Kāpiti Coast
DISTRICT COUNCIL
Me Huri Whakamuri, Ka Titiro Whakamua

Healthy Home Kit

User Guide

Disclaimer

The information in this booklet is true and accurate to the best of our knowledge and is intended to provide general information. All guidance and advice is made without guarantee on the part of Kāpiti Coast District Council. Kāpiti Coast District Council does not accept any liability, whether direct, indirect, or consequential, arising out of the provision of the information within this user guide. Kāpiti Coast District Council is not responsible for any injuries or damage that may be caused to people and property by using this self-assessment kit. This Healthy Home Kit User Guide is based on the user guide produced by the Carterton, Masterton and South Wairarapa District Councils.

Contents

Introduction

A warm, dry home is not just more comfortable, it is also more energy efficient and much better for your health. Cold, damp and mouldy houses can lead to discomfort and more serious health problems, such as respiratory illness and cardiovascular disease. It is more difficult and expensive to heat damp and draughty houses.

The Building Research Association of New Zealand (BRANZ) undertook nationwide house condition surveys every five years from 1995 to 2015. The most recent survey, in 2015, showed:

- 53 percent of houses could benefit from retrofit insulation in the ceiling and/or subfloor
- mould was visible in 49 percent of houses, mainly in bathrooms, in houses with poor heating, ventilation and insulation
- 9 percent of houses had a leaking tap or shower head.[1]

As for the Wellington Region, the 2018 Census showed that:

- 21.8 percent of houses in the Wellington Region are sometimes or always damp
- 16.7 percent of houses in the Wellington Region sometimes or always have a mould patch bigger than an A4 paper sheet.

This self-assessment toolkit will let you assess your home for warmth and dampness to understand how it is performing. It includes useful tips and advice to improve the comfort of your home.

The kit contains:

- a thermometer/hygrometer
- an infrared thermometer
- stopwatch
- power meter
- wood moisture level meter
- this user guide, with useful information to increase your house's health.

Note: to measure how much water your shower uses (flow rate), you will also need a **10-litre bucket**. If you can't find a 10-litre bucket, call us on 04 296 4700 so we can provide an alternative.

Online resources

We have a Healthy Home kit section on our website, at www.kapiticoast.govt.nz/HealthyHomeKit. There you'll find:

- a copy of this user guide
- editable and printable copies of the record sheets we discuss in this user guide, and which are also in Appendix 1 of this guide
- our introduction and how-to videos
- information from our Keep it warm, Keep it dry, and Keep it affordable sections, with links.

[1] For more information, visit https://www.branz.co.nz/healthy-homes-research/hcs/2015-results/.

Getting started

This user guide for the Healthy Home Kit includes a separate chapter for each of the five tools in the kit, with suggestions on to improve your home's health based on the information you gather from each tool.

This section will help you decide where to start. Some tools – like the power meter – need about 24 hours for each measurement. We suggest starting with the power meter if you want to evaluate any large appliances. If you are mainly interested in measuring temperatures and humidity in your home, you might skip the power meter and go directly to the thermometer/hygrometer.

	Tool and time required	Step
Power usage and CO_2 emissions	**Power meter** 4–5 days = refrigerator, freezer, dishwasher, washing machine, dryer, computer, TV, other small to medium appliances (electric jug, space heater, phone charger). **Note:** this is the most complex tool, so don't be discouraged!	You must allow about 24 hours per continuously running appliance (e.g., a refrigerator), so start with this tool if you want a robust measurement for an appliance used like this. Recommendations: **Keep it affordable**
Temperature and humidity	**Thermometer/ hygrometer** 90 minutes = 3 bedrooms, 2 baths, kitchen, living room, dining room and laundry. Add 10 minutes for each additional room.	Set this tool in each room and, while you are waiting for it to stabilise, take the measurements with the infrared thermometer. Recommendations: **Keep it warm, Keep it dry**
Consistency of temperatures	**Infrared thermometer** 90 minutes = 3 bedrooms, 2 baths, kitchen, living room, dining room and laundry. Add 10 minutes for each additional room.	Before you start with this tool, set the thermometer/hygrometer up in the room. Recommendations: **Keep it warm**
Shower flow rate	**Stopwatch** Less than 5 minutes per bathroom	Before you start, find your own 10L bucket. Recommendations: **Keep it affordable**
Firewood quality	**Wood moisture level meter** Less than 5 minutes, depending on the size of your wood pile	Skip this tool if you don't have a fireplace. Recommendations: **Keep it dry**

Thermometer/hygrometer

Description

This tool measures the temperature and humidity inside your house, helping you understand whether your house is cold and damp or warm and dry.

How to use this tool

You can watch an instructional video for this tool on our YouTube playlist, and at https://youtu.be/kbv-rlxYzrwcan.

Step	Action
1	Check the back of the tool to make sure the battery is in it. It takes a size AA battery. If it's not, the battery could be loose in the Home Health Kit box. To put it back in: • lift the stand on the back of the tool (where the C/F switch is located) • slide the battery cover off • place the battery inside (with the + end facing to the right) • put the battery cover back on.
2	Put the thermometer/hygrometer in the room you want to assess.
3	Check the switch on the back of the tool, as shown on the right, to make sure the temperature is shown in degrees Celsius (C). 
4	Wait 10 minutes to allow the temperature (red box in photo) and humidity (blue box in photo) readings to stabilise. 
5	Read the temperature and humidity of the room.
6	Record the reading on the record sheet. **Note:** You can create or download your own temperature table for the thermometer/ hygrometer as shown in **Appendix 1 – Recording sheets**.
7	Repeat in all the rooms you want to assess, including: • living room/dining room • kitchen • bedrooms • bathrooms • laundry.

Notes:

- To compare the relative temperatures in different parts of your house, the measurements should be made around the same time of the day or night.
- This tool can be used at the same time as the infrared thermometer in each room. This will help you see the difference in air temperature and how much cold air is coming through the windows or walls. Night can be a good time to do this.

Why it matters

Temperature

Respiratory problems are more likely to happened in low-temperature homes.

The World Health Organization (WHO) recommends a minimum indoor temperature of:

- 18°C in the living areas
- 16°C in the bedrooms
- 20–21°C for households with babies and seniors.

If you find the temperature in any of your rooms is below these recommendations, see our **Keep it warm** section for how to increase the temperature of your home.

Humidity

A humidity of 40–60 percent is recommended inside your house.

If humidity is too high, your house will feel colder in winter and hotter in summer. It also increases condensation problems on windows, walls, ceilings, etc, which can be harmful to your health and damage your house.

High levels of humidity allow mould and dust mites to grow. Both can increase respiratory problems and allergies (especially for asthma sufferers) and mould can also cause unpleasant odours.

If your humidity level is too low, it may cause discomfort such as dryness in the nose and on the skin.

If you find that the humidity in any of your rooms is above or below these recommendations, turn to the **Keep it dry** section for ideas to improve the humidity in your home.

Tip: You can also use the thermometer/hygrometer to measure the temperature inside your fridge or freezer.

According to Love Food Hate Waste, your fridge temperature should be between 0^{o}C to 4^{o}C and your freezer should be -18^{o}C.

For more information, see the Love Food Hate Waste website at https://lovefoodhatewaste.co.nz/is-your-fridge-the-right-temperature/.

Infrared thermometer

Description

The infrared thermometer will help you know how consistent temperatures are across your house. It measures the temperatures of different surfaces in your house to identify:

- cold spots in your house – areas of poor insulation or air leaks (floor, walls, ceilings, windows, doors)
- cold/hot spots around your fridge and freezer – air leaks, and whether there is enough ventilation at the back of your fridge and freezer
- hot spots around your hot water cylinder
- the temperature of your hot water.

Warning:

- The thermometer is not for use by children under 18 years.
- The thermometer cannot be used to measure a person's temperature.
- Do not point the thermometer at a person, as it may cause serious eye damage.

Tip: Take the measurements when there is a big difference between the outside temperature and the temperature inside, ie, on a cold day or night when your house seems warm and comfortable.

How to use this tool

You can watch an instructional video for this tool on our YouTube playlist, and at https://youtu.be/8wi_0bV-UxA.

To measure surface temperature with the infrared thermometer:

Step	Action
1	Press the trigger to turn on the thermometer. **Notes:** • If it doesn't turn on right away, hold the trigger down for a few seconds. • Do not adjust the settings. To read the temperature, just press the trigger.
2	Aim at the surface you want to check. You should not be more than 70 centimetres from the surface. **Note:** To measure water temperature, **do not place the thermometer in water**; point the thermometer where the water hits the sink, the same way you would point at your walls.
3	Press and hold the trigger until temperature stabilises (this can take a few seconds).

Step	Action
4	Read the temperature (see below). 
5	Record the reading in the record sheet. **Notes:** • You can create or download your own temperature readings table for the infrared thermometer as shown in **Appendix 1 – Recording sheets**. • The thermometer will turn off by itself.
6	Record the temperatures of the following: • ceiling, floors, and walls in different rooms of your house (living room, dining room, kitchen, bedrooms, and bathrooms) • seals around your windows and doors • seals of fridges and freezers, and the walls at the back of the appliances • hot water cylinder • hot water.

Assess your home

To see how consistent temperatures are across your house, measure the temperature of a number of places on the ceilings, floors, and walls (internal- and external-facing) in each room of your house.

You want to look for areas where the differences in temperature are more than a few degrees. This can help you identify cold spots in your home.

Cold spots – ceilings

In each room, measure your ceiling temperature(s) in several different locations. The results should be about the same, or within a couple of degrees.

Note: Lights might warm the ceiling. You might need to turn off the lights and let the ceiling cool down before measuring the temperature.

Cold spots – floors

Measure the floor temperature(s) in different locations in each room. The results should be the same, or within a couple of degrees.

Note: if you want to understand the power of passive heating (when you use the sun to warm your house), measure the temperature of the floor surface in the sunlight and one in the shade. The

temperature in the sunlight will be higher than the one in the shade. If you need to increase the warmth of your home, you might consider whether increased sunlight could help.

Cold spots – internal walls

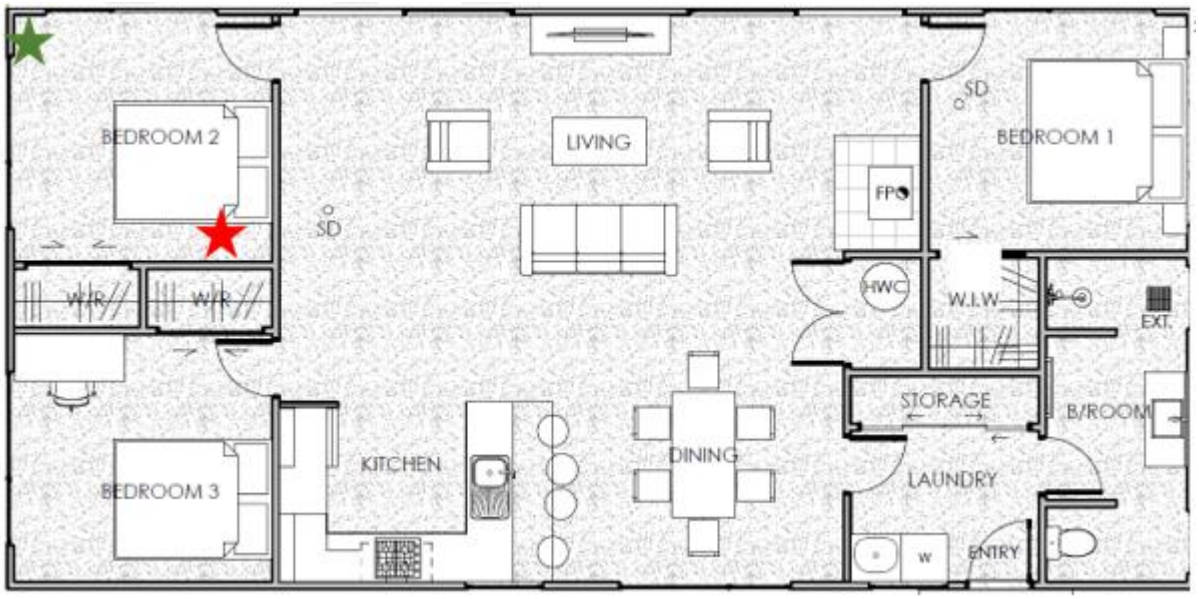
In each room, measure the internal wall temperature(s) in several different places. The results should be about the same, or within a couple of degrees.

Cold spots – internal and external walls

To compare the temperatures of external and internal walls, in one room take the temperature on the inside of an:

- external wall (shown by the green star)
- internal wall (shown by the red star).

This will show how well your external walls are insulated. This works best if you take the measurements when there is a big difference between the outside temperature and the temperature inside, like on a cold day or night when your house seems warm and comfortable.



If any of your measurements differ by more than a few degrees and there is no obvious reason (like open windows or large appliances in some areas), your insulation might not be efficient (i.e. there is none or what is there has been damaged or displaced).

Cold spots – window and door seals

Cold spots in your home can also be caused by leaky seals on your windows, doors and appliances. These cold spots can make it difficult to heat your home and cost you more in energy use.

Take the temperature around the window and door seals throughout your house.

For accurate results, take multiple measurements (as shown in the image on the left).

The results should be about the same, or within a couple of degrees. If a measurement is very different, it could mean that there is an air leak (for example, a damaged seal).

Cold spots – fridge and freezer seals

Take multiple measurements of your fridge and freezer (as shown in the image on the right). If you find any differences greater than a few degrees, it means there is an air leak (for example, due to a damaged seal).
Take the temperature of the wall behind your fridge/freezer, and another on the same wall but away from your fridge/freezer. If the wall behind the fridge/freezer is warmer by more than a few degrees, it means you should leave more space for ventilation between the wall and the fridge/freezer. Check your appliance's user guide for information on the required spacing.

If you find the temperature measurements differ by more than a few degrees, you might have a leaky seal. See our **Keep it warm** section for suggestions on what you can do.

Hot spots – hot water

The infrared thermometer can also be used to identify hot spots around your hot water cylinder and the temperature of your hot water.

Measure the temperature on the surface of your hot water cylinder. It should not be higher than 25°C. If it is, your hot water cylinder is not well insulated.

To check the hot water temperature, run the hot water until the temperature stabilises (at least 30 seconds). Point the thermometer where the water is hitting the sink. **Do not submerge the thermometer, as it is not waterproof.** For health reasons, the temperature should be around 55–60°C.

If the water is:

- hotter, it can cause burn injuries (especially on children).
- colder, harmful bacteria can develop in the hot water cylinder.

For how to insulate a hot water cylinder or manage your hot water temperature, see the **Keep it affordable** section.

Stopwatch

Description

The stopwatch measures precise timing so that you can measure your shower flow rate. If you have a water meter, you can also check for water leaks.

How to use this tool

You can watch an instructional video for this tool on our YouTube playlist, and at https://youtu.be/z22rOaKkGds.

The stopwatch will ordinarily display the time. To use the stopwatch's functions, press the:

Press the…	to…
middle button	go to the stopwatch function
left-hand button	reset, if necessary
right-hand button	start the stopwatch
right-hand button, again	stop the stopwatch
left-hand button	reset the stopwatch
middle button	go back to the time display

Note: to measure how much water your shower uses (flow rate), you will also need a **10-litre bucket**. If you can't find a 10-litre bucket, call us on 04 296 4700 so we can provide an alternative.

Assess your home

Measure your shower flow rate

To measure how long it takes to fill the bucket in your shower:

Step	Action
1	Put a 10-litre bucket under your shower head. Put a 10-litre bucket under your shower head.
2	Turn on your shower and start the stopwatch at the same time. Note: Make sure all the water falls into the bucket for accurate measurement.
3	Turn off the stopwatch when the bucket is filled.
4	Read the stopwatch.
5	Record the reading in your record sheet. **Note:** You can create or download your own water flow rate table for the stopwatch readings as shown in **Appendix 1 – Recording sheets**.
6	Compare your reading to those in Table 1 to determine if the shower has a high, average, or low flow rate.

Having a high flow rate means that you are wasting a lot of water during your showers, and energy to heat the water.

If you have a high shower flow rate, see the **Keep it affordable** section for ideas. This section also includes other ways you can conserve water to save energy and costs.

Table 1: Flow rates

Time it takes to fill a 10L bucket (seconds)	**Flow rate (Litres per minute)**	
30	20.0	High flow rate
35	17.1	
40	15.0	
45	13.3	Average flow rate
50	12.0	
55	10.9	
60	10.0	
65	9.2	Low flow rate
70	8.6	
75	8.0	
80	7.5	

Checking for water leaks (households with water meter only)

You can check for water leaks by:

<table>
<tr><th>Step</th><th>Action</th></tr>
<tr><td>1</td><td>Turn off all the taps and appliances that use water in your house.</td></tr>
<tr><td>2</td><td>Check your water meter.

Note: The water meter will often be at the toby, which is the valve where the Council water supply meets your plumbing. Both are usually at the boundary of your property.
<table>
<tr><th>If the meter’s counter…</th><th>then…</th></tr>
<tr><td>is moving</td><td>• you may have a leak
• go to step 3.</td></tr>
<tr><td>is not moving</td><td>you’re good! It’s unlikely you have a leak; you shouldn’t need to take any further action.</td></tr>
</table></td></tr>
<tr><td>3</td><td>Shut off the toby and check your meter again.
Note: If you can’t find your toby, see leaks on private property on our website for more information.
<table>
<tr><th>If the meter’s counter…</th><th>then…</th></tr>
<tr><td>is moving</td><td>• you may have a leak between the house toby and the water meter
• contact a plumber for advice.</td></tr>
<tr><td>is not moving</td><td>• you may have a leak in your house, or in the pipes feeding outside taps.
• contact a plumber for advice
• see leaks on private property to learn how to fix some minor leaks yourself.</td></tr>
</table></td></tr>
</table>

Water is a precious resource and should not be wasted through leaks.

For more information, see:

- reading your meter – www.kapiticoast.govt.nz/how-to-read-a-water-meter
- leaks on private property – www.kapiticoast.govt.nz/PrivatePropertyLeaks

Power meter

Description

The power meter measures the power usage and carbon dioxide equivalent emissions of your appliances, and helps you understand where you can make savings.

The tables included at the end of this section can help you assess the energy efficiency of your appliances.

Note: This is the most complex of the tools in the kit. Don't be discouraged if you find it difficult to understand; this tool is useful, but should be considered an extra for experts.

How to use this tool

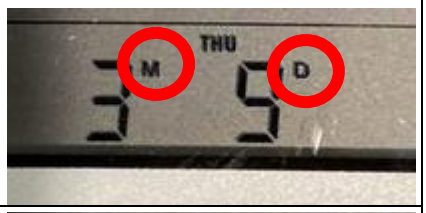
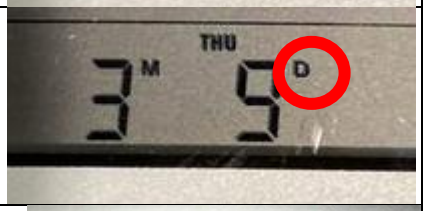
There are three parts to setting up the power meter to use it. These are setting the:

- date and time
- price of electricity
- greenhouse gas emission factor.

You can watch an instructional video for this tool on our YouTube playlist, and at https://youtu.be/hvJfAMowEo8.

Set the date and time on the power meter

Step	Action
1	Plug the power meter into the wall socket and plug your appliance into it. **Note:** if no action is taken within 30 seconds at any time in this procedure, the device automatically switches off the setting mode. 
2	Press SET – the **year** blinks Press the ▲ or ▼ to adjust the year. **Note:** this example is set to 2023 
3	Press SET – the **date** blinks

Step	Action	
	Adjust Month/Day (M/D) or Day/Month (D/M) display by pressing ▲ or ▼	
4	Press SET – The **month** blinks Press the ▲ or ▼ to adjust the month	
5	Press SET – The **day** blinks Press the ▲ or ▼ to adjust the day	
6	Press SET – the **hour** blinks Press the ▲ or ▼ to adjust the hour	
7	Press SET – the **minutes** blink. Press the ▲ or ▼ to adjust the minutes.	
8	Press SET – you return to the main screen.	

Set the price of electricity on the power meter

The meter allows you to enter two different electricity costs for different set time periods (PRICE 1 and PRICE 2). We recommend you use $0.33 per kilowatt-hour (kWh) for each period, as recommended by the Ministry of Business Innovation and Employment. If you'd prefer to use a more exact cost, see **Electricity pricing** below.

To set the electricity price:

Step	Action
1	Long press SET.
2	Adjust the **currency** to $ by pressing ▲ or ▼ (the other options are £ or €). 
3	Press SET. **Result:** the 'PRICE 1' screen displays. 
4	Set the price, by pressing SET – the **day line** blinks.
5	Press SET – the **hour** blinks.
6	Press SET – the **minutes** blinks.
7	Press SET – the **dollar price** (in the ones place) blinks. **Note:** in the pictured example, we are setting the price to $0.30 per kWh. As mentioned above, we recommend you use $0.33 per kilowatt-hour (kWh) for each period, as recommended by the Ministry of Business Innovation and Employment. • Press the ▲ or ▼ to adjust the **dollar price** to $0 
8	Press SET – the **cent price** (in the tenths place) blinks • Press the ▲ or ▼ to adjust the **cent price** to $0.3 

Step	Action
9	Press SET – the **cent price** (in the hundredths place) blinks. **Note:** in the pictured example, we are setting the price to $0.30 per kWh, so the hundredths place is shown as 0). • Press the ▲ or ▼ to adjust the **cent price** to $0.33 
10	Press SET – the **price decimal point** blinks.
11	Press SET. **Result:** the PRICE 2 screen displays. 
12	Go to step 4 and repeat instructions to set 'PRICE 2' to $0.33.

A few things to note:

- The cost function will switch off if 'PRICE 1' and 'PRICE 2' are both set to "0.00".
- If too much time elapses before you enter any price data, you may find yourself back at the home screen and cannot locate the price setting. If this happens, long press SET and continue to press the SET button until you get to the correct setting.

About greenhouse gas emissions

Greenhouse gas emissions are important to understand as they contribute to climate change. As greenhouse gases are released into our atmosphere, they act like a blanket around the earth, trapping warmth from the sun and causing global warming. Global warming leads to imbalances in our natural environment, in turn causing climate change. Mitigation refers to the actions we can take to reduce the amount of greenhouse gases in our atmosphere. Understanding our household emissions is an important first step.

The power meter can estimate the greenhouse gas emissions (measured in terms of carbon dioxide equivalents, CO_2e) from your appliances by multiplying the amount of electricity used in kWh by an emission factor of 0.12 kg CO_2e/kWh provided by the Ministry for the Environment.

Set the greenhouse gas emissions from electricity

To set the greenhouse gas emission factor in the power meter:

Step	Action
1	Press SET – the KG/LB option blinks.
2	Press the ▲ or ▼ to select KG.

Step	Action	
3	Press SET – the KG blinks.	
4	Set the **greenhouse gas emissions** to 0.11 kg CO_2e/kWh, by pressing SET – the **ones place** blinks. • Press the ▲ or ▼ to adjust the **ones place** to 0.	
	Press SET – the **tenths place** blinks. • Press the ▲ or ▼ to adjust the **tenths place** to 0.1.	
	Press SET – the **hundredths place** blinks. • Press the ▲ or ▼ to adjust the **hundredths place** to 0.11.	
5	Press SET to go back to the main screen. **Result:** It is now safe to unplug your power meter. You will not lose the information you input in the previous steps.	

Note:

- The greenhouse gas emission function will not provide any results if 'CO2 - KG' is set to "0.00".
- If too much time elapses before you enter any value for kg CO_2e/kWh, you may find yourself back at the home screen and unable to locate the CO2 setting. If this happens:
  - long press SET
  - continue to press the SET button (through the PRICE 1 and PRICE 2 settings) until you get to the correct setting for greenhouse gas emissions.

How to read the meter for your power consumption and greenhouse gas emissions

After setting up the power meter above, you are ready to measure the power consumption of your appliances. The amount of time needed to measure power consumption will depend on the type of appliance you are measuring. For appliances that run:

- on continuous cycles (refrigerators or freezers) or have cooling systems depending on how long you use the appliance, we recommend the power meter is used for 24 hours per appliance
- a complete cycle (dishwasher, washing machine or dryer), we recommend the power meter is used for the full cycle.

Some appliances only use power for a short period of time (electric jugs) or for the time you are using the appliance (heaters, stoves, or TVs).

To ensure you are confident using the power meter, we recommend you try this tool on your kitchen kettle first as it has a short cycle.

Step	Action
1	Clear the accumulated data on the power meter without losing the time, date and cost settings, by pressing and holding the buttons "TOTAL" and "UP" (▲ & ▼) at the same time for 2 seconds. **Result:** The accumulated data will reset to zero.
2	Plug the power meter into the wall socket, and then plug your appliance into the power meter.
3	Leave the appliance you are measuring plugged in for the time required, either: • while you use the appliance • until a cycle is complete • for 24 hours.
4	Read your results as outlined below.
5	Press MODE until power consumption (W) is shown in the top row (circled in red), showing you the **power used**.  **Notes:** • The top section (outlined in green) shows the **power consumption in watts (W) that would be used by this appliance in one hour**. In this example, this appliance would use 2,036W of electricity in one hour. This is equal to 2.036kWh. • The middle section (outlined in orange) shows the **actual power consumption in kilowatt-hour (kWh)**. This means the total amount of power used by the appliance while you've been measuring it. In this example, the appliance is a kitchen kettle, and one cycle of the kettle was just over 3 minutes. This appliance has used 0.11kWh of electricity in this 3-minute cycle.

Step	Action
6	Press MODE until the dollar sign ($) is shown in the top row (circled in red), showing you the cost of the power used. **Notes:** • The top section (outlined in green) shows the **cost in dollars ($) if the appliance was used for one hour**. In this example, the appliance cost $0.60 for one hour of use. • The middle section (outlined in orange) shows the **actual cost in dollars ($)**. This means the total cost of the power used by the appliance in this measurement period. In this example, the appliance is a kitchen kettle, and one cycle was just over 3 minutes. This appliance has used 0.11kWh of electricity in this 3-minute cycle. The cost of this electricity is $0.03. 
7	Press MODE until carbon emissions (KG) is shown in the top row (circled in red), showing you the greenhouse gas emissions. (You'll need to press a few times to scroll past VOLT and AMP.) **Notes:** • The top section (outlined in green) shows the **carbon emissions (KG) if the appliance was used for one hour**. In this example, this appliance would emit 0.22 KG of carbon dioxide equivalents (CO_2e) if it were to be used for one hour. • The middle section (outlined in orange) shows the **actual amount of carbon emissions (KG)**. This means the total amount of carbon emissions the appliance generated in this measurement period. In this example, the appliance is a kitchen kettle, and one cycle is just over 3 minutes. This appliance has used 0.11kWh of electricity in this 3-minute cycle. This means that 0.01 KG of CO2e was emitted during this time. 
8	Record your readings as outlined in our **Record sheet** section. **Notes:** • To record your readings, you can create or download your own power meter table as shown in **Appendix 1 – Recording sheets**. • See **Record sheet** below for more on recording your readings.

Record sheet

For the **power consumption** of any household appliance, record the readings following the recommended time period for each appliance type.

The **recommended time period for each measurement** is dependent on the appliance type and what you want to understand.

If you want to have a better understanding of how much it costs to use your appliances (in power consumption, dollars or greenhouse gas emissions), then select the time period most appropriate for your appliance.

- continuous cycle appliances (eg, refrigerator) = 24 hours
- complete cycle appliances (eg, dishwasher) = full cycle
- quick use and other appliances (eg, kettle or heaters) = the time in which you use the appliance.

If you want to compare the efficiency of your appliance to the average listed in tables 2 or 3, check the table to ensure you use the same measurement time period as that in the table.

For example, if you wanted to compare your dishwasher, table 2 provides the average consumption rates for seven dish washer uses. This means you need to use the power meter over one dishwasher cycle and then multiply it by 7 to compare your results with the table.

Electricity pricing

The average cost in the Kāpiti Coast District is $0.33 per kWh, based on the Ministry of Business Innovation and Employment quarterly survey of domestic electricity prices from February 2023.

Extra for experts

Note that the following really is extra for experts! If you find it overwhelming, do use the $0.33 per kWh figure we've suggested above instead.

If you would like a more exact cost per kWh, you can find the rates you pay on your power bill. Your power bill might look something like this example here:

45 Gray Avenue (ICP 0015762300ELF7F)	Period	Rate (incl GST)	Quantity	Total
Seasonal Energy				
211127374:1 Uncontrolled	26 Feb - 28 Feb	26.70 c/kWh	71 kWh	$18.96
	1 Mar - 25 Mar	28.37 c/kWh	684 kWh	$194.05
211127374:2 Controlled	26 Feb - 28 Feb	19.90 c/kWh	14 kWh	$2.79
	1 Mar - 25 Mar	21.56 c/kWh	218 kWh	$47.00

If you are using the costs from your power bill, you could use one average cost for PRICE 1 and PRICE 2, or you could vary costs based on time of day or controlled versus uncontrolled.

If you choose to use two costs, the power meter will give you an option for switching between PRICE 1 and PRICE 2 when you are reading the results. You might also choose to add the day, hour and minutes before you add in the cost (rather than skip over those lines as instructed above) if you are measuring the usage of an appliance that will run over both time periods.

Assess your home

Following the directions in the section above, use the power meter to measure how much power is consumed by the electric appliances you use. You might choose to measure any or all the following:

- fridge/freezer
- dishwasher
- electric jug
- microwave
- oven
- stove
- washing machine
- dryer
- vacuum cleaner
- heaters
- TV
- computer
- smartphone chargers
- spa pool.

Understanding your results

Energy efficient appliances can help save money and reduce greenhouse gas emissions in your home.

Tables 2 and 3 show the average consumption of different appliances. Comparing your home measurements with those in the tables will help you see where your power usage could be more efficient.

If you find that any of your appliances are inefficient, see our **Keep it affordable** section for what you can do.

Note: These tables were prepared in January 2021 with information available at that time. The running cost of appliances may vary depending on the electricity provider, location, intensity of use, and age of the appliance. The tables are based on normal use for a family of three people.

Table 2: Average consumption of large household appliances

Appliance	Rating (star)	Energy use (kWh)[2]				Running cost (NZD)[3]				Greenhouse gas emissions ($kgCO_2e$)[4]				Additional information
		Per year	Per month	Per week	Per use or day	Per year	Per month	Per week	Per use or day	Per year	Per month	Per week	Per use or day	
Fridge/ freezer	0.5	786	66	15.1	2.2	262.13	21.84	5.04	0.72	87	7	1.7	0.24	280 litres for fridge compartment + 120 litres for freezer compartment
	3	405	34	7.8	1.1	135.07	11.26	2.60	0.37	45	4	0.9	0.12	
	6	185	15	3.6	0.5	61.70	5.14	1.19	0.17	20	2	0.4	0.06	
Fridge	0.5	479	40	9.2	1.3	159.75	13.31	3.07	0.44	53	4	1.0	0.14	400 litres
	3	247	21	4.8	0.7	82.37	6.86	1.58	0.23	27	2	0.5	0.07	
	6	113	9	2.2	0.3	37.69	3.14	0.72	0.10	12	1	0.2	0.03	
Freezer	0.5	701	58	13.5	1.9	233.78	19.48	4.50	0.64	77	6	1.5	0.21	300 litres
	3	362	30	7.0	1.0	120.73	10.06	2.32	0.33	40	3	0.8	0.11	
	6	165	14	3.2	0.5	55.03	4.59	1.06	0.15	18	2	0.3	0.05	
Dishwasher	0.5	699	58	13.4	1.9	233.12	19.43	4.48	0.64	77	6	1.5	0.21	
	3	282	24	5.4	0.8	94.05	7.84	1.81	0.26	31	3	0.6	0.09	

[2] Source: https://tools.genless.govt.nz/individuals/running-costs-calculator/#!/
[3] 33.35 c/kWh – Source: Ministry of Business, Innovation and Employment, Quarterly survey of domestic Electricity Price, February 2023
[4] Emission factors: 0.12 $kgCO_2e$ / kWh. Source: Ministry for the Environment

Table 2: Average consumption of large household appliances

Appliance	Rating (star)	Energy use (kWh)[2]				Running cost (NZD)[3]				Greenhouse gas emissions ($kgCO_2e$)[4]				Additional information
		Per year	Per month	Per week	Per use or day	Per year	Per month	Per week	Per use or day	Per year	Per month	Per week	Per use or day	
	6	97	8	1.9	0.3	32.35	2.70	0.62	0.09	11	1	0.2	0.03	Capacity: 12 places – seven uses per week
Washing machine	0.5	694	58	13.3	3.3	231.45	19.29	4.45	1.11	76	6	1.5	0.37	Capacity: 8kg – four uses per week on a warm wash
	3	259	22	5.0	1.2	86.38	7.20	1.66	0.42	29	2	0.5	0.14	
	6	37	3	0.7	0.2	12.34	1.03	0.24	0.06	4	0	0.1	0.02	
Clothes dryer	0.5	1,846	154	35.5	8.9	615.64	51.30	11.84	2.96	203	17	3.9	0.98	Capacity: 8kg – four uses per week, all year round
	3	1,225	102	23.6	5.9	408.54	34.04	7.86	1.96	135	11	2.6	0.65	
	6	753	63	14.5	3.6	251.13	20.93	4.83	1.21	83	7	1.6	0.40	
Heat pump	0.5	2,281	190	43.9	6.2	760.71	63.39	14.63	2.08	251	21	4.8	0.69	Heat output of 6 kWs; used six months a year, 8 hours a day
	3	1,521	127	29.3	4.2	507.25	42.27	9.75	1.39	167	14	3.2	0.46	
	6	1,086	91	20.9	3.0	362.18	30.18	6.97	0.99	120	10	2.3	0.33	
Television	0.5	476	40	9.2	1.3	158.75	13.23	3.05	0.43	52	4	1.0	0.14	55-inch television, used 5 hours a day
	5	177	15	3.4	0.5	59.03	4.92	1.14	0.16	19	2	0.4	0.05	
	10	61	5	1.2	0.2	20.34	1.70	0.39	0.06	7	1	0.1	0.02	

Table 2: Average consumption of large household appliances

Appliance	Rating (star)	Energy use (kWh)[2]				Running cost (NZD)[3]				Greenhouse gas emissions ($kgCO_2e$)[4]				Additional information
		Per year	Per month	Per week	Per use or day	Per year	Per month	Per week	Per use or day	Per year	Per month	Per week	Per use or day	
Monitor	0.5	216	18	4.2	0.6	72.04	6.00	1.39	0.20	24	2	0.5	0.07	24-inch monitor, used 9 hours a day
	5	80	7	1.5	0.2	26.68	2.22	0.51	0.07	9	1	0.2	0.02	
	10	27	2	0.5	0.1	9.00	0.75	0.17	0.02	3	0	0.1	0.01	

Table 3: Average consumption of small household appliances

Appliance	Typical power use (KW)	Energy use (kWh)[5]				Running cost (NZD)[6]				Greenhouse gas emissions ($kgCO_2e$)[7]				Additional Information
		Per year	Per month	Per week	Per use or day	Per year	Per month	Per week	Per use or day	Per year	Per month	Per week	Per use or day	
Microwave	1.2	58	5	1.1	0.08	19.48	1.62	0.37	0.03	6	0.5	0.12	0.01	4 minutes per use, two times a day
Oven	3.0	46	39	9.0	3.00	156.51	13.04	3.00	1.00	52	4.3	0.99	0.33	1 hour per use, three times a week
Kettle	2.2	268	22	5.1	0.15	89.27	7.44	1.71	0.05	29	2.5	0.57	0.02	4 minutes per use, five times a day
Toaster	1.5	73	6	1.4	0.10	24.35	2.03	0.47	0.03	8	0.7	0.15	0.01	4 minutes per use, twice a day
Cooktop	2.0	1,460	122	28.0	4.00	486.91	40.58	9.34	1.33	161	13.4	3.08	0.44	Used 2 hours per day
Heated towel rail	0.1	15	3	0.7	0.10	5.07	1.01	0.23	0.03	2	0.3	0.08	0.01	Used 1 hour per day, five months a year

[5] Source: https://tools.genless.govt.nz/individuals/running-costs-calculator/#!/
[6] 33.35 c/kWh – Source: MBIE, Quarterly survey of domestic Electricity Price, February 2023
[7] Emission factors: 0.12 $kgCO_2e$ / kWh – Source: Ministry for the Environment

Table 3: Average consumption of small household appliances

Appliance	Typical power use (KW)	Energy use (kWh)[5]				Running cost (NZD)[6]				Greenhouse gas emissions ($kgCO_2e$)[7]				Additional Information
		Per year	Per month	Per week	Per use or day	Per year	Per month	Per week	Per use or day	Per year	Per month	Per week	Per use or day	
Electric heater	2.0	2,920	487	112.0	16.00	973.82	162.30	37.35	5.34	321	53.6	12.33	1.76	Used 8 hours a day, six months a year
Vacuum cleaner	2.0	156	13	3.0	1.00	52.17	4.35	1.00	0.33	17	1.4	0.33	0.11	30 minutes per use, three times a week
Incandescent bulb	0.06	131	11	2.5	0.36	43.82	3.65	0.84	0.12	14	1.2	0.28	0.04	Lights turned on 6 hours per day
Halogen bulb	0.042	92	8	1.8	0.25	30.68	2.56	0.59	0.08	10	0.8	0.19	0.03	Lights turned on 6 hours per day
Fluorescent bulb	0.012	26	2	0.5	0.07	8.76	0.73	0.17	0.02	3	0.2	0.06	0.01	Lights turned on 6 hours per day
LED bulb	0.01	22	2	0.4	0.06	7.30	0.61	0.14	0.02	2	0.2	0.05	0.01	Lights turned on 6 hours per day

Wood moisture level meter

Description

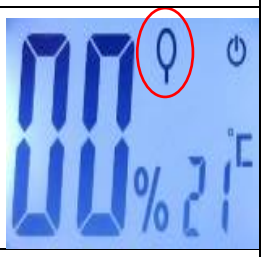
The wood moisture level meter measures the moisture level in different materials such as wood and building materials. This tool helps you understand the moisture level of your firewood.

How to use this tool

You can watch an instructional video for this tool on our YouTube playlist, and at https://youtu.be/bFDhu3LOnbI.

Warning: Be careful when using the tool as the electrodes are sharp and may cause injury.

To measure the moisture content in the wood:

Step	Action
1	Open the top part of the wood moisture level meter so the measuring electrodes are visible.
2	Hold the red button down to turn the wood moisture level meter ON.
3	Hold the MODE button down to switch from degree Fahrenheit (°F) to degree Celsius (°C).
4	Press the MODE button to switch to firewood mode (see the tree icon). **Note:** There is another mode with a house icon, which can be used to measure the moisture of other building materials. If you choose to use this mode, be careful as the electrode pins will leave marks. 
5	Press the measuring electrodes as far as possible into the firewood.
6	Read the moisture level and record the reading in the record sheet.
7	Hold the red button down to turn the wood moisture level meter OFF.
8	Put the cap back on to protect the electrodes.
9	Record the moisture level in your firewood. **Note:** You can create or download your own wood moisture level table as shown in **Appendix 1 – Recording sheets**.

Assess your home

Ideally, firewood should be burnt when it has a moisture content of 15–20 percent. This is because:

- Burning wet firewood is not efficient as most of the energy is used to evaporate the moisture rather than warming your house.

- Wet wood burns less efficiently, and produces more smoke, tar and soot that damages your chimney and affects the quality of the air we breathe.

It is a good idea to always check the moisture content of the wood you buy, especially when it is being sold with a dry wood price.

If your firewood is not within the recommended moisture content range, see the **Keep it dry** section for what you can do.

How to improve the health of your home

Keep it warm

Difficulty in heating cold houses can be due to poor insulation and inefficient heating.

Poor insulation is common in New Zealand homes, particularly in older houses. Good insulation reduces how fast your house loses heat, helping to keep homes warmer and drier. Poor insulation makes it hard to maintain indoor temperatures.

These tips can help you improve your insulation, reduce draughts, and heat your home more efficiently.

Insulation

- Insulate your ceiling and under the floor to reduce heat loss by up to 50 percent. You can do this at any time.
- Insulate your walls. This is harder and more expensive to do, but you can do it during renovations.
- Use an inexpensive kit (around $6 per standard size window) to stick insulation film to the frames of wooden windows. The transparent film creates a layer of still air in front of the glass that acts as insulation – just like double glazing.
- Upgrade your doors and windows (double-glazed windows with thermally broken aluminium,[8] uPVC joinery,[9] or wooden joinery).

You may be able to get a grant for a heater and/or home insulation, particularly if you have a Community Services Card or live in an area that qualifies for an insurance subsidy through the Wellington Sustainability Trust.

Find out more at:

- https://sustaintrust.org.nz/blogs/news/how-much-can-i-save-with-insulation-grants
- https://tools.eeca.govt.nz/warmer-kiwi-homes-tool/

Reducing draughts

- Tighten loose hinges, catches and latches.
- Replace damaged rubber seals around your windows and doors.
- Seal gaps around door and window frames with a sealant to make them weather resistant.
- Fit draught excluders or door snakes along the bottom of your doors.
- Block an unused chimney or fireplace. Use a rubbish bag filled with shredded newspaper. Just make it obvious the chimney is blocked, so noone tries to light a fire.

Curtains

- Open your curtains during the day to passively heat your house with the sun.

[8] Thermally broken windows are made with a thermal barrier between the inside and outside of the window frames. This is designed to reduce heat loss.
[9] UPVC refers to unplasticized polyvinyl chloride. As the name suggests, it does not contain phthalates or BPA, so it's a safe product for the environment, while still giving the benefits of a vinyl window frame. UPVC is a robust material, especially used in window construction due to its thermal efficiency and durability.

- Close your curtains just before dark to retain the heat accumulated during the day.
- Use thermal curtains (double-layered with a thick lining) that:
  - touch the floor
  - are wider than the window frame
  - fit tightly against the wall and window frame
  - have a pelmet[10] above curtains to add insulation.

Ōtaki Curtain Bank

The Ōtaki Curtain Bank is an initiative of Energise Ōtaki in partnership with the Sustainability Trust in Wellington, supported by the Kāpiti Coast District Council and the Citizens Advice Bureau Ōtaki.

Kāpiti Coast District households with a Community Services Card can apply to get lined curtains for their home. These are upcycled, pre-loved curtains.

For more information, contact Energise Ōtaki (info@energise.otaki.net) or the Ōtaki Citizens' Advice Bureau on 06 364 8664.

Heating your home

- Choose a heater that uses renewable energies (wood, wood pellets, electricity)
- Choose a model that is efficient and meets your needs.
- Get professional advice when it comes to choosing a new heating system.
- Follow maintenance advice for your heaters.
- Burn dry wood (15–20 percent moisture content) to increase efficiency and save money.

[10] A pelmet is a framework placed above a window. While it can be used decoratively and to hide curtain fixtures, it also helps insulate the window by preventing heat from escaping. A pelmet is similar in appearance to a valance, which performs the same function but is made of fabric.

Keep it dry

Damp homes can result from damp subfloors, unflued gas heaters, inadequate ventilation, having no extractor fan in the kitchen or bathroom, and drying washing inside. Colder and/or poorly insulated homes are also likely to be damp, as water condenses more easily onto cold surfaces. Damp houses can lead to mould growth.

Reduce excess moisture

- Don't dry your clothes inside.
- Put lids on pots and pans when cooking.
- Use extraction fans in the kitchen and bathroom and take short showers instead of a bath.

Raise indoor temperature

Heat your house to at least 18˚C to experience fewer periods of high humidity.

Open your windows

- Open some windows and doors on opposite sides of the house for 15–20 minutes each day, even in winter, to maintain a good air flow and reduce indoor moisture levels.
- Open your bathroom windows after a shower.
- Open your kitchen windows when cooking.
- Leave your bedroom window open at night (just a finger's width is enough in winter).
- Install windows with vents to allow ventilation even when the windows are closed.

Reduce humidity in your house

- Extract the moisture to the outside and not into the ceiling:
  - Use an extractor fan in the bathroom.
  - Use a rangehood in the kitchen.
  - Vent your dryer to the outside.
  - Use only externally vented (flued) gas heaters.
- Use a shower cover to retain humidity in the shower cubicle.

Tip: An effective fan should be able to hold an A4 sheet of paper in place when it's operating and be extracted to the outside (not into the ceiling).

For more information visit: www.tenancy.govt.nz/healthy-homes/ventilation-standard/

Reduce moisture levels in your floors

- Install a groundsheet (polyethylene barrier or vapour barrier) under your house to effectively reduce indoor humidity. This is very cost effective and, most of the time, you can do it yourself.
- If your house is on piles, ensure good ventilation of the area under your floor.

Reduce condensation

- Reduce the likelihood of warm air coming into contact with cold surfaces with:
  - good insulation

- double-glazed windows with thermally broken aluminium frame or uPVC frame or wooden frame[11]
- curtains.

- Wipe condensation off your windows every day.

Reduce and remove mould

- Reduce mould growth by following the advice to keep it dry.
- Remove mould with methylated spirits in order to reduce the health problems associated with the presence of mould.

Firewood content

For more information on buying the best firewood, visit:

- www.consumer.org.nz/articles/firewood
- www.warmercheaper.co.nz/good-wood/what-is-good-wood/
- https://environment.govt.nz/guides/authorised-wood-burners/

[11] Thermally broken windows are manufactured with a thermal barrier between the inside and outside of the window frames. Meanwhile, UPVC refers to unplasticized polyvinyl chloride. As the name suggests, it does not contain phthalates or BPA, rendering a safe product for the environment while still maintaining the benefits of a vinyl window frame. Both are designed for thermal efficiency to reduce heat loss.

Keep it affordable

Lighting

Switch your lights to LEDs to reduce your power bill for lighting by up to 83 percent.

Electricity and gas plans

- The websitehttps://www.powerswitch.org.nz/ helps you find the best electricity and gas plans. Keeping track of your bills will help you understand where you can make savings.
- Electra, the lines company for the Kāpiti Coast district, has tips on their website for reviewing whether you're on the right plan, and a free booklet to help you save power. Go to https://savemoneyforjam.electra.co.nz/.

Water – using less water and saving on costs to heat water

To reduce costs associated with water you can:

- shower instead of taking a bath
- reduce your shower time
- use cold water for your laundry
- run the dishwasher and washing machine with full loads
- fix your leaks.
- Install a shower flow restrictor (as these are inexpensive).
- Install an efficient shower head with a flow rate of 9 litres a minute or less
- Set the thermostat of your hot water cylinder to 55-60°C (you may need a plumber to do this).
- Wrap your hot water cylinder with a cylinder wrap to reduce heat loss and insulate your hot water pipes (at least the first 1-1.5 m).
- Maintain your hot water system.

For further advice on how to save water, see www.kapiticoast.govt.nz/WaterUse

Council also offers 200-litre rainwater tanks for a discounted price of only $105. For more information, contact Kāpiti Coast District Council on (04) 296 4700.

Appliances

- Choose energy-efficient appliances. Use the Star rating system to help you choose models that best meet your needs.
- Turn off appliances when not in use – do not leave them on standby.
- Do not leave devices plugged in when they are fully charged.
- Use timers and thermostats to reduce your power consumption (eg, heaters, freezers, lights, etc).
- Identify the appliances that are using a lot of power and replace them, if possible, with more efficient models, or minimise their use.
- Plug multiple appliances into one power board (e.g. all your appliances around the TV) allowing you to switch off the power board rather than appliances one by one.
- Use your smartphone to turn on/off smart WiFi power points.

Fridges and freezers

- Make sure that fridge and freezer doors are sealing properly.
- Leave 3–5cm between the back of your fridge or freezer and the wall, to enable good ventilation. Poor air circulation can double the electricity use of a fridge or freezer.
- Manage the temperatures of your refrigeration appliances (-18°C for your freezer and 0–4°C for your fridge). For more information, see the Love Food Hate Waste website, https://lovefoodhatewaste.co.nz/is-your-fridge-the-right-temperature.

Gen Less

Gen Less provides some great resources to help you reduce costs, while also helping the planet by reducing emissions.

Go to Gen Less Tools for Individuals (https://genless.govt.nz/for-everyone/) to find their:

- HomeFit online check (homefit.org.nz)
- solar tool
- water heating systems tool
- fuel efficient driving tool
- tyre pressure tool.

Gen Less also provides similar tools for businesses. See https://genless.govt.nz/for-business/ for more information.

More information

Funding

The **Well Homes programme** is a free service offered by Regional Public Health. If you live in the greater Wellington region, visit here to learn more about the programme and check eligibility: www.rph.org.nz/public-health-topics/housing-well-homes/

Warmer Kiwi Homes programme provides grants to owner-occupiers to cover 67% of the cost of installing insulation and/or heating. To check eligibility visit: www.energywise.govt.nz/tools/warmer-kiwi-homes-tool/

Other resources

Eco-design information sheets on a range of topics can help you improve our home's performance: www.ecodesignadvisor.org.nz/resources

Gen Less has more tips on keeping your home warm, dry and healthier. See https://genless.govt.nz/for-everyone/at-home/.

Appendix 1 – Recording sheets

Thermometer/hygrometer

Room	Temperature reading	Humidity reading
Kitchen		

Stopwatch (water flow rate)

Tap/room	Time to fill a 10L bucket (seconds)	Flow rate associated in litres per minute (see table 1 in guide)
Shower main bathroom		

Wood moisture level meter

	Reading 1	Reading 2	Reading 3	Reading 4	Reading 5	Reading 6
Moisture content						

Infrared thermometer

Room	Temperature readings								
	Floors	Walls	Ceiling	Window 1 seals	Window 2 seals	Window 3 seals	Door 1 seals	Door 2 seals	Other
Kitchen									

Power meter

Appliance			**Power consumption**	**Carbon dioxide emissions**	**Cost**
Item	**Per cycle/day***	**My Star rating**	**Cumulative power (kWh)**	**Cumulative emissions (kg)**	**Cumulative cost ($)**
Kettle	Cycle				
Toaster	Cycle				
Microwave	Time-of-use				
Fridge	24 hours				
Freezer	24 hours				
Dishwasher	Cycle				
Washing Machine	Cycle				
Dryer	Cycle				
Vacuum	Time-of-use				
Television	Time-of-use				
Computer monitor screen	Time-of-use				
Electric heater	Time-of-use				
Heated towel rail	Time-of-use				

Note: the measurement time will be determined by whether you want to simply measure power consumption or compare your appliance to those listed in tables 2 and 3 in the guide. If you want to compare to the guide, please look at the guide to determine what time-period will be needed.