



# HOME ENERGY AND WATER EFFICIENCY KITS

Supporting Myli residents to collectively reduce their energy use, tackle climate change, and build a cleaner renewable energy future.

These kits are provided to residents serviced by Myli libraries to help reduce utility bills and cut household greenhouse gas emissions. You can also borrow a Portable Induction Cooktop Kit from your local Myli library.

Please treat all items with care and return all items in the same condition you hired them in.

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For further support please contact [support@myli.org.au](mailto:support@myli.org.au)

This kit is designed to support and empower residents serviced by Myli libraries to reduce their impact on climate change. The kit will identify where you can improve the efficiency of your home, helping you save money, make your home more comfortable and reduce your carbon emissions.



### Feedback

Did this kit help you improve the energy and water efficiency of your home?

Please email us with your feedback:  
[support@myli.org.au](mailto:support@myli.org.au)

Tell us about your experience so we can share and celebrate your household water and energy reduction.

### Inside you will find:

- **Power-Mate Lite**  
The power-mate lite shows how much electricity an appliance is using and what this is costing you.
- **Thermal Imaging Camera**  
The thermal imaging camera shows where hot and cold areas are around your house. It highlights areas where draughts, water leaks and missing insulation might be present.
- **Energy Saving Thermometer**  
The energy saving thermometer shows the appropriate operating temperature for heating, cooling, hot water service, fridge, and freezer. It will inform you if you need to adjust your settings.
- **Water-Flow Measuring Cup**  
The water flow measuring cup will tell you the flow of your shower and taps in litres per minute.
- **Instructions**  
Instructions for each of the items are provided for additional support and reference.

## LOOKING FOR FURTHER IMPROVEMENTS?

If this kit has inspired you to make changes to live more sustainably, here are some useful resources that are worth referring to:

- **Your Home** Technical Manual is a federal government resource guide to environmentally sustainable homes. Because it's local to Australia it is relevant to our climates and local building regulations. It is primarily aimed at new homes or renovations, but most of the information can also be applied to an existing house. It is available for free online, or you can purchase a printed book. [www.yourhome.gov.au/](http://www.yourhome.gov.au/)
- **Renew** is an Australian not-for-profit organisation that has been providing expert, independent advice on sustainable solutions since 1980. Their website, forums and magazines are a goldmine of information about all aspects of living sustainably. You can also sign up for a membership or subscribe to their magazines to help support them. [www.renew.org.au/](http://www.renew.org.au/)
- **My Efficient Electric Home** is a popular group on Facebook dedicated to helping people make their homes more efficient and get off gas. At the time of writing, they have over 80,000 members and there is a vast archive of questions and answers in the group. If you can't find the answer already there, then you can ask and you'll likely get a range of expert opinions. [www.facebook.com/groups/MyEfficientElectricHome/](https://www.facebook.com/groups/MyEfficientElectricHome/)
- **Solar Victoria** is an initiative of the Victorian government and delivers various programs that help Victorians save on their energy bills, tackle climate change, and build a cleaner, renewable future. You can access rebates for solar panels, hot water systems, batteries and zero emissions vehicles through the Solar Victoria website. [www.solar.vic.gov.au/](http://www.solar.vic.gov.au/)
- **Sustainability Victoria** is an agency of the Victorian government that facilitates and promotes integrated environmental sustainability in the use of resources, energy efficiency, and reducing emissions. You can find free advice about how to improve energy efficiency in your home through the Sustainability Victoria website: [www.sustainability.vic.gov.au](http://www.sustainability.vic.gov.au)

*These kits were donated to Myli in 2023 as a collaboration between Bass Coast, Baw Baw, Cardinia, and South Gippsland councils. We are grateful to Casey, Darebin, and Hobart councils for providing the instructional materials from their home energy efficiency kits as a guide. The support of the Energy Innovation Cooperative in developing early versions of these kits is also acknowledged, as is their continued work in supporting community energy solutions.*



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# POWER MATE LITE

The Power-Mate Lite (PML) measures the consumption and running cost of an electrical appliance. It calculates the electricity used and greenhouse gas generation, providing estimated hourly, quarterly and yearly figures. The PML can also determine how much power an appliance is using while on stand-by.

## ENTERING YOUR HOUSEHOLD COSTS

- To get the most accurate cost estimates, the tariff or cents per kilowatt-hour (c/kWh) needs to be set on the PML. Refer to a recent electricity bill to obtain the cents/kWh value you are currently paying. If there are multiple values such as peak and off-peak, use the average between the two. You may need to convert your tariff from \$/kWh to cents/kWh.
- After switching on the PML click the 'MENU' button.
- To change between the screens. Find the 'Cost' screen. Set the value by holding down the 'MENU' button until the word 'Set'; is displayed on the screen.
- To change the cost, click the 'ZOOM' button to change the number (this cycles through 0-9).
- Click the 'RUN' key to move to the next digit, similar to setting a digital clock.
- Click the 'MENU' button to finish this.



## DISPLAY

The cost screen displays four items of data:

1. The real (or actual) figure to date (taken from the time you turned on the PML)
2. The estimated hourly amount
3. The estimated quarterly amount
4. The estimated yearly amount

The estimates are calculated from the average energy consumption of the appliance which is calculated from the data collected during the measurement period.

You can use the 'ZOOM' button to display the minimum and maximum values during the sampling time period.

## TAKING A MEASUREMENT

- Plug an appliance into the piggy-back plug of the PML.
- Plug the PML into a wall socket and switch on.
- Click the 'MENU' button until cost is displayed.
- Hold the 'RUN' button until prompted 'clear all data' click the button under 'yes'.
- Click the 'RUN' button to start the measurement.
- The cost screen will update with running costs for that appliance.
- By pressing the 'MENU' button you can scroll through to see the live costs, greenhouse gas and power information.
- Once you have recorded the values, switch off the appliance and disconnect the PML.
- Once the appliance is switched off you will be able to see the standby power use for your records.
- Make sure you follow these steps to clear all data between each appliance reading.

## TIME BASED MEASUREMENTS

For some appliances you may only need a single point of data. However for some appliances with a thermostat, such as a fridge, a longer sampling period such 24 hours will provide more useful data.

You can choose to manually control the time or set a timer. For most measurement manual control is the best option. If you wish to set a timer:

- Click 'MENU'
- Scroll to 'RUNTIME' or 'ENDTIME'
- Click and hold 'MENU' to set 'TIMER DURATION'
- Click 'ZOOM' to scroll through the options
- Choosing 'NOT SET' allows manual control of the measurement. Alternatively, you can set the timer duration
- Click MENU to return to the measurement screens

Time based measurements are best for washing machines or dish washer cycles to know the cost of washing a load. These types of appliances use different amounts of power at different times during a load and for different settings. To measure this type of appliance, start the PML before you start the appliance. When the appliance has finished stop the PML. The readout for REAL is the measure of the energy or cost of the load. Refrigerators and freezers are best to be measured over a 24 hour period to capture a true daily read.

## IMPORTANT SAFETY INFORMATION

This product contains live mains voltage and should be used only by an adult or under adult supervision. Do not use in wet areas or allow the unit to get wet. If the power cord or case becomes damaged, please do not use and notify the library staff when returning this kit. For further operating advice refer to the operating instructions located in the kit.

This device is intended to be used for operation of 240 volts AC with a maximum load current of 10 Amps. When the current exceeds 10 Amps the display flashes the message 'WARNING OVERLOAD'. Turn off or disconnect the excessive load as soon as possible to avoid damaging the PML.

## COMPARING YOUR APPLIANCES

The PML can be used on any appliance with a power plug, including:

- Fridges and freezers
- Washing machines, dryers and dishwashers
- TVs and computer monitors
- Heaters and air conditioning units
- Laptops, tablets, lamps, fans, kitchen appliances, hair straighteners etc.

To compare the running costs of your appliance against other appliance that range from a 1 star efficiency to a 10 star efficiency rating, go to [www.energyrating.gov.au](http://www.energyrating.gov.au).

The PML will determine which appliances are efficient and which are not. While replacing your old appliance for a highly energy efficient version is the quick solution, it is not always the best option.

- Use a clothes line instead of the dryer
- Use the washing machine on cold or cool cycles
- Only use the washing machine and dishwasher when they are full
- Switch appliances off at the wall instead of using stand-by power
- Use 'eco' modes on washing machines and dishwashers
- Set appliances to 'power saving' mode such as coffee machines
- Don't leave heaters or air conditioners running overnight
- Switch off appliances you aren't using regularly like second fridges or freezers
- Set your fridge at efficient temperatures at or just below 5degC and your freezer at or just below -15°C
- Defrost freezers when more than 5mm of ice builds up.
- Ensure fridge and freezer doors are not left open.
- Inefficient fridges older than 10 years may need to be replaced with a more energy efficient model that is cheaper to run.







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# THERMAL IMAGING CAMERA

Thermal imaging cameras show the surface temperatures and the change in temperature within an area. The camera in this kit is a Forward Looking Infrared (FLIR). These cameras are used to show draughts, gaps or missing insulation, and leaks. It is a useful tool to compare before and after images to demonstrate the effectiveness of the improvements you make in your home.

## OPERATING THE FLIR TG267 CAMERA

- Using the USB cable, charge for at least one hour.
- Press and hold the centre power button for a second or two and the unit will power up. After a few seconds it will show a live image on the screen. You can move this around to compare the temperature of different parts of an object.
- This basic camera view is all you really need to diagnose issues in your home. Point it at a wall, ceiling, etc, give the camera a second or so to stabilize, and you will clearly be able to see whether the surface is one continuous colour/temperature, or if there are obviously hotter/colder patches.
- Note: If investigating draughts and insulation, you will get the best results when there is a larger temperature difference between the inside temperature and the outside temperature. (i.e. in the evening or when the house is heated on a cold day, or in the middle of the day / when the house is being actively cooled on a hot day).



## SOME OTHER FEATURES THAT MIGHT BE HANDY

- If you pull the trigger on the front of the unit it will save a picture to the internal memory. You can then use the USB cable to connect the camera to a computer and download the picture. You can also wirelessly transfer images using the FLIR Tools app on your smartphone. This app is available on the Apple App Store and Google Play store.
- If you press the button to the left of the main button it will turn on a laser indicator so you can see exactly where the temperature indicator on the screen is measuring.
- If you press the centre button quickly it will bring up the menu system. You can navigate using the up and down buttons, the Back button to the right and using the centre button as Enter. Use the Back button to return to the live view screen. It's unlikely you'll need to use any of the menu functions. If you change any settings, please change them back to the defaults before returning the unit.
- There are quite a few advanced features of the camera. You are highly unlikely to need these for diagnosing home thermal efficiency issues. If you do need to use them, please download and refer to a copy of the manual from the FLIR website: [www.flir.com/](http://www.flir.com/)



## WHEN YOU'RE DONE

When you've finished with the camera there are a few things we'd appreciate you doing, like the old video store 'Be Kind, Rewind' motto.

- Hold down the centre button for a few seconds to power off the camera.
- Please make sure you've deleted any images you saved onto the camera (after transferring them to your PC or phone)
- Please make sure the thermal camera is clean and ready for re-use. Leave it connected to a USB charger for a while to make sure the battery is full.
- Please make sure all included parts and accessories are present (e.g. USB cable)

## DRAUGHTS

Draughts are one of the biggest issues in older buildings. Air can escape from your home, requiring you to over use your heaters or air conditioners. This increases energy bills and also contributes to an uncomfortable home and can cause other health issues. Use the thermal imaging camera to identify draughts. After you have sealed the draught, take another photo to determine if the fix has been effective.

ITEM	HOW TO REDUCE DRAUGHTS
External door	<p>There are a few main sections of your door that can let in draughts – keyhole, letterbox, gap at the bottom, and around the edges.</p> <p>You can buy purpose-made covers for keyholes and flaps and brushes for your letterbox that are reasonably cheap and easy to fit.</p> <p>For any gaps, you can buy brushes, door seals or special strips that fit around the edges from a hardware store. Double check that your door closes properly and there are no faults where air could creep in. Door seals are easy to stick on as they are adhesive backed. They also help to block out bugs and dust.</p> <p>For an easy fix or for tricky doors consider a door snake to block out draughts at the bottom of the door.</p>
Windows	<p><u>Winter</u></p> <p>During the day ensure curtains and blinds are open to allow the winter sun into the home. In the evening and nights close curtains and blinds to block out cold air coming into the home. Keep windows closed when heaters are on to avoid heat loss.</p> <p>In extreme cases or when a window needs to be replaced, consider purchasing energy-efficient windows such as double glazing.</p> <p><u>Summer</u></p> <p>Install block out or heavy curtains and blinds, At the start of a hot day close blinds or curtains to block out direct sunlight.</p> <p>Install awnings on north facing windows to block out direct sunlight in summer. Plant deciduous trees north and west of your home, the tree will shade your home in summer but allow winter sun through when deciduous.</p> <p>Maintain your windows and window frames, wooden frames can rot or warp creating gaps. Use putty or filler to block any holes. Older houses may require caulking or weather stripping.</p>

### Chimneys and fire places

When the chimney or fire place is not in use, cover the opening securely to stop air flow. There are many products on the market that can be used to block a draught such as chimney pillow/balloon, draught guards or a chimney damper.

If the fire place is never used, you could consider removing it, however this can be very costly.

### Floorboards or skirting boards

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### Floorboards or skirting boards

It might not be somewhere you immediately think of, but both floorboards and skirting boards can let in draughts.

Floorboards aren't as much of an issue if you have flooring on top, but are still worth dealing with to fully prevent draughts. You can use sealant to fill in gaps around skirting, whilst silicone-based filler is preferable for floorboards to allow for movement in the boards.

Underfloor insulation is also an option if the house has a crawl space that allows installation. Alternatively use rugs or mats on bare floorboards to reduce air loss through cracks and gaps in the floor.

### Vents

You may find that draughts are coming in through vents in your house. If these are disused vents, after old gas fires or central heating boilers have been removed, then these vents can be blocked up using a vent cover or filled using polyurethane foam.

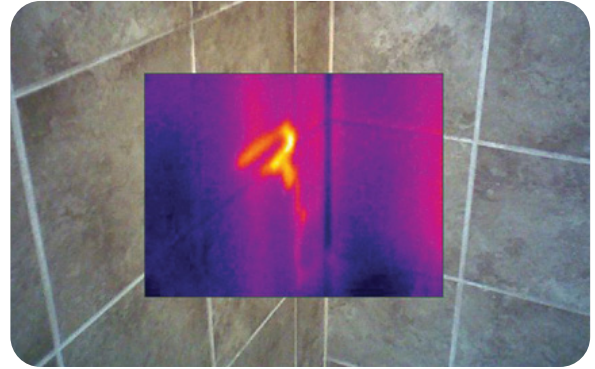
Vents into the ceiling such as extraction fans, can be covered with an exhaust fan cover. The flaps on these covers can be opened when the fan is running and closed when the fan is off, reducing air loss.

However, you don't want to block up vents that are actually used. For example, extractor fans in the bathroom or kitchen will help reduce moisture build-up, airbricks help keep wooden floors and beams dry, and trickle vents are often used in modern windows to allow fresh air into a room.



## LEAKS IN CEILING AND WALLS

The thermal camera can detect areas in your ceiling or walls where pipes may be leaking. Turn on the hot water, you should see the hot water in the pipe behind the wall. If there are temperature differences not in the expected areas, you may have a leaking pipe requiring further investigation. Do the same for the cold water pipe.



## INSULATION

Taking images of the ceiling and walls will identify if the surface is all the same temperature, or if there are gaps in your insulation. To give you an idea of the temperature difference start with taking an image of the man hole to your ceiling. Generally, the man hole cover is not insulated showing a difference in temperature. If your ceiling cavity is not insulated the temperature will appear to look similar to the man hole. If insulation is present, then the temperature will be different. If there is a temperature difference, consider looking into insulating your ceiling and walls.



## APPLIANCES

In a warm home, take a snapshot of your fridge door seal to reveal if cold air is escaping the fridge due to a damaged or worn door seal. If there is cold air escaping your fridge door, the seal needs to be replaced. Additionally, if the back of your fridge is really hot, ensure it is cleaned regularly and has good air ventilation at the back. The harder your fridge works, the more electricity it uses.

Appliance such as computers and laptops emit heat even when sitting on stand by. On a warm day this additional heat source is adding to the room temperature. If the thermal camera shows appliances are emitting heat, ensure they are switched off, not just on stand-by.

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# ENERGY SAVING THERMOMETER

Running appliances either too hot or too cold can result in wasted energy. This will cost you more money, increase your emissions, may reduce the lifespan of the appliance and make your home uncomfortable.

The energy saving thermometer tells you the appropriate operating temperature for heating, air-conditioning, hot water services, fridges and freezers. This information is used to adjust the thermostat on the appliance to the most energy-efficient temperature.

## REFRIGERATOR

Place the thermometer on the middle shelf of the fridge and check the temperature after the thermometer reading has stabilised, after 30 minutes. The ideal temperature for a fridge is between 4°C (degrees Celsius) and 5°C.

Repeat the process for the freezer. The ideal temperature for a freezer is between and -15°C and -18°C. Adjust the thermostat of the fridge and freezer to achieve this range.

Your fridge runs 24/7 and is one of your most expensive appliances.

- Ensure the fridge door seal is tight and that no gaps or cracks let cold air escape.
- If you have a second fridge or freezer, only turn it on when needed.
- Ensure there is space behind the fridge to improve air circulation and fridge efficiency.
- Keep the back of the fridge clean with regular dusting.
- For older manual-defrost freezers, ensure to defrost regularly to improve efficiency.



## HEATING AND COOLING

Place the thermometer in the living rooms and check the reading after 15 minutes (do not open any doors or windows).

Adjust your thermostats so that your room temperatures are between 18°C and 20°C in winter and 25°C and 27°C in summer.

Every degree above 20 degrees can add 10% to your heating bill. In winter, heating can account for over 30% of your bill.

- Where possible close off heating ducts or doors to unoccupied rooms.
- If you have gas heating and a modern reverse cycle air-conditioner, try using your reverse cycle system in heating mode.
- Close curtains on cold nights and hot days to reduce the temperature transfer through the windows.
- Look for draughts and seal gaps to avoid losing air.
- Adjust your clothing first before switching on appliance.



## HOT WATER

Using a tap that is close to the hot water unit, carefully hold the end of the thermometer in the middle of a steady stream of hot water and read the thermometer once the temperature is stable.

Hot water heaters that store your water hot should be set to between 60°C and 65°C to reduce health risks from dangerous bacteria. Instantaneous hot water heaters should be set at 50°C.

Water heating is the second largest energy expense in your home (behind heating and cooling), accounting for about 18% of your bill.

- Add insulation or lagging on the uninsulated sections of hot water pipe to reduce heat loss
- Conserve hot water by fixing leaks and installing water efficient shower heads
- Wash your clothes and dishes with cold or warm water
- When you need to upgrade your hot water heater, consider an energy efficient hot water heat pump
- Reduce showering time
- Have an electrician adjust the thermostat of your hot water unit to ensure it is within the recommended range.



# WATER FLOW MEASURING CUP

The water flow measuring cup is used to measure the water flow of a tap. Inefficient taps have a flow rate of between 15 and 22 litres of water per minute. Water efficient taps use less than 9 litres per minute. Refer to the Water Efficiency Labelling and Standards (WELS) scheme for help selecting the right appliance: [www.waterrating.gov.au](http://www.waterrating.gov.au)

## MEASURING THE FLOW OF A TAP

- Start with the cup handles together. Turn the tap on slowly and increase the flow rate until the cup is overflowing and the tap is running at the maximum.
- Slowly pull the handles apart until the water level stabilises so that the cup is not overflowing and the water level is not dropping.
- Once the flow is stable, read the flow rate off the side of the cup. The number that lines up with the left side of the handle is the flow rate of your tap.
- The cup measures between 3 litres and 20 litres per minute. If the cup is overflowing at 20 litres per minute the tap is very inefficient.



We use our taps every day, so it is important we are not using more water than we need.

- If your taps are old, leaking and need replacing, ensure you select water efficient low flow taps that use less than 9 litres per minute.
- New taps should be WELS star rating of 4 or 5 for bathroom basins and 3 or 4 stars for kitchen sinks.
- Some taps can have aerators fitted to the nozzle. Aerators mix air and water to reduce the volume of water used.
- Install a flow regulator or flow control valve on existing taps to reduce the flow without replacing your tapware.
- Fix drips as soon as you notice them. Don't over tighten taps as this wears the washers and causes leaks.
- Always use a qualified plumber when undertaking water efficiency measures.





## MEASURING THE FLOW OF A SHOWER

- This activity is easiest with two people however it can be done with one person, depending on the type of shower. You can also find online calculators that assist with the formulas below.
- Using a 1 litre jug, hold the jug up to the shower head.
- Using a stop watch or timer on your phone, time how long it takes to fill the 1 litre jug.
- Use the formula:

$$\frac{1 \text{ litre}}{\text{number of seconds}} \times 60 \text{ seconds} = \text{Flow of the shower head in litres per minute}$$

- For large rain shower heads you will need to use a bucket. Using the same steps as above a standard bucket is 10 litres to the top of the rim.

- Use the formula:

$$\frac{10 \text{ litres}}{\text{number of seconds}} \times 60 \text{ seconds} = \text{Flow of the shower head in litres per minute}$$

- Any jug or bucket can be used, just modify the top value accordingly.

- An inefficient shower head uses 15 to 20 litres per minute and an efficient shower head uses 6 to 9 litres per minute.
- The Victorian Energy Upgrade program offer free water efficient shower heads to eligible homes in Victoria. Check to see if you are eligible at [www.energy.vic.gov.au](http://www.energy.vic.gov.au).
- Set a 4 minute timer on your mobile phone before you get into the shower to ensure you stick to a time limit.
- Replace your shower head with a WELS 5 star shower head which uses between 4.5 and 6 litres a minute.
- Install a mixer tap as they mix water faster and easier reducing time spent running the shower to get the right temperature.
- Next time you need to replace your hot water system, consider a hot water heat pump.



## OTHER IDEAS FOR REDUCING WATER CONSUMPTION

- Only use the washing machine or dishwasher when it is full.
- Use eco cycles on your appliance where possible.
- Scrape dishes before using the dishwasher, instead of rinsing under a tap.
- When you need to upgrade your appliances such as dish washers and washing machine, select the most efficient appliance. While you may spend more upfront, you will save money in the long run with reduce water and electricity use.
- If your toilet is a single flush, considering upgrading to a dual flush water efficient toilet. Replacing a 12 litre single flush with a 4.5/2.2 litre WELS 6 star toilet in a household of 4 people can save more than 60,000 litres of water each year.



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