 for those with solar power (Victorian Government 2022). These savings will be amplified if the price of gas continues to rise relative to electricity. Gas-retaining households may also face higher gas network charges in future as the cost of running gas infrastructure is shared between progressively fewer users. In turn, these charges may accelerate households' departures from the gas network, increasing prices further. This potential situation is often called a 'death spiral' for gas networks.

Definitions and data collection

In this study 'energy hardship' refers to a general situation where people cannot achieve an adequate level of energy services in their home – or where achieving this level leads to financial stress and/or deprivation of other essential goods and services.[1]

We use 'capabilities' to refer to the individual and structural factors which enable people to convert resources into opportunities and make change (Willand et al. 2021; Robeyns 2017).

We have integrated findings from an online survey and a series of in-person and online focus group discussions. Our analysis provides insights on the willingness and capacity of these households to transition from gas to electricity use, to guide recommendations for targeted policies and support measures.

A poorly managed transition away from gas risks exacerbating disadvantage, but on the other hand there is scope to reduce energy hardship through effective policy, regulatory and market actions.

1 We distinguish this from the applied, specific use of the term 'hardship' in an energy retailer's hardship program.

2 Our research approach

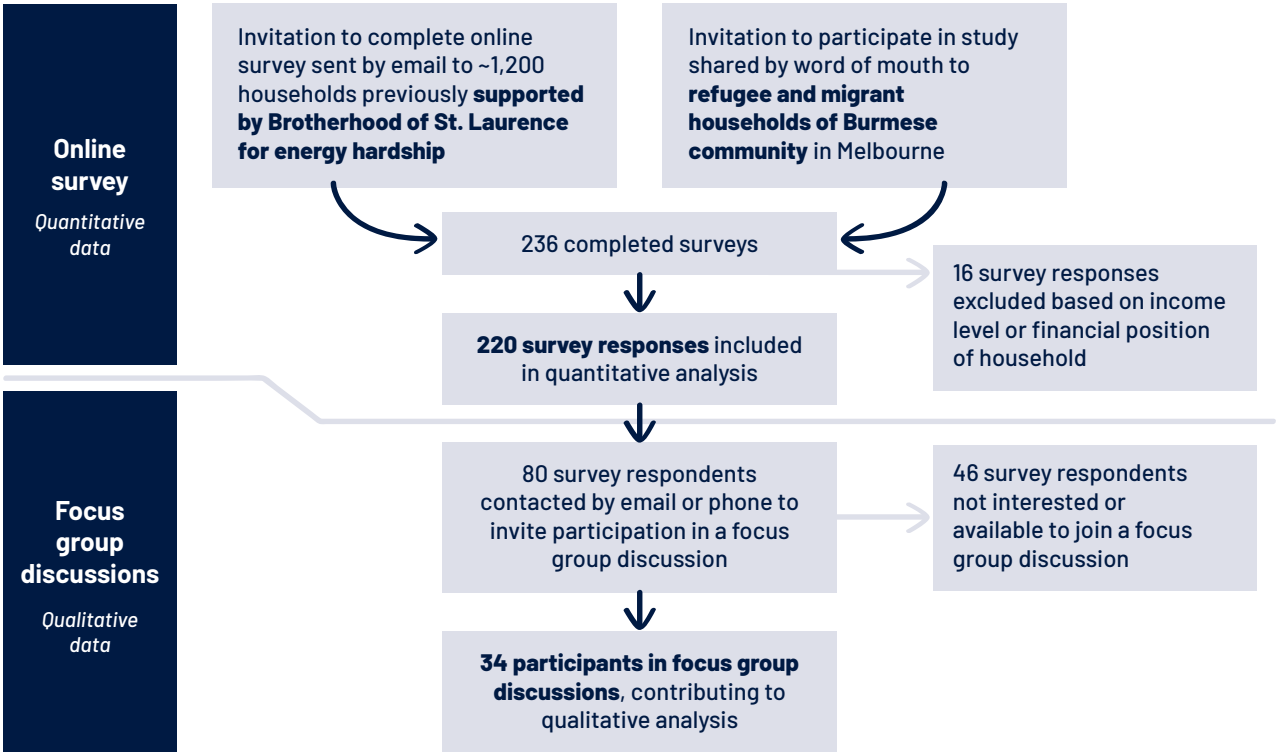
Our primary mode of recruitment for this study was an invitation to households that had received support from the Brotherhood of St. Laurence during the previous two years, through one or more energy-related programs. To increase the representation of culturally and linguistically diverse (CALD) participants, we also extended an invitation to lower-income households of the Burmese community in Melbourne with whom the research team had existing contacts.

This research contributes to a growing body of evidence on consumer perspectives on a transition away from gas in Victoria. It complements recent surveys commissioned by Infrastructure Victoria (Quantum Market Research 2022) and the former Department of Environment, Land, Water and Planning[2] (2021), which produced findings representative of Victoria's population by age, gender and metropolitan or regional location. Our purposive sampling and mixed methods approach offers additional insights into perspectives of lower-income households, many of whom are vulnerable to energy hardship (Figure 2). We conducted:

- **an online survey** to collect information on sociodemographic characteristics including indicators of hardship, housing, current energy use and preferences, awareness and utilisation of government programs related to energy, and attitudes to a transition away from household gas
- **focus group discussions**, in person and online, to explore perspectives on the proposed energy transition, priorities and challenges in energy use in the home, capacity for electrification, and potential support measures.

This study was approved by the University of Melbourne Human Research Ethics Committee (ID 24478).

Figure 2 Participant recruitment and data collection



2 Now the Department of Energy, Environment and Climate Action (DEECA).

3 A profile of our research participants

There is growing recognition of the many factors beyond income that lead to experiences of vulnerability. These span individual and household circumstances, policies and dynamics of the energy sector, and the wider social, political and economic context; and they may change in sudden and unexpected ways. Within the energy sector, there is commitment to improving identification of vulnerability, increasing consumer engagement, strengthening consumer protections and drawing on lived experience of vulnerability to shape sectoral reform (AER 2022; ESC 2021). Our research seeks to expand understanding of factors which may make lower-income households vulnerable to energy hardship and being 'left behind' in a zero-carbon transition.

Our sample includes a high proportion of older and female respondents. Most surveyed households (87%) received some form of income support, and the group can generally be described as lower-income. Based on equivalised figures, adjusted for the number and age of household members, one-third (31%) of respondents reported a household income below $20,000 per year, and a large majority (85%) reported an income below $40,000 per year. Around half of our respondents were renters in either private or social housing. Table 1 shows a range of characteristics of our sample.

Table 1 Selected characteristics of survey respondents

Characteristics of survey respondents (n = 220)	
Respondent characteristics	
Female	68%
Over 60 years of age	50%
Born outside Australia	38%
Completed high school	71%
Employed, full-time or part-time	24%
Care responsibilities as main activity	29%
Household characteristics	
Language other than English spoken at home	25%
Includes child(ren)	35%
Household type	
Lone person	33%
Couple	17%
Couple with children	20%
Single parent with children	17%
Receive income support	
Any type	87%
Age Pension	37%
Disability Pension	21%
Carer Payment	15%
JobSeeker Payment	15%
Parenting Payment	12%

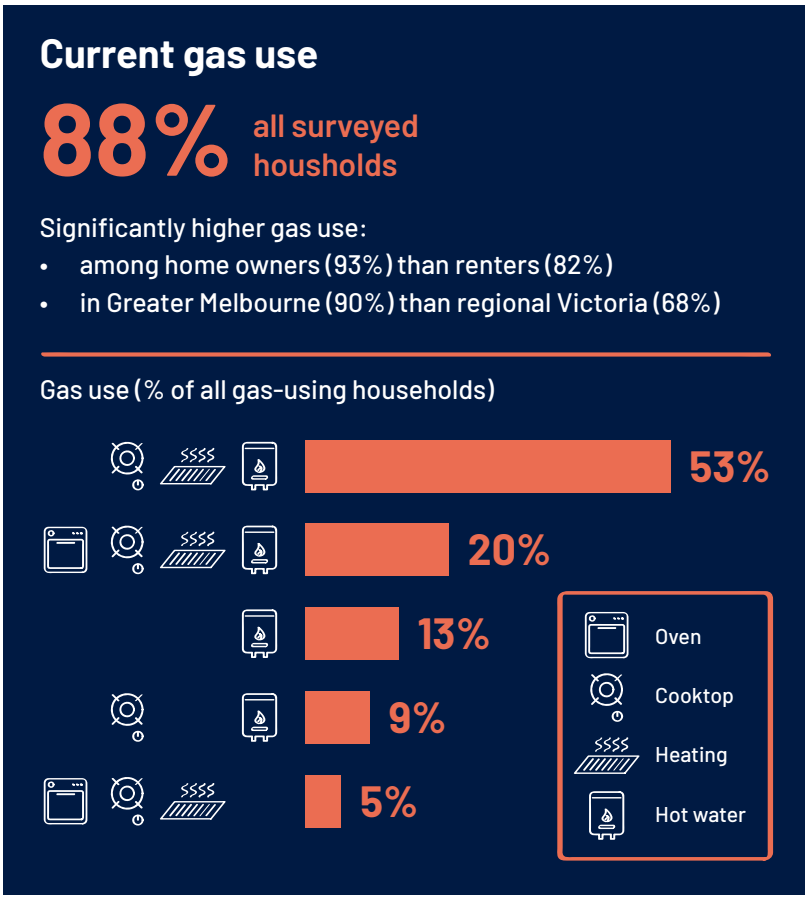
Characteristics of survey respondents (cont.)	
Annual household income, equivalised	
<$20,000	31%
<$40,000	85%
Housing tenure	
Social housing	14%
Private rental	35%
Own with mortgage	17%
Own outright	31%
Dwelling type	
House or single-storey unit or flat	86%
Multi-storey unit or flat	8%
Location	
Greater Melbourne	84%
Regional Victoria	11%

Notes: Some categories with low responses have been omitted. Some households received multiple forms of income support.

A large majority (88%) of survey respondents currently used gas in their home (Figure 3). Gas use was significantly higher in Greater Melbourne than in regional Victoria, and by home owners than those in private rental or social housing. Almost two-thirds (64%) of surveyed households used gas heating, and over three-quarters (76%) used gas for cooking. Of the various combinations of gas appliances and uses in the home, having a gas cooktop, hot water system and heating was the most common (53% of gas users in this study).

Achieving an inclusive transition away from gas relies on understanding the diverse challenges and competing priorities faced by lower-income households and others at risk of being left behind. Our findings highlight some experiences of severe and sustained energy hardship, within a wider context of financial stress and precarious housing.

Figure 3 Current gas use



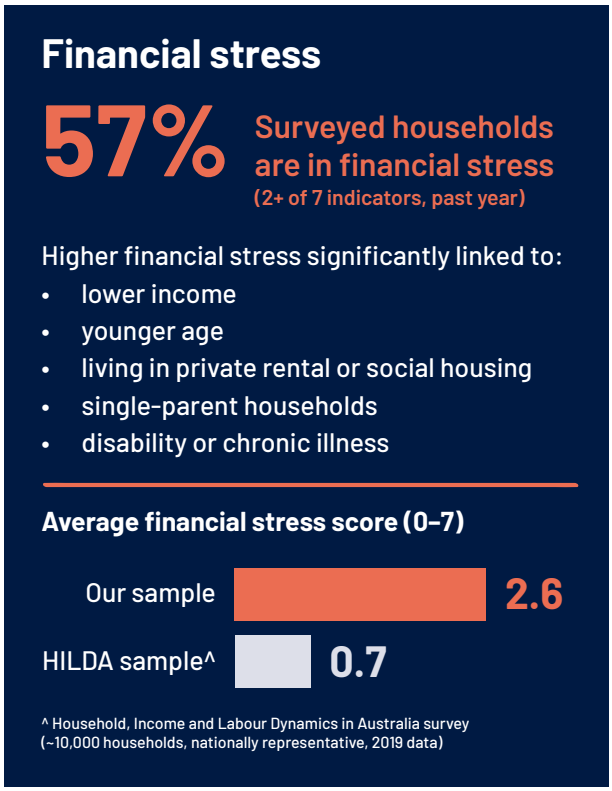
Financial stress

Households face financial stress when they cannot meet basic financial commitments because of a shortage of money (Wilkins et al. 2021). A household is considered to be in financial stress if two or more of seven events[3] have applied to them in the past year. Over half (57%) of surveyed households were in financial stress, with significant variation according to housing tenure, income and household composition (Figure 4).

Participants in this study had an average financial stress score of 2.6 (on a 0–7 scale), markedly higher than the average score of 0.7 for households in a nationally representative sample of the Australian population (Wilkins et al. 2021). The most common indicator of financial stress in the past year was inability to pay bills on time, reported by almost half of all survey respondents (48%). Nearly half had asked for assistance from friends, family or a welfare organisation. More than a third had pawned or sold possessions. One in four people (26%) had gone without meals, an event considered to indicate severe financial stress, compared with around one in 25 people in the wider Australian population (Wilkins et al. 2021). One person explained:

> ***You have to make the choice between feeding your kids and (paying) your power (bills). I'd go without a lot to make sure that my kids had what they needed, but also so I didn't feel that I was put in the position to ask for help when I was made to feel inadequate for asking.***
>
> ***Female participant, 40–49 years, private renter***

Figure 4 Financial stress



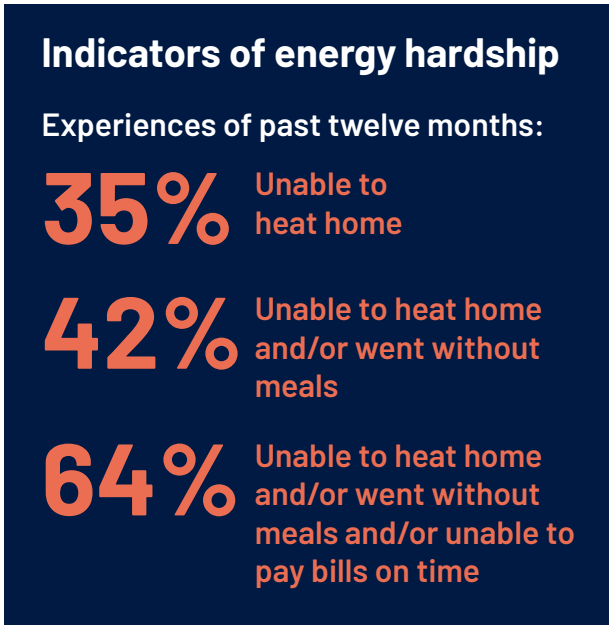
Energy hardship

Energy hardship, also referred to as energy stress or energy poverty, describes a situation where people cannot achieve an adequate level of energy services in their home (Petrova and Bouzarovski 2015) or where achieving this level causes financial stress (e.g. rationing of other essentials). This reflects the relationship between a household's income, energy costs and energy consumption. There is no universally accepted approach to measure energy hardship. One common approach focuses on the ratio between energy bills and household income, but has been criticised because it may overlook those households that are restricting energy use (Chandrashekeran et al. 2022). Households may also make trade-offs, including delaying the payment of bills and prioritising scarce funds for essential needs.

3 These events are: could not pay electricity, gas or telephone bills on time; could not pay rent or mortgage on time; asked for financial help from friends or family; were unable to heat home; went without meals; pawned or sold something; asked for help from welfare/community organisations.

Households in energy hardship may experience periods when they cannot heat their home or go without meals due a shortage of money. Based on experiences over the previous year, 42% of our cohort are in energy hardship by this marker (Figure 5). If we also include those unable to pay bills on time, even if energy usage has not been affected, we find close to two-thirds (64%) of surveyed households are in energy hardship.

Figure 5 Indicators of energy hardship



Efforts to limit home energy use were widespread, most commonly reducing the use of heating. This often involved turning heating devices on for short periods only, wearing additional layers of clothing at home or spending more time in bed. Two participants spoke of showering less frequently, to lower energy costs. Several parents spoke of their willingness to tolerate cold conditions after their children had moved out. Many also described minimising the use of lighting, including using lamps rather than overhead lights, or changing activity patterns:

> ***We're always lights out, in bed by 8 pm, just to keep warm, because my daughter and I, we get so cold in the winter that we actually sleep in the same room with a small plug-in heater just to try and keep each other warm because it is like ice.***
>
> ***Female participant, 30–39 years, private renter***

> ***With the kids out of the house, I just put on an extra jumper and jacket and sit under blankets … As much as I care, I don't either, because both of my boys are now out of home, so I've stopped worrying about certain things, because it is just me.***
>
> ***Female participant, 50–59 years, private renter***

Housing affordability and precarious housing

Housing tenure emerged as a clear differentiating factor in this study, linked to financial capacity, quality of living, agency to make energy-related decisions, and level of engagement with energy issues. Around half of our respondents were renters (either social or private).

Close to one in three surveyed households (31%) had been unable to pay their mortgage or rent on time at some point in the previous 12 months, compared with 6% reported in the wider Australian population (Wilkins et al. 2021). In focus groups, multiple people described the challenges of finding affordable housing.

Focus groups revealed poor living conditions in rented homes, and most renters' reluctance to suggest improvements to landlords, including to improve energy efficiency or change appliances, out of fear this would lead to a rent increase:

> ***I'd be lucky to get a one-bedroom unit in the worst part of [this area] for the same price I now pay, so for that reason I stay, and for that same reason, I don't really complain too much to the landlord about certain things.***
>
> ***Female participant, 40–49 years, private renter***

4 Findings

This section presents findings from our survey and focus groups about participants' energy preferences and attitudes towards the transition from gas, factors influencing electrification, awareness of supports and influence of future supports, and access to information.

Energy preferences and attitudes to a transition away from gas

Key findings include that participants' preferences for gas or electric appliances are strongly linked to their current use, and that support for the gas transition is high in principle.

Energy preferences

Survey results highlight that preferences for home energy use are linked to current energy use, across all categories. Gas-using households were more likely to favour gas over electricity. This was particularly evident for heating: gas was preferred by 40% of households currently using gas heating, compared with only 18% of those without it. This suggests that the experience of using electric heating appliances, including reverse-cycle air conditioners, may reduce an attachment to gas heating. In general, heating preferences were evenly split between gas and electric.

Focus group insights suggest that those who prefer gas heating – particularly central heating – want a uniformly warm home. In contrast, those favouring electric heating value being able to selectively heat areas of the home according to which rooms are in use, and which household members are present.

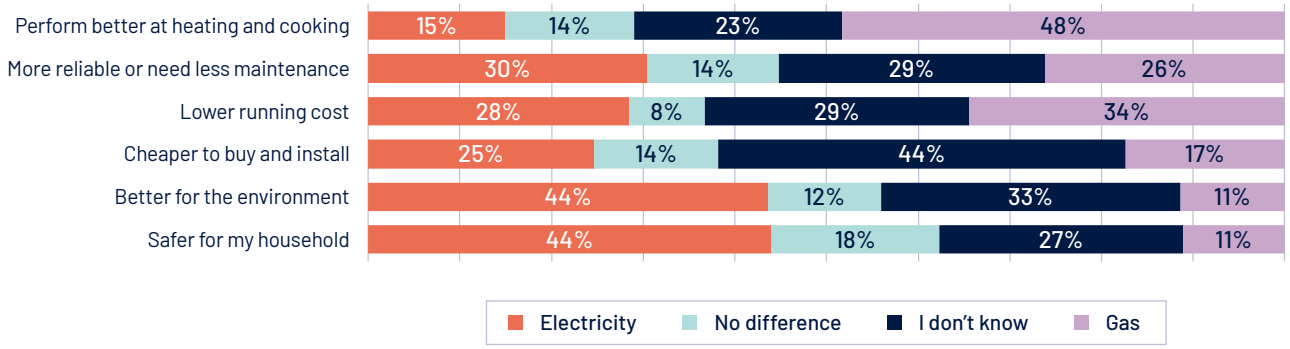
A common and strong preference for gas cooktops over electric ones was supported by both survey and focus group data. Many participants spoke positively of the speed of cooking with gas, and the ease of adjusting cooking temperatures. Few focus group participants were aware of induction cooktops, and only one had experience of using them. Respondents preferred electric ovens to gas ones, and electric ovens were already far more common.

Perceptions about gas and electricity

When asked to compare the benefits of gas and electric appliances (Figure 6), our survey respondents considered gas appliances to perform better for heating and cooking, while electric appliances were considered better for the environment, and safer. Some 34% of respondents considered gas to have lower running costs, while 28% thought electric appliances were cheaper to run and 29% did not know. Whereas 17% thought gas appliances were cheaper to buy and install, 25% thought electric appliances were cheaper upfront and a significant number of respondents (44%) did not know.

Our survey reveals a high level of support for a transition away from gas in Victoria.

Figure 6 Perceived benefits of electric appliances vs gas appliances



Attitudes to a transition away from gas in Victoria and ending gas network expansion

Our survey reveals a high level of support for a transition away from gas in Victoria (Figure 7). Around half of our respondents indicated strong support and more than two-thirds indicating some level of support, with only 7% (n = 17) expressing opposition. Those who had expressed a preference for gas (for cooking, heating or hot water) were significantly less likely to support electrification. Support was greater with higher levels of education, but there was no significant difference by financial stress, housing tenure, location, age, or capacity to meet heating and food costs. Most participants also supported ending the expansion of the gas network (55% expressed some level of support).

Figure 7 Opinion on a transition away from gas

Opinion on a transition away from gas

69% support (49% strongly support)

- More likely with higher levels of education
- Less likely with a preference for gas
- No association with tenure, location, age or financial stress

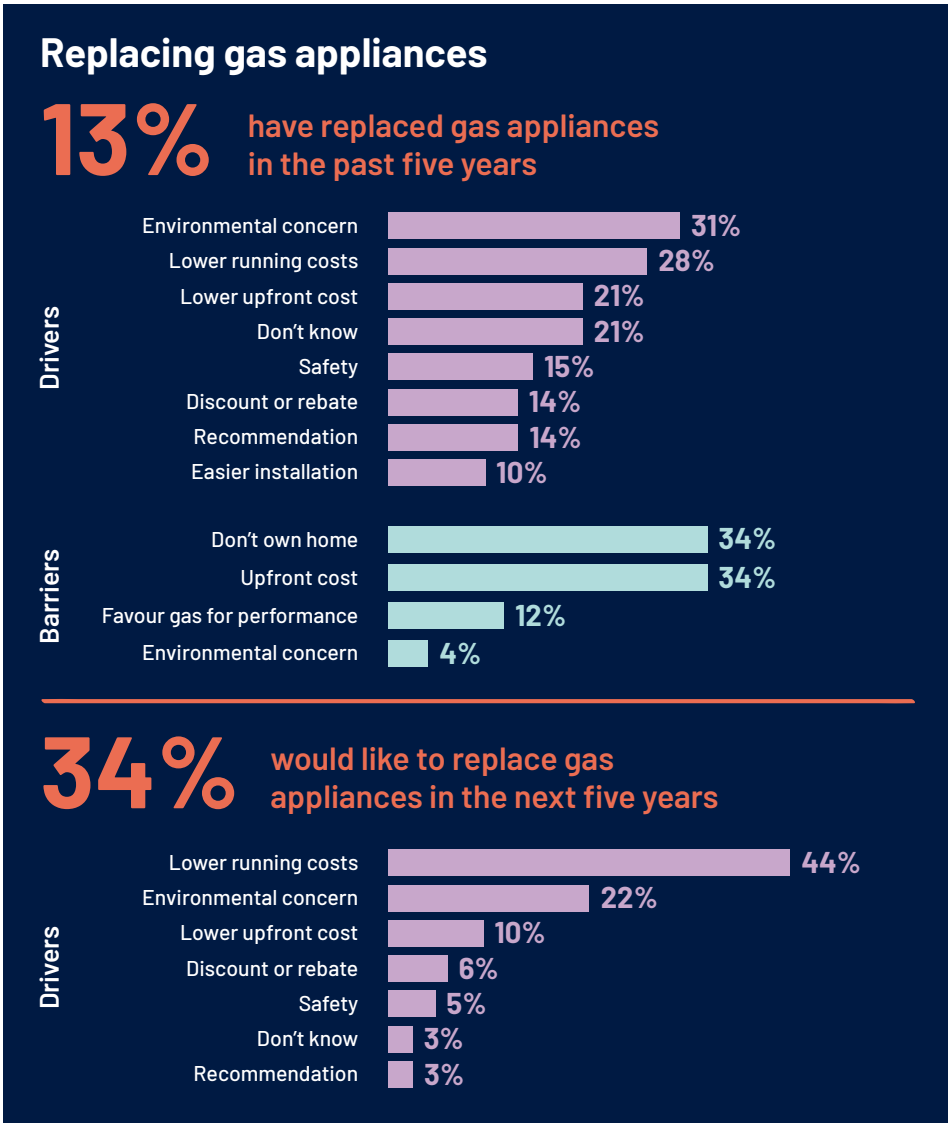
Factors influencing electrification

Around one in ten surveyed households (13%) had replaced gas appliances with electric ones within the past five years (Figure 8). Among this small group (n = 29), there were no significant variations by individual or household factors. Electrification was most commonly motivated by perceived lower running costs and environmental benefits.

Twice as many surveyed households with solar panels as without solar panels had replaced gas appliances with electric ones in the past five years (Figure 9). Having solar panels was also significantly linked to an ambition to replace gas appliances in the future. Fewer than one in five households in this study currently used solar power in their home, ranging from around one in three home owners (30%) to one in fifteen in private rental or social housing (7%).

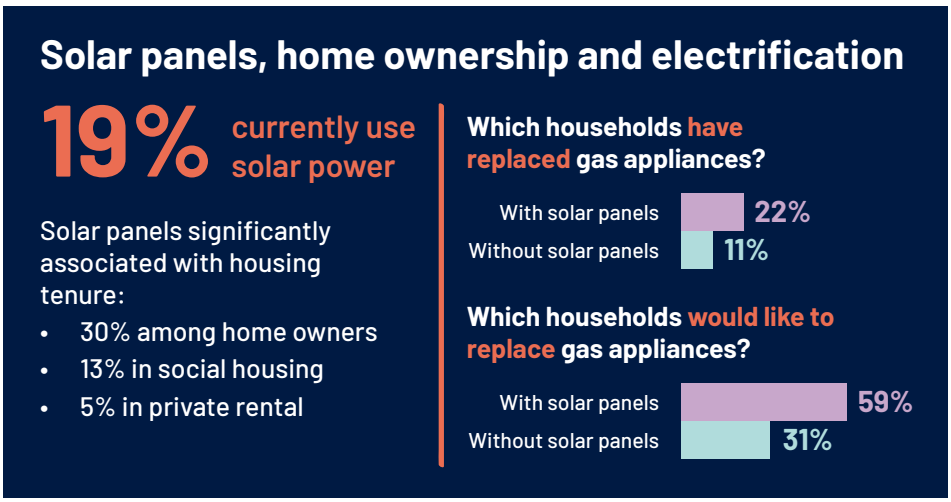
Tenure emerged as a key factor, with home owners more likely to be aware of supports for solar and have solar panels (which incentivise electrification). For those who had not replaced gas appliances, not owning their home was one of the most significant barriers to electrification, alongside upfront costs. (A larger group were not inclined to replace gas appliances that were working fine.)

Figure 8 Drivers of and barriers to replacing gas appliances



Note: Responses are from different subgroups and respondents could select multiple drivers or barriers.

Figure 9 Solar panels, housing tenure and electrification



Awareness and utilisation of existing support

Our research confirms a large majority of households were aware of and had accessed (by August 2022) the Victorian Government's Power Saving Bonus, and the energy concessions (which provide close to a 17.5% reduction in electricity bills and a reduction in gas bills) for people on low incomes holding a Pensioner Concession Card, Health Care Card or Veterans' Affairs Gold Card.

By contrast, there was lower awareness – and a marked gap between awareness and utilisation – of three government programs which support electrification (Figure 10). Only around one in three people in our survey had heard of the Home Heating and Cooling Upgrades Program (29%) and the Victorian Energy Upgrades Program (35%). Awareness was higher among male participants (66% vs 56% among women), those over 60 years of age (74% vs 43% among younger people), those living in their own home (77% vs 38% among private renters), and those unable to heat their home or struggling with food costs in the past year (71% vs 44% among others).

The Solar Homes Program had been accessed by one in four home owners surveyed (25%), compared with less than one in ten people in private rental accommodation (8%) or social housing (10%). In focus groups, renters who had a direct and positive relationship with their rental provider were more likely to see the potential in the Solar Homes Program than those who did not know their rental provider or did not have a good relationship with them. Despite some positive views about the scheme, most renters were deterred by the challenge of coordinating with multiple entities and having to make a co-contribution.

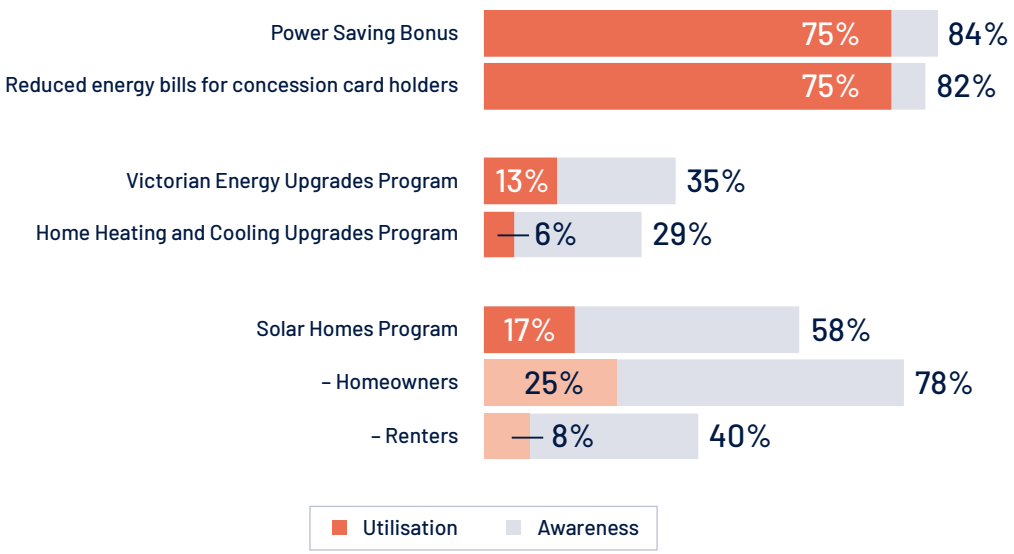
Access to information

Focus group participants emphasised the importance of trust in sources of information about energy-related decisions, and many regarded the lack of tailored, independent sources as a problem.

Respondents had high levels of trust in information from social welfare organisations; government bodies, especially councils; and social and cultural networks, particularly for people who speak a language other than English at home. Tradespeople and appliance or energy retailers were also seen as important sources of information, but as less trustworthy.

> ***We prefer information coming from the community. That way we can relate to one another, and [it's] easier to understand ... we don't need to go through the messy, technical process.***
>
> ***Male participant, 40–49 years, owns home with mortgage***

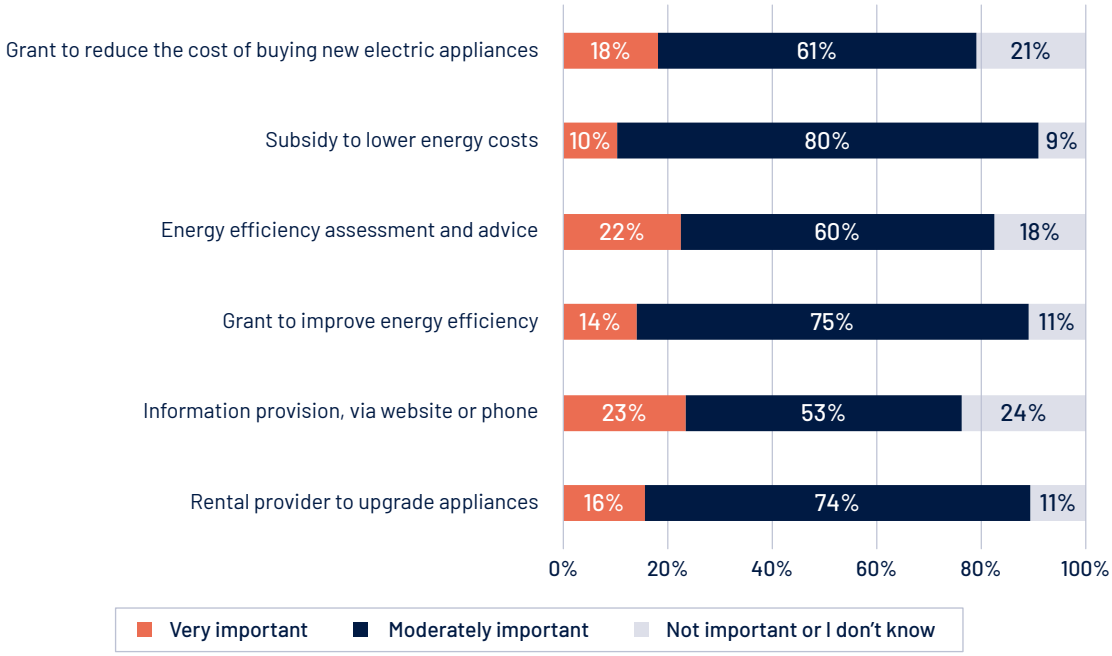
Figure 10 Awareness and utilisation of Victorian Government energy-related programs



Importance of potential support measures

Survey respondents were asked to rate the importance of potential support measures in enabling them to transition away from gas in their home (Figure 11). Support was strongest for subsidies to lower energy costs; grants to improve energy efficiency; and, for renters, rental provider upgrades to appliances. Our analysis shows that information-based measures receive higher support from households speaking a language other than English, compared with those speaking English only. Subsidies to lower energy costs and grants to improve energy efficiency were considered very important by households who were extremely conscious of limiting their energy use. Financial support to purchase electric appliances was rated highly by renters, those with solar panels, and those speaking a language other than English at home.

Figure 11 Importance of support measures to households surveyed



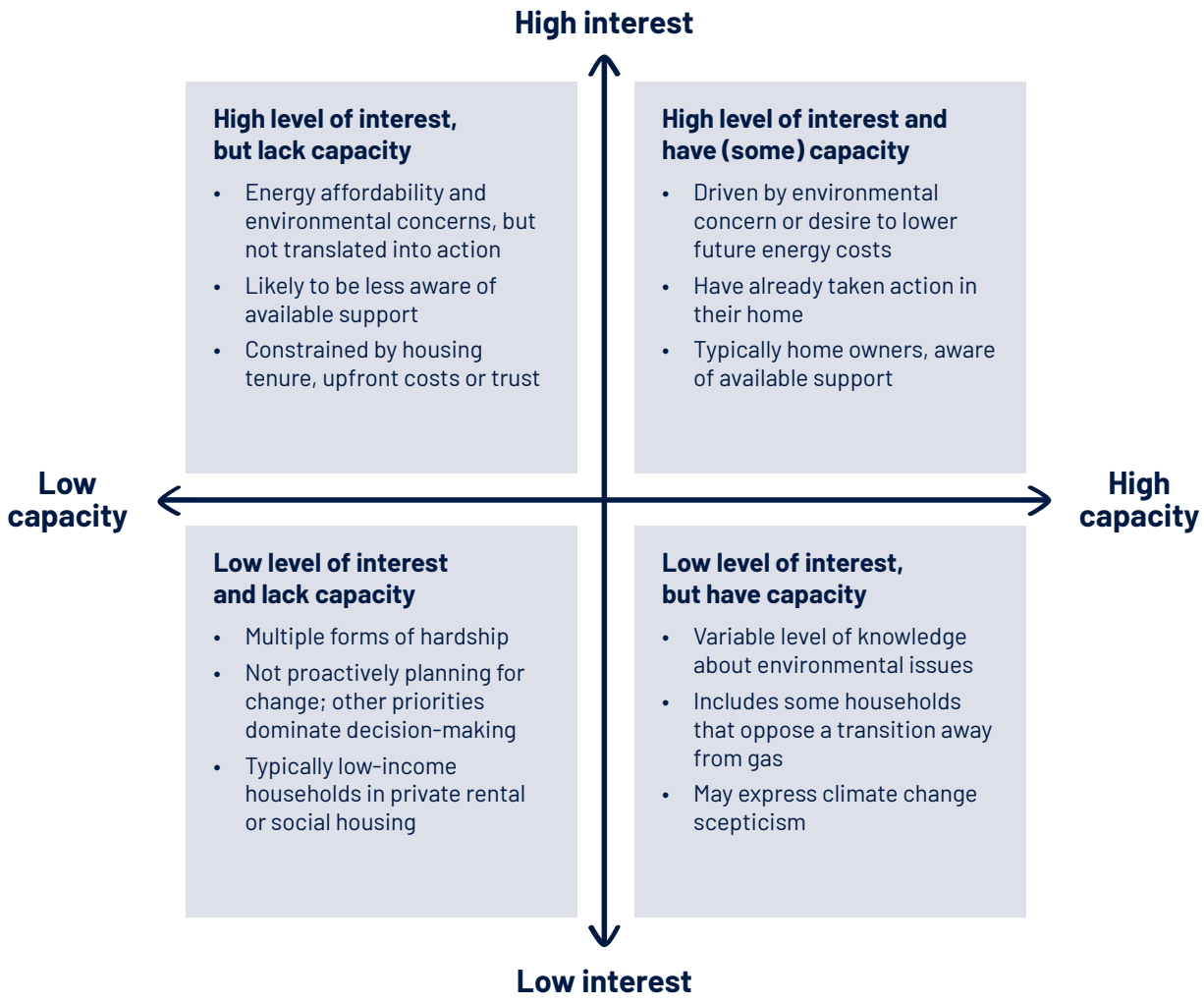
Support was strongest for subsidies to lower energy costs; grants to improve energy efficiency; and, for renters, rental provider upgrades to appliances.

Variation in interest and capacity to electrify

Our findings demonstrate a high level of support for a planned transition away from gas; however, opportunities for households to electrify vary considerably. In Figure 12, we identify on the axes two key factors that shape the electrification journey: (i) interest in electrification, and (ii) capacity to electrify. Interest describes the extent to which people desire to transition away from gas, and reflects their beliefs, values and priorities. Capacity refers to the extent to which people are able to make desired changes and reflects both household members' knowledge, skills, resources and circumstances and wider structural and contextual influences. Quantifying the households that fall into each group is a possible subject for future research.

Among our participants, capacity to electrify had been improved for some through the provision of advice or subsidised retrofits by BSL.

Figure 12 A matrix of consumer types, differentiated by interest in, and capacity for electrification



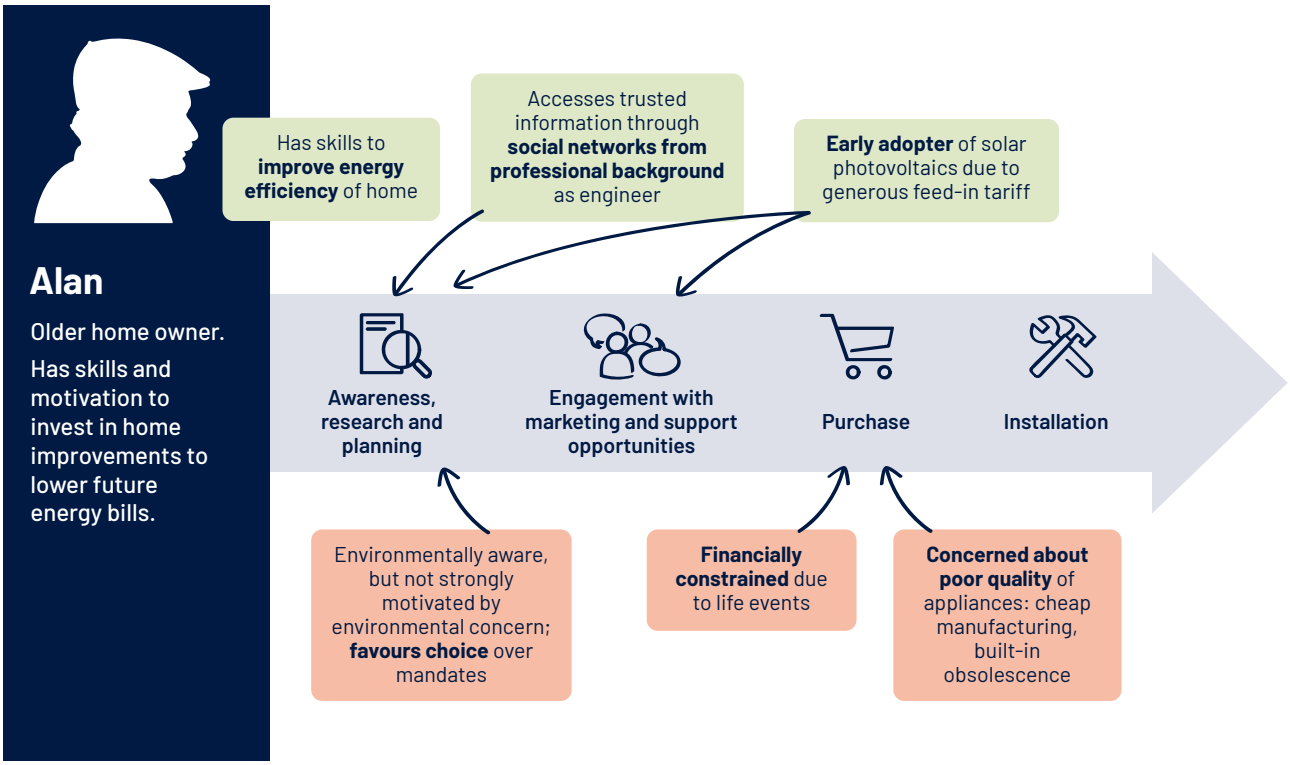
5 Consumer journeys

This section presents individual focus group participants' electrification stories, providing illustrative examples of barriers and how decisions are made for the households in the different categories we have identified. All names are pseudonyms.

High interest and have capacity

Alan

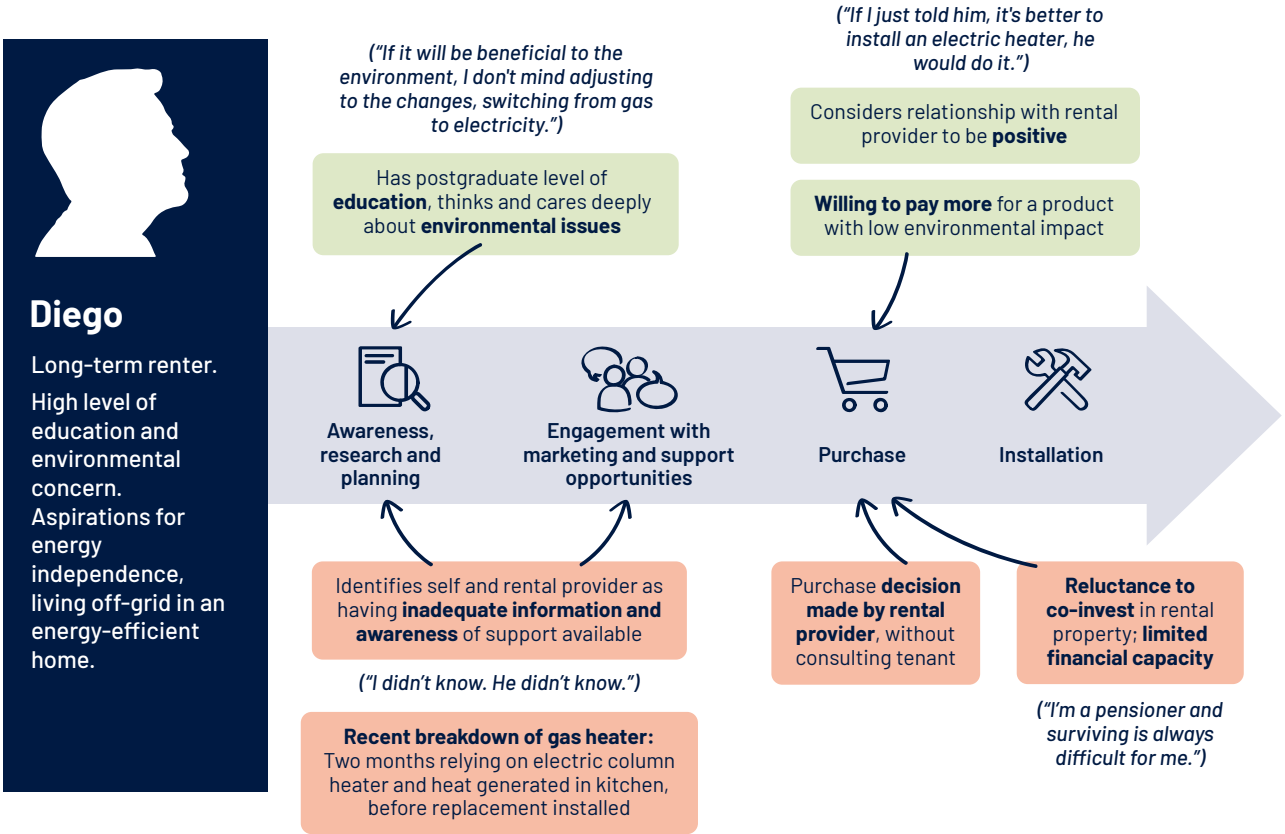
Alan is a retired engineer, whose capacity to electrify reflects his home ownership and his knowledge, skills and time to undertake home improvements. He is highly motivated to electrify for affordability reasons, but family breakdown has constrained his financial capacity to invest in upgrades. Alan thinks very carefully about how to use his limited resources, and prioritises DIY solutions, trying to avoid costly mistakes. Although his digital literacy is low, his energy and financial literacy are relatively high. He could see the quick payback on solar panels from generous state feed-in tariffs in the late 2000s, and purchased solar panels accordingly. This has proven to be an economically wise decision; however the high feed-in tariff will end in the next few years, and he is concerned about the sustainability of his existing system and the affordability of a new system. Alan lives frugally and sees energy efficiency and small home retrofits as the best way to spend his time and resources.



High interest, but lack capacity

Diego

Diego, a self-described 'forever renter' and pensioner, displays a number of capacities that would enable a transition away from gas, including a postgraduate education, high financial literacy and environmental interest. He reported a positive, longstanding relationship with his current rental provider. Despite this, when his gas heater broke down, Diego went two months without a replacement. On hearing he would have been eligible for the Home Heating and Cooling Upgrades Program to install a split system air conditioner, he lamented that a lack of knowledge had prevented this electrification opportunity: *'If I just told [my rental provider] it's better to install an electric heater, he would do it'*. Instead, a tradesperson arrived and installed another gas heater. Information about support and appliance options at the right time and consultation between Diego and his rental provider might have prevented his being locked into gas heating and its ongoing costs.



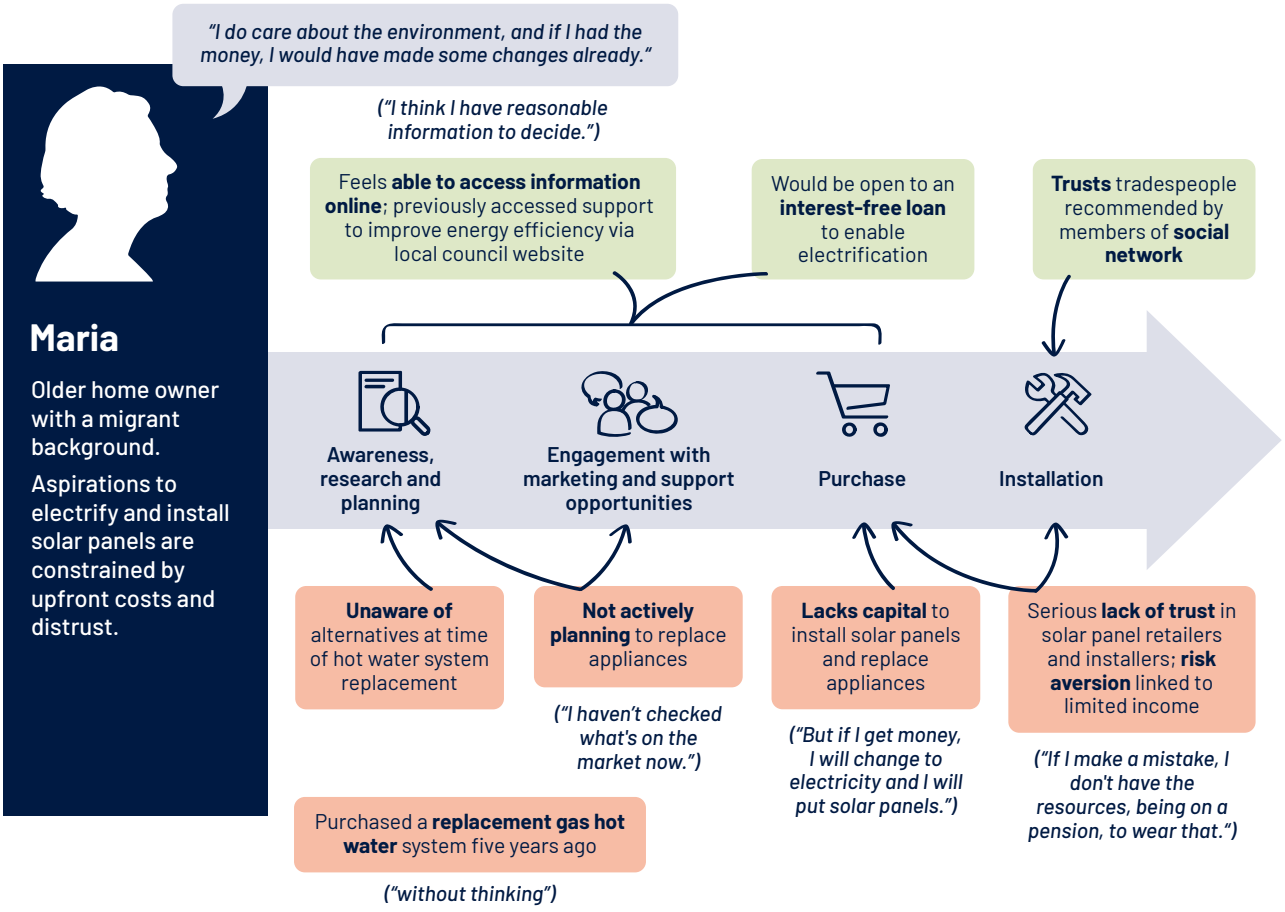
High interest, but lack capacity

Maria

Maria, an older home owner with a migrant background, lives in the western suburbs of Melbourne. She was confident in her ability to access information online, including through her local council's website. Through that website she discovered the Victorian Healthy Homes Program, which identified and funded improvements to the energy efficiency of her home, such as heavy curtains and draught excluders for doors.

Nevertheless, when her gas hot water system later broke down, she replaced it with another gas system, despite having recently inherited money that could have covered the cost of an electric alternative. This was because Maria was unaware of electric alternatives that might have lower running costs and environmental impact, and the government support available (e.g. Victorian Energy Upgrades program).

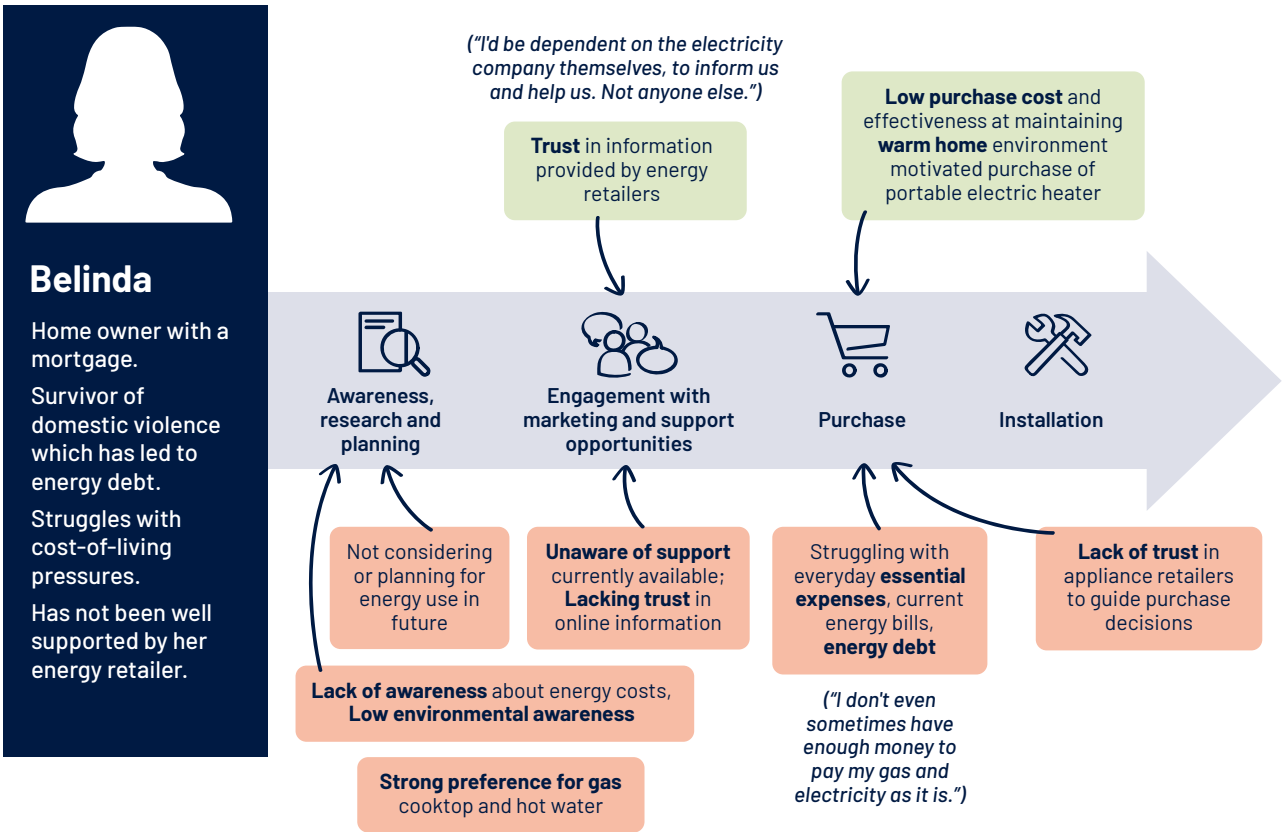
It is a priority to Maria to electrify her home, beginning with solar panels, but she now lacks the finances to cover the upfront costs even with government rebates and an interest-free loan. Another major barrier for Maria is her lack of trust in retailers and installers; she says, *'If I make a mistake I don't have the resources, being on a pension, to wear that.'*



Low interest and lack capacity

Belinda

Belinda relies on a Disability Support Pension and is paying a mortgage on a house she shares with her adult daughter. She is a survivor of long-term domestic violence. She experiences a high level of financial stress and struggles to pay bills. She is on a payment plan with her energy retailer to pay off a significant debt accrued by her ex-partner. Belinda is not strongly engaged in considering the transition away from gas, and environmental concerns are not a priority, largely due to pressing everyday concerns about the cost of living. She is largely unaware of the support available to assist with electrification and energy efficiency upgrades. She lacks trust in appliance retailers, but values heating devices that provide immediate thermal comfort. Affordability is the major factor underpinning Belinda's energy decisions, but these decisions can backfire. For example, she has purchased a heater with a low upfront cost but a high running cost, which is likely to be more expensive in the long term.



6 Implications

This section discusses policy implications of our findings. These insights will be important to guide a planned, equitable transition from gas to electric homes in Victoria and other jurisdictions.

Multiple stressors

Households facing barriers to electrification also experience many other challenges

Barriers to electrification are not the only challenges faced by many households in our study. Our respondents exhibited a high level of financial stress, with nearly half having asked for assistance from friends, family or a welfare organisation and/or been unable to pay bills on time in the past year. More than one in four had gone without meals, and more than a third had pawned or sold possessions. Other stressors, such as unemployment and disabilities or chronic health conditions, were also common, and likely to exacerbate financial pressures.

With this lack of financial capacity, spending thousands of dollars on upgrades that may take several years to pay for themselves is understandably unlikely to be a priority even if these households have sufficient interest in and information about electrification. Alongside specific policies to promote electrification, a comprehensive effort is needed to alleviate financial stress. In relation to energy, this may include measures to lower energy prices through greater availability of low-cost renewables in the system, minimum energy efficiency standards for rented homes and retail market reform. More broadly, it may involve adequate income support, constraining costs of living and generating decent jobs.

Information and knowledge

Support for electrification is relatively high but awareness of support services is low

There was widespread support for electrification among respondents, but awareness and uptake of current programs that enable electrification were variable and generally low. For the Solar Homes program, awareness among home owners was twice as high, and uptake three times as high, as among renters. Interest in information about how to electrify was highest among people who speak a language other than English at home. Better targeted information and advice, as discussed below, provides one potential solution.

Lower-income households may be deterred by the perceived risks of electrification

Electrification was perceived as risky by some respondents because the costs can be considerable and the changes present unknowns, for example regarding an appliance's quality, longevity, reliability or payback time, or the trustworthiness of the installer or installation. Among renters, there was a real concern that upgrades to their home would trigger future rent rises, deterring many from raising the issue in the first place.

This sense of risk is magnified for lower-income households, who lack savings to cover unexpected events, and people facing information barriers. Even those with a high level of environmental concern may not be willing and able to take on risk. This risk reinforces the status quo, with appliances often being replaced like for like.

Lowering the risk of electrification requires addressing structural barriers, such as the split incentive problem for renters; providing financial support tailored to people's circumstances; and issuing information that acknowledges households' experiences (see below).

More evidence-based information on the benefits of electric versus gas appliances will aid household decision making

There was considerable uncertainty among respondents regarding the relative benefits of upfront and running costs, reliability, safety and environmental benefits of electric versus gas appliances. Despite significant gas price increases in the 12 months leading up to the survey, there were more people who perceived gas to be cheaper to run than electricity. Clearer communication is needed around the affordability of electric appliances and the savings lower-income households could achieve from electrification. Information about the other benefits (environment, reliability, household safety) would also be helpful for household decision making.

Trusted and tailored advisory assistance is needed to help households electrify

Decisions about household energy are complex for everyone. Those facing major barriers to moving off gas have a greater need for trusted information and advice. Trusted advisors are required to guide people to decide when and how to replace appliances, both as a planned investment and when appliances break down. Our findings highlight higher trust in information from social welfare organisations, such as BSL and Uniting; government bodies, particularly local councils; and social or cultural networks, especially for households speaking languages other than English at home.

A trusted 'one-stop shop'[4], similar to the service the Gas and Fuel Corporation and the State Electricity Commission offered in Victoria in the 1980s, could provide energy advice to guide electrification and energy efficiency plans, facilitate access to appropriately skilled local tradespeople, and organise related services such as energy audits. Households should be given the option to engage in genuine conversations tailored to their needs, rather than simply provided with generic advice. A one-stop shop would need to be able to meet the diverse needs of households, including those facing energy hardship. Co-designing such a service with leaders from culturally and linguistically diverse communities and people in various degrees of energy hardship would be important. Our households expressed interest in accessing advice from physical government-run offices, local council websites and events, trusted social welfare organisations and Neighbourhood Houses. They wanted advice tailored to their circumstances of energy hardship, vulnerability or financial stress.

Tradespeople, appliance retailers and energy retailers are also important sources of advice, and trust between households and these groups could be improved. Some participants expressed a lack of trust in those selling products. Through training and, where appropriate, accreditation, it is important to develop the capacity of tradespeople, particularly electricians, plumbers and heating/cooling technicians, to provide fair advice that assists households in the transition away from gas. For example, the Plumbing Industry Climate Action Centre provides training funded by Solar Victoria on the installation of heat pumps for registered plumbers and fourth-year apprentices (Solar Victoria 2023). Such knowledge-building should complement independent sources of advice such as the 'one-stop shop'.

Through regulation, governments should prevent gas network businesses from offering incentives and promoting new gas connections and appliances. Promoting greater gas use runs counter to government policy, provides contradictory information to households, and ultimately risks locking households into future vulnerability.

4 Here, we are using the term 'one-stop shop' to refer to a trusted, independent advice service that can assist households with electrification planning and connect them with accredited tradespeople and other relevant service providers. This is distinct from a service that project manages a household's retrofit, such as the Sustainable Energy Authority of Ireland's one stop shop.

Building energy literacy may also help lower-income households chart a path towards future electrification through careful management and planning. A number of our participants had effective strategies for navigating the energy market to manage high bills, but lacked knowledge or skills related to electrification.

Energy advisory services that include financial considerations, particularly for energy efficiency and electrification, can build awareness about both the costs and likely benefits of electrification and their distribution over time. This can guide decisions about appliance replacement, both as a planned step towards electrification and in the instance of appliance breakdown. Greater resourcing of financial counsellors and energy assistance services can also assist households to navigate the complexity of the energy market, and devise strategies out of energy hardship.

Even for energy-literate households, however, the complexity and uncertainty of the energy transition exacerbate other barriers these households face.

A plan for the future of the residential gas network will reduce uncertainty

Governments need to take a lead in developing a clear plan for the future of the residential gas network. Such a plan will assist households to transition to electric-only homes, including by reducing uncertainty, enabling longer-term decision making about appliance purchases and allowing tradespeople to provide better advice. Many gas fixtures (such as heating and hot water systems) will last well over a decade, and the sooner a plan is in place, the more future expense can be avoided. Government regulation should ensure that further investment in the residential gas network does not lock in future vulnerability.

Tenure and control

Home owners are better placed to electrify, provided they can wait to recoup the cost

Electrification takes time and involves investing money in home improvements. The householder needs to know that they are going to be in their home for a long time to recoup the cost, which is not the case for most renters. Home ownership provides agency to make energy-related decisions, while renters typically face limited involvement or consultation in decisions made by their rental provider.

A strategy to support renters and rental providers to electrify is essential

A low-income renter – focused strategy needs to be better coordinated across housing and energy policy. Stronger energy efficiency standards for rented homes and appliances should be implemented to lower renters' energy costs. It is also important to have measures in place to ensure that minimum standards for rental properties do not translate into higher rents, and that renters' security of tenure is protected. The Victorian Government is investing in progressively transforming community and public housing to electric-only homes, with quality appliances, but much more investment is needed. This includes funding upgrades for efficient heating and cooling, hot water systems, improving building fabric and installing rooftop solar panels.

A number of our participants had effective strategies for navigating the energy market to manage high bills, but lacked knowledge or skills related to electrification.

Capital and finance

Addressing capital barriers is vital for electrification

Some of our home owner participants had high mortgages and other debts and wanted to make upgrades but couldn't afford to do so. This led them to fall into short-term decisions in an attempt to save money, rather than spending time investigating options. These home owners are likely to require financial support from government to electrify their homes. A smaller group of our participants, particularly older pensioners who own their home outright, had some savings to upgrade their homes.

Appropriate mechanisms of support could include grants or rebates – preferably through programs that provide households with advice and hold suppliers to safety and compliance requirements – and, where appropriate, interest-free loans. Limited savings and low credit scores restrict access to other financing arrangements and potential third-party ownership schemes. Support for grants to improve energy efficiency and lower energy tariffs was favoured by those very conscious of limiting their energy use. At a foundational level, adequate income support is essential, as are supplementary supports including expanded energy advisory services and access to financial counselling.

While interest-free loans have a role to play, they should not be seen as a panacea. Many households are reticent to take out a loan, particularly a large loan, and their reticence is exacerbated by perceived uncertainties of newer technologies such as rooftop solar or heat pumps.

Rooftop solar and energy efficiency

Access to solar panels is a key step for electrification, and renters and lower-income households need more assistance

Having solar panels reduces the everyday cost of energy and encourages people to electrify their homes. In our sample, ownership of solar panels is associated with action or plans to replace gas appliances. However, tenure, capital and information barriers remain. The investment required to install solar panels, even with existing state subsidies, remains a barrier for many households who most need to reduce their bills. Many households also face physical barriers to solar installation because they live in multi-unit buildings or share roofs.

Renters face barriers to solar installation even if their home is suitable, due to the split incentive problem between tenants and property owners: tenants will benefit from the bill savings that come from solar energy, but property owners will bear the upfront cost. We note that the government's Solar for Rentals program within the Solar Homes program provides a partial redress by allowing rental providers to claim up to $1,400 as a rebate on the cost of the solar system and to receive a matching interest-free loan. Renters are sometimes expected to make a co-contribution to the monthly loan repayments. Low uptake of the program by renters in our sample reflected the difficulties of making a co-contribution and coordinating with the landlord and the program delivery agency. Greater financial incentives for rental providers with lower-income tenants to install solar are needed.

Appropriate mechanisms of support could include grants or rebates – preferably through programs that provide households with advice and hold suppliers to safety and compliance requirements.

Energy efficiency upgrades go hand in hand with electrification, especially for renters

Energy efficiency upgrades can help maximise the benefits of electrification by lowering energy costs, reducing the need to restrict energy use, and enhancing health and wellbeing. The poor thermal efficiency of many properties, particularly rental properties, increases the payback period for electric heating and cooling. For a number of our participants, poor energy efficiency was a driver of energy hardship, especially if they did not have the time or the skills to undertake do-it-yourself home improvements. Energy efficiency upgrades should be made widely accessible and affordable, through appropriately delivered advice, grants for upgrades and, where appropriate, no interest loans, to facilitate electrification for lower-income households.

Energy efficiency upgrades can help maximise the benefits of electrification by lowering energy costs, reducing the need to restrict energy use, and enhancing health and wellbeing.

Inclusive planning processes

The voices of those facing barriers to electrification need to be heard and included in planning

A transition away from gas and towards electricity is a large-scale, long-term planning exercise. The voices and experiences of households facing barriers to electrification must be heard in the gas transition, especially in relation to support schemes. Channels for effective participation of these households in the planning process need to be developed. Only governments are equipped to undertake this; consumer engagement by gas network businesses is not sufficient.

Governments should work through trusted agencies like consumer welfare organisations and culturally safe networks to involve communities in the planning process. This is best done locally, for example through local government, community housing bodies or Neighbourhood Houses. Diverse models of participation will ensure perspectives of these households are included in policy development from the outset, not as an afterthought.

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Enabling electrification

Addressing the barriers to moving off gas faced by lower-income households

Sangeetha Chandrashekeran, Julia de Bruyn, David Bryant and Damian Sullivan

2023

Acknowledgement of Country

The Brotherhood of St. Laurence and the University of Melbourne acknowledge the Traditional Custodians of the land and waterways on which our respective organisations operate. We pay our respects to Aboriginal and Torres Strait Islander Elders past, present and emerging.

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