



LOW CARBON HOMES FOR LOW INCOME HOUSEHOLDS

Affordable and low carbon housing Nightingale 1.0 - Breathe

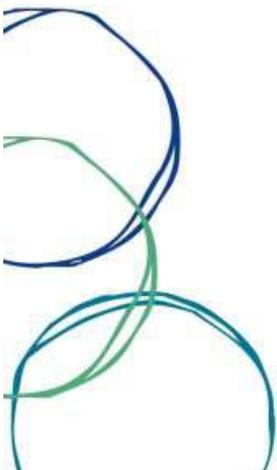
**CRC for Low Carbon Living, the Australian Sustainable Built Environment
Council and the University of Wollongong**

Briefing Paper - National Forum

Low Carbon Homes for Low Income Households

Wednesday 8th August 2018

University of Wollongong



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Briefing Paper – CRC LCL National Forum Low Carbon Homes for Low Income Households

1. Introduction

The purpose of this briefing paper is to explore the context and challenges that exist in providing low carbon homes for households on low incomes, and to draw attention to the key issues for practitioners working in the field.

The issues surrounding energy efficiency and low-income households are complex and need careful consideration if innovations and interventions are to be implemented effectively, whilst ensuring that good social and environmental outcomes are achieved.

The details of these issues will be addressed by speakers and attendees of the Cooperative Research Centre for Low Carbon Living (CRC LCL) National Forum on *Low Carbon Homes for Low Income Households* to be held at University of Wollongong (Innovation Campus) on 8 August 2018.

The forum will be of significant interest to government agencies, social housing providers and tenant advocacy groups, university researchers, architects and building designers, and the construction and utility industries.

The forum will provide the opportunity to explore a range of issues and solutions including:

- The provision of cost effective, decentralised, renewable energy generation for low-income households - from private homeowners through to social housing tenants;
- New-build construction and retrofit solutions to improve energy efficiency in low-income homes;
- The positive health impacts of low carbon, energy efficient homes demonstrated through initiatives such as the Victorian Healthy Homes and NSW Government Programs;
- Policy approaches and dialogue with a wide range of stakeholders such as: energy providers, community health workers, tenant support groups, technical experts and academics;
- Impacts of existing and proposed energy policies on low-income households, such as voluntary/mandatory building efficiency disclosure, tariff structures and safety nets; and
- Energy justice and equity for low-income tenants, home owners and renters.

2. Energy Challenges for Low Income Households

2.1. Energy Costs and Energy Affordability

Low income households throughout Australia tend to live in housing that performs poorly in terms of energy efficiency and thermal comfort. Because of this and high energy prices, these households face the challenge of having to spend a large proportion of their income on fuel to meet their basic needs, including heating, cooling and lighting of their homes. However, many also choose to, or are constrained to, limit their use of energy despite the unhealthy and uncomfortable indoor conditions that might result. Indeed, a significant fraction of low-income and vulnerable people report having to make the difficult choice between paying for fuel or paying for other basic essentials, such as transport or even medical treatment (NCOSS, 2017).

Access to affordable energy is important for all Australians. The cost of energy is therefore central to issues of social, environmental and economic sustainability, and energy price rises over recent years are cause for increasing concern. NSW households experienced an 80% increase in electricity prices over the period from 2007 to 2012 (Chester and Morris, 2011) and a further notable increase in July 2017, for example. These increases in household electricity prices has been significantly higher than inflation and increases in household income.

The issue of energy affordability has received increased attention in recent years, particularly in relation to low-income households. An analysis of the ABS 2016 Australian Household Expenditure Survey (HES) by Hogan and Salt (2017) for KPMG revealed that Australians in the lowest income quintile (20% of households as ranked by income) spent \$15.57 per person per week on household energy compared to those in the highest income quintile who spent \$18.91 per person per week. In other words, there was a difference of only about \$3 per week per person between the amount spent on energy by those in the highest and lowest income quintiles. This suggests that energy used in the home is largely a fixed, non-discretionary cost.

Of the 8 million or so households in Australia, there were about 1.5 million with an income of less than \$34,000 p.a. in 2016 (<\$650 per week), the vast majority of which were old age pensioners. Energy costs may present a challenge for these households. However, the KPMG report highlighted the fact that there are 42,000 households which are both low-income (< \$650 per week per household) *and* large (i.e. > 5 people); these households are particularly vulnerable as energy accounts for a proportionally larger amount of their weekly budget due to its relatively fixed per-capita cost. The authors note:

“Poor households with big families in the public housing estates of our biggest cities are most exposed. For these Australians there is no defence. There is no option but to rejig priorities and make difficult choices about household spending. Indigenous communities are also almost universally exposed to this issue. The issue of energy poverty is both an economic and a moral issue. It is the most critical issue in the current energy ‘trilemma’¹ for consumers. There will continue to be pressure on electricity prices for the foreseeable future which will place continued pressure on electricity affordability on Australian households.”

Whilst larger low-income families are most at risk from energy poverty, this issue is not confined to this demographic. Chester and Morris (2011) report early findings that energy poverty is spreading from the lowest income quintile into the second lowest quintile as a result of rapidly rising energy costs related to electricity sector restructuring.

2.2. Household Responses to High Energy Bills

Many households living in energy poverty suffer deprivation and social exclusion as a result of their lack of disposable income. NCOSS (2017) found that 4-9% of low-income survey respondents regularly or always go without daily essentials such as medical treatment, healthy meals, basic household repairs and transport in order to pay their energy bills. There was also a larger cohort of respondents (greater than 20%), which sometimes goes without basic essentials in order to meet their energy costs. A summary of the responses to the NCOSS survey is shown in Figure 1. Similar results have emerged in CRC LCL research by Liu and Judd (2016), who reported that:

¹ The ‘energy trilemma’ is often framed as the need for, and provision of, affordable, reliable and environmentally responsible energy.

“Going without food, medication and comfort were reported as common compensating practices, as were missing out on socialising opportunities and family activities, all important social and physical costs borne by lower income households”.

Such actions can without any doubt risk serious impacts on the health and wellbeing of these very vulnerable people and their families and policy-makers need to ensure that appropriate safety nets are in place. The UK Government, for example, has a number of schemes designed to ease the burden of energy prices during the colder month for those on a low-income and/or receiving a pension. These include the annual Winter Fuel Payment, the additional Cold Weather Payment (for particularly cold weeks) and the Warm Home Discount Scheme.

The impact of the cost of energy on the daily lives of those on low incomes is exemplified by the following conclusions from NCOSS’s *Turning the Lights Off - The Cost of Living in NSW* report:

“The picture is very sobering. Energy costs continue to increase, and many low-income households are struggling with costs that already exceed their capacity to pay. We’ve found that many low income households are paying their bills late and being disconnected. In an attempt to lower these bills, households are rationing their energy use in ways that will have potentially serious impacts on their own health and wellbeing and that of their families. Having reduced their usage as far as possible, many are now running into debt, pawning household items, and going without a range of household essentials just to keep the lights on. With energy costs likely to escalate many households will reach crisis point and the flow-on effects to the health, wellbeing and inclusion of the adults and children living in these households should cause us all genuine concern” (NCOSS 2017).

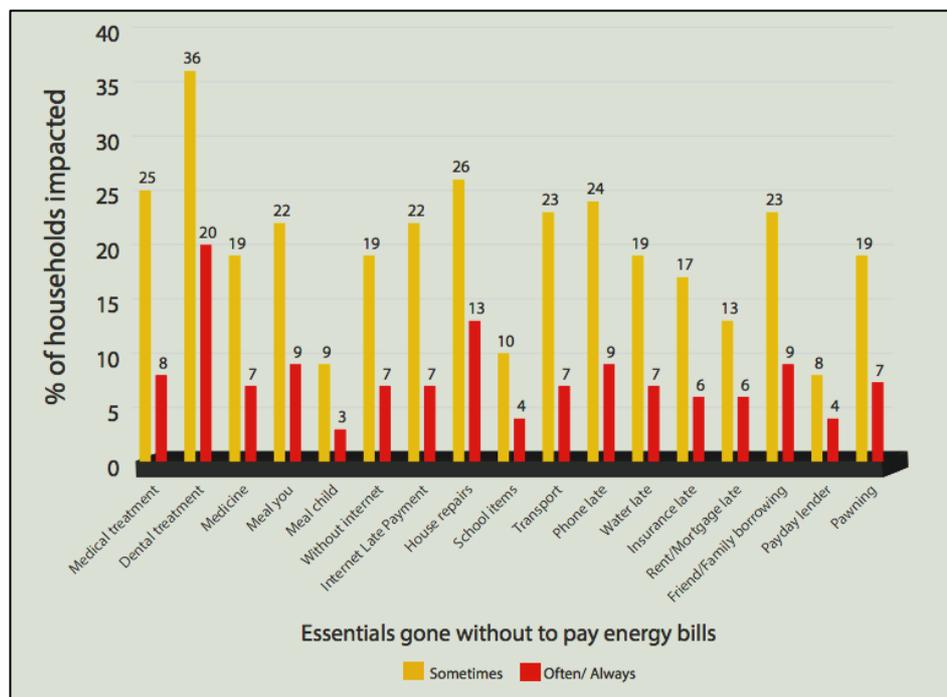


Figure 1. What low-income households do, and items they forgo, so that they can pay their energy bills (NCOSS, 2017).

The NCOSS report also found that a significant proportion of low-income households felt they were unable to implement even the most basic energy efficiency measures, such as buying efficient light bulbs (20% of respondents) and that the uptake of other measures was even less likely (see Figure 2). The main barriers to accessing energy efficiency upgrades were found to be the high cost of

energy efficient appliances and household improvements, and a lack of householder awareness of financial assistance programs.

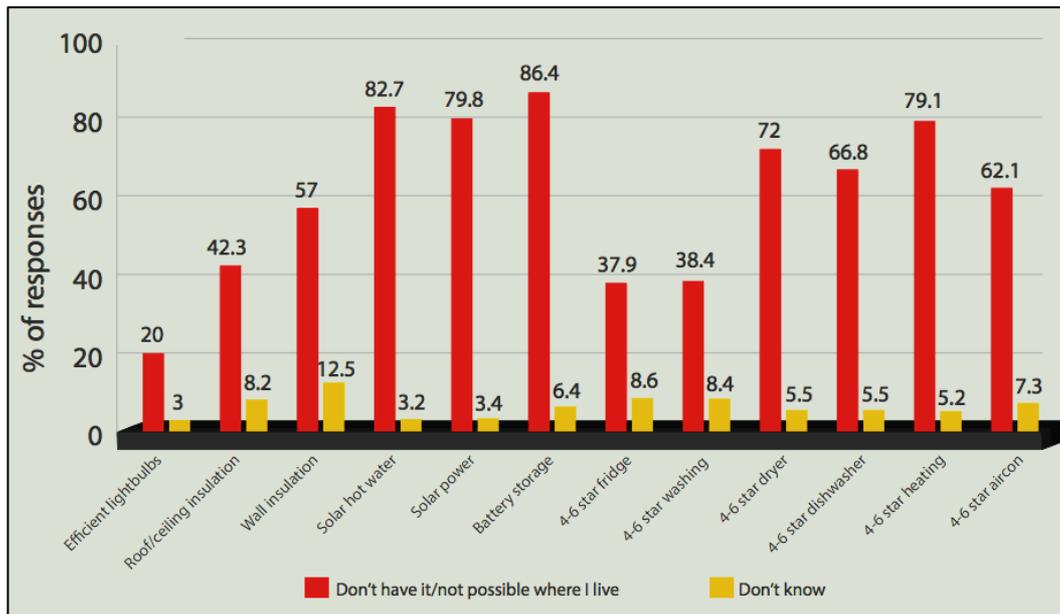


Figure 2. Lack of take-up of energy efficiency measures amongst low-income households over the previous three years [2014-2017], expressed as a percentage of total responses (NCOSS, 2017).

In the context of rapidly rising energy costs, it is therefore imperative that policy makers consider how vulnerable Australians can continue to access essential energy services through a coordinated approach keeping protection of customers at front of mind. Hogan and Salt (2017), for example, recommended the following key strategies:

- Subsidies for vulnerable customers, either via concessions/grants or via making it harder for retailer to disconnect customers.
- Lower the electricity costs facing such customers individually, through energy efficiency initiatives, better information to allowing customers to benefit of most cost effective tariffs and technology enabling customers to adapt energy usage pattern to lower cost.
- Take action to lower overall system costs so that all customers are better off and the prospect of affordability concerns is lower consistent with the ACCC recommendations.”

Householders have been identified as important agents in any future transition of our national energy supply to a more affordable and environmentally sustainable system. Indeed, some hold that consumers have the potential to contribute to a lowering of energy prices through effective demand management, leading to a reduction of network and generation costs (Hogan and Salt 2017).

Resources such as smart meters, in-home power consumption displays and other ‘apps’ that make it possible for consumers to see how much energy specific appliances consume in their homes, are seen as important means by which householders can reduce their consumption. Access to and ease of use of these technologies is important for low-income households and/or those people living in rental or social housing properties, but it should also be noted that many low-income families are already very frugal in their use of energy and have limited options to further reduce consumption.

Recent CRC Low Carbon Living research (Liu and Judd, 2016) has highlighted the difficulties faced by low-income householders in accessing these new opportunities, including low energy literacy, difficulty in accessing computers and internet connections, low computer literacy, and lack of understanding of what support is available, or what to search for.

2.3. Health Impacts of Energy Poverty and Energy Efficiency Intervention Co-benefits

It is often said that energy consumption and fuel bills can be reduced if better ‘user behaviour’ could be implemented, yet we know that most low-income families and individuals are already doing their very best to reduce their fuel consumption.

Cooper *et al.* (2016) found that for older, low-income people, energy use is often seen through the lens of thrift, and such people often do not want to be seen as frivolous or wasteful. This frugal use of energy in low-income homes can be problematic and may create ‘tyrannies of thrift’, whereby being thrifty with energy can lead to significant risks to comfort, health and wellbeing (Waitt *et al.* 2016). Low energy usage in low-income homes is often achieved at the expense of essential items and services, and is likely to have adverse impacts on householders’ health and wellbeing. Vulnerable occupants also frequently report having strong feelings of anxiety, guilt and fear in respect of their forthcoming energy bills (Cooper *et al.* 2016).

There is also increasing evidence of direct health impacts from energy poverty. Exposure to both high and low temperatures in the home have been associated with an increased risk for a wide range of cardiovascular, respiratory, and other mortality causes. This can include more obvious risks, such as poor quality homes that overheat during hot periods and heat waves, as well as the somewhat hidden consequences of low-income households not being able to adequately heat their homes over longer periods, leading to respiratory or cardio-vascular conditions that may result from under-heating during winter months, or from damp homes with mould growth.

In recent years, research out worldwide has attempted to quantify health and other co-benefits that result from energy efficiency interventions, particularly for low-income households. Many studies have indeed demonstrated that health benefits flow to low-income households as a result of energy efficiency upgrades, with benefits being realised particularly for vulnerable groups (see, for example, the work in New Zealand by Howden-Chapman *et al.*, 2008). Vulnerable groups, such as the sick, the elderly, and the unemployed, are more likely to live in poor quality housing, to spend a greater amount of time at home, and to be exposed to poor quality indoor environments (Thomson *et al.* 2009). Low-income groups are also more likely to have a lower adaptive capacity to deal with unhealthy environments, and are therefore more vulnerable to health risks from poor quality housing.

At present there is relatively little quantitative evidence regarding the health benefits of energy efficiency interventions for low-income households in Australia. The link between health outcomes and energy efficiency interventions is exceedingly complex, and there are numerous confounding factors affecting any study in this space. There is a pressing need for high quality, large sample size, randomised controlled trials of interventions in multiple Australian climate zones. The recently commenced Victorian Healthy Homes Program (Sustainability Victoria 2018) is an excellent example of the type of study that is required to fill this gap in our knowledge.

Nevertheless, the significant and growing body of international literature exploring energy efficiency co-benefits provides strong indications that the health co-benefits experienced by low-income occupants who receive an energy efficiency intervention could represent a substantial benefit to

both occupants (particularly young children, the elderly, and those with pre-existing health conditions) and society more generally. These positive effects are not currently captured by standard benefit-cost assessments. A review of relevant studies can be found on the CRC Low Carbon Living [website](#) (Daly *et al.*, 2018).

3. National Forum Themes and Challenges

This National Forum seeks to generate a better understanding of the energy-related challenges faced by less well-off people in our community, and to develop solutions to change their lives for the better through the provision of energy efficient homes in which they can live affordably. This is a complex challenge that needs a holistic approach to effect real change.

The National Forum will provide the opportunity to explore a range of possible issues and solutions through Panel Sessions and Collaborative Breakout Sessions including the following.

3.1. Energy-related Challenges, Experiences and Perceptions of Low Income Households

Challenge Question: “How do we support low income households so that they can lower their energy bills without further exacerbating their disadvantage or vulnerability”

This theme will focus on the experience of households living in, or close to, energy poverty and highlight low-income household perceptions of the way energy intersects and influences their day-to-day lives and practices.

Energy use in the home is a complex issue that is intertwined with many other practices and considerations, which can complicate energy saving interventions. Many projects under the Commonwealth Government’s recent Low Income Energy Efficiency Program (LIEEP) scheme and other research projects have explored how energy usage in the home is tied up with health, social well-being, and care for family, e.g. Nicholls and Strengers (2015), Liu and Judd (2016), LIEEP (2016). A very comprehensive and useful summary of LIEEP projects has been produced by members of the Group of Energy Efficiency Researchers ([GEER](#)) Australia (Russell-Bennett *et al.* 2017) under the auspices of the Energy Consumers Association’s Power Shift project (ECA, 2017).

Whilst there is support available for low-income households to pay for their energy usage, it is the responsibility of the householder to navigate the complex energy retail sector to ensure they are on a competitive tariff plan, and that they are receiving the rebates to which they are entitled.

There is a need to facilitate a constructive and truly cross-disciplinary dialogue and solution-search for this sector. This needs to call on the expertise and agency of a wide range of stakeholders, from energy utilities, through community health workers and tenant support groups, through to technical experts and academics.

3.2. Implementing Low Carbon Homes for Low Income Households

Challenge Questions:

‘Are there conflicts and barriers between the goals of delivering *affordable housing* versus delivering *low carbon housing*, i.e. is it possible to deliver both under current circumstances?’

‘If there are barriers to simultaneously achieving both goals, how should we set about overcoming these?’

We need to develop cost-effective housing construction and retrofit solutions that significantly improve the operational energy efficiency of the homes of low-income homeowners and renters. These solutions will need to address the specific issues facing the following different types of households.

- Private renters. Major issues facing private renters include split incentives, short tenure length, limited rights to make modifications to their homes, and a lack of minimum standards for energy efficiency.
- Social housing tenants. The social and community housing sector represents a significant opportunity for the development of a major aggregated approach to delivering low carbon homes in large portfolios of residential building stock.
- Owner-occupiers. Whilst low-income owner-occupiers have potentially fewer barriers to accessing low carbon homes, many are affected by issues such as lack of relevant knowledge and information, low energy literacy, and limited discretionary financial resources.

3.3. Impacts and Opportunities of New Policy Approaches and Levers

Challenge Question: “What innovative policy solutions can be implemented to help vulnerable households save energy and money, while avoiding negative and unintended consequences?”

Good policy-making and decisions in the area of affordable low carbon housing for low-income people has the potential to achieve significant positive socio-economic and environmental impacts. It is critically important that we bring forward new ideas and policy approaches to break the long-standing cycle of energy impoverishment of the poorer members of our community. New studies and programs need to explore key impacts (both intended and unintended) of forthcoming and emerging energy issues and policies on low-income households, such as voluntary/mandatory building efficiency disclosure, tariff structures, safety-nets, etc. Some pertinent questions to be discussed at the Forum include:

- What will the impacts of voluntary/mandatory building efficiency disclosure be on low-income households?
- What policy changes can be implemented to support private renters to access or bring about low carbon rental accommodation?
- How can we make sure that vulnerable community members are able to effectively access existing subsidies, and do we need to provide a more secure safety net during extreme weather events, such as heat waves or cold snaps?

3.4. Energy and Services Supply Alternatives

Challenge Question: “How can we ensure vulnerable community members are not locked out of the benefits of innovative energy supply and pricing alternatives?”

The advent of cost-effective, decentralised renewable energy generation is but one of a number of new opportunities and new technologies that can reduce energy costs. Many are being explored by housing providers; from private homeowners through to social housing providers.

Consumer support programs for appropriate tariff and utility selection, electricity market price transparency, and other support to empower households to reduce their bills, should all be available and tailored to the needs of low-income households.

KPMG's report on *The rise of energy poverty in Australia* (Hogan and Salt 2017) demonstrates that it is critical for households at risk of energy poverty to be given strong support, including:

- “Automatically place hardship customers on the best available offer, noting that low-income and vulnerable consumers often struggle to access pay-on-time discounts.
- Improve efforts to offer early assistance to customers struggling to pay, including access to hardship programs and the associated protections from late payment and early termination fees, access to payment plans and other assistance.
- Work with, and provide direct support to, financial counselling services.”

Provision of affordable and sustainable energy for all households should be our ultimate long-term goal. In the words of former UN Secretary General Ban Ki-moon, ‘Sustainable energy is the golden thread that connects economic growth, increased social equity, and an environment that allows the world to thrive. Low-carbon growth can foster decent jobs, empower women, promote equality, provide access to sustainable energy, make cities more sustainable and enhance the health of both people and the planet’ (Ki-moon, 2014).

3.5. Addressing Health and Other Impacts on Low Income Households through Low Carbon Homes

Challenge Question: “How can we best quantify the societal value of providing low carbon homes for low income households to realise the numerous health and other co-benefits that follow, and thereby provide the evidence to increase rates of uptake and construction?”

We need a much better understanding of the positive health impacts that low carbon, energy efficient homes can provide, e.g. through exemplary projects like the Victorian Healthy Homes Program and the NSW Home Energy Action Scheme.

There are strong indications that the health co-benefits experienced by low-income occupants who receive an energy efficiency intervention could represent a substantial benefit to both occupants and society more generally. These positive effects are not currently captured by standard benefit-cost assessments.

Quantifying such benefits through scientifically rigorous methodologies is not trivial, but is of great importance to policy makers by generating more accurate and compelling business cases for low carbon housing programs, and also for interventions/schemes to support low-income families living in existing energy-inefficient, unhealthy and uncomfortable houses.

4 References

ACOSS (2016). Poverty in Australia. Australian Council of Social Service and Social Policy Research Centre. <https://www.acoss.org.au/poverty/>

Chester, L. and A. Morris (2011). "A new form of energy poverty is the hallmark of liberalised electricity sector." *Australian Journal of Social Issues* 46(4): 435-459.

Cooper P, Gordon R, Waitt G, Petkovic D, Burroughs N, Tibbs M, Butler K, Roggeveen K, McDowell C, Kokogiannakis G, Ledo Gomis L, and Magee C. (2016) *EE3A: Pathways and initiatives for low-income older people to manage energy: Final Report.*

<https://www.energy.gov.au/publications/low-income-energy-efficiency-program-lieep>

- Daly D, Halldorsson J, Kempton L, and Cooper P. (2018), *Targeted review of evidence of direct and co-benefits of energy efficiency upgrades in low income dwellings in Australia*. Available at the CRC for Low Carbon Living [website](#).
- ECA (2017), Launch of Power Shift reports. Energy Consumers Australia. Accessed 20/7/2018 <http://energyconsumersaustralia.com.au/news/launch-power-shift-reports/>
- Hogan, C. and B. Salt (2017). The rise of energy poverty in Australia. Census Insight Series, KPMG: 12.
- Howden-Chapman, P., A. Matheson, J. Crane, H. Viggers, M. Cunningham, T. Blakely, C. Cunningham, A. Woodward, K. Saville-Smith, D. O'Dea, M. Kennedy, M. Baker, N. Waipara, R. Chapman and G. Davie (2007). "Effect of insulating existing houses on health inequality: cluster randomised study in the community." *BMJ* **334**(7591): 460.
- Howden-Chapman, P., N. Pierse, S. Nicholls, J. Gillespie-Bennett, H. Viggers, M. Cunningham, R. Phipps, M. Boulic, P. Fjallstrom, S. Free, R. Chapman, B. Lloyd, K. Wickens, D. Shields, M. Baker, C. Cunningham, A. Woodward, C. Bullen and J. Crane (2008). "Effects of improved home heating on asthma in community dwelling children: randomised controlled trial." *BMJ* **337**: a1411.
- Ki-moon, B. (2014). Sustainable Energy 'Golden Thread' Connecting Economic Growth, Increased Social Equity, Secretary-General Tells Ministerial Meeting. Message to Fifth Clean Energy Ministerial Meeting; Seoul, Korea.
- LIEEP (2016). Low Income Energy Efficiency Program (LIEEP): final reports. <https://www.energy.gov.au/publications/low-income-energy-efficiency-program-lieep>
- Liu, E. and B. Judd (2016) Lower income barriers to low carbon living (RP3038): Summary of focus group and survey findings, Cooperative Research Centre for Low Carbon Living, Sydney.
- Nicholls, L. and Y. Strengers (2015). "Peak demand and the 'family peak' period in Australia: Understanding practice (in)flexibility in households with children." *Energy Research & Social Science* **9**: 116-124.
- NCOSS (2017). Turning Out the Lights: The Cost of Living in NSW, NSW Council of Social Service (NCOSS).
- Russell-Bennett, R., Bedggood, R., Glavas, C., Swinton, T., McAndrew, R., O'Mahony, C., Pervan, F., & Willand, N. (2017). Power Shift Project One: Driving Change – Identifying what Caused Low-Income Consumers to Change Behaviour, Final Report, Brisbane: Queensland University of Technology and Swinburne University of Technology.
- Sustainability Victoria (2018). Outcomes evaluation of the Victorian Healthy Homes Program: a staggered parallel group cluster randomised controlled trial assessing the thermal comfort and health benefits of home energy efficiency improvements. Sydney Australian New Zealand Clinical Trials Registry.
- Thomson, H., S. Thomas, E. Sellstrom and M. Petticrew (2009). "The Health Impacts of Housing Improvement: A Systematic Review of Intervention Studies From 1887 to 2007." *American Journal of Public Health* **99**(3).
- Waitt, G. R., Roggeveen, K., Gordon, R., Butler, K. A. & Cooper, P. (2016) "Tyrannies of thrift: Governmentality and older, low-income people's energy efficiency narratives in the Illawarra", Australia. *Energy Policy*, 90, 37-45.