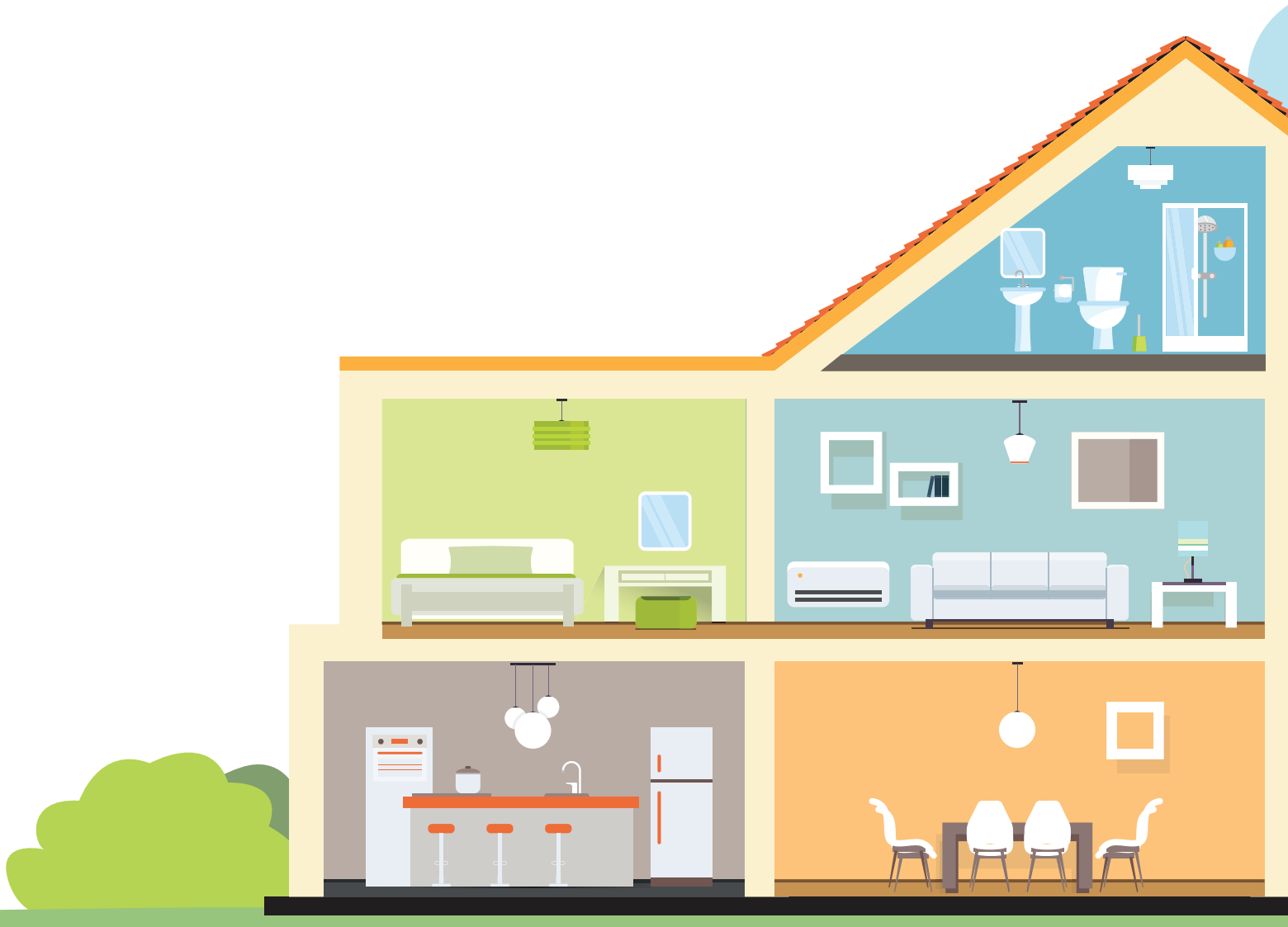
BRANZ

Understanding Energy Use in New Zealand Homes

Info pack

HEEP2 | full



INTRODUCTION

BRANZ is carrying out the Household Energy End-use Project #2, or HEEP2 for short, to find out how, when and why energy is used in New Zealand households. The study follows HEEP1, which ran from 1995–2005.

HEEP2 collects information on how much electricity, gas and solid fuel is used in real households throughout the country. It also collects information about what the energy is used for (such as heating rooms and water, cooking, refrigeration and entertainment) and how effectively it does the job.

This information is collected in different ways.

Electricity use is measured by a special device that is attached to your circuit board. This device records electricity being used in the home, in one-minute intervals.

Gas use (for households with a gas supply) is measured by using the existing gas meter (a smart meter or traditional meter) or installing a meter to measure the gas flow.

Hot water use is measured to provide an indication of how much energy is used to heat the water and how much hot water is used. Depending on the type of hot water system you have, this might involve taking temperature measurements at the inlet and outlet to the cylinder, measuring the flow into the cylinder, or measuring the total amount of water used in the home.

Indoor and outdoor conditions, for example how warm or cold, or damp or dry the air is, are recorded by sensors placed in the living area and bedrooms. This information is important because we spend a lot of time inside our homes and the conditions we live in can affect our health and wellbeing. A sensor is also placed outside the property, because the weather can affect conditions inside the home.

We carry out a **building and appliance survey** to collect information about the physical characteristics of your home and the appliances inside. For example, is there insulation, are the windows double or single-glazed, what kind of lighting is there? This information is important because it can affect how much energy is used for different things, like heating or powering appliances.

We also carry out a **householder survey** to collect information on household energy bills, how appliances are used, householder attitudes to energy, and the way in which they use energy in the home. For example, how often is the living room heated in winter? How often is the shower or bath used? This is important because how household occupants use appliances and services in the home affects how much energy is used.

All this information will help provide a picture of energy use in New Zealand houses that can be used to help support healthier, more energy-efficient homes.

Where can you get more information?

More information about each part of HEEP2, including what information is collected and how, is provided in this booklet:

ELECTRICITY MONITORING

Purpose

Electricity is one of the main sources of energy used in New Zealand homes. HEEP2 will collect information on when and where that energy is used and what level of service it provides. This information will help us understand how households can use energy more efficiently and reduce energy bills, making it easier to keep homes warm and dry.

What information is collected?

To collect detailed information on electricity usage, we use an electric power monitor. This records the energy used on each of the circuits in your home at 1-minute intervals. For comparison, a smart meter will typically record the total electricity usage in the house at 30-minute intervals. By measuring electricity on individual circuits, we can separate out usage for lighting, hot water heating, heat pumps, cooking and groups of appliances.

How is this information collected?

Circuit level usage is recorded using a power monitoring device called an IoTaWatt™. The IoTaWatt™ is enclosed in a specially made box and will be connected to your electrical switchboard. This will be done by a registered electrician, using devices called current clamps. A current clamp is attached to each circuit in the house.

The box containing the IoTaWatt™ is fixed in place using small screws within the switchboard. This means there are no holes in the wall itself. We refer to this larger box as 'the main HEEP2 box'.

Household energy needs can vary throughout the year so **we ask that the monitoring equipment is left in place for 12 months**. This will enable us to compare energy use in summer and winter for example.

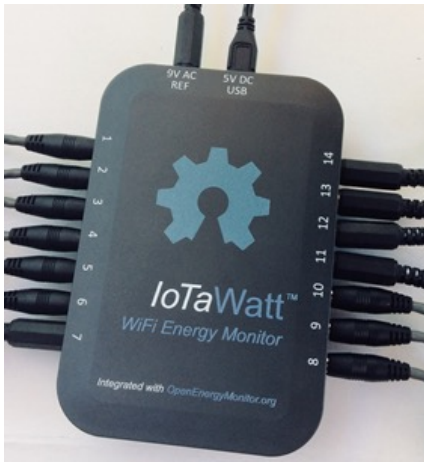
Once installed, the power monitoring equipment will not affect your electricity supply. You will be able to turn the power on and off, access fuses and use all household appliances as normal.

How is the information transmitted?

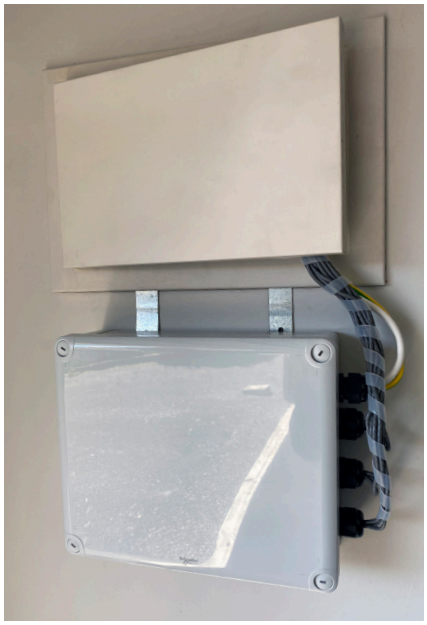
The data recorded by the IoTaWatt™ is encrypted, which means it is converted into a code that ensures security. The encrypted data is then transmitted back to the secure BRANZ database over a wifi network that we provide. This happens automatically – you don't need to do anything, and we don't need access to the device during the monitoring period.

How will this information be used?

The information collected about electricity usage will show when and why electricity is being used in New Zealand homes. For example, what proportion of electricity usage is used for heating the home compared to heating water? It can be used by researchers, government and non-government agencies to help householders use energy more efficiently, save money on their bills and ensure our homes are comfortable and healthy places to live.



The IotaWatt™ measures the energy used on individual circuits.



The IotaWatt™ is contained in a specially made box and mounted next to the switchboard.

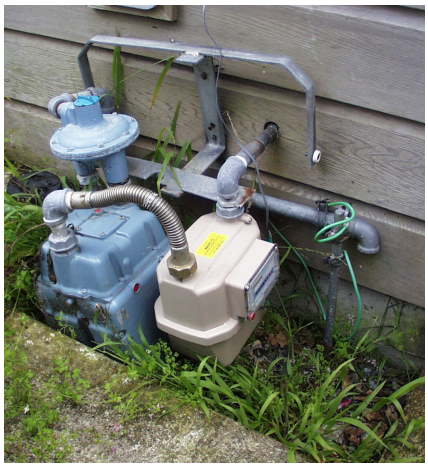
GAS MONITORING

Purpose

Gas, either natural gas or LPG, is a significant fuel source for many New Zealand houses. HEEP2 aims to understand how much gas is used to help heat the home, how much is used to heat water and how much is used for cooking.

What information is collected?

In general, we are collecting the total flow of gas into the house and then trying to separate out the different amounts for heating and hot water by looking at the pattern of usage. In some cases, we may measure the flow on individual gas lines rather than infer the flow from the overall usage pattern.



BRANZ gas meter installed side by side with existing meter (picture is from HEEP1).

How is this information collected?

Depending on the configuration of your house, we can measure gas flow in a number of ways. If you have, or will have, a gas smart meter installed, that will provide flow measurement directly. If your house has a traditional gas meter we may be able to install equipment to read it automatically. If we can't do that, we will have a registered gas fitter install a meter that we can read automatically.

As with the electricity monitoring, any monitoring equipment installed will not affect your gas supply and we measure usage over 12 months to allow for seasonal differences.

How is the information transmitted?

If not using a smart meter, the same kind of devices that are used for water flow measurement (explained on p6) are used to measure gas usage. The equipment simply counts the pulses emitted by the gas meter each time a certain amount of gas has been used. The devices send the pulse count back to the main HEEP2 box where the data is encrypted and then transmitted back to the secure BRANZ database.

How will this information be used?

The information collected will show how and when gas is being used in New Zealand homes. For example, what proportion of gas usage is used for heating the home compared to heating water? This information can be used by researchers, government and non-government agencies to help householders use energy more efficiently, save money on bills and ensure their homes are comfortable and healthy places to live.

HOT WATER USE

Purpose

Heating water can be a big user of energy in New Zealand homes. HEEP2 collects information to help understand how much energy is used to heat the water in our homes and when and how much hot water is used. This information can help us find smarter ways of delivering the hot water we need as well supporting healthy and more energy-efficient homes.

What information is collected?

HEEP2 will record information about:

- hot water systems present in the home, including:
  - system type (for example, cylinder or instantaneous)
  - cylinder size and level of insulation (where applicable)
  - the amount of any pipe lagging
  - the flow rate of the shower(s) at different temperatures
- energy used to heat the hot water
- how much hot water is used.

Information about the hot water system is collected as part of the building and appliance survey (see page 9).

The energy used for heating hot water is typically electricity or gas. Pages 4 and 5 of this booklet explain how this information is collected.

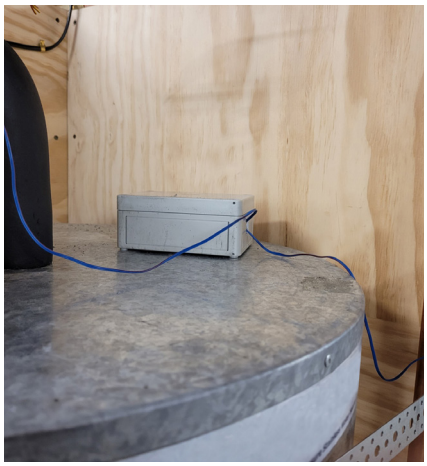
The amount of hot water used is calculated using small battery-powered devices called 'turtle boards' that measure:

- the temperature at the inlet and outlet of the cylinder
- the flow of water into the cylinder
- the total water used in the home.

The information recorded depends on the type and set-up of the hot water system.

The data is encrypted and transmitted back to the secure BRANZ database using the same encryption and data transfer process as the electricity data.

The equipment used to measure hot water use will not affect your hot water supply. As with all monitoring equipment installed as part of HEEP2 we ask for it to be in place for 12 months.



Turtle board measuring cylinder temperatures.

How will this information be used?

The information collected will provide important data on how energy is used for heating water in our homes and how much hot water we are using. This is important for understanding how we can use energy more efficiently in the home.

ENVIRONMENTAL MONITORING

Purpose

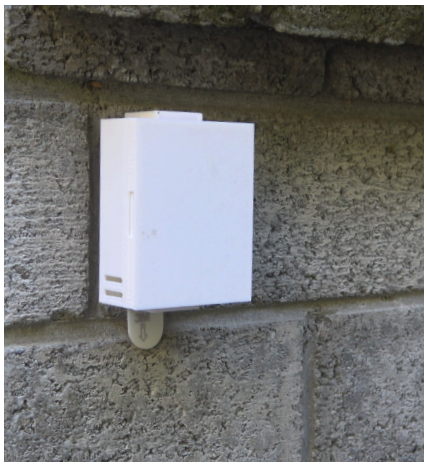
One of the things we want to understand in HEEP2 is how warm and healthy our homes are and how much energy we use to make our homes this way. This is important because we spend a lot of time inside the home and the conditions we live in can affect our health and wellbeing.

What information is collected?

HEEP2 collects information on conditions inside the home and outside over 12 months. It is important to monitor conditions over a whole year to allow for seasonal differences.

Information recorded inside the home includes:

- air temperature (how warm or cold the room is)
- relative humidity (a measure of moisture in the air)
- levels of carbon dioxide (CO_2)
- atmospheric pressure
- light levels.



Wireless tags are contained inside a small box and mounted to an exterior wall.

Temperature is important because how warm or cold the home is can affect our health and wellbeing. The World Health Organization recommends a minimum indoor temperature of 18°C in occupied areas of the home.

Relative humidity is important because high moisture levels can support the growth of mould in the home and very dry air can affect our health and comfort.

We breathe out carbon dioxide (CO_2), so levels of CO_2 can build up in the home over time. Measuring CO_2 levels provides an indication of how well ventilated the home is. Ventilation such as opening windows to let fresh air in is important for keeping the home healthy.

Atmospheric pressure is another measurement that can help us understand household ventilation. For example, if your windows are open, the pressure should be similar inside and out. Pressure from mechanical ventilation systems can be picked up by this sensor.

Light levels, including sunlight, are measured because these affect comfort in the home. The sun can also be an important source of warmth. Measuring light levels will also help us understand the data on electricity used for lighting (see page 4 on measuring electricity use).

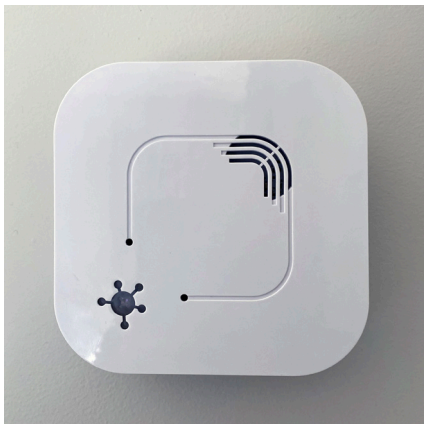
How is this information collected?

In HEEP2, we are using two types of sensor to collect information on environmental conditions: the Tether™ EnviroQ and wireless tags.

Tether™ EnviroQ

The Tether™ EnviroQ is a battery-powered sensor that looks a bit like a traditional household smoke detector. We use the sensors to record the conditions in living rooms and bedrooms. These rooms are chosen because they tend to be where we spend a lot of time when we're at home. Sensors are mounted to the wall using adhesive Velcro Command strips, which are non-marking and easily removed.

The Tether™ EnviroQ sensors measure the temperature, relative humidity, carbon dioxide, atmospheric pressure and light level every 15 minutes. The data is encrypted, which means it is converted into a code that ensures security. The encrypted data is then transmitted back to the secure BRANZ database using a wireless network called Sigfox. This happens automatically – you don't need to do anything, and we don't need to access the device during the monitoring period.



The Tether™ EnviroQ.

Wireless tags

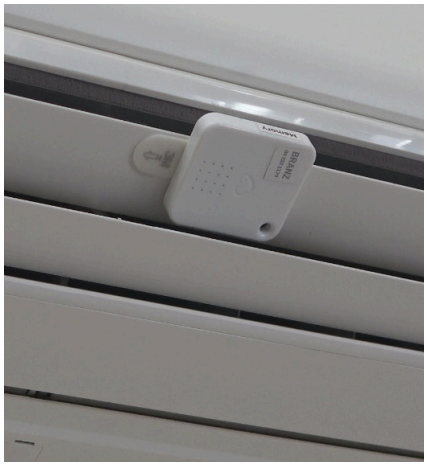
The wireless tags are also battery-powered sensors, but they are smaller and measure temperature and relative humidity only.

They are used to monitor conditions outside. This is important because the weather can affect conditions in the home. The wireless tag is contained inside a small box and mounted to an exterior wall, using adhesive Velcro Command strips. These are non-marking and easily removed.

In some houses, wireless tags will be used inside the home to help monitor the use of heating devices. For example, a wireless tag can be mounted on a heat pump or near a wood burner to measure temperature close to the heating source. This will help show how and when heating is used.

In some houses, the wireless network used for the EnviroQ may be limited. In these cases, wireless tags are used instead to monitor conditions in living rooms and bedrooms.

These sensors 'talk' to the main HEEP2 box over a wifi network we provide. The data is encrypted, sent to a secure cloud environment and then added to the main BRANZ database.



Wireless tags can be mounted on a heat pump to measure temperature close to the source.

How will this information be used?

The first HEEP (1995-2005) told us information about temperatures in living rooms and bedrooms. This showed that New Zealand houses were often colder than the recommended healthy indoor temperature. This information helped support the development of policies and programmes to improve conditions in our homes, such as funding for insulation and heating through the Warm Up New Zealand scheme. HEEP2 data will help show what has changed since then and what we need to do to ensure more people enjoy a healthy indoor environment.

BUILDING AND APPLIANCE SURVEY

Purpose

The building and appliance survey provides information on the physical characteristics of the dwelling. This is important because the building and appliances will affect how much energy is used in the home. For example, how much insulation there is or whether windows are single glazed or double glazed will affect how well the house retains heat. A poorly insulated or draughty house will need more heating to keep it at a healthy temperature.

Who will do the building and appliance survey?

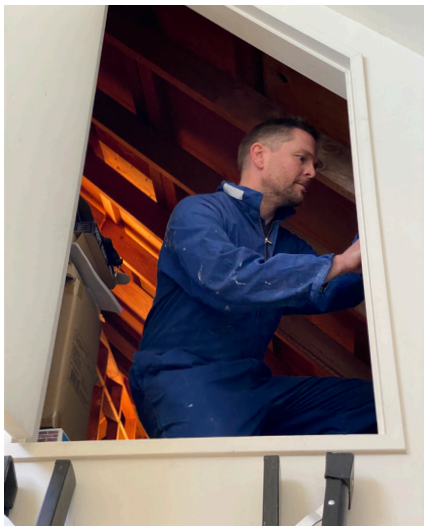
A BRANZ-trained assessor will do the survey. All assessors are trained to undertake building assessments.

What does the survey involve?

The survey is a visual assessment so the assessor won't need to poke into walls or disturb the house or contents in any way to get the information they need.

The assessor will look at the exterior of the dwelling, in all rooms and the roof space and under the house where possible. You can tell us if there are any areas of the home that you do not want the assessor to access.

With your consent, the assessor will photograph areas of your home and some appliances to support the information being collected. You can agree or say no to photographs being taken.



The survey includes a visual inspection of the roof space.

What information is collected?

The building survey will collect information on the size and construction of the dwelling such as:

- the number and size of different rooms
- how much insulation there is in the roof and under the house
- what the exterior walls, windows and roof are made from
- how draughty the house is
- any visible signs of damp and mould.

The appliance survey will collect information on lighting, heating and cooling, hot water, ventilation and common household appliances such as fridge-freezers, cookers, washing machines and televisions. Depending on the appliance, this may include recording information about where the appliance is in the home and its size, energy rating, make and model.

How will this information be used?

The information collected in the building and appliance survey will be used to compare data from the energy monitoring and sensors. For example, we can compare houses with and without insulation to see if there is a difference in the indoor temperature. The survey will also tell us more about the condition and energy efficiency of New Zealand houses. This information can be used to help support healthy, more energy-efficient homes.

If you agree to photographs, these will only be taken of the building, appliances or monitoring equipment. We take great care to ensure photographs do not contain people or personal items.

Photographs are important to the research because they provide a visual reference for the data recorded. It is also useful to photograph rooms so these can be referenced in different parts of the study. For example, when we talk to an occupant about 'bedroom 1' it is important this numbering and labelling is the same as in the building survey and monitoring equipment record.

If you agree to photographs being taken, they will only be used for research purposes, and as with all the information collected, we do not identify individuals or households in published statistics or research.

HOUSEHOLDER SURVEY

Purpose

We carry out this survey to collect information on household energy bills and how appliances are used in the home as well as attitudes and behaviours related to using energy in the home.

The information helps provide a complete picture of how, when and why New Zealand households use energy.

For example, how, how often and when householders heat different parts of the home will affect how much energy is used and how warm the home is. Hot water is another big part of energy use in the home. How occupants use hot water, such as how often showers or baths are taken, will affect how much energy is used.

Together with the data from the monitoring equipment and the building survey, this information can be used to help support healthy, more energy-efficient homes.

How to complete the survey

You will be interviewed by one of our field staff, who will fill in the survey questionnaire with the answers you give. This will be a face-to-face interview by an interviewer using a laptop. This will done at the same time as the monitoring equipment is being installed and the building survey carried out.

How long will it take?

It generally takes about 60 minutes to complete the survey.

METERED ENERGY USE FROM YOUR RETAILER

Purpose

As part of HEEP2, we are asking households to allow BRANZ access to metered electricity and gas (if applicable) consumption information from their retailer(s). This information will allow us to cross-check the data recorded by our monitoring equipment. However, providing access to metered energy data is not a requirement of taking part in HEEP2.

What information is collected?

Your retailer collects data on how much electricity you are using. They use this to generate your energy bill. Depending on the type of meter, electricity use may be recorded more than half-hourly, every half-hour or over a longer period of time. Your retailer is obliged to provide the information they hold if you request it.

How is this information collected in HEEP2?

As an electricity consumer, you can authorise an agent to act on your behalf and request electricity consumption data from your retailer. You do this by completing a consent form provided by the electricity industry.

By completing the form (which we have included in this pack), you consent to BRANZ acting as an agent on your behalf. With your consent, we will then request the data from your electricity retailer. This will be done in accordance with the rules set by the Electricity Authority using the electricity information exchange protocol.

How is the information transmitted?

The retailer will transfer the data it holds to BRANZ using the Electricity Authority's Registry Transfer Hub. BRANZ is a registered user of this secure file transfer system.

Once we receive the data from your retailer, we can share it with you if you would like us to. Please complete the relevant information on the consent form so we can send the data to you.

What happens to this information?

Our authority to act as an agent on your behalf and to access data from your retailer will expire at the end of the HEEP2 study.

As with all the information collected in the study, this information will be treated as confidential, held securely by BRANZ and Stats NZ and only be used for research and statistical purposes.

Gas Consumption

For certain houses, which have or are about to have smart meters installed to measure gas use, we may also be able to access that data on your behalf. The consent form has a section relating to your gas connection, if applicable.

DATA PRIVACY, SECURITY AND CONFIDENTIALITY

Privacy, security and confidentiality of data

We know your information is important to you. That's why it's important for us to look after it. We have high standards for keeping your information private, secure and confidential. The information collected in HEEP2 is primarily used by trusted researchers to produce statistics and research that will benefit New Zealand.

We protect your identity

We do not identify individuals or households in published statistics or research.

Laws and standards keep your data safe

Your information is protected by legislation and by the safeguards we have put in place.

We apply ethical, statistical and security best-practice standards to the data we collect. Others who use the data must apply the same standards, which includes signed agreements to keep data confidential.

We ensure:

- privacy by collecting only the information we need to produce statistics and research
- security by keeping data safe from unauthorised access and use
- confidentiality by not releasing information that could identify individuals or households.

We store your data securely

We keep your information for as long as it has statistical or research value. All data collected in HEEP2 is stored securely on the BRANZ network. Only approved researchers can access the data, and our IT team monitors and evaluates security issues and risks.

When the data is no longer needed, we destroy it. For example, your name, address and contact details will be completely removed from BRANZ records once the study is complete.

Data is linked to make it more useful

The information collected by BRANZ in HEEP2 will be linked with the Household Economic Survey dataset that you filled out with Stats NZ. Linking the information makes it more useful to researchers who are answering important questions about New Zealand.

This linked data is held by Stats NZ. This can only be accessed by trusted researchers through the Stats NZ Data Lab. Access to data is controlled and secure. Stats NZ checks all research and statistics produced to make sure confidentiality is maintained.

FREQUENTLY ASKED QUESTIONS

Who is BRANZ?

BRANZ is an independent research organisation that uses an impartial, evidence-based approach to improving the performance of the New Zealand building system. We transform insightful research into trusted, accessible and actionable knowledge. For more information, please go to www.branz.nz.

Why is BRANZ carrying out this study?

BRANZ is carrying out the Household Energy End-use Project #2 (HEEP2) to collect information on how, when and why New Zealand households use energy in the home. The study follows HEEP1, which ran from 1995–2005.

How is this information used?

Information collected in HEEP1 changed our understanding of how energy was used in homes and showed that our homes were not always kept at a safe and comfortable temperature. By repeating the study, we will be able to see what has changed. This information is used by researchers and government agencies to help develop policy and make decisions to help make homes healthier and more energy efficient.

Who is taking part in HEEP2?

All households who took part in the Stats NZ Household Economic Survey this year were asked if they would be willing to be contacted by BRANZ about taking part in HEEP2. One of the aims is to have an overall sample that adequately represents the whole of New Zealand, but taking part in HEEP2 is completely voluntary.

Is this part of the Household Economic Survey?

No, HEEP2 is separate from the Household Economic Survey (HES).

Will you be paid for taking part?

No, you won't be paid for taking part. We will give you a Prezzy® card to thank you for your participation.

How long does it take to install the equipment?

The installation of the monitoring equipment, the building and appliance survey and the householder survey will all take place in one visit. In total this takes about 2–3 hours. We do require you to be at home during this time.

Does the HEEP2 equipment use energy to run?

The HEEP2 equipment does use a bit of your electricity to run. We estimate this will cost about five cents a day, or $1.50 a month and less than $20 over the whole year that the equipment is in place. While the Prezzy® card is predominantly to say thank you for your participation, it will also more than cover this electricity cost.

What happens to your information?

The information collected in HEEP2 is stored securely by BRANZ and Stats NZ. The information is only used by trusted researchers to provide statistics and research that will benefit New Zealand. We do not identify individuals in published statistics or research.

Can you access your data from HEEP2?

A summary of the data collected for your household will be provided at the end of the study. This will contain some advice on how to improve the energy wellbeing of your household.

What happens if you move to a new house?

Please contact BRANZ if you're planning to move to a new house. We will then arrange for the equipment to be removed from your home.

FREQUENTLY ASKED QUESTIONS

What happens if you make changes to your home that affect the equipment installed?

Please contact us if you make changes to your home during the study period – for example, if you are replacing or installing a new heat pump or hot water system. We will then arrange for the monitoring equipment to be removed or replaced as required.

What happens if someone new moves into the house?

If someone new moves into the house during the study period, it is important that you talk to them about being part of the research. If they don't want to be a part of the study, please contact BRANZ and we will arrange for the equipment to be removed. It's important all household occupants consent to taking part.

If you are a tenant, do you need your landlord's permission to take part?

Yes, we need both the tenants' and landlords' consent to take part in HEEP2. Some of the equipment requires electrical work and it is important the landlord is aware of this. All tenants living in the house during the study period must also consent to being part of the study. If you are a tenant, an additional information pack has been provided for you to give to your landlord. This contains a separate consent form for them to sign.

What happens if equipment breaks?

Our systems will tell us if any equipment fails during HEEP2. If this happens, we will contact you to discuss a solution. You can also contact us at any point if you suspect there is a problem. In the unlikely event that any damage is caused to the property as a result of HEEP2 either during installation, usage or the uninstallation process, we will bear the costs and repair it to the condition it was.

How will the equipment be removed?

We will contact you towards the end of the 12-month monitoring period to arrange removal of the equipment. The removal only takes about 30 minutes. We will also ask you to complete a short survey at that time to record any changes to the dwelling or household over the monitoring period.

Health and safety

All members of our research team who visit your home will carry photo ID. You will be told in advance the names of people visiting and visits will always be pre-arranged, for a day and time that's convenient for you. Our staff will carry face masks and hand sanitiser and follow government guidelines for Covid-19 at the time of the visit.

Who can you contact with any questions?

If you have any questions or would like more information at any time, please call our Household Energy End-use Project helpline on 0800 886 422 or email heep2@branz.co.nz.

Can you change your mind?

Yes, you can opt out of HEEP2 at any time. Please contact BRANZ on the number or email provided.

How to get in touch

Call: 0800 886 422

Email: heep2@branz.co.nz

Web: www.branz.co.nz/heep2

HEEP2 PARTICIPANT CONSENT FORM

- [ ] I am aged 18+
- [ ] I have read and understood the Information Pack explaining this research.
- [ ] I have had the opportunity to talk about the research and ask questions. I am satisfied with the answers I have been given.
- [ ] I understand that my participation is voluntary and that I can withdraw from this research at any time.
- [ ] I understand that the data will be treated as confidential and held securely by BRANZ and Statistics New Zealand.
- [ ] I understand that any published findings will not identify individual houses or any other personal details.
- [ ] I know whom to contact if I have any questions about this research.
- [ ] I understand I will not be paid for taking part in this research but will be offered koha (a gift) as a thank you.
- [ ] I will contact BRANZ if I am planning to move house to have the equipment removed.
- [ ] I agree to take part in the Household Energy End-use Project (HEEP2).

Photographs:

I agree / do not agree [delete as appropriate] to photographs being taken of any / certain rooms [delete as appropriate] as required for this research.

I agree / do not agree [delete as appropriate] to photographs being taken of any / certain appliances [delete as appropriate] as required for this research.

I agree / do not agree [delete as appropriate] to photographs being taken of any / certain equipment installed [delete as appropriate] as required for this research.

For households with other occupants aged 16 or over:

- [ ] I have discussed participation in this research with all household occupants aged 16 or over.
- [ ] I am satisfied that they understand what is involved and consent to take part.

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For tenanted properties:

☐	I have discussed participation in this study with my landlord.
☐	My landlord agrees to the monitoring equipment being installed and understands the nature of the work involved.
☐	If a new tenant moves into the property during the study period, I understand I must seek their agreement to continue participating in the research.

Signed:

Print name:

Date:

In reference to address:

Please tear here

METER DATA CONSENT FORM

Form for authorisation of an Agent to request energy consumption information

Consumer full name:	
Property address:	
Electricity customer number:	Gas customer number:
Electricity ICP[s]*:	Gas ICP[s]*:
Electricity retailer:	Gas retailer:
Agent: BRANZ	
Period of authority: 1/10/2021-30/9/2023	

- ☐ I (being the Consumer named above) confirm that I own or occupy the Property identified above (or owned or occupied that property at the relevant time) or otherwise am or was responsible for the consumption of electricity and/or gas at the Property.
- ☐ I confirm that I am or have been a customer of the Retailer(s) identified above in relation to the Property and ICP(s) identified above.

I authorise:

- ☐ the Agent identified above to request, receive and hold information on my behalf about electricity consumption for the Property or the ICP(s); and
- ☐ the Retailer to transfer information on my behalf about electricity consumption for the Property or ICP(s) to the Agent.
- ☐ the Agent identified above to request, receive and hold information on my behalf about gas consumption for the Property or the ICP(s) from the retailer/meter owner.

Signed:	Date:

* Installation Control Points

Please tear here

Please tear here

BRANZ

0800 886 422 | Email: heep2@branz.co.nz | Web: www.branz.co.nz/heep2