LA TROBE UNIVERSITY

AUSTRALIAN INSTITUTE
FOR PRIMARY CARE & AGEING

THE ENERGY-HEALTH HARDSHIP NEXUS IN VICTORIA: EXPLORING THE ROLE OF THE HEALTH SYSTEM

Literature Review

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As part of a project funded by Energy Consumers Australia Limited, the Victorian Council of Social Service (VCOSS) commissioned the Australian Institute for Primary Care & Ageing at La Trobe University to undertake the following literature review.

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The Energy-Health Hardship Nexus in Victoria: Exploring the Role of the Health System

1. LITERATURE REVIEW PURPOSE & SCOPE

Review aims

Evidence in Australia has established that energy hardship negatively affects health and wellbeing (Awaworyi-Churchill et al., 2020; Bentley et al., 2023; Daniel et al., 2020; Nicholls et al., 2017; Nicholls & Strengers, 2018; VCOSS, 2017), consistent with international observations. Factors such as rising energy prices, increased global temperatures, and widespread energy-inefficient housing are likely to push more households towards energy hardship (Awaworyi-Churchill et al., 2022; KPMG, 2017; Thwaites et al., 2017), and make more Australians prone to negative health consequences.

While the link between energy hardship and poor health has been well-established (Section 2.1), it is less clear how health system actors currently participate in responding to the energy hardship.

As part of a project funded by Energy Consumers Australia, La Trobe University in partnership with the Victorian Council of Social Service (VCOSS) has undertaken a literature review to understand the energy-health hardship nexus through a Victorian health system lens, and to answer the following questions:

1. How do health system actors in Victoria currently participate in tackling energy hardship and other social determinants of health?
2. Are there promising health-related interventions relevant to energy-health hardship nexus, and what are the existing barriers to their wider implementation?
3. What broader challenges may be preventing recognition of the energy-health hardship nexus in Australia?

Our review begins with an overview of the evidence linking energy and health hardships. Sections 3 and 4 of this review will explore the roles that health systems have played, or could play, in tackling energy hardship, by reviewing case examples from across the world. In Section 5, we explore implementation barriers that may affect interventions involving health system actors. In Section 6 we focus on the Victorian setting, reviewing recent interventions and opportunities for future advances. Finally, in Section 7 we explore wider contextual challenges that may affect our understanding of energy hardship.

Methods

The research team anticipated there would be a high component of grey literature relating to the topic, such as government reports and policy documents, which may not have been picked up using systematic refereed literature search and screening methods. As such, literature in this review was collected using a 'hand search' approach.

The research team used an array of databases to capture literature including Medline, EMBASE, PsychINFO and SCOPUS. Search engines such as Google Scholar were also used to retrieve grey literature. To collect publications relevant to the aims of the review, we used variations of the following general search query: ("energy poverty" OR "energy hardship" OR "fuel poverty") AND ("health" OR "health system*" OR "health work*" OR "health service*") AND ("program*" OR "intervention" OR "scheme" OR "initiative" OR "pilot" OR "project")

The research team also collected literature using the reference lists within publications (snowball method). Relevant information was also found on public websites; these are presented as footnotes in the review.

While the review predominantly focusses on the Victorian context, evidence from national and international literature was also collected and used to elucidate wider observations and challenges in this growing field of work.

2. BACKGROUND

We begin with an overview of existing evidence linking energy hardship and poor public health and summarise what is known about energy hardship at the Australian and Victorian scale.

The energy-health hardship nexus

'Energy hardship'[i] refers to the inability to afford and obtain energy services to meet household demands and a basic standard of living. There is widespread evidence that, where household energy demands are not met, individuals may be prone to a range of negative health outcomes (Figure 1), including: (i) physical health problems, such as cold-related illnesses, respiratory problems, cardiovascular diseases, heat stress and dehydration, and obesity (Alam et al., 2018; Ballesteros-Arjona et al., 2022; Bentley et al., 2023; Champagne et al., 2023; Katoch et al., 2023; Mohan, 2021; O'Sullivan & Viggers, 2021; Prakash & Munyanyi, 2021); (ii) mental health problems, such as depression, anxiety, decreased life satisfaction and feelings of isolation (Bentley et al., 2023; Carrere et al., 2021; Davillas et al., 2022; Gilbertson et al., 2012; Jessel et al., 2019; Mould & Baker, 2017; Oliveras et al., 2020); and (iii) reduced wellbeing, including lower life satisfaction, poorer quality of life and lower overall general health (Awaworyi-Churchill et al., 2020; Davillas et al., 2022; Llorca et al., 2020; Nicholls & Strengers, 2017; Oliveras et al., 2021). Links between energy hardship and excess winter mortality[ii] and overall life expectancy have also been established (Atsalis et al., 2016; Pan et al., 2021). Combined, these observations can be described as the *energy and health hardship nexus*.

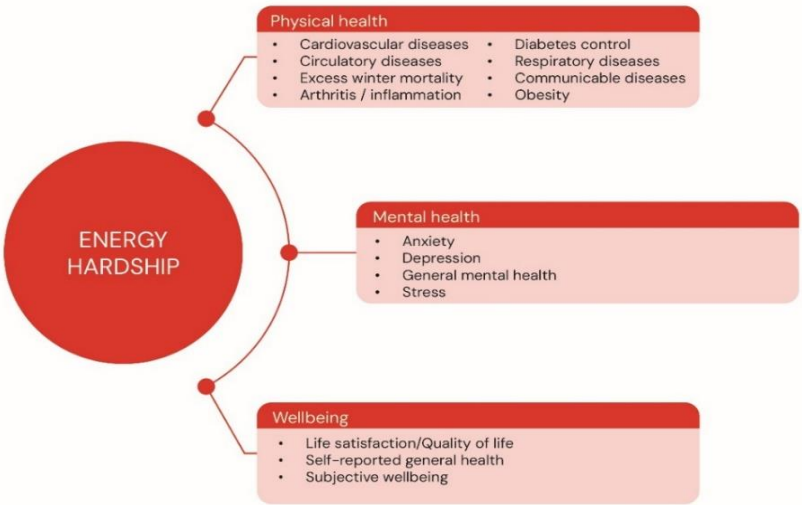

Figure 1: Relationships between energy hardship and various negative health outcomes that have been described in international literature (Table 1A).

[i] In this review, we use 'energy hardship' in place of other common terms in the literature, such as 'energy poverty' and 'fuel poverty'. A discussion on semantics and terminology is presented in Section 4.1.

[ii] 'Excess winter mortality' is commonly used in public health research to refer to an increased number of deaths during winter months compared to the expected mortality rate during non-winter periods.

The negative health impacts associated with energy hardship may continue beyond the time the hardship is alleviated (Mould & Baker, 2017), impacting, for example, individuals' education (Free et al., 2010) and overall life satisfaction. Households may be reluctant to consume energy due to cost concerns and may restrict the use of appliances at the expense of their general health and wellbeing (Chester, 2013; Nicholls et al., 2017; VCOSS, 2017). Similar behaviours are observed where households sacrifice warming their home to afford groceries, often described as the 'heat or eat' dilemma (Fry et al., 2023).

The source country of literature indicates that links between energy and health hardships are found across many countries (Figure 2; Table 1A). Global panel data has also been synthesised to demonstrate the international scale of this relationship (Banerjee et al., 2021; Pan et al., 2021).

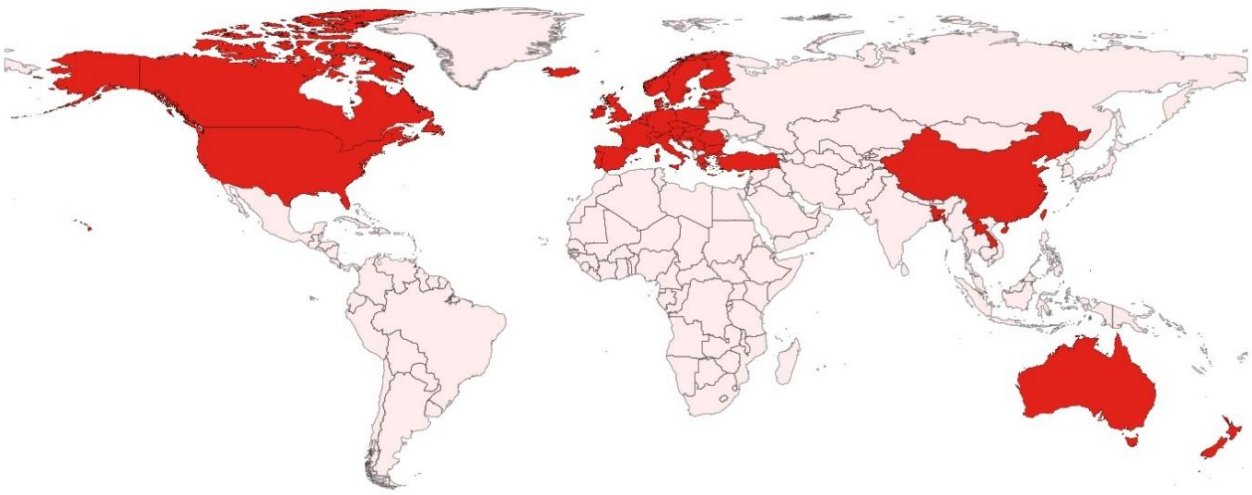

Figure 2: Summary of countries where a relationship has been demonstrated in the literature between energy hardship (following the definition outlined in Section 2.1) and public health. Note that definitions of energy hardship, and the respective measures thereof, may differ between studies; and that the degree to which specific drivers affect energy hardship may differ in each country. A tabulated summary of studies is provided in Table 2A.

There are, however, limitations with understanding the global scale of energy hardship based on the literature. Most of the refereed academic literature originates from middle- and high-income countries, and the search for this literature review and many like it was restricted to English language articles. Energy hardship is the product of multiple factors, such as household income, energy prices, and the energy efficiency of households (Boardman, 1991; Bryant et al., 2022; Pan et al., 2021; Valente et al., 2022). These can influence the degree to which countries are impacted (Thomson et al., 2017). There are additional challenges that affect how energy hardship is measured and monitored, including how it is formally defined and what indicators are used to determine who is at risk. These challenges variably affect the way countries recognise and act on energy hardship. Nevertheless, the refereed literature suggests that energy-health hardship nexus may be a widespread issue.

Energy hardship in Australia and Victoria

It is estimated that up to 2−14 per cent of Australian households currently suffer energy hardship, depending on the definition and indicators used (Nance, 2013; Vera-Toscano & Brown, 2022). The literature also suggests that there are particular groups of people in Australia that are more at risk of energy hardship than others (Bryant et al., 2022; Vera-Toscano & Brown, 2022), including:

- Individuals within the lowest 20 per cent of household incomes;
- Individuals renting in public or community housing;

- Individuals or households relying on Jobseeker payments;
- Single parent households;
- Households with long term health condition or disability; and
- Immigrants from non-English speaking countries.

In general, the groups identified are, or are likely to be on lower incomes and experience hardship in many areas as a consequence, and groups who may have more difficulty accessing information because of language or other barriers.

There are factors specific to Australia that should be considered in conjunction with international evidence when considering the extent of energy hardship. Seasonal fluctuations in climate, for example, mean that the Australian population may experience difficulties in maintaining adequate warmth during winter and cooling during summer (Awaworyi-Churchill & Smyth, 2021a). It is also important to consider Australia's socioeconomic status, as living standards play a moderating role in the relationship between energy hardship and health, with fewer negative effects of energy hardship observed where there are higher living standards (Pan et al., 2021). There is a pre-existing relationship between lower socioeconomic status and poorer health outcomes (e.g. de Leeuw et al., 2021), and these factors are likely amplified by energy affordability.

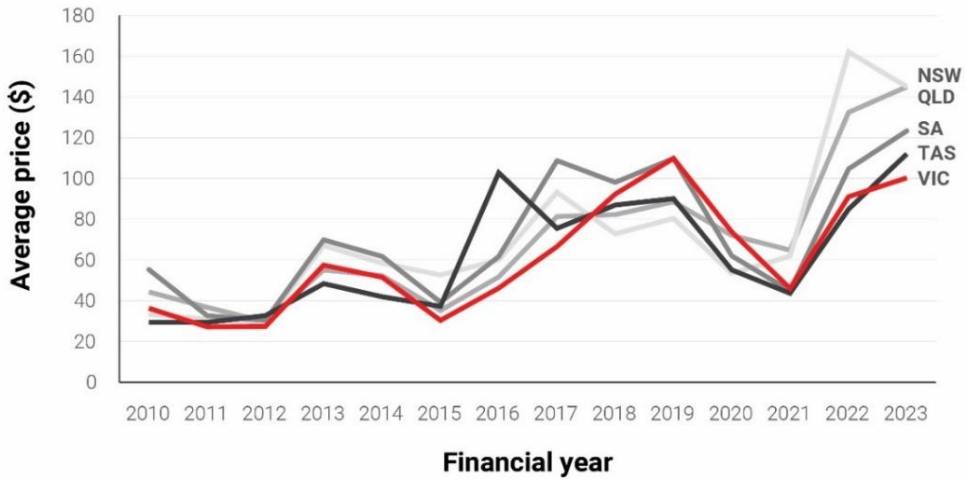

Figure 3: Average electricity price per state per fiscal year between the years 2010–2023.
Source: Australian Energy Market Operator.

The effects of energy hardship are also clear at the state level. Analysis of data from the 2014–2016 Household, Income and Labour Dynamics in Australia (HILDA) surveys suggests that 23.3 per cent of Victorian households face payment difficulty, and 5.4 per cent are unable to heat their homes (VCOSS, 2018).

In Victoria, where electricity and gas are private markets, the effect of rising energy retail charges has elicited debate (Figure 3). An independent review of Victoria's energy market by Thwaites et al. (2017) revealed that Victorians paid disproportionately higher prices for energy compared with other national and international markets. The review found that household electricity and gas prices increased almost 200 per cent between 2000–2017. The authors attributed this "market failure" to three factors: (i) high retail charges set by providers; (ii) ambiguous and strategically complex or confusing marketing practices; and (iii)

the overall structure of the market. A private energy market with competitive pricing may leave consumers feeling ill-equipped to navigate its complexity, leading to confusion and potentially mistrust (Section 7).

Recent research also suggests that there may be people in the community who experience challenges with energy affordability but may not be reached by current energy programs and concessions (Nicholls & Strengers, 2017; VCOSS, 2017, 2018). A recent VCOSS report (2023) found that, on average, more than one in ten Victorians eligible for energy concessions may miss out or do not claim the benefits they are otherwise entitled to. Reasons consumers do not receive such concessions include limited awareness, prevailing attitudes around the complexity of the application process, or the stigma associated with claiming assistance. There are also language, cultural and technological barriers associated with uptake.

In response, a wide array of research has been undertaken to explore how household wellbeing can be improved through policy and practice. Indeed, some of this work has informed government policies, regulatory instruments and energy market programs that are intended to prevent energy hardship or moderate its effects.

3. RESPONDING TO THE ENERGY-HEALTH HARDSHIP NEXUS

In this section we review the range of interventions for tackling energy hardship described in the literature, with particular emphasis on examples involving the health system.

A taxonomy of energy hardship interventions

Energy hardship is a multidimensional issue. In addition to its clear association with public health (Figure 4), energy hardship may also intersect with housing, financial hardship, and socio-demographic challenges (Valente et al., 2022). Due to these complexities, there is typically no single set of policies or governmental actions for tackling energy hardship, but rather a portfolio of measures (Bouzarovski et al., 2021; Daniel et al., 2020).

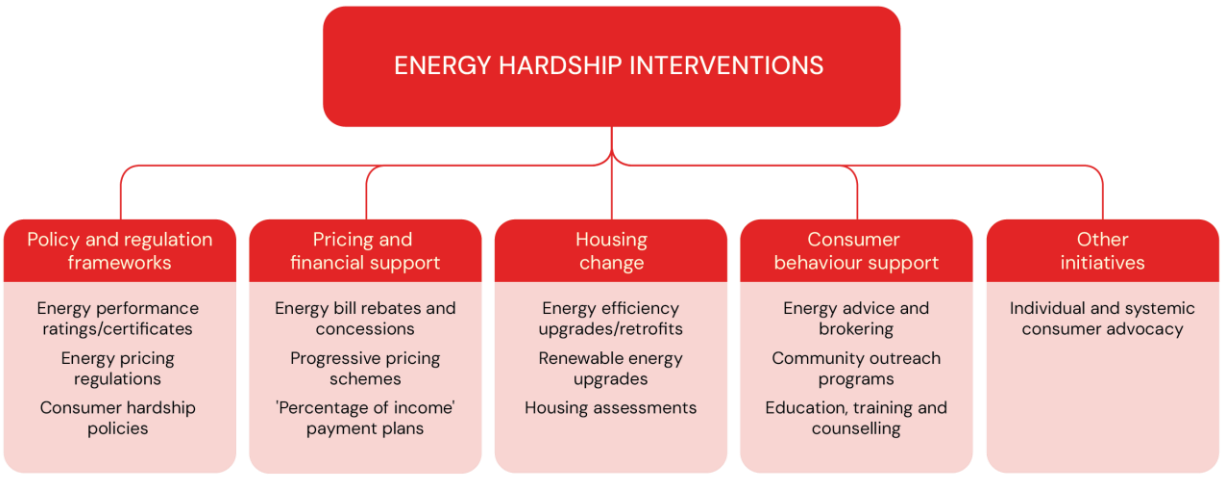

Figure 4: Summary of various interventions employed worldwide to tackle energy hardship.

Similar approaches are used internationally for reducing energy hardship (Figure 4). Much of this work has been led by the United Kingdom, whose contributions to the global understanding of energy hardship date back to the 1980s (Bradshaw & Hutton, 1983). This is discussed further in Section 4. The research team has

categorised the various energy hardship interventions into five groups, based on their overall function and outcomes.

Policy and regulatory frameworks provide the broad context for energy supply and generally aim to influence the private energy market to include measures for equitable energy pricing and access. For example, there are consumer hardship protections that mandate energy retailers to assist households unable to pay bills; or energy performance schemes, such as NatHERS in Australia[iii], which assesses the energy performance of households.

Pricing and financial support interventions aim to alleviate the financial difficulties experienced by households, and may include rebates, grants, concessions, and progressive pricing schemes. However, experts warn that these should not be relied upon exclusively, as: (i) there is a risk that some groups may not be effectively targeted (Bednar & Reames, 2020; Nicholls & Strengers, 2017; VCOSS, 2017; Willand et al., 2021); and (ii) they are considered as 'one-off solutions' that fail to address the long-term challenges of energy hardship (Das et al., 2022). In Australia, increases in energy prices are also outpacing the adjustment of income support payments (Willand et al., 2021).

Housing changes interventions aim to reduce energy consumption through making targeted improvements to the energy efficiency of housing and appliances (Ambrose et al., 2019; Ballesteros-Arjona et al., 2022). For example, upgrading households to green energy systems, such as solar photo-voltaic (PV) systems, is becoming an increasingly common intervention to enable energy self-generation and consumption management (Judson & Zirakbash, 2022; Judson et al., 2019). It is well-established that improving the energy efficiency of households can improve the health of inhabitants (Ballesteros-Arjona et al., 2022; Howden-Chapman et al., 2007; Maidment et al., 2014; Thomson et al., 2009), and can lead to energy cost savings (Howden-Chapman et al., 2007). A wide range of targeted programs and initiatives are designed to offer free or low-cost support to households to implement housing changes so that poverty and other factors that contribute to energy hardship do not also act as barriers to strategies that increase household energy efficiency and reduce energy use (e.g., Home Heating and Cooling Upgrades Program, see Table 4A).

Consumer behaviour support interventions aim to help consumers to address the health-energy nexus at an individual level. This may include: online tools to support decision making that are offered by government or energy providers (e.g. *Energy Info Hub* in Victoria; Section 6); education programs that aim to increase financial and energy literacy (e.g. the *Support for Energy Education in Communities* program in New Zealand; Section 4); and targeted referral programs involving health professionals identifying people who are most at risk of suffering poor health because of energy hardship (e.g., the *Weatherization Plus Health* program in Washington, US; Section 4). The intended outcome is that consumers will better navigate the energy market, access cost-effective energy offers and eligible concessions, and be able to assess the energy efficiency of their homes (Carrere et al., 2022; Willand et al., 2021). In some cases, the interventions include health promotion and chronic disease management elements that promote greater awareness of the relationship between energy hardship and individual health (e.g., the *Weatherization Plus Health* program).

It is important to note that these interventions do not happen in isolation, and that many examples identified in the literature involved components from multiple categories. An intervention with a core focus on improving housing energy efficiency may involve housing changes, outreach activities, counselling, and

[iii] **https://www.nathers.gov.au/**

may also rely on policy at state or national level (some examples are discussed in Section 4). Similarly, policy or regulatory measures are often intended to increase consumer awareness of their potential control of energy consumption and how to manage their bills effectively, with an assumption that people will act in their best interests to minimise potential energy hardship.

Health-related not-for-profit organisations may also be involved in individual and systemic consumer advocacy. This includes advocating for people who are in crisis (e.g., requesting energy-related debts are waived and addressing legal issues) and campaigning efforts that aim to influence decision-making at a policy and program level. For example, the Right to Energy Coalition[iv] is a cross-sectoral collaboration that includes the Health and Environment Alliance (HEAL). The coalition undertakes numerous lobbying and advocacy campaigns aimed at reducing energy hardship, such as disconnection bans, free of charge renovations for energy poor households.

How health systems currently participate

A key question in this review is if and how health systems currently participate across energy hardship interventions. Health professionals can play a significant role in the identification of energy hardship within the community through their interactions with individuals at risk (Castaño-Rosa et al., 2020; Nicholls et al., 2017; Scarpellini et al., 2017; VCOSS, 2023). Individual health professionals may also identify and connect people to energy assistance schemes as part of their daily practice or through an allocated role in targeted programs (Ambrose et al., 2019; Willand, 2022).

Health system actors may play a direct role in meeting the health demands of households experiencing energy hardship, without necessarily recognising the causal relationship. There is evidence that energy hardship is associated with increased use of health services in Europe (Castaño-Rosa et al., 2020; Oliveras et al., 2020), China (Nie & Li, 2023), Canada (Makasi, 2022), and the US (Berkowitz et al., 2015). Individuals may turn to health professionals for mental health treatment (Hernández, 2016).

There is little in the literature identified by this review that articulates the routine role of health professionals in addressing energy hardship as a specific social determinant of health, rather than a consequence of other factors. This may be because energy hardship is generally framed as an economic issue, rather than one of public health (Bouzarovski et al., 2021). Some authors have also commented on the limited intersectionality between health and energy policy development, which may occur in siloes (Strengers & Maller, 2011; Willand, 2022).

The modest number of international examples in the literature where health professionals have been involved in energy hardship interventions (Section 4) suggests that the collective experience and expertise of health care workers in responding to energy hardship, which may be critical for intervention co-design and implementation, has not been fully leveraged in Australia and internationally hitherto. At the very least, the role of the health system is not recognised in the literature outside of pilot and trial programs.

[iv] **https://righttoenergy.org/**

4. EXAMPLES OF INTERVENTIONS INVOLVING HEALTH SYSTEM ACTORS

There are some examples in the literature where there has been planned involvement by health system actors in energy hardship interventions. In this section, we provide overviews of energy hardship responses in several countries and describe examples involving health system actors. A tabulated summary of the examples described in this section is presented in Table 5A.

United Kingdom

There has been significant progress in energy hardship research (Boardman, 1991; Bradshaw & Hutton, 1983) and policy development (Hills, 2012; HM Government, 2015) in the United Kingdom. The importance of energy hardship as a public health issue has received considerable government attention. An independent review in 2012 (Hills, 2012) concluded that energy hardship (referred to as 'fuel poverty') was a major social problem in England with clear negative health outcomes, which led to the development of a comprehensive fuel poverty strategy and adoption of the *Fuel Poverty (England) Regulations 2014* (HM Government, 2015). The strategy, which outlines all government responses to energy hardship until 2030, recognises the importance of cross-sectoral approaches to energy hardship, including partnerships with the National Health Service (NHS). Fuel poverty is also included as an indicator in the Public Health Outcomes Framework (Office for Health Improvement and Disparities, 2023), which allows end users to analyse public health trends.

A core focus of the energy hardship response in the UK is on housing energy efficiency interventions. The National Institute for Health and Care Excellence (NICE) has published guidelines for health services and other sectors to promote energy efficient households and in turn mitigate winter deaths (National Institute for Clinical Excellence, 2015). Regional government health authorities may directly commission energy efficiency interventions. For example, the National Health Service Hastings and Rother Clinical Commissioning Group (England) established the *Healthy Homes* program, an 18-month pilot project that funded installation of major heating and insulation measures in energy-poor homes (the 'Winter Home Check Service') (Sawyer et al., 2022). The health system was involved as third-party organisations generating referrals. The project was found to have substantial benefits for the health and wellbeing of participants (Sawyer et al., 2022); however, only 1 of 149 referrals came from NHS providers and the lack of engagement by GPs was described as a source of frustration, given they were likely to have contact with those with the greatest need. Organisations who provided home-based support services were seen as important partners because of their existing knowledge of consumers' needs.

In other cases, programs have taken a more direct approach to collaborating with the community sector. The *Warm Front Scheme*, an energy efficiency improvement program that ran in England between 2000−2014, included strategies to support collaboration with health and other community service providers. (The Scheme was the successor to the *Home Energy Efficiency Scheme* and was replaced by the *Green Deal*.) The *Warm Front Scheme* was administered by a private energy service. This service established "Warm Front Network Teams" to work with key stakeholders to support the generation of referrals for the scheme, with a focus on increasing access to individuals at risk. Third party organisations promoted the scheme in a variety of ways, including through direct mailing, leaflets, advertising, online, and public outreach. Health service providers were seen as a mechanism to reach some of those most at risk, and the scheme benefited from being promoted by the Department of Health alongside its flu vaccination program. From 2005 to 2013, 1.5 million people were assisted by the scheme and 922,000 properties received at least one major energy measure. However, a cross-sectional survey of *Warm Front Scheme* participants found that only improvements in self-reported mental health were directly associated with the program

(Gilbertson et al., 2012). Stakeholders agreed that the collaborations with health services were beneficial for the Scheme (Department of Energy and Climate Change, 2014), but reported that no single avenue was key to generating demand and that hearing about the Scheme from multiple sources helped to build trust and confidence and added to the perceived trustworthiness of the scheme.

A more focused approach to the role of the health system in targeted interventions is seen in the *Warm Home Prescription* Scheme, piloted between 2021−2022 by Energy Systems Catapult (an "independent research and technology organisation") and Gloucestershire NHS (England)[v], and then expanded in 2022-2023 to include the London, Tees Valley and Aberdeen regions (Smith & Wilson, 2023). This scheme supports people with cold-sensitive health conditions to access a range of interventions. Local social prescribing link workers and health care professionals were trained to identify patients with heating cost concerns and chronic illness that is likely to be made worse by living in a cold home. After identifying eligible patients, people are contacted by the NHS and offered a "warm home prescription" to be delivered by local energy advisors. The advisors then liaise with the patient's energy supplier to calculate the total heating costs over the winter period and organise payment for the services for eligible households. Seventy percent of the program expenditure in 2022-2023 was for energy bill payments[vi]. Local energy advisors could also undertake home visits and advise on installation of heating controls, heating systems and other energy efficiency measures. These types of interventions comprised 3% of the program costs in the 2022-2023 winter period. A "Warm Home Prescription Digital Platform" was used to support assessment, energy cost pricing, delivery and monitoring of the WHP project. A pilot study report[vii] noted that the NHS brand and follow-ups gave patients more confidence that the service was legitimate. In the expanded 2022-2023 trial, 823 individuals received a prescription. There was very little uptake in two of the four regions, but no explanation was offered in the evaluation report. The evaluation found that on average, more than three quarters of baseline survey respondents reported their homes were being heated to a healthy temperature, although two-fifths said they were did not normally feel comfortably warm in their living room during a normal winter. A follow-up survey indicated a significant increase in this proportion after the program. Individuals also reported significantly higher overall life satisfaction and reported a range of positive changes since they received a WHP. A Value for Money analyses suggested that, for every £1 of expenditure, the *Warm Home Prescription* supported £5.1 of social value to patients in the form of short-term wellbeing (self-reported).

United States

Unlike the UK, the US has not formally recognised energy hardship, or any similar terms, in any statutory capacity (Bednar & Reames, 2020). Two longstanding government programs, the *Low Income Home Energy Assistance Program* (LIHEAP) and *Weatherization Assistance Program* (WAP), have responded to energy hardship through financial support and home energy efficiency upgrades, respectively[viii]. However, these programs have been criticised for not meeting demand and showing 'pseudo-recognition' of the actual scale of energy hardship across the US (Bednar & Reames, 2020).

From 2015 to 2018, the Washington State Department of Commerce rolled out a program that extended the WAP to incorporate a more active role for the health system. The *Weatherization Plus Health* (Wx+H)

[v] **https://energyconsumersaustralia.com.au/wp-content/uploads/Paul-Jordna-Presentation-Foresighitng-Forum-2023.pdf**
[vi] **https://www.shu.ac.uk/centre-regional-economic-social-research/publications/warm-homes-prescription-impact-and-vfm**
[vii] **https://es.catapult.org.uk/report/warm-home-prescription-pilot-report/?reportDownload=https://es.catapult.org.uk/wp-content/uploads/2022/10/Warm-Home-Prescription_Pilot-Summary.pdf**
[viii] The term 'weatherization' is commonly used in the US to refer to housing energy efficiency upgrades.

initiative funded some high performing "weatherization agencies" to establish community partnerships with community-based medical and public health entities and other community organisations to develop, test and deploy new strategies to deliver the Matchmaker Low Income Weatherization Program in a more integrated way (Schueler, 2018). Health agency partners were supported by the Weatherization agencies and undertook different activities. Three of the Weatherization agencies identified and prioritised high need households, while others provided services to existing clients who were identified as having respiratory conditions. Some of the public health agencies and clinics were delivering medical home visit services and these were seen to be particularly valuable for reaching households with medical needs that could be helped by energy measures, and providing a more integrated service model, including education and follow-up visits with medical case management-related services (e.g., asthma/COPD self-management). Where health agency partners focused more on referral with no follow-up, the evaluation suggested that referrals were not always aligned to eligibility criteria, and the home visits provided by the weatherization agencies did not recognise or address health issues (Schueler, 2018). In addition to 254 home who received measures and services through the WAP Matchmaker program, 211 homes received low-cost Healthy Home measures delivered that were funded by community partners. While only 23% of homes that received the complete set of measures originated from referrals by community partners, which included health services (Schueler, 2018), the evaluation noted that health services that provided care through home visits were effective and delivered health interventions as well as energy efficiency measures.

Ireland

Government concessions to improve the energy efficiency of homes are common in Ireland[ix], and in some cases, have been run in partnership with the health system. For example, the *Warmth and Wellbeing Pilot Scheme*[x], which ran in Dublin between 2016−2019 (and continues as the *Warmer Homes Scheme*), supported public health services to assess applications from people facing energy hardship who had existing chronic respiratory conditions against eligibility criteria and refer them to the Sustainable Energy Authority of Ireland (SEAI) for SEAI home surveys and energy efficiency upgrades. Households had to include someone under 12 years or over 55 years old as a habitual resident and be in receipt of a fuel allowance or one-parent family payment already. There was no information about how health professionals were trained to identify potential applicants. Over the three-year period, 1,300 homes were upgraded and impacts reported included: increases in indoor winter temperatures; self-reported health and wellbeing impacts (mobility, self-care, pain, emotional wellbeing, physical activity and symptoms, social functioning); reduced use of health service including fewer visits to GPs, fewer presentations to Emergency Departments and fewer hospital admissions; and reduced volume of prescribed drugs. Self-reported heating related impacts included increased thermal comfort, reduced difficulty paying fuel bills, an improved sense of control over indoor temperatures and improved social inclusion. Modelling based on the results predicted lower mortality, especially from cardiorespiratory conditions.

[ix] **https://www.gov.ie/en/press-release/government-launches-the-national-retrofitting-scheme/#**
[x] **https://www.seai.ie/grants/home-energy-grants/fully-funded-upgrades-for-eligible-homes/warmth-and-wellbeing/2018-10-WarmthWellbeingA5Booklet.pdf**

New Zealand

Unlike Australia, New Zealand has a formal definition of energy hardship[xi], a set of measures for monitoring trends, a framework of energy wellbeing, and numerous forms of legislation that regulate energy pricing[xii]. Federal funding is allocated to assist with energy bill payments, such as the *Winter Energy Payment* scheme[xiii].

New Zealand also funds energy hardship initiatives through the national *Support for Energy Education in Communities* scheme, a competitive grants program that allows successful recipients to contribute to "the provision of personalised, specialist advice and education to households in energy hardship, and purchasing low-cost energy-saving equipment and devices"[xiv].

There are a few examples in the literature where health service providers have been involved in delivering projects. The *Healthy Homes Initiative* (HHI), co-funded in part by the Ministry of Health, is a national cross-sectoral program operating through District Health Boards that connects low-income households with appropriate housing interventions (e.g. insulation, heating, relocation, education) to improve energy efficiency and other outcomes (Pierse et al., 2022). HHI providers, which include Māori and public health services, along with housing and sustainability providers, identify eligible families. Health and housing assessors employed through the initiative undertake housing assessments and subsequently work with agencies and other partners to facilitate access to a range of interventions to create warmer, drier, healthier homes. The program cost $55.6M for staff salaries from 2014-2021, and a further $30M in 2022 when the program was rolled out nationally. A three-year follow-up identified significantly reduced hospitalisations for referred children & their wider family/community (20%), increased school attendance, reductions in days off for medical reasons, and positive employment outcomes.

Australia

Policy development in Australia has focussed on the economic factors of energy hardship, by reducing the effects of high energy costs and assisting consumers in at risk circumstances (Awaworyi-Churchill & Smyth, 2021b). The National Energy Retail Rules, rule 75A(1) requires the Australian Energy Regulator (AER), an independent regulator of the wholesale electricity and gas markets in Australia, to develop, maintain and publish a binding Customer Hardship Policy Guideline (Australian Energy Regulator, 2019). The Guidelines obligates energy retailers to maintain a hardship policy that protects and assists customers experiencing payment difficulties. The Australian Government also provides the *Energy Bill Relief Fund*[xv], which offers financial support for energy bill payments.

In some states[xvi], electricity costs are guided by the Australian Government's Default Market Offer (DMO), the reference price calculated for each electricity zone based on the average usage and varies temporally based on the state of the economy. In 2023, for example, the Australian Government announced a 21–24%

[xi] In New Zealand energy hardship is defined as being "not able to obtain and afford adequate energy services to support their wellbeing"

[xii] Indicators and framework can be reviewed on the MBIE website: **https://www.mbie.govt.nz/building-and-energy/energy-and-natural-resources/energy-hardship/defining-energy-hardship/**

[xiii] **https://www.workandincome.govt.nz/products/a-z-benefits/winter-energy-payment.html**

[xiv] **https://www.mbie.govt.nz/building-and-energy/energy-and-natural-resources/energy-hardship/support-for-energy-education-in-communities-programme/**

[xv] **https://www.energy.gov.au/government-priorities/energy-programs/energy-bill-relief-fund**

[xvi] The DMO applies to small business and residential customers in South Australia, New South Wales, and south-east Queensland.

price increase to the DMO (depending on location). Elsewhere, electricity prices are regulated by state-based authorities, for example the Economic Regulation Authority in Western Australia and the Essential Services Commission in Victoria.

The role of the health system in addressing energy hardship has been explored in the literature to some extent with health care workers involved in energy hardship-related research as stakeholders, informants or focus group participants (Nicholls et al., 2017; VCOSS, 2023; Willand, 2022). However, there is overall a low level of evidence about how health service actors have been actively involved in the energy hardship response. Programs and Initiatives that have operated in Victoria are summarised later in this report.

5. BARRIERS TO HEALTH SYSTEM INVOLVEMENT

Some contextual and other factors that are likely to affect the level of involvement of health systems in addressing energy hardship were identified in the literature.

Lack of shared definitions and measures

Some researchers have suggested that a fundamental issue in some countries may be simply that energy hardship hasn't been formally defined, nor has an appropriate set of indicators been established for identifying the characteristics of those at risk (Bouzarovski et al., 2021; Hernández, 2016; Hernández et al., 2022). There is no consistent definition for energy hardship at a policy level in Australia (Chandrashekeran et al., 2022), Canada (Das et al., 2022), the US (Bednar & Reames, 2020), and many European countries (Bouzarovski et al., 2021). Definitions and measures of energy hardship at a government level allow countries to fully conceptualise the issue and appropriately measure and address the challenges faced by households experiencing the hardship. It is possible that, in the absence of these essential elements, there may an underdeveloped recognition of key stakeholders that can assist in energy hardship response, including the health system. The challenges regarding energy hardship definitions and indicators are explored further in Section 7.

Policy fragmentation

Many researchers have noted that there may be a siloed approach to energy hardship policy, and a lack of integration between policy makers in different sectors (Bouzarovski et al., 2021; Strengers & Maller, 2011; Willand, 2022). Well-rounded energy hardship policy should be informed by stakeholders across energy, social policy, health, business, housing, planning and regional development sectors (Bouzarovski et al., 2021). It may be the case in some countries that energy hardship responses by different sectors have been developed in isolation, and thus the potential role for health systems in designing and delivering appropriate energy hardship responses has not been fully realised.

Program funding patterns

The duration of funding of energy hardship programs reported in the literature ranges from short-term or one-off to ongoing. Initiatives, such as the *Support for Energy Education in Communities* scheme in New Zealand, may receive rolling funding, whereas other interventions like the *Warm Home Prescription* scheme may be short term pilots. It is clear that some programs have continued to provide similar interventions and energy hardship measures but have had name changes over time. The reason for these changes is not clear in the literature.

Health system barriers

Some literature refers to barriers to participation in interventions experienced by particular health professionals. For example, general practitioners that participated in the *Warm Home Prescription* reported a lack of time for referring eligible individuals to the program, which is a commonly reported barrier for programs involving GPs. The *Healthy Homes* program evaluation also reported frustration that GPs and other social health providers did not generate many referrals and noted that fee-for-service funding models that prioritise throughput are not conducive to including information about energy hardship. The *Warm Front Scheme* evaluation reported that referrals from third party organisations was a strength of the scheme, but they noted that there were different approaches at the local authority level in how they trained frontline staff and that health services varied in what they did to support their role.

6. THE ROLE OF THE HEALTH SYSTEM IN TACKLING ENERGY HARDSHIP IN VICTORIA

In this section we refine the lens and review current practices within Victoria reported in refereed and grey literature. We review examples of Victorian interventions where health system actors have been involved and investigate the wider role of the health system in tackling energy hardship.

Victoria's response to energy hardship

Before investigating relationships between the health system and energy hardship in Victoria, it is useful to review the current range of approaches being undertaken to alleviate energy hardship by the state, and the key actors delivering these approaches. This will provide an overview of the current 'state of play'.

Like other countries and jurisdictions, the Victorian Government's response to energy hardship focusses on direct financial support to householders, improving housing energy efficiency, consumer protection initiatives, and information tools that promote energy advice. The Victorian Government offers a range of concessions to eligible households that subsidise energy costs, such as rebates, utility relief grants and transfer fee waivers[xvii] (Table 3A). Some of these concessions are run in conjunction with federal programs. For example, in 2022 the Victorian Government implemented an annual electricity concession scheme, the state counterpart of the Commonwealth Government's *Energy Bill Relief Fund*[xviii]. Under this scheme, Victorians can claim a $250 annual energy rebate (the *Power Saving Bonus*; PSB), provided in periodic instalments on bills across the fiscal year.

A range of other Victorian programs and initiatives across the broader spectrum of energy hardship were identified during the literature review process (Table 4A). As observed internationally, most of these initiatives focus on improving the energy efficiency of properties through retrofits and installation upgrades, which in turn reduces household energy consumption. Collaboration between public, private and not-for-profit sectors, and between local and state government jurisdictions, is commonly observed across energy efficiency initiatives. They may also be funded as part of broader federal programs, such as the *Low-Income Energy Efficiency Program*[xix].

Some Victorian government initiatives include offering tools to support consumers to make effective behaviour change, such as navigating the energy market and improving energy efficiency literacy. For

[xvii] https://services.dffh.vic.gov.au/energy
[xviii] https://www.energy.gov.au/government-priorities/energy-programs/energy-bill-relief-fund
[xix] https://www.energy.gov.au/publications/low-income-energy-efficiency-program-lieep

example, the *Victorian Energy Compare* (VEC) online tool allows users to navigate the most suitable energy offers relative to their circumstances (e.g. location, eligibility for concessions). Households were required to use the VEC website to check the best market offer before they could access the PSB payment. Resources like the *Energy Assistance Program* and *Energy Info Hub Outreach Program* offer individualised energy assistance for low-income households and concession card holders.

There are also state-based policy frameworks that support and protect energy consumers. The Victorian Default Offer (VDO) was implemented by the Essential Services Commission (ESC) in 2019, following recommendations in Thwaites et al. (2017). The VDO is a reference price set by the ESC, which acts as a safeguard against unreasonably priced market offers, and a price cap on charges in embedded networks. Most market offers tend to be more affordable than the VDO, however the VDO acts to protect consumers who are unable or unwilling to engage with the retail market. The Victorian Government also enforces customer hardship policy guidelines. Under these measures, energy retailers must introduce and maintain protections for energy customers experiencing payment difficulties due to hardship.

Overall, the predominant focus for tackling energy hardship in Victoria is through financial support for individuals/households and energy efficiency interventions. The role of the health sector in these kinds of measures is not usually specified. There are few instances reported in the literature where there is planned involvement of health system actors (e.g. Lynch et al., 2016). While Victoria's approach is not dissimilar to those in other countries, such as Canada (Das et al., 2022), opportunities remain for a more holistic response to energy hardship that leverages the expertise of health system actors.

Examples of Victorian interventions involving health system actors

There are a small number of instances in the literature that describe the role health services have played in Victoria in reducing energy hardship. A tabulated summary of these examples is presented in Table 6A and are described briefly below. As observed internationally, the nature of the role varies across the interventions.

In general, the role of the health system has been to link consumers who are experiencing or at risk of experiencing energy hardship to programs and measures that offer relief. This is primarily through outreach activities or through targeted referrals to government programs. For example, cohealth collaborated with the *Energy Info Hub* project to identify energy concessions and improve energy literacy among public housing residents facing energy hardship[xx]. Over a two-month period in 2022, more than 100 public housing residents in Collingwood were visited by cohealth staff who were community workers. The community workers (called "Concierges") made appointments for Energy Info Hub teams to assess homes and provide support with energy cost saving measures and access to more affordable energy plans.

The *$250 Power Saving Bonus* scheme in Victoria also includes an outreach program and is delivered in partnership with social services charities, who can connect directly with those most at risk (Table 2A). A media release by the Premier of Victoria reported that "three quarters of households who applied through the Community Outreach Program received assistance on applicable energy concessions"[xxi].

[xx] **https://www.cohealth.org.au/news/taking-the-heat-out-of-energy-bills-for-people-in-public-housing/**
[xxi] **https://www.premier.vic.gov.au/helping-victorians-need-access-power-saving-bonus**

The *Glenelg SAVES* project (Lynch et al., 2016), which ran from 2013−2016, was funded in Victoria as part of the Australian Government's *Low-Income Energy Efficiency Program*[xxii], and provided tailored energy efficiency training for home and community care workers that could be used for undertaking home energy assessments and providing energy advice to low-income households. This intervention is notable as it was led in part by health system actors, the Western District Health Service – Southern Grampians Glenelg Primary Care Partnership[xxiii]. A process evaluation found that the intervention increased beliefs about energy efficiency knowledge in staff and clients but found the electricity use was not reduced. Nevertheless, the report recommended extension of the program and promotion of energy efficiency within public health services (Lynch et al., 2016).

The *Victorian Healthy Homes Program* was a randomised controlled trial that measured the effects of energy efficiency upgrades to low-income households on health care utilisation, among other measures (Campbell et al., 2022). The project, designed and led by Sustainability Victoria, partnered with local governments and health care organisations to recruit participants into the program. The Australian Energy Foundation (AEF) engaged community and social services agencies to undertake home visits and consult with participants. AEF was responsible for delivering the home upgrade components of the project, which included home safety checks and arranging certification of the work by contractors. Evaluation of the project found that individuals in the upgraded homes used fewer services and had lower health costs (Sustainability Victoria, 2022). The evaluation concluded that "the upgrade would be cost-saving within three years – and would yield a net saving of $4,783 over 10 years – due to savings in both energy and health. Savings were heavily weighted towards healthcare: for every $1 saved in energy, more than $10 is saved in health" (Campbell et al., 2022).

Scoping the role of the Victorian health system

Some work has been undertaken in Victoria to investigate where health systems *could* be involved in energy hardship interventions. For example, Willand (2022) explored stakeholder perceptions of integrating energy assistance and energy efficiency retrofits into the Australian In-Home Care platform of the federal My Aged Care program[xxiv], a national aged care service addressing physiological, mental and social health needs. Willand's study highlights opportunities for collaboration between energy and health sectors but recognises challenges such as funding arrangements and convincing health policy makers of the health risks associated with energy hardship.

Integrating energy hardship related support into Australian health services more visibly, and vice versa, has been recommended by researchers and advocacy groups (Daniel et al., 2020; Lynch et al., 2016; Nicholls et al., 2017; Nicholls & Strengers, 2018; VCOSS, 2018). Common advocacy themes include: upskilling of health care staff and frontline workers to provide energy advice (Nicholls et al., 2017; VCOSS, 2018); improved public messaging from health services regarding energy efficiency (Nicholls et al., 2017; VCOSS, 2021); energy-related referral systems in health system settings (VCOSS, 2017, 2018); connecting health services with energy assistance platforms, including independent brokers (VCOSS, 2017, 2018, 2021); and

[xxii] **https://www.energy.gov.au/publications/low-income-energy-efficiency-program-lieep**

[xxiii] Primary Care Partnerships were set up in Victoria 2000 as a mechanism for bringing health system stakeholders together to plan and implement system-level change. There were 28 PCPs. They were defunded in 2022 and some functions were transferred to Local Public Health Units. An online searchable repository of work undertaken by PCPs, including the Glenelg SAVES project, is available at **http://vicpcp.org.au**.

[xxiv] **https://www.myagedcare.gov.au/**

incorporating energy assistance services into state and national health care schemes (VCOSS, 2018; Willand, 2022).

It is also commonly argued that health system actors are a critical yet under-engaged stakeholder, and are an essential voice for cross-portfolio initiatives to reduce energy hardship (Bouzarovski et al., 2021; Daniel et al., 2020; National Institute for Clinical Excellence, 2015; Strengers & Maller, 2011; Willand, 2022). The literature lacks information about the role of health and social service professionals who address the social determinants of health as part of their routine practice, particularly at an individual consumer level. The literature review identified programs and planned interventions that involved health and energy system actors. We did not search the literature for information that would indicate how energy hardship might be addressed as part of usual care, particularly in settings that reach people who experience a range of disadvantages and/or experiences that contribute to inequities in health and access to healthcare and social support services. In this context, energy hardship is one of many possible consequences of and contributors to health inequities, and health professionals will try to respond to need. Recognising energy hardship more explicitly at a system level would encourage its inclusion in assessments of and responses to health and social needs, increasing awareness of the role of the health system and encouraging further development and strengthening of that role.

7. CONTEXTUAL CHALLENGES

While there is likely to be an informal effort by health and social care workers to respond to energy hardship, the literature suggests that explicit collaboration between energy, housing, and health sectors is rare. This gap in collaboration may be further complicated by fundamental challenges with advancing energy hardship mitigation in Australia. We now review some of these broader issues affecting state and national responses to the energy-hardship nexus.

Conceptual and semantic issues

Energy hardship is related to wider concepts of ‘energy poverty’ and ‘fuel poverty’, which can be traced back to early work in the UK by Isherwood and Hancock (Liddell et al., 2012), Bradshaw and Hutton (1983) and Boardman (1991). Similar terminologies in the literature include ‘energy burden’, ‘energy insecurity’, ‘energy stress’, and ‘energy vulnerability’.

‘Energy hardship’ has tended to focus on the financial burden of energy costs, whereas terms such as ‘energy poverty’ or ‘fuel poverty’ may encompass energy accessibility and infrastructure. Despite this, these terms are often used interchangeably across the literature, which has led to ambiguity regarding their use, and potentially causing miscommunication between researchers and decision makers (Castaño-Rosa et al., 2019).

This issue has been addressed in detail by Hernández (2016) and Hernández et al. (2022), both arguing that a lack of common language may hinder effective research and communication, and subsequently stall the development of quantitative assessment instruments and appropriate allocation of resources. Hernandez et al. analysed the range of terminologies and categorised them into distinct contexts (Table 1 in Hernandez et al., 2022).

As well as having a distinct conceptual provenance in the UK, the concepts are also temporally and spatially focussed. In Australia and New Zealand, ‘energy hardship’ appears to be the most locally appropriate term for describing energy affordability issues, gaining prominence from the beginning of the 2010’s (Brabo-

Catala et al., 2022). Other terms that may be used in similar circumstances include 'energy insecurity' and in particular 'economic energy insecurity' (Carley et al., 2022; Hernández, 2016).

These semantic issues mean that it may be hard to recognise and communicate energy hardship as a distinct social and public health issue. Australia has no formal legislative definition for energy hardship, energy poverty or any similar constructs. Instead, such constructs are referred to in loose terms, such as households "struggling to pay energy bills" (The Hon Jacinta Allan, 2020). Chandrashekeran et al. (2022) have argued that a lack of clear definition, measurements, targets, and metrics for energy hardship in Australia is preventing appropriate governance and reporting.

It has thus been argued that a clear and agreed upon definition must be a policy priority (Bryant et al., 2022). Without these foundational components, scale of the issue and an operational framework that systematically outlines how to manage energy hardship and evaluate success cannot be achieved.

Indicators of energy hardship

In addition to a robust definition, energy hardship indicators are critical to understanding its prevalence, to ensure appropriate measurement and monitoring, to aid policy development, and to set clear targets. It is argued that a lack of appropriate indicators in Australia, moreover a well-developed conceptual framework, stymies policy and program development and leaves many households unidentified and at risk (Bryant et al., 2022; Chandrashekeran et al., 2022).

There is no single robust and defensible means of identifying energy hardship within a population. Numerous methods are currently used, all of which carry limitations when used in isolation (Tirado Herrero, 2017).

Indicators for energy hardship vary from traditional qualifiers, for example when a household spends over 10 per cent of its income to heat its home to an acceptable temperature (Boardman, 1991); to more dynamic forms such as the Low Income Low Energy Efficiency (LILEE) compound indicator in the UK (Bednar & Reames, 2020; Chandrashekeran et al., 2022). There are also self-reported measures of energy hardship, which may be collected through surveys like the Household, Income and Labour Dynamics in Australia (HILDA) survey in Australia (Awaworyi-Churchill et al., 2020; Azpitarte et al., 2015; Bryant et al., 2022; Hailemariam et al., 2021; VCOSS, 2018). In this survey, participants are asked about their annual energy bill expenditures and if they are unable to heat their home because of a shortage of money.

These various indicators can spotlight distinct aspects of energy hardship, and often identify different types of 'at risk' individuals. It is therefore best practice to employ multiple indicators to yield the most comprehensive profile of households at risk (Azpitarte et al., 2015). For example, in New Zealand the Ministry of Business, Innovation and Employment use 26 indicators to identify energy hardship (Brabo-Catala et al., 2023).

In Australia, indicators of energy hardship focus mainly on hardship program participation, energy disconnections, and levels of debt (Chandrashekeran et al., 2022). A formal set of indicators will be essential for capturing the scale and characteristics of energy hardship into the future.

Type of energy hardship

Consideration must be given to different types of energy hardship. *Warming-based* energy hardship, or the inability to warm homes in cold settings, forms the foundation of global evidence (Boardman, 1991). The

evidence for its effects is well-documented in the literature, with studies undertaken across wider Europe, as well as New Zealand, the UK, and the US. The World Health Organization also focusses on warming in its literature on energy hardship (World Health Organization, 2007).

Cooling-based energy hardship, the inability to cool homes in hotter settings, is comparatively less understood, with a modest collection of literature contributed by southern and continental European countries (Bienvenido-Huertas et al., 2020). Champagne et al. (2023) have addressed the lack of focus on this subdomain of energy hardship, and the over-representation of warming-related literature.

There is a small number of publications that specifically address cooling-related energy hardship in Australia (Awaworyi-Churchill & Smyth, 2021a; Nicholls et al., 2017; Nicholls & Strengers, 2018). This is particularly important given the forecasted rise in the increased frequency of extreme heat days in Victoria (Department of Environment Land Water and Planning, 2019).

Problems arise when combining the two constructs, as there are differences in geography, climate, and the type of energy sources and appliances required to address them (e.g. boilers, thermal insulation and gas sources are important in warming-based energy hardship, but not cooling-based energy hardship). Consequently, they may be subject to different policy actions (Davillas et al., 2022; Nicholls & Strengers, 2018).

Australia may be in a complex situation due to temporal and spatial variations in temperatures across its expanse, and the differences in heat extremes evidently have specific health consequences, measurements, and indicators. This will likely complicate quantitative assessments of energy hardship and, in turn, the development of appropriate policy (Chandrashekeran et al., 2022), what roles health system actors should play in responding to the different forms of energy hardship.

Other challenges to consider

As discussed in previous sections, energy hardship is a complex social issue that requires stakeholder activation across energy, health, housing, and economic sectors (Valente et al., 2022). A lack of cross-sectoral collaboration, connecting policy makers in different settings, has been criticised as preventing effective responses to the challenge (Bouzarovski et al., 2021).

Ambiguity in energy marketing and messaging may also act as a precursor to energy hardship. In Victoria's privatised energy market, the means by which energy retailers market their services has been criticised (Thwaites et al., 2017). Ambiguity around energy prices and general public messaging leads to public distrust, confusion, and a general reticence to participate in otherwise well-meaning programs and concessions (Nicholls et al., 2017; VCOSS, 2017).

8. CONCLUSIONS

There is clear evidence that energy hardship leads to social inequities and places significant burdens on public health, a relationship that can be described as the *energy-health hardship nexus*. While the true scale of this nexus is unclear from the literature—related to challenges with how energy hardship is defined, measured, and reported—there is evidence of a link between energy hardship and poor public health in many countries. Analysis of public health data across 143 countries suggests that reducing energy hardship can tangibly reduce health vulnerability resilience and improve overall public health (Pan et al., 2021).

In addressing the question of how health system actors currently participate in tackling energy hardship, the limited literature identified for this review suggests that health systems have generally been engaged as intermediaries between energy-related policies and programs and individuals experiencing energy hardship. This has focused on their role identifying and referring consumers to a range of energy hardship measures (e.g. Department of Energy and Climate Change, 2014; Gilbertson et al., 2006; Schueler, 2018). Program evaluations discovered through this literature review suggest that where health services have participated in energy hardship interventions, there have been positive health outcomes (Gilbertson et al., 2012; Pierse et al., 2022; Sawyer et al., 2022; Schueler, 2018). Health and social services with existing relationships to people who are likely to experience energy hardship have been involved directly in a range of programs, with the intent of improving the reach of measures and interventions to those that need them most.

While the current literature review did not explore the ways in which health system actors address other social determinants of health, the role of health professionals in identifying those at risk of or currently experience a range of negative consequences because of social factors and experience and linking people to available services and resources is well established. Some recent initiatives have labelled this role as 'social prescribing' (Wells et al., 2020), but it has been an element of much of the health sector and some professions for many years. It is logical, therefore, to frame health providers as critical stakeholders in responding to energy hardship challenges, and to foster a more collaborative cross-sectoral approach in the design of appropriate interventions.

Outside of government financial support schemes, the most common interventions for reducing energy hardship are programs involving energy efficiency improvements to housing. Indeed, there is widespread evidence that such interventions lead to better health outcomes (Ballesteros-Arjona et al., 2022; Howden-Chapman et al., 2007; Thomson et al., 2009), and decreased health care costs (Howden-Chapman et al., 2007; Telfar Barnard et al., 2011). It is, therefore, in governments' interests to support such interventions.

The current literature review identified some examples where health system actors had an identified role in energy-hardship programs and measures. In general, health system actors participated in identifying people who would be eligible for programs and supporting them to access those programs by referring them or supporting them to apply directly. One initiative (*Weatherization Plus Health*) that aimed to increase integration between energy and health systems provided funding to energy agencies to support them to develop partnerships with health and community organisations. Those agencies that engaged with community-based health services that provided home-visits observed a range of health-related services were delivered as part of the engagement with the program. This suggests that seeking to engage the health system in more integrated responses to the health-energy nexus may be strengthened by considering which parts of the system are most appropriate to the proposed role. In Victoria, the large community health sector and wide range of non-for-profit community-based services are well positioned at a systems level to take on an active role as partners in addressing the health-energy nexus.

The literature review suggested there are broader challenges that may be preventing recognition of the energy-health hardship nexus in Australia. Addressing these issues is likely to create a more supportive context for future efforts to draw the health system into an integrated response to the health-energy nexus. There is a need to widen the conceptualisation of energy hardship and recognise its intersectionality with health, as well as other policy domains such as housing, sustainability, climate change and economics. At a national level, a federal strategy that includes formal definitions and indicators, reduction targets, and

periodic evaluation, will become critical as temperatures systematically increase and more households are placed at risk of energy hardship.

Implications and recommendations

Based on this literature review, the response to the energy-health nexus is likely to be strengthened by stronger and more strategic engagement of the health system. This could include:

- Energy hardship policy that is informed by stakeholders across energy, social policy, health, business, housing, planning and regional development sectors.
- Strategic engagement of health services and energy assistance programs at the management level. To be successful, this kind of activity needs to be facilitated and funded.
- Upskilling relevant health care staff and frontline workers to provide health-related energy advice and support to access services and programs with a focus on those professions and services that are best suited to the role.
- Integration of energy-related referral programs into health IT systems to simplify referral pathways.
- Upskilling energy program staff about health impacts of energy hardship and how to respond.

The success of future interventions around energy hardship is likely to be greater if the broader context also strengthens the role of the health system in responding to the issue. This would involve:

- Clear recognition of the nexus between energy hardship and health across the energy, health and housing sectors, including in their policies and programs.
- Clear definitions and indicators for 'energy hardship', with distinctions between warming- and cooling-based hardship.
- Clear and transparent public messaging for energy pricing and concessions to foster public trust and engagement.
- Stronger collaborative approaches between energy and health systems for research, stakeholder engagement, planning, and program development.

Appendices

Table 1A: Tabulated summary of studies that have reported an association between energy hardship and health and/or wellbeing outcome.

Category	Condition	First author	Year	Area of focus
Mental	General mental health	Bentley	2023	Australia
Mental	Respiratory health	Bentley	2023	Australia
Mental	Anxiety	Carrere	2021	Spain
Mental	Depression	Carrere	2021	Spain
Mental	General mental health	Davillas	2022	UK
Mental	Depression	de Vries	2012	UK
Mental	Stress	Hernandez	2016	US
Mental	Depression	Mould	2017	UK
Mental	Anxiety	Mould	2017	UK
Mental	General mental health	Oliveras	2020	Spain
Mental	Anxiety	Sawyer	2022	UK
Mental	Depression	Thomson	2017	Europe
Physical	Cardiovascular diseases	Atsalis	2016	Greece
Physical	Respiratory diseases	Atsalis	2016	Greece
Physical	Cardiovascular diseases	Bentley	2023	Australia
Physical	Circulatory diseases	Bentley	2023	Australia
Physical	Diabetes control	Berkowitz	2015	US
Physical	Respiratory diseases	Carrere	2021	Spain
Physical	Cardiovascular diseases	Davillas	2022	UK
Physical	Arthritis and inflammation	Davillas	2022	UK

Category	Condition	First author	Year	Area of focus
Physical	Cardiovascular diseases	de Vries	2012	UK
Physical	Respiratory diseases	de Vries	2012	UK
Physical	Excess winter mortality	El Ansari	2008	UK
Physical	Respiratory diseases	Liddell	2010	UK
Physical	Communicable diseases	Liddell	2010	UK
Physical	Respiratory diseases	Mohan	2021	Ireland
Physical	Respiratory diseases	Oliveras	2020	Spain
Physical	Respiratory diseases	Oliveras	2021	Spain
Physical	Cardiovascular diseases	Pollard	2019	UK
Physical	Circulatory diseases	Pollard	2019	UK
Physical	Communicable diseases	Pollard	2019	UK
Physical	Obesity	Prakash	2021	Australia
Physical	Excess winter mortality	Recalde	2019	Europe
Physical	Arthritis and inflammation	Sawyer	2022	UK
Physical	Excess winter mortality	Wise	2011	UK
Wellbeing	Self-reported general health	Awaworyi	2021	Australia
Wellbeing	Subjective wellbeing	Awaworyi	2020	Australia
Wellbeing	Self-reported general health	Bartiaux	2021	Belgium
Wellbeing	Self-reported general health	Bosch	2019	Europe
Wellbeing	Self-reported general health	Carrere	2021	Spain
Wellbeing	Life satisfaction/quality of life	Davillas	2022	UK
Wellbeing	Self-reported general health	Davillas	2022	UK
Wellbeing	Self-reported general health	Kose	2019	Turkey
Wellbeing	Self-reported general health	Llorca	2020	Spain

Category	Condition	First author	Year	Area of focus
Wellbeing	Life satisfaction/quality of life	Oliveras	2020	Spain
Wellbeing	Self-reported general health	Oliveras	2020	Spain
Wellbeing	Self-reported general health	Oliveras	2021	Spain
Wellbeing	Self-reported general health	Sawyer	2022	UK
Wellbeing	Self-reported general health	Thomson	2017	Europe
Wellbeing	Life satisfaction/quality of life	Valente	2022	Australia

Table 2A: Publications reporting associations between energy hardship and poor health, and their respective country.

Country	First author	Year	Measures	Data/instrument
Australia	Awaworyi-Churchill	2021	Self-reported	Household, Income and Labour Dynamics in Australia survey
Austria	Bosch	2019	Self-reported	European Union Statistics on Income and Living Conditions
Bangladesh	Omar	2021	Self-reported	Household Income and Expenditure Survey
Belgium	Bartiaux	2018	Self-reported	European Survey on Income and Living Conditions
Bulgaria	Thomson	2017	Self-reported	European Quality of Life Survey
Bulgaria	Bosch	2019	Self-reported	European Union Statistics on Income and Living Conditions
Canada	Riva	2023	Self-reported	Canadian Housing Survey
China	Nie	2023	Self-reported	China Family Panel Studies
China	Zhang	2019	Self-reported	China Family Panel Studies
Croatia	Bosch	2019	Self-reported	European Union Statistics on Income and Living Conditions
Cyprus	Bosch	2019	Self-reported	European Union Statistics on Income and Living Conditions
Czech Republic	Thomson	2017	Self-reported	European Quality of Life Survey
Czech Republic	Bosch	2019	Self-reported	European Union Statistics on Income and Living Conditions
Denmark	Bosch	2019	Self-reported	European Union Statistics on Income and Living Conditions
Estonia	Thomson	2017	Self-reported	European Quality of Life Survey
Estonia	Bosch	2019	Self-reported	European Union Statistics on Income and Living Conditions
Finland	Bosch	2019	Self-reported	European Union Statistics on Income and Living Conditions
France	Lacroix	2015	Self-reported	Healthcare and Insurance Survey
France	Thomson	2017	Self-reported	European Quality of Life Survey
France	Bosch	2019	Self-reported	European Union Statistics on Income and Living Conditions
Germany	Thomson	2017	Self-reported	European Quality of Life Survey
Germany	Bosch	2019	Self-reported	European Union Statistics on Income and Living Conditions
Greece	Atsalis	2016	Self-reported	Primary data from surveys conducted by Hellenic Statistical Authority

Country	First author	Year	Measures	Data/instrument
Greece	Thomson	2017	Self-reported	European Quality of Life Survey
Greece	Bosch	2019	Self-reported	European Union Statistics on Income and Living Conditions
Hungary	Thomson	2017	Self-reported	European Quality of Life Survey
Hungary	Bosch	2019	Self-reported	European Union Statistics on Income and Living Conditions
Iceland	Bosch	2019	Self-reported	European Union Statistics on Income and Living Conditions
Ireland	Mohan	2016	Self-reported	Growing Up in Ireland Study
Ireland	Thomson	2017	Self-reported	European Quality of Life Survey
Italy	Thomson	2017	Self-reported	European Quality of Life Survey
Italy	Bosch	2019	Self-reported	European Union Statistics on Income and Living Conditions
Lao PDR	Oum	2019	Self-reported	Lao Economic Consumption Survey
Latvia	Thomson	2017	Self-reported	European Quality of Life Survey
Latvia	Bosch	2019	Self-reported	European Union Statistics on Income and Living Conditions
Lithuania	Thomson	2017	Self-reported	European Quality of Life Survey
Lithuania	Bosch	2019	Self-reported	European Union Statistics on Income and Living Conditions
Luxembourg	Bosch	2019	Self-reported	European Union Statistics on Income and Living Conditions
Macedonia	Thomson	2017	Self-reported	European Quality of Life Survey
Malta	Thomson	2017	Self-reported	European Quality of Life Survey
Malta	Bosch	2019	Self-reported	European Union Statistics on Income and Living Conditions
Montenegro	Thomson	2017	Self-reported	European Quality of Life Survey
Netherlands	Bosch	2019	Self-reported	European Union Statistics on Income and Living Conditions
New Zealand	Butler	2003	Self-reported	Pacific Islands Families: First Two Years of Life Study
Norway	Bosch	2019	Self-reported	European Union Statistics on Income and Living Conditions
Poland	Thomson	2017	Self-reported	European Quality of Life Survey
Poland	Bosch	2019	Self-reported	European Union Statistics on Income and Living Conditions

Country	First author	Year	Measures	Data/instrument
Portugal	Thomson	2017	Self-reported	European Quality of Life Survey
Portugal	Bosch	2019	Self-reported	European Union Statistics on Income and Living Conditions
Romania	Thomson	2017	Self-reported	European Quality of Life Survey
Romania	Bosch	2019	Self-reported	European Union Statistics on Income and Living Conditions
Serbia	Thomson	2017	Self-reported	European Quality of Life Survey
Slovakia	Thomson	2017	Self-reported	European Quality of Life Survey
Slovakia	Bosch	2019	Self-reported	European Union Statistics on Income and Living Conditions
Slovenia	Thomson	2017	Self-reported	European Quality of Life Survey
Slovenia	Bosch	2019	Self-reported	European Union Statistics on Income and Living Conditions
Spain	Oliveras	2020	Self-reported	5-item World Health Organisation Wellbeing Index
Spain	Llorca	2020	Self-reported	Life Conditions Survey
Spain	Thomson	2017	Self-reported	European Quality of Life Survey
Spain	Bosch	2019	Self-reported	European Union Statistics on Income and Living Conditions
Sweden	Bosch	2019	Self-reported	European Union Statistics on Income and Living Conditions
Switzerland	Bosch	2019	Self-reported	European Union Statistics on Income and Living Conditions
Turkey	Thomson	2017	Self-reported	European Quality of Life Survey
United Kingdom	Davillas	2022	Self-reported	Understanding Society: the UK Household Longitudinal Study
United Kingdom	Bosch	2019	Self-reported	European Union Statistics on Income and Living Conditions
United States	Hernandez	2021	Self-reported	Authors' primary data
United States	Berkowitz	2015	Self-reported	Authors' primary data

Table 3A: Victoria's energy affordability concessions in 2023[xxv]. Table excludes business-related concessions.

Provider	Concession name	Description	Value ($ or %)	Status
Victorian Government	Power Saving Bonus	Provided in conjunction with the Australian Government's Energy Bill Relief Fund	$250 per household	Ended August 2023
Victorian Government	Annual electricity concession	Discounted electricity usage and service costs for concession card holders[xxvi]	17.5% of electricity usage and service costs	Ongoing
Victorian Government	Excess electricity concession	Relief for concession card holders[2] whose annual electricity usage and services costs are above $3563.00.	17.5% of electricity usage and service costs	Ongoing
Victorian Government	Excess gas concession	Relief for concession card holders[2] whose annual gas usage and services costs are above $2067.00.	17.5% of gas usage and service costs	Ongoing
Victorian Government	Life support concession	Discounted electricity costs for concession card holders using life support machines	Cost of 1,880 kilowatt hours of annual electricity, calculated using general domestic retail tariffs	Ongoing
Victorian Government	Medical cooling concession	Discounts for concession card holders on electricity usage related to medically required cooling	17.5% of gas usage and service costs	Ongoing
Victorian Government	Non-mains energy concession	Annual rebates for concession card holders on electricity usage who source non-mains energy	Rebate priced based on non-mains energy expenditure	Ongoing
Victorian Government	Winter gas concession	Discounts on gas bills for eligible concession card holders to reduce costs during winter months	17.5% of gas usage and service costs	Ongoing
Victorian Government	Utility relief grant schemes	Grants for concession card holders to cover overdue energy bills (including non-mains energy) due to temporary or unexpected financial hardship	Up to $650 on each utility type (up to $1300 for single source of energy)	Ongoing
Victorian Government	Controlled load electricity concession	Discounts for concession card holders on separately metered electric hot water or slab heating	13% of controlled load electricity costs	Discontinued
Victorian Government	Electricity transfer fee waiver	Full transfer fee waiver for concession card holders moving house		Discontinued
Victorian Government	Service to property charge concession	Discounts on service charges for concession card holders whose electricity usage bill is lower than the service charge.		Discontinued

[xxv] https://services.dffh.vic.gov.au/energy

[xxvi] People holding a Pensioner Concession Card, Health Care Card, Veterans' Affairs Gold Card.

Table 4A: Victorian programs and initiatives for alleviating energy hardship.

Provider	Program name	Description	Status	Reference
Victorian Government	Victorian Energy Compare	Energy price comparison tool	Ongoing	URL
Victorian Government, Anglicare Victoria, Community Information and Support Victoria	Energy Assistance Program	Individualised counselling to improve energy market literary and referrals to energy affordability support	Ongoing	URL
Consumer Policy Research Centre	Energy Info Hub	Online resource for energy assistance, providing advice on energy concessions and hardship options, and tips for preserving energy.	Ongoing	URL
Victorian Government	Victorian Energy Upgrades Program	Rebates or discounts on energy-saving products. Formerly Victorian Energy Efficiency Target (VEET) scheme.	Ongoing	URL
Essential Services Commission	Victorian Energy Efficiency Certificate Program	Program that incentivises property owners who undertake projects that improve the energy efficiency of properties.	Ongoing	URL
Victorian Government	EnergySmart Public Housing Project	Energy efficiency upgrades to 1500 public housing properties across Victoria, including hot water systems, new energy-efficient heating/cooling systems, draughtproofing and insulation.	Completed	URL
Victorian Government, Sustainability Victoria	La Trobe Valley Home Energy Upgrade Program	Energy efficiency upgrades to 1000 low-income households across the local government areas of La Trobe City, Wellington Shire, and Baw Baw Shire.	Completed	URL
Moreland City Council, Sustainability Victoria, Brotherhood of Saint Laurence	Warm Home Cool Home and Concession Assist programs	Home energy audits, retrofit programs, and general energy education.	Completed	Johnson et al. (2013)
Victorian Government, Ovida, Allume Energy	Ovida Community Energy Hub project	Installation of shared solar PV and battery systems in three Melbourne apartment buildings to reduce energy costs for tenants	Completed	URL
Environment Victoria	Future Powered Families	Home visits to assist householders to reduce energy use and addressing energy hardship. Funded by Australian Government's Low Income Energy Efficiency Program (LIEEP).	Completed	URL
Western District Health Service – Southern Grampians Glenelg	Glenelg Saves	Improve energy efficiency through home audits, energy advice, and training for frontline community care staff. Funded by LIEEP.	Completed	Lynch et al. (2016)

Provider	Program name	Description	Status	Reference
Primary Care Partnership, Glenelg Shire Council				
Brotherhood of Saint Laurence	Home Energy Efficiency Upgrade Program	Energy efficient hot water system upgrades for 793 households in greater Melbourne and regional Victoria. Funded by LIEEP.	Completed	Sullivan (2016)
Uniting Care	Koorie Energy Efficiency Project	Home visits to provide advice to householders to reduce energy use and address energy hardship. Funded by LIEEP.	Completed	Bedggood et al. (2017)
Northern Grampians Shire Council	Northern Grampians Low Income Energy Efficiency Project	In-home energy assessments, installation of energy-efficiency upgrades of up to $5,000 per household.	Completed	URL
Victorian Government	Low Income Energy Efficiency Program	Competitive grant program to provide grants to consortia of government, business, and community organisations to trial approaches to improve the energy efficiency of low-income households and enable them to better manage their energy use	Completed	
Solar Victoria	Solar panel rebate	Rebates up to $1400 and no-interest loans for solar panel installation	Ongoing	URL
Solar Victoria	Hot water rebate	Rebate up to $1000 for solar hot water and heat pump system installation	Ongoing	URL
Solar Victoria	Solar battery loan	No-interest loan to assist with purchase of solar batteries	Ongoing	URL
Solar Victoria	Home Heating and Cooling Upgrades program	Rebates supporting the supply and installation of split system reverse cycle air conditioners in low-income households.	Ended April 2023	URL
Solar Victoria	Residential Electrification Grant	Grant program for organisations to enable bulk installations of solar (PV) and energy efficient hot water systems across multiple households (minimum 50), for the benefit of homeowners.	Ongoing	URL
Victorian Government	Energy Efficiency in Social Housing Program	Rebates supporting a range of cost-effective energy efficiency upgrades for 35,000 public, community, and Aboriginal housing properties.	Ongoing	URL
Sustainability Victoria, University of Sydney	Victorian Healthy Homes Program	Energy efficiency and thermal comfort home upgrades	Completed	Campbell et al. (2022); Sustainability Victoria, (2022)
United Housing, Swinburne University	Renewable Energy Retrofitting and Energy Poverty in	Pilot study involving solar panel installations to improve energy performance in cooperative housing	Completed	Judson et al. (2019)

Provider	Program name	Description	Status	Reference
	Low-income Households			
Victorian Government	$250 Power Saving Bonus Community Outreach Program	State-wide community-based support to support hard-to-reach households to become aware of and access the $250 Bonus.	Completed	URL
cohealth, Consumer Policy Research Centre	Energy Info Hub Community Outreach Program	Support for public housing residents to reduce energy bills and improve financial literacy.	Completed	URL
Brotherhood of Saint Lawrence	Your Energy Broker	Information sessions for eligible household on reducing energy bills.	Completed	URL
Victorian Government, Essential Services Commission	Victorian Default Offer	State-regulated price for electricity	Ongoing	URL
Victorian Government, Australian Energy Regulator	Customer Hardship Policy Guideline	Energy retailers must uphold protections for customers experiencing payment difficulties due to hardship	Ongoing	URL
Victorian Government	National Construction Code 2022	7-star minimum energy efficiency building standards for all new houses	Commencing May 2024	URL

Table 5A: International programs and initiatives for alleviating energy hardship.

Country	Program name	Year	Design/delivery partners	Description	Health system actors	Detail on health system involvement	Outcomes and effectiveness	Implications	Status	Reference
Ireland	Warmth and Wellbeing Pilot	2016-2019	Department of Communications, Climate Action and Environment (DCCAE), Department of Health, Health Service Executive (HSE), Sustainable Energy Authority of Ireland (SEAI)	Energy efficiency upgrades targeted to the homes of those in energy poverty who are living with chronic respiratory conditions. Evaluation report was due in 2022.	Government employed health professionals (HSE officials)	Funded in part by Department of Health, applicants referred to program by government employed health professionals (HSE officials). HSE officials assessed applications against eligibility criteria and approved applicants.	* 1300 homes were upgraded. (Scheme closed when "research element of the scheme has reached a sufficient number") * Increases in winter indoor temp * Self-reported HWB - mobility, self-care, pain, emotional WB, physical activity and symptoms; social functioning * Health service usage - reduced use of GP, ED and hospital; reduced volume of prescribed drugs * Self-reported heating related - increase in thermal comfort; reduced difficulty paying fuel bills; improved sense of control over indoor temp, improved social inclusion	* *No information about how the health professionals were trained for their role*	Complete	Sustainable Energy Authority of Ireland, 2018
New Zealand	Healthy Homes Initiatives	2013-Current	Ministry of Health, Kāinga Ora – Homes and Communities, Ministry of Social Development (MSD), Energy Efficiency Conversation Authority (EECA), Ministry of Business, Innovation and Employment (MBIE), District Health Boards	National program connecting low-income households with appropriate housing interventions (e.g. insulation, heating, relocation, education) to improve energy efficiency. HHI providers ("health and housing assessors") identify eligible families, undertake housing assessments, and then collaborate with partners to facilitate access to interventions that create healthier homes. Initially focussed on households with children at risk of rheumatic fever, but expanded to low-income whānau with 0-5 children and pregnant people.	Programme delivered by a range of providers and sub-contracted providers, such as Māori health providers, housing and sustainability providers, and public health providers.	Program established by Ministry of Health, district health boards participate as HHIs providers	* 28,901 referrals; 75,858 people from 14,625 households * Significantly reduced hospitalisations for referred child & wider whānau (20%) * Increased school attendance; reduction in days off for medical reasons (3%) * Employment outcomes * Equity - half of those referred are Māori or Pacific	* 11 Regional District Health Boards implemented the intervention first; national roll out in 2022 following evidence of positive impacts	Ongoing	Pierse et al., 2022
United Kingdom	Healthy Homes	2016-2017	NHS Hastings and Rother Clinical Commissioning Group, East Sussex County Council (Public Health team)	An 18-month pilot project that funded the 'Winter Home Check Service' (WHCS) - installation of major heating and insulation measures in energy-poor homes. Qualified Energy advisors check property and provide advice on behaviours that will both promote health and wellbeing.	GPs and social care services	Program funded by NHS, referrals to program from GPs and social care services.	* 149 dwellings received major heating and insulation measures. * SAP ratings were significantly higher post installation. * Self-rated HWB and social isolation improved after upgrades. * High satisfaction among beneficiaries. * Evaluation describes stronger partnerships between orgs and sectors as a consequence. * Very low number of referrals by NHS providers (1 of 149).	* Consistent ongoing engagement with practices to increase knowledge/confidence (e.g. training, staff briefings, intranet articles, advertising). * Simple and quick referral mechanisms. * Working through care coordinator roles. * Reaching patients through pop-up stalls or leaflets at clinics. * Organisations providing home-based support services seen as important partners due to existing knowledge of consumers' needs	Complete	Sawyer et al., 2022

Country	Program name	Year	Design/delivery partners	Description	Health system actors	Detail on health system involvement	Outcomes and effectiveness	Implications	Status	Reference
United Kingdom	Warm Front Scheme (previously Home Energy Efficiency Scheme)	2000-2013	Department of Energy and Climate Change, Department of Health, energy services contractors (e.g. Carillion Energy Services, 2005-2013), consumer and charity organisations (advisory roles)	Contractors provide energy efficiency improvements to households (e.g. home heating, insulation). Program targeted households with older people, children, and long-term sick and disabled people.		Program promotion through Department of Health's flu vaccination program	* 1.5M assisted from 2005-2013 * 922,000 properties received at least one major measure. * System through which third party orgs worked to generate "referrals" was seen as a strength. * Local authority thought communication could be better - particularly after networking teams removed * Several evaluations reported positive health impacts * Hearing about scheme through multiple avenues built trust and confidence of trust worthiness of scheme for applicants * View that there could have been more community "champions" to reach individuals	* GPs may not be in a position to administer referrals, other health service actors may be better placed. * No single promotional source was key to generating demand, promotion from multiple sources builds consumer trust and confidence.	Complete	Gilbertson et al. (2012); Department of Energy and Climate Change (2014)
United Kingdom	Warm Home Prescription pilot	2021-2022	Catapult Energy Systems, Gloucestershire NHS, Severn Wye, Evolve Home Energy Solutions, local GPs (Churchdown Surgery, Forest of Dean GP Surgeries)	Supported people with cold-sensitive health conditions. Health staff identified patients with conditions affected by cold homes and connected them with local energy charities to facilitate support, in particular energy bill payments, with some in-home energy assessments and heating control upgrades.	Local GPs, NHS managers	GPs and NHS teams identified eligible patients (social prescribing)	* Twenty-eight individuals supported by the pilot. * Temperatures increased in most homes. * Some patients did not completely trust the new service, worried bills would go up in future. * Average cost per patient was £647. * GPs too busy to prescribe patients	* NHS branding was seen as improving the authenticity of the program - building consumer confidence may be important.	Complete	Catapult (2022)
United States	Weatherisation Plus Health (Wx+H)	2015-2018	Washington State Department of Commerce	Competitive grants to weatherization agencies to establish community partnerships with community medical and public health entities to deliver services, leverage resources and improve outreach; and to develop, test, and deploy new strategies with these partners to deliver weatherisation upgrades to housing.	Several health agencies awarded grants, including Seattle King County Public Health (SKCPH) and Tacoma Pierce County Public Health (TPCPH). All grantees established partnerships with public health agencies (unnamed) to facilitate programs, among other partners.	Health agency partners undertook various activities, including established contracts for medical home visit services, consultations, and referrals.	* 254 homes had measures and services * 211 had low-cost HH measures paid by community partners Health/social Agencies with CHW, and existing medical home visit services provided a more integrated service model. Education and follow-up visits more likely to include medical case management-related services. * Staff not equipped by training to do behaviour change, medication, or social service needs identification (asthma/COPD control). * Not well trained to deal with mental health concerns such as hoarding and depression. * Only 23% of completed projects came from community partner referrals, and many referrals did not match eligibility criteria. * Modest success for weatherisation agencies in gaining entry in Medicaid Waiver/ACH process * Lack of time to maintain partnerships and staff capacity for weatherization agencies (despite agencies being committed) * Referrals not always aligned to eligibility criteria	* There are different sets of skills and expertise within the health system; understanding the most appropriate actors to partner with is important for success	Complete	Schueler (2018)

Table 6A: Further details about Victorian programs and initiatives for alleviating energy hardship.

Program name	Year	Key design/delivery partners	Description	Health system actors	Detail on health system involvement	Outcomes and effectiveness	Implications	Status	Reference
Glenelg Saves	2016	Western District Health Service – Southern Grampians Glenelg Primary Care Partnership, Glenelg Shire Council, Glenelg Shire Council and Federation University	Program targeted low-income households receiving HACC services, aimed to improve energy efficiency through home audits, energy advice, and training for frontline community care staff.	Western District Health Service – Southern Grampians Glenelg Primary Care Partnership, Glenelg Shire Council	Project direction and management. Facilitate project advisory group. Project Reporting, including data. Information dissemination. Project Manager employment. Manage contractors (for energy efficiency implementation).	* Increased beliefs about energy efficiency and perceived control * Increased knowledge of HACC staff * Most workers and clients carried out some of the recs arising from the energy efficiency assessments * Did not reduce household electricity use (5% higher post-intervention) * Knowledge affected attitudes to perceived control * HACC staff motivated by economic factors; clients motivated by HACC staff and financial support for purchases - mostly related to appliances and heating	* Program delivered through HACC services, which involve home-visits. (Reflects international findings about added value of this part of health system having an active role)	Completed	Lynch et al. (2016)
Energy Info Hub Community Outreach Program	2022	cohealth, Consumer Policy Research Centre	Support for public housing residents to reduce energy bills and improve financial literacy.	cohealth	cohealth team members visited residents of housing blocks, supported them accessing cost-saving measures on their utilities. Also recruited residents as 'Health Concierges' to promote program, distribute flyers, and organise interpreters.	* Helped 33 people move to a cheaper energy plan with their existing energy company, saving a total of $4,470 ($117/year average) * Supported 9 households, with a combined energy debt of $8,940, to complete applications for the Utility Relief Grant to help pay debts * Identified 9 households that were not receiving energy concessions and contacted energy companies to get 17.5% discount applied to their bills	* Pre-engagement by cohealth (community connectors) key to success * Residents may assist as intermediaries for information dissemination	Completed	cohealth (2022)
$250 Power Saving Bonus Community Outreach Program	2023	Victorian Government, Anglicare Victoria, Bendigo Community Health Services, Brotherhood of St Laurence, Consumer Action Law Centre, Community Information & Support Victoria, Ethnic Communities' Council Victoria, Good Shepherd - Neighbourhood Houses Victoria, cohealth	State-wide community-based support for hard-to-reach households to become aware of and access the $250 Bonus.	Bendigo Community Health Services, cohealth	Community health services promoted $250 Power Saving Bonus. Unclear who was targeted.	* 50,000 people submitted an application for the $250 bonus within 3 months * Three quarters of households who applied through the Community Outreach Program received assistance on applicable energy concessions.		Completed	Victorian Government (2023)
Victorian Healthy Homes Program	2022	Sustainability Victoria, Australian Energy Foundation, Uniting Care, GV Community Energy, University of Technology Sydney	Randomised controlled trial. Intervention targeted energy efficiency upgrades to low-income households.	Community health care services (unnamed)	Health care services recruited eligible participants into the program	* 984 households (493 randomised to control, 491 to intervention). * Intervention households were significantly warmer than control households. * Intervention participants had increased average indoor temperature, lower winter gas use, and higher mental health-related quality of life, compared to control group. * No significant difference between groups for physical health-related quality of life, self-reported health for asthma and COPD, and lower electricity use. * Total healthcare costs were lower for the intervention than control group. $887 per person saved in the healthcare system over the winter period. * Upgrades were cost-saving within 3 years.	* Savings heavily weighted towards healthcare, "for every $1 saved in energy, more than $10 is saved in health".	Completed	Sustainability Victoria (2022)

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