

What happened to the outside? Exploring the role of 'nature' in household retrofits



Sarah Robertson

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Rationale

Low-carbon retrofits are increasingly a strategy to alleviate fuel poverty. While research has moved beyond understanding retrofit as a technological issue towards exploring people's experiences, little attention has been given to the natural elements that shape how and why householders retrofit, as well as their opportunities to do so. This is curious given that trees, other plants, weather, and climate, are central actors influencing health, wellbeing and equity issues, the thermal performance of housing, and the adaptive capacities of householders in response to extreme weather. By studying the place of 'natures' in retrofit, this project begins to explore the implications of human-nature relations for just low-carbon transitions.

Key research question(s) and/or aims

The project aimed to place 'natures', specifically, trees, plants, climate and heat, more firmly into discussions of household retrofit and fuel poverty, and to explore the implications of doing so for policy and practice. It asked the following questions:

1. Where, how, and why do 'natures' figure in experiences and practices of household retrofit?
2. What do these experiences mean for retrofit and fuel poverty policy responses?
3. How might this help broaden the lens through which we a) view the opportunities and barriers to retrofit and alleviate energy poverty, and b) focus policy and program responses?

Summary of research activity

Qualitative analysis was used to analyse interviews conducted as part of the Household Energy Efficiency Transitions (HEET) project. Interviews with eighty-two householders in a metropolitan area of Melbourne and the regional area of the Latrobe Valley in Victoria, Australia, were re-analysed using NVivo. An initial analysis was carried out identifying where and when natural elements – plants, trees, animals, and climate forces such as heat – were mentioned by participants. A more fine-grained analysis of householders' experiences of summer heat was conducted, drawing on rhythm analysis (Oppermann et al., 2020). [More information on the HEET project.](#)

Methodologies

This project analysed 82 interviews that were carried out as part of the HEET project in a metropolitan area of Melbourne and a regional area in Victoria, Australia, between June 2019 and December 2021. These in-person, online and telephone interviews involved household tours and semi-structured interviews with householders who had made, or wished to make, improvements to their homes. Interviews were approved under Human Research Ethics at RMIT University. Interviews covered householder experiences of the home during different seasons and at different times of day, the aspects of the house they liked and disliked, their experience managing energy bills, and any changes they had made to the house, or would like to make. Trees and plants were discussed on the household tour and during the interview if the householder brought them up. Householders were asked about their experience of summer heat. Secondary data analysis conducted for this EPEC project returned to the interviews to look at the 'natural' elements discussed by participants, even though these were not the focus of the original interviews.

Analysis of the interviews was informed by post-phenomenological (Ash & Simpson, 2014) and more-than-human (Whatmore, 2006) thinking to explore human-nature relations at home. Together, these understand experience as shaped by human-nonhuman entanglements. Interview transcripts

were uploaded to NVivo where keyword searches were used to identify references to the different 'natural' elements or actors that shaped household experiences of retrofit and homemaking – including trees, animals, and summer heat. Interviews where householders discussed their experiences with these 'natural' actors and forces were then analysed in greater depth.

Findings

Framing nature in retrofit and energy vulnerability:

This research explored the place and role of 'natures' in household retrofit to consider the implications for retrofit theory and practice.

'Nature' is often framed and acted upon as something external to the environments and lives of people (Hinchliffe, 2007). This plays out in imagined separations between cities and 'nature' in rural, 'natural' or 'wild' places. It also plays out in how homes are often imagined, as places separate to the dust, dirt and animals of outside (Kaika, 2012; Power, 2009).

However, such externalisations of nature are problematic. Human framings of nature have significant effects on human and nonhuman worlds (Castree, 2005, 2014; Kaika, 2012). Trees, other plants, the weather and climate, are central actors influencing health, wellbeing and equity issues (Bulkeley, 2013; Hartig et al., 2014; Walker & Day, 2012; Wolch et al., 2014) and the thermal performance of housing (Byrne et al., 2016; Ko, 2018). Indeed, the design and construction of thermally poor housing without reference to its environment is just one example of the trouble created when 'nature' is externalised.

A more productive way to understand 'nature' is as something co-produced by humans and the living and non-living beings and things that dwell on Earth (Castree, 2005; Hinchliffe, 2007). That is, we, humans, live in relation with these living and non-living earthly companions.

Retrofit literature is increasingly focusing on the social relations that shape home improvements and energy demand and use (e.g. Bartiaux et al., 2014; Fyhn et al., 2019; Gram-Hanssen, 2014; Hargreaves & Middlemiss, 2020). However, there remains little explicit attention on the place of 'natural' elements or forces on retrofitting practices, and the implications of this for energy vulnerable householders.

Experiences of nature in household retrofit and homemaking

This project found householders experienced 'natures' in different ways as they went about homemaking and retrofitting. Different natural actors and/or 'natural' forces were found to shape retrofit opportunities and practices, including animals, plants and trees, and elements or forces such as sun, wind, rain, heat and cold. These human-nature interactions had different effects, sometimes enabling retrofit, sometimes disrupting it, and often doing both to varying degrees.

"The mice got in..." Retrofitting home with others

The animals discussed by participants in the research included rats, mice, possums (or animals deemed disruptive to homemaking), and household companion animals (which featured as householders and therefore consumers of electricity). However, the distinction was not always so clear.

The following extract is an example of mice disrupting and enabling low-carbon retrofit. After what the householder described as a “mouse plague” that caused electrical problems, a conversation with their electrician saw them install a hot water heat pump. The “plague” also saw them invest in a new split system air-conditioner.

“I had to have some power points fixed because some mice had got into and they had disrupted a couple of our power connections. Having a discussion with the sparky ... “The hot water heat pumps are really the way to go.” ... I said, okay. I went and did some research [on hot water heat pumps].

I bought two [brand] units [inverters], one for here and one in the other thing. The original one of this got killed. ... We had a year where we had pretty much a mouse plague. One of the faults with the units is the condense head outside is not sealed. ... The mice got in. Decided to make the actual control unit area their home. Their faeces and urine corroded the fittings and that was it.” (Latrobe Valley owner-occupier)

Homes, not just houses – navigating the meanings and contribution of trees

Trees and plants featured heavily in householder experiences of homemaking. In relation to retrofit, trees were discussed as providing shade or were mentioned as lacking where there used to be tree(s) that had been removed. Trees also featured significantly as a substitute for the limitations of poor-quality housing and high living costs (e.g., vegetable gardens).

The following example again illustrates that while trees may disrupt retrofit, they may support passive thermal performance and/or be a meaningful element of the place householders call home; meanings that may shape retrofit opportunities and practices. The householder quoted below was interested to install solar panels through a local retrofit program supporting energy vulnerable households. However, their installation meant losing a gumtree they were particularly attached to.

“In the afternoon, I enjoy sitting in my backyard. I’ve got shelter from the veranda, that’s looking outwards towards my tree.

I did request solar panels and they [the retrofit program provider] said no, the roof faces east-west. So, on the western side, there’s enough roof space, for lots of solar panels to be placed. The gumtree provides some shade onto the roof and a few people who’ve said, if I was to remove the gumtree, solar panels would be effective for me. And I’m like, ‘Well, that’s not going to happen.’” (Latrobe Valley owner-occupier)

“We just get by” – managing summer heat

Finally, the weather and ‘natural’ forces, such as the sun, wind, rain, heat and cold/warmth and shade, were central in how householders spoke about their experience of home and the retrofits they had made or would like to make. Experiences of summer heat highlighted the ways severe heat in Melbourne and southern Victoria was experienced as a short-term phenomenon. It also reiterated existing knowledge of the uneven impacts of summer heat, particularly in this case on energy vulnerable households in urban areas (Dialesandro et al., 2021; Harlan et al., 2007; Maller & Strengers, 2011).

This may in part be due to the pattern and severity of heatwaves in the region. Victoria’s climate is referred to as mild temperate, but it experiences “hot to very hot summers, [and] moderate humidity” that exceed human comfort (Australian Bureau of Statistics, 2013). A feature of southern Victoria’s summer weather patterns are heatwaves that may last for several days followed by significant cool changes during which temperatures can drop quickly as cold fronts pass through (Bureau of Meteorology, 2016).

The following Melbourne householder's response to coping during these heatwaves and their plans to manage summer heat was common. They described summer heat as a short-term phenomenon and their response framed a split system air-conditioner as a temporary solution they envisaged they would use sparingly:

"Yeah. On those hot days, we struggled to get through. So that's why we are considering a split system for down here, possibly over that window here...That way, it'll provide that burst of freshness, coolness that... Because you know, our [Melbourne] summer is really hot. In Melbourne it gets really hot..."

Interviewer: So how have you coped with those really hot days?

We just get by, and just hope it cools, the change comes through, you know? Just praying for that change. Yeah." (Melbourne owner-occupier)

Retrofits requiring more material intervention and longer-term investment (such as double-glazed windows or insulation) helped other householders cope with summer heat events, slowing heat transference through homes. However, for energy vulnerable households, there were temporal trade-offs that limited their opportunities to retrofit. The Melbourne owner-occupier mother quoted below had considered installing a split-system air-conditioner but faced a temporal trade-off in maintaining the comfort of her young sons and herself. She framed the decision of whether to invest in the unit as having to choose between the short-term relief provided by an air-conditioner and the longer-term uncertainty this would bring into her electricity bills:

"So, there are quite a few days of summer where we quite suffer. But I've been weighing up getting air conditioning, and yeah, it's not probably a priority either, because it's really about maybe six or seven days in a Melbourne summer that are quite unbearable, and we could do something else, like we could just go to the pool those days... because it's only a few days a year, I haven't bothered thinking about the aircon. Yeah. I think, yeah, I'd rather keep the bills low." (Melbourne owner-occupier)

Implications for retrofit theory and practice

These examples are illustrative of experiences across the interviews and emphasise the human-nature relations that shape retrofit in diverse ways. Nature often informed householder experiences of their homes and their practices of low carbon household retrofit.

While trees, plants, animals and elemental forces were central to retrofit, the research also emphasised that time – the daily and seasonal routines of householders, the life cycles of housing materials, technologies, and green infrastructures such as trees – shaped the opportunities householders had to retrofit. These temporal influences featured alongside elements of place – from local and regional environments to the meanings associated with the trees, plants and animals that made their house a home.

Experiences of summer heat highlighted the significance of considering nature, time and place in retrofit interventions aimed at alleviating energy vulnerability. Summer heat impacts are felt disproportionately by lower-income households (Dialesandro et al., 2021; Harlan et al., 2007; Klinenberg, 2002). This research suggests that the ways heat events are framed temporally shapes retrofit decisions and that energy vulnerable households face temporal challenges in how they might respond to heat.

Recommendations

This research has found that 'natures', time, and place dimensions shape the opportunities householders have to retrofit their homes. It suggests the following be considered by stakeholders involved in retrofit and energy vulnerability policy and practice:

Homes are places we share with 'nature' – As much as we make homes places of shelter from 'nature', we share home with and must negotiate nonhuman actors – animals, plants (or where they are missing), and weathering forces (see also Gillon & Gibbs, 2019; Power, 2009).

Homes are places that interact with local environments and the meanings and relations associated with them (see also Blunt, 2005; Craft et al., 2017; Robertson, 2018). Householders experienced home beyond its four walls (Middha et al., 2022), and this shaped retrofit opportunities and practices. Retrofit interventions could consider contributors to thermal performance beyond the four walls of the house.

Time matters – Experiences of summer heat bring time into focus, from daily, weekly, and seasonal routines of householders to the life cycles of housing materials and technologies and natural infrastructures such as trees. Greater attention is needed on the impacts of summer heat on existing housing and energy poor and vulnerable householders (Thomson et al, 2019). This research points to the importance of energy poverty and retrofit governance considering both how time dimensions shape opportunities for householders to respond to heat events and the impacts of short-term framings of summer heat on these responses (Bolitho & Miller, 2017).

To bring natures more firmly into view as something humans dwell *with* rather than *alongside*, the following questions have been designed to help those involved in retrofit policy and practice. The three questions may be used as prompts or guides in decision-making processes where a retrofit intervention or policy is being considered.

1. Who/what are the natural actors that influence retrofit opportunities?
2. What are the relevant time and place dimensions?
3. How might these actors, time and place dimensions contribute to, enable, or disrupt retrofit opportunities, and their potential success?

Outputs

- Presentation at the 2021 RGS-IBG Conference, UK: 'Tracing the sociomaterialities of summer heat, energy poverty and household retrofit for just low carbon transitions'. September 2021
- Presentation to HEET project partners, Australia: 'Centring 'nature', time and place in retrofit theory and practice'. November 2022
- Draft of a journal article prepared based on the RGS-IBG conference presentation, to be submitted in 2023.

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