HEEP2 data collection catalogue

This document provides a high-level overview of all the data being collected as part of the Household Energy End-use Project 2 (HEEP2) and the various sample groups (referred to as 'Full', 'Medium', 'Light' and 'High performance').

Participant recruitment

Households were recruited to the HEEP2 Full, Light and Medium (national) samples through the 2021/22 and 2023/24 Stats NZ Household Economic Survey (HES). All household and dwelling types were eligible to take part.

The High-Performance (HP) sample (Canterbury only) was recruited through alternative means, to target specific dwelling types, using the BRANZ 'new homeowners satisfaction survey' for new built-to-Code minimum houses and networks such as Homestar (New Zealand Green Building Council (NZGBC)), Passive House and Superhomes for high-performance dwellings.

Data collected in HEEP2

The table below summarises how the different data collections apply across the samples and timeframes for data collection.

Table 1. Summary of HEEP2 data collections and sample groups

Sample name:	"Light"	"Medium"	"Full"	"High Performance"
Funded by:	BRANZ	BRANZ + MBIE	BRANZ	BRANZ + MBIE + NZGBC
Sample size:	333	138	287	43
Recruitment method:	Stats NZ HES	Stats NZ HES	Stats NZ HES	Targeted
Coverage:	National	National	National	Canterbury only
DATA COLLECTED:				
Initial short household survey	✓	✓	✓	✓
Consent to access Retailer data	✓	✓	✓	✓
In-home householder interview		✓	✓	✓
In-home Building and appliance survey		✓	✓	✓
12-months monitoring: **Indoor conditions** (T, RH, CO2)			✓	✓
12-months monitoring: **Heater use** (temperature sensors)			✓	✓
12-months monitoring: **Outdoor conditions** (T, RH)			✓	✓
12-months monitoring: **Electricity circuit-level**			✓	✓
12-months monitoring: **Hot water draw-off** *			✓	✓
12-months monitoring: **Gas use** **			✓	
Exit survey			✓	✓
Timeline of data collection:				
surveys/fieldwork	Sep-21 to Aug-24	Aug-22 to Apr-24	Aug-22 to May-24	Jun-23 to May-24
monitoring	N/A	N/A	Aug-22 to May-25	Jun-23 to May-25

* half the Full sample and all the high-performance sample
** limited to around 30 households due to equipment availability and cost; prioritised households using reticulated gas (North Island only) for heating and/or hot water.

The information collected for each of the items listed above is described in more detail in the tables below (click link to jump to table):

1) Initial short household survey

Sample	All
Purpose	For Full, Medium & HP: This acts as a pre-install survey to help the field team plan for the visit. For Light: It provides some basic information about the dwelling and occupants to support analysis and interpretation of the Retailer data. The core information collected in this survey is the same across all groups, to intentionally provide a harmonised, consistent dataset across the entire HEEP2 sample.
Data collection approach	For Full, Medium & HP: Telephone survey, completed by BRANZ Interviewer using Qualtrics For Light: Self-complete paper survey. Data entered by BRANZ into Qualtrics
Information collected	
About the dwelling	Dwelling type
	Number of rooms
	Year of construction
	Floor area
	Roof space insulation present
	Subfloor insulation present
	Wall insulation present
	Windows single- or double-glazed
Energy and hot water	Facilities and amenities present
	Energy types used in the home
	Hot water system(s) type(s)
Heating habits	Frequency of heating main living area in winter
	Appliance(s) used for heating main living area in winter
	Frequency of heating bedroom in winter
	Appliance(s) used for heating bedroom in winter
	Other appliances used for heating in any other areas of the house
Comfort behaviours	Things to help keep warm in the home in winter
Cooling	Frequency of using heat pump or air con for cooling in summer
Socio-demographics	Number of adults (18 or over) usually resident
	Number if children (under 18) usually resident
	Own or rent
	Landlord (if rent)

2) Access to retailer data

Sample	All
Purpose	To provide timeseries of metered electricity (and gas, where applicable and possible to obtain) consumption data for all HEEP2 participants
Data collection approach	Information on retailer and ICP number obtained from Participant through consent process. Request submitted by BRANZ (acting as agent on behalf of the consumer) through the Electricity Information Exchange hub or directly to Gas retailers.
Information collected	Timeseries of electricity (and where obtainable, gas) consumption. Data provided (e.g. granularity) is subject to, and varies by, Retailer.

3) In-home householder interview

Sample	Full, Medium, HP
Purpose	Collect information about household energy using behaviours, energy bills, comfort and attitudes to energy use.
Data collection approach	Face-to-face in-home survey completed by BRANZ-trained interviewer on an iPad/tablet
Information collected:	
Occupancy	Time at address
	Usual times of day someone at home
Heating	When start and stop heating (months of year)
	Main living area (how often, times of day, how, temp settings, timers/controls)
	For all other rooms/areas of the house that are heated at some time (info below recorded for each room/area separately): How often, times of day, how
	Bedrooms: How often, times of day, how, who sleeps there
	Things do to help keep warm
Cooling	How often heat pump / air con used for cooling [recorded for living area, bedrooms, any other parts of house]
	Things do to help keep cool
Ventilation	Frequency of opening windows and using extract in bathrooms
	Frequency of opening windows and using extract in kitchen
	Frequency of airing out bedroom
	Frequency of using dehumidifier and where in house
Water heating and hot water use	Frequency baths and showers used by time of day (for whole household)
	Frequency of loads of washing, washing machine temp setting, times of day washing done
Drying clothes	Frequency of using clothes drier in summer and winter
	Frequency of drying clothes outside in summer and winter
	Frequency of drying clothes inside in summer and winter, and where in house and use of ventilation
Cooking and dishes	Appliances used to cook hot meals in last 7 days
	Times of day hot meal usually cooked
	Frequency of using dishwasher
EVs	Have on that is charged at home; times of day charged
Energy bills	Electricity: How pay Day rate, Night rate, Controlled rate, Fixed daily charge Last bill amount and for what month and n days When last switched retailer/plan Plan offerings (hours of power, free power days, power shouts)

	Perception of household energy consumption (high, average etc)
	Receive Winter Energy Payment Effect of WEP on energy use in winter *(the only free text qual question in the survey!)*
	Mains Gas: How pay Day rate, Fixed daily charge Last bill amount and for what month and n days When last switched retailer/plan
	LPG (exc bbqs): Monthly bottle rental charge Gas bottle refill/swap charge Approximately how many refills/swap per year? Bottle size
	Wood and Coal: Amount paid For what volume Approximately how many loads per year
Home improvements and maintenance	Changes made to house since lived there and when done (e.g. insulation, new heat pump etc)
	Changes planning to make in next 12 months (same options e.g. insulation, new heat pump etc)
	Perception of condition (state of repair) of house
	How long maintenance/repairs been needed
	Reasons for not doing maintenance/repairs
Attitudes to using energy	Statements with Likert scale response (very important, somewhat important, not important)
Comfort, damp and mould	House ever colder than would like last winter
	Reasons house colder than would like
	House cold enough to see breath indoors
	House cold enough to shiver indoors
	House ever warmer than would like last summer
	Any mould in house
	Mould greater than A4
	Condensation on windowsills or panes in winter
	House damp (always, often, sometimes, never)
	House draughty (always, often, sometimes, never)
Energy needs, practices and norms	Gone without heating because felt unable to pay for it
	Anyone in household suffer from illness that requires energy use
	Statements about managing energy bills with Likert scale (Strongly agree to Strongly disagree)
	Actions can do save energy with scale of how often do them

3B) Self-complete householder demographic survey

Sample	Full, Medium, HP
Purpose	Collect information about the household
Data collection approach	Designed as a self-complete survey (due to sensitive nature of data), completed in the home, on iPad/tablet (follows on from in-home interview) by householder (or interviewer subject to respondent's preference)
Information collected:	
Participant information	Age
	Ethnicity
	Migrant status
	Work situation

	Personal income
	General health
Household information	Number of occupants aged: under 5; 5-17; 18-64; 65 or older
	Combined household income estimate

4) Building and appliance survey

Sample	Full, Medium, HP
Purpose	Detailed survey of the dwelling and appliances within in it. To inform analysis and interpretation of other data collected (e.g. the monitored and metered data) and enable general reporting on the dwelling and appliance characteristics of the sample.
Data collection approach	Onsite survey completed by BRANZ-trained building surveyor
Information collected:	
Dwelling overview	Number of rooms and storeys
	Dwelling type
	Floor area
	Year of construction
	Typology
	Part of retirement village
	Shading
	Shelter
Building features: Roof and Roof space	Roof form type
	Roof cladding
	Roof colour
	Number of wind powered roof ventilators
	Number of electric roof ventilators
	Eaves depth
	Critical roof defects
	Condition rating of roof
	Is there insulation?
	Roof space insulation: Base layer type, coverage and depth
	If an area without insulation: Reason for area not insulated
	Is there Top-up Insulation?
	Add: Top- up roof space insulation type, coverage and depth
	Reason for area not topped up
Building features: Wall cladding	Wall cladding type(s)
	Wall insulation
	Wall colour
	Condition rating
Building features: Floor and subfloor	Floor type (foundation)
	Material
	Is there insulation?
	Insulation [record material(s) and coverage]
	If <100% insulation, or None, Record reason
	Subfloor exists?
	Subfloor ventilation assessment
	Subfloor ground vapour barrier present (greater than 75% coverage)
	IF YES to Subfloor ground vapour barrier present: Are there significant holes or tears that could allow moisture through

	IF YES to Subfloor ground vapour barrier present: Any signs of moisture on its upper surface which could be the result of storm or surface water entering the subfloor space or leaking plumbing pipes?
	Are there signs of leaks, dampness or ponding?
Building features: Guttering and downpipes	All gutters connected to a downpipe (directly or via another connected gutter)
	Gutters and downpipes intact (not broken, corroded, or with pieces missing) and fixed to home (not loose)
	Gutters and downpipes not obstructed or blocked (with leaf matter or other debris)
	All downpipes direct water to appropriate outfall
Building features: Air leakage / draughtiness	Open Fireplace/Chimney
	Quantity of gaps (i.e., $2 coin fits (3mm))
	Qty of external doors
	External Doors gaps
	Windows gaps
	Skirting Board Gaps
	Floorboard gaps (most visible from subfloor)
	Vented Skylights
Services and Systems	Renewable electricity supply present?
	Hot water system type
	(If cylinder) Wet-back?
	(If cylinder) Solar-boosted?
	If cylinder present: Cylinder grade
	If cylinder present: Cylinder capacity
	If cylinder present: Cylinder thermostat setting
	If cylinder present: Cylinder wrapped
	If cylinder present: Pipes insulation/lagging location [check as many as apply]
	Lagging material
	If cylinder present: Signs of leaks
	If cylinder present: Tempering Valve
	Temperature at nearest tap °C
	Phase-changing material
	Solar room heating
Room level details	Roof type
	Room-level ceiling insulation
	Floor type
	Room-level floor insulation
	Floor covering
	Floor area
	External wall cladding and wall insulation
	Ceiling height at external wall
	Add glazing:
	Orientation
	Height
	Width
	Frame material
	Glazing
	Overhang/ Eave depth
	Overhang permanent or adjustable
	Curtains/ blinds [select all that apply for this window/glazing]
	Pelmet present?
	Puddling?
	External blind/ shutter
	Trickle vents present

	Window/Glazing highly openable
	Number of shared walls
	Signs of leaks or water damage to linings
	Visible mould
Appliances (recorded at Room-level)	
Heating	Appliance, Type, heating capacity, star rating, year of purchase
Cooling	Air conditioner, Evaporative cooler, Fan
Lighting	Fixture, Bulb, Wattage
Cooking	Oven, Rayburn / AGA, Hob – Type, Fuel, Power rating
Fridges and Freezers	Type, Energy user per year, Capacity, Through-door services, Make, Model
Extract fan	Type, Venting to, Duct Diameter, Functional, Light-integrated, Exhaust sealing, Continuous running
Balanced or Supply Ventilation system	Present (Y/N)
(De)Humidifier	Present (Y/N)
Washing machine	Type, Connection, Power rating, Capacity, Energy per cycle, Make & Model
Drier	Vented to, Power rating, Capacity, Energy per year
Dishwasher	Type, Connection, Power rating, Width, Energy per cycle
Bath/shower	Type, shower flow at hot-warm-cold
TVs	Screen Type, Screen size (mm), Power rating (W)
Monitors	Screen Type, Screen size (mm), Power rating (W)
Home theatre equipment	Type (Soundbar / speakers, Projector, Hi-Fi all-in one, Hi-Fi component system, HDD recorder (eg Sky+), Satellite Decoder (non-HDD), Console, Blu-Ray/DVD Player, VHS) Power rating
Other ICT	Server, Other; Power rating
Other appliances/ amenities	Heated pool (Heating and chlorine type), Spa, Sauna, Water Features, Fish tank, Reptile Enclosure, Zip style water boiler, Growing Lamps, Other

5) Indoor conditions monitoring

Sample	Full and HP
Purpose	To provide data on conditions inside the home
Data collection approach	Installation of monitoring devices for 12 months: • Tether EnviroQs: Record Temperature, Relative Humidity, CO_2, Light, Atmospheric pressure at 15-minute intervals, in Main Living Area and up to 3 bedrooms
Information collected	Timeseries of data for each of the data collections outlined above

6) Heater use monitoring

Sample	Full and HP
Purpose	To provide data on time of use of heaters
Data collection approach	Installation of monitoring devices for 12 months: • Wireless tags: placed on or in close proximity to fixed heating sources such as heat pumps, wood burners and gas heaters, to record Temperature in 15-minute intervals, to provide an indication of when heating is used

Information collected	Timeseries of temperature measurements

7) Outdoor conditions monitoring

Sample	Full and HP
Purpose	To provide data on conditions outside the home
Data collection approach	Installation of monitoring devices for 12 months: • Wireless tags: On exterior of property to record Temperature and Relative Humidity at 30-minute intervals (outside data supplemented by NIWA weather station data from nearest station(s))
Information collected	Timeseries of data on outdoor conditions

8) Electricity circuit-level monitoring

Sample	Full and HP
Purpose	To provide detailed data on electricity used on up to 14 circuits in the home at 1-minute intervals for a full year
Data collection approach	Installation of monitoring device for 12 months (wired into circuit board by electrician), with indicators of 'end-use' for each circuit (e.g. heating, hot water, lighting, cooking, plug-loads)
Information collected	Timeseries of circuit-level electricity power demand (W) at 1 min intervals together with indicators of circuit end-use

9) Hot water draw-off monitoring

Sample	Full (n=140) and HP
Purpose	To provide insights into hot water use (when hot water is drawn off)
Data collection approach	Installation of thermocouples at inlets and outlets to hot water system with BRANZ bespoke solution for data capture and transmission
Information collected	Temperatures at inlet and outlet of hot water system to give an indication of hot water draw-off

10) Gas usage

Sample	Full (n ~30, North Island, reticulated natural gas only)
Purpose	To provide detailed data on gas use. Monitoring targeted at households using gas for heating and/or hot water.
Data collection approach	Installation of gas meter with pulse-counter
Information collected	Granular data on gas use for 12 months

11) Exit survey

Sample	Full and HP
Purpose	Check if there have been any significant changes to the dwelling or household composition since the equipment was installed.

Data collection approach	Telephone survey with Qualtrics
Information collected	A short survey to record if any significant changes to the dwelling (e.g. installation of new windows), appliances (e.g. installation of new heating or hot water appliance), energy supply or retailer, or household members (e.g. change in composition or occupancy), and if so, when they occurred.