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Household Energy End-use Project 2:

Report on winter comfort, heating and indoor temperatures (preliminary analysis)

Executive summary

HEEP2

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Executive summary

The Household Energy End-use Project 2 (HEEP2) is a national study of energy use and conditions in New Zealand homes. It was designed to closely replicate HEEP1, a similar study undertaken from 1999 to 2005.

Households were recruited to the national HEEP2 study through the Stats NZ Household Economic Survey (HES) 2021/22, with additional recruitment through the 2023/24 HES. All household types and typologies were eligible to take part.

HEEP2 is collecting data in various ways from a national sample of over 800 households. Data collection includes combinations of self-completion and on-site surveys, in-home monitoring and accessing metered energy data from retailers.

This report presents preliminary results, focusing on winter heating, comfort and internal temperatures in homes. It draws on data from an in-home interview and building and appliance survey completed for 425 households.

Analysis of internal temperatures uses a subset of this national sample comprising 128 households that were monitored over winter 2023.

All results reported here use unweighted data. As the monitoring data covers less than half of the HEEP2 monitored dataset, these results must be considered preliminary. Similar analyses will be undertaken and reported using the complete and final dataset.

Sample demographics

- Households in the HEEP2 sample are predominantly owner-occupied with respondents being slightly older and having slightly higher incomes compared to the national population.
- The regional spread reflects the national dwelling distribution with some exceptions due to fieldwork challenges (namely Tasman and Gisborne).

Dwelling characteristics

- The dwelling type and size of houses in the HEEP2 sample is consistent with previous national housing surveys with most homes being stand-alone single-storey dwellings.
- The age distribution roughly aligns with other data, though there are possibly slightly fewer houses built pre-1920 and post-2000 in the HEEP2 sample.

Occupant comfort and problems in the home over winter

- Almost half (48%) of respondents said their home felt colder than they would like at least some of the time in winter. Around 1 in 5 said they could see their breath and 1 in 5 reported that their home was cold enough that they shivered at least some time in winter. These results are consistent with those from a 2018 Stats NZ survey.
- Those who felt cold most commonly associated this with poor heat retention and efforts to reduce energy costs. They were more likely to have gaps around their windows (a potential source of draughts), while those whose homes were predominantly double glazed were much less likely to report feeling cold in winter.
- Damp (33%), condensation (75%) and mould (48%) were frequently reported.

Heating behaviours

- 85% said they heated their main living area every day or most days in winter, which corresponds to the original HEEP1 finding and results from a 2018 Stats NZ survey.
- 41% of HEEP2 respondents reported never heating their bedroom, which is lower than the original HEEP1 finding of 50%.
- Occupied bedrooms are more likely to be heated if the youngest occupant is aged under 5, with 41% reporting these are heated every day in winter compared to under 25% for other age groups. Nevertheless, just over 30% of young children's bedrooms were never heated.

Attitudes to energy use and perceptions of the home

- In line with results around feeling cold and cost being a reason for inadequately heating, 44% said they would like their homes to be warmer, 70% said they paid attention to energy bills and 79% reported making some form of change to their home to provide a more comfortable temperature.
- However, despite the prevalence of feeling cold, of experiencing damp, condensation and mould and of wanting their house to be warmer, 92% felt their home was a healthy place to live.
- Households adopted a range of different practices to help keep warm in their home in winter. A high proportion reported energy-efficient behaviours such as closing curtains, using extra blankets, wearing extra clothes and closing off unused rooms. However, having a hot shower/bath, which is a less effective way of using energy to keep warm, was also reported by around a quarter.
- Despite efforts reported by a high proportion of survey respondents to help keep energy bills down, 1 in 20 (5%) said they had gone without heating at some time in the last year because they felt unable to pay for it.

Indoor temperatures

- Preliminary analysis of a subset of the HEEP2 sample (125 households) monitored over winter (June to August) 2023 suggests indoor temperatures have increased over time, with significant improvements over the last 20 years (since HEEP1 was completed).
- The average (mean) temperature in living areas in the evening (17:00–23:00) for the HEEP2 winter 2023 subsample was just under 20°C compared to 17.8°C reported in HEEP1.
- The average (mean) temperature in bedrooms overnight (23:00–07:00) for the HEEP2 winter 2023 subsample was 16.1°C compared to 13.6°C reported in HEEP1.
- The average temperature overnight in HEEP2 occupied bedrooms was 16.4°C.
- While average living room temperatures exceeded the recommended healthy minimum of 18°C, average bedroom temperatures are still below this threshold – and substantially so for some.
- Frequency of heating appears a key factor in indoor temperatures achieved for both living areas and bedrooms.
- Early indications from the HEEP2 data suggest households in the lowest income group may experience bedroom temperatures significantly lower than other income groups, while houses built post-2007 may have higher temperatures in bedrooms.
- Preliminary results also suggest households with someone usually at home during the day are warmer than those usually unoccupied in the daytime, which aligns with self-reported heating habits.

- Age of bedroom occupant also appears a factor, with bedrooms occupied by young children being warmer than all other bedrooms, which again aligns with reported heating behaviours.

Conclusions

This report provides initial and, in the case of the internal temperature data, preliminary insights from the HEEP2 study. The results generally confirm findings from previous comparable studies while also indicating potential change (improvement) over time in internal temperatures but highlighting ongoing issues with cold, damp and mould.

The results draw attention to the differences between socio-demographic groups, the continued exposure to unhealthy night-time temperatures and the apparent prioritisation of young children's bedroom temperatures. They also give some indications of the potential role of improvements in insulation/thermal performance and heating appliances in contributing to higher room temperatures, although this requires further research and analysis.

The preliminary analysis of indoor temperatures will be updated and reported on for the complete HEEP2 dataset when available (2025).

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