Learning the Hard Way:
Energy Practices of International Students in Rental Accommodation

SUMMARY

Change for Good at UTS

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UTS

SBRC SUSTAINABLE BUILDINGS RESEARCH CENTRE

UNIVERSITY OF WOLLONGONG AUSTRALIA

Methods

This multi-stage multi-method project is an interdisciplinary collaboration. As such, different methods were used at each stage from 2022-2024.

STAGE 1	Quantitative survey to measure energy efficiency knowledge, thermal comfort, energy hardship, health impacts of housing, health and well-being, satisfaction with energy provider, and billing hardship.
STAGE 2	Qualitative semi-structured interviews.
STAGE 3	Quantitative building audits using scorecard tool.
STAGE 4	In-home monitoring of temperature over the winter and summer periods. Some homes also had plug-in appliance energy monitors installed at the same time.

STAGE 1
QUANTITATIVE SURVEY

We developed an online survey instrument using established and validated measures to understand energy efficiency knowledge, thermal comfort, energy hardship, health impacts of housing, health and well-being, satisfaction with energy provider, and billing hardship.

The online survey included 8 sections, had a range of question formats, could be completed on a mobile phone, and took around 15-20 minutes to complete.

The Qualtrics survey was distributed from 7th November 2023 to 13th July 2024.

The Qualtrics survey operated as a recruitment tool for the follow-on stages of the study and all respondents who indicated a willingness to participate in further research were contacted. To supplement this, the CALD research assistant used personal networks to recruit a total of 32 international students.

The recruitment criteria were that participants had to be CALD international students living in private rental accommodation (not including university-provided accommodation) and that they did not have plans to move residence within the next 9 months. In addition, a diversity of demographics was sought with some targeted recruitment in the latter stages to engage more female students and in particular from Climate Zone 6 in Western Sydney.

We emphasise the value of the data captured due to the transience and mobility of this cohort.

STAGE 2
Qualitative semi-structured interviews

The interviews explored how the cultural experiences of students influenced their use (or not) of domestic appliances in the home. We explored how people have an embodied history of climate which influences how they perceive levels of thermal comfort and discomfort, and how they may be able to embrace adaptive practices to improve levels of thermal comfort and reduce billing anxieties associated with high energy costs. Yet, while adaptive practices may reduce energy anxieties, it is important to recognise that this may lead to higher levels of physical discomfort, with the potential for physical and mental health impacts that can lead to reduced well-being (Waitt and Harada, 2019) and impact on the ability to achieve educational outcomes (Banerjee et al., 2022).

We also explored how CALD students make decisions around the use of energy in the home in relation to the physical infrastructure of the home. For example, what measures can CALD students take to improve the energy efficiency of their home (purchase and install insulating curtains or window coverings, purchase energy efficient appliances)? What are the ethical implications of CALD students living in private rental accommodation when they are unable to improve the property performance (e.g., should they appeal to real estate agents or landlords)? What strategies do CALD students use when they are unable to afford the cost of energy to maintain a minimum standard of comfort (e.g., spending little time at home, reducing

food consumption or spending on essentials like medication)? We investigated how CALD students experience energy poverty in terms of the effect on physical health, mental well-being, social connectedness, academic outcomes. We asked about their energy providers, plans, costs and what they knew about energy efficiency to give insights into how their practices brought together knowledge, beliefs, and understandings that related to the housing type and building performance.

Semi-structured interviews were conducted in student homes between 03/06/2024 and 17/12/2024. All interviews were audio recorded with participant consent and transcribed.

Interviews were analysed in qualitative software NVivo 12.

Participants received a $100 Coles voucher to thank them for their engagement in the interviews.

STAGE 3
Quantitative building audits

All 32 student homes were assessed using the Residential Efficiency Scorecard developed and administered by the Victorian Government. The Scorecard is a home energy and thermal comfort rating tool for existing homes across Australia. This tool generates a star rating out of 10 as an indication of how much energy is expected to be consumed by a typical household for that sized home and includes a breakdown of energy consumption by appliance/function. The tool also provides an indication of how the home performs in hot and cold weather without any heating or cooling energy.

Scorecard assessments required documented evidence of multiple aspects of the building. For example, the external construction, size and orientation of the building including eaves and roof and wall colour. Heating, cooling and hot water appliances were documented according to type, star rating, and year of purchase. Data for each room included the floor area, insulation in ceiling, walls and subfloor, heating/cooling appliance selection, window details (size, construction, orientation, glazing type, opening type, external and internal coverings) air leakage gaps (at windows, doors, floorboards, exhaust fans, chimneys, downlights and other envelope penetrations). Pool/spa pumps and rooftop solar system size are also documented.

These assessments were conducted by an accredited Scorecard assessor during the first home visits (usually concurrent with the semi-structured interviews to minimise the participant disruption) between 3 June 2024 and 25 September 2024 with the first 14 completed by 21 June and the remainder being delayed by recruitment difficulties.

Participants received a $100 Coles voucher to thank them for their engagement in the home energy assessments and indoor thermal comfort monitoring tasks.

STAGE 4

In-home monitoring of Indoor temperature and plug-in appliance loads

Figure 2.1: Hobo UX100 and Hobo MX1101 temperature and humidity data loggers.

All homes had a temperature and humidity monitor installed in the main living area. The Hobo UX100-003 and MX1101 data loggers, depicted in Figure 2.1, were used to collect indoor thermal comfort data at 15-minute intervals over the duration of the project. They were attached by double sided removable tape to an internal wall in a position that was not impacted by direct sunlight or heating sources. The data were stored on the devices and downloaded on collection at the end of the monitoring period.

Participants were asked to provide energy bills for the 12-month period which covered the indoor temperature and humidity monitoring period. This allowed the research team to correlate seasonal (quarterly) energy consumption against measured thermal comfort.

Figure 2.2: Meross smart energy monitor for daily energy consumption logging.

Participants who used plug-in heaters were asked if they were willing to have a WiFi connected energy monitor installed for the duration of the study.

The Meross smart energy monitor logs daily totals of energy consumption for plug loads. This data provides more granular and heating-specific energy data that may be cross correlated with indoor temperature data to build a picture of energy and thermal comfort behaviours in practice.

Limitations, Generalisability and relevance

We acknowledge the limitations of this research because of the small sample size and limited geographical coverage. Data collected from Stages 2 and 3 are focused on two climatic zones and provide a limited comparative sample. Our national survey response does not allow for generalisable findings.

We point to the political climate as a significant factor which impacted on our ability to undertake this research. First, the media discourse around the current housing crisis in Australia has focused on the additional strain on housing availability and affordability caused by international migrants. Caps on international student numbers, increases in international student fees, and consequent job cuts in the university sector have resulted in more media and public focus on international students in the community.

Second, the time delays between university acceptance and issue of a student visa contribute to a situation where student accommodation quickly reaches capacity. For students waiting on visa issue, there were limited choices in terms of housing availability, and many turned to the private rental market. Within the private rental market, the requirements and competition for properties put international students

at a disadvantage-they experienced challenges with supplying Australian identify documents, proof of income, or rental references. As a result, many students were forced to find accommodation through personal or online networks. Within our cohort they reported either staying with friends or family, living in single rooms in a family home, living in granny flats or alternative housing arrangements.

During the monitoring period of this research the transience and vulnerability of the cohort presented a raft of challenges to data collection. Despite, screening participants for not planning on relocation for 12 months, out of 32 participants, 14 relocated homes before the end of the summer monitoring period of the study. Further, 4 participants lost the installed sensors due to moving home and the data and sensors were unable to be recovered.

Despite a sustained and consistent effort to engage with international students for this project we also met with a high level of reticence and hesitation. Participants expressed that they were unwilling to complain about the poor thermal performance of their housing, or energy bill-sharing arrangements. Our recruitment success came primarily through word of mouth starting with personal networks and cultural communities of trust. For these reasons we were unable to recruit any participants at all from the more diverse climate zones of either Brisbane or Canberra and had to consolidate across the more similar BCA Climate Zones 5 (warm temperate) and 6 (mild temperate).

The relevance of findings from this research would be strengthened by investigating CALD international student housing in multiple climatic zones to generate data that covers different jurisdictions, universities, climatic zones and housing types.

Comparisons are made within each field site, and between each field site to generate energy biographies and understandings of how these are made through the relations between ethnicity, housing type, climate and jurisdiction. Energy biographies point to the way that structural forces alongside embodied knowledge of climate and culture influence how people negotiate social and material environments that are underpinned by energy usage.

The interdisciplinary triangulation of the quantitative survey data, qualitative interview data and the quantitative building performance, thermal comfort, and energy consumption data adds a tangible depth and breadth to the energy biographies.

Summary of Key Findings

The results from this project indicate that CALD International students:

- living in private rental accommodation experience thermal comfort levels outside of the acceptable range of temperatures for a substantial portion of time.
- live in housing types generally rate low in terms of building performance.
- live in precarious housing arrangements with little knowledge of their rights as renters.
- have low levels of understanding of home energy efficiency.
- are disadvantaged by the current system of university acceptance and visa issue which exacerbates housing scarcity.
- are motivated to use energy efficiently for financial reasons but also cite cultural or religious beliefs as influencing their energy practices.
- experience a range of challenges with some groups (young males living in shared housing arrangements; nuclear families with children in better performing buildings) faring better than others (singles living in bedsits).

Summary of recommendations

1. Improve awareness of home energy efficiency, passive heating and cooling measures, the range of available energy retailers and the implications of different energy plans for international students living in Australia.

2. Improve awareness of the rights of international students as renters in the private sector.

3. Recognise how the current private rental sector disadvantages CALD International students in terms of the requirements (Australian identity documents, income statements, bank balances or rental ledgers etc.) and how this often results in reduced housing choices.

4. Provide clearer housing options and opportunities for international students applying to study at Australian Universities between university acceptance and visa approval.

5. Initiate pilot projects for the implementation of home energy star rating systems (e.g., Scorecard or NatHERS Existing Homes) in conjunction with home energy upgrades that focus on improved thermal comfort and lower energy bills for lower end of property market i.e., older less efficient buildings.

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