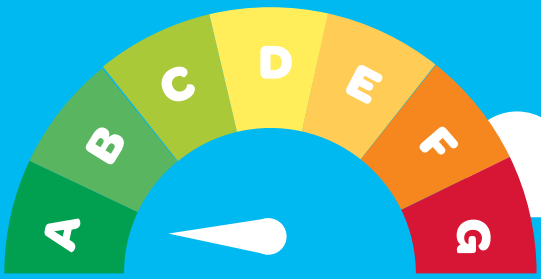
Codema
Dublin's Energy Agency

HOME ENERGY SAVING KIT MANUAL

Take charge of your energy use today



Acknowledgement

A special thanks goes out to the Department of State Development of the Government of South Australia who developed the first Home Energy Toolkit in Australia in early 2000 (http://sa.gov.au/energysmart). Their advice and cooperation has been invaluable in the process of developing this Home Energy Saving Kit.

We also thank the INTERREG IVB North West Europe Programme for their support. INTERREG IVB NWE is a Programme of the European Union, which promotes the economic, environmental, social and territorial future of the North-West Europe area. It funds activities based on the cooperation of partners from eight countries: Belgium, France, Germany, Ireland, Luxembourg, The Netherlands, Switzerland and the United Kingdom.

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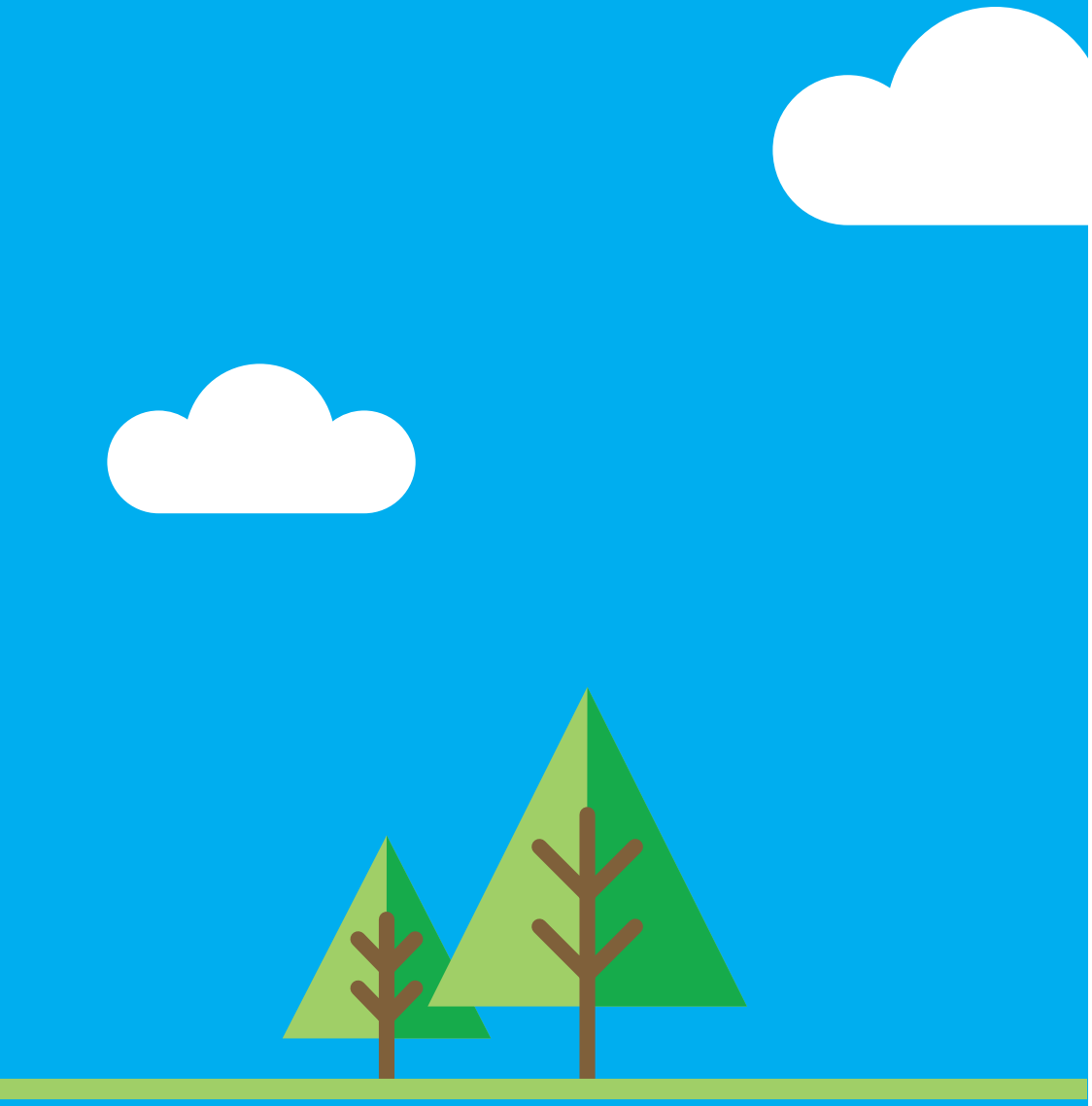


Introduction

The Home Energy Saving Kit has been developed to help you understand your energy consumption at home, whether you own or rent your accommodation. It provides six practical energy saving tools which will help you conduct your own home energy audit and find the easiest and most important areas to reduce your energy. By implementing easy energy saving measures, you can reduce your energy bill by up to 20% while improving the comfort of your home and helping to contribute to a better environment at the same time.

This manual has been designed for easy use and to give you a basic understanding of your current energy needs at home. Technical expertise or extensive knowledge on energy are not required.

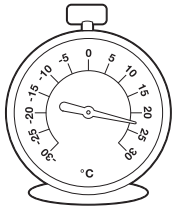
So what are you waiting for? Get started and save energy now!

For free energy saving tips, why not pick up our Guide to Home Energy Savings from your local library and start changing your habits today! You can also visit www.codema.ie/thinkenergy for further information.

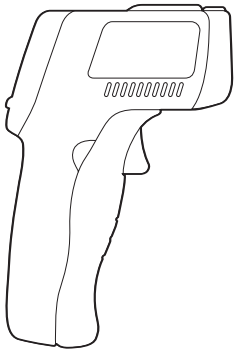
What's included

The following six energy saving tools are included in this Home Energy Saving Kit and address three key areas of energy use in your home - space heating, hot water and electrical appliances.

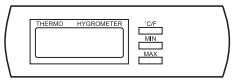
Fridge/Freezer Thermometer



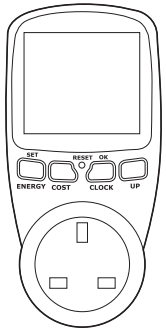
Laser Temperature Gun



Temperature & Humidity Meter



Plug-In Energy Monitor

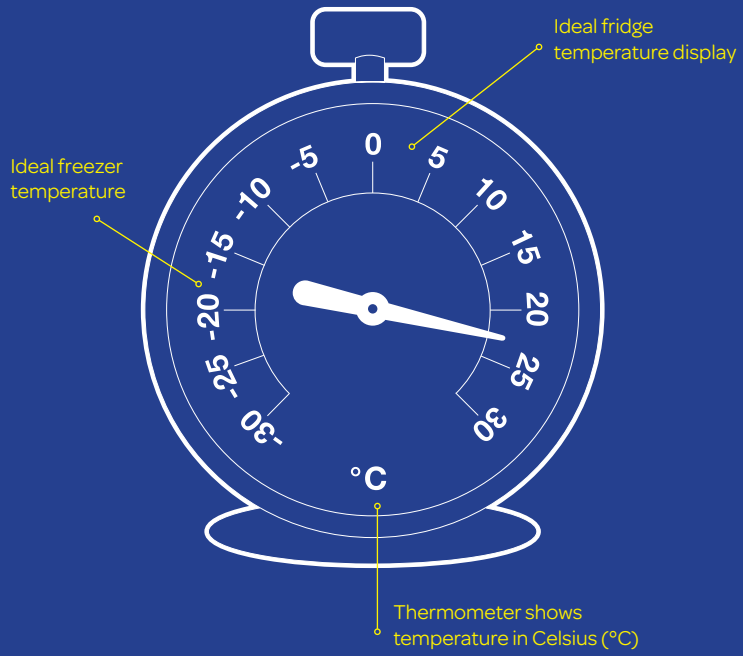


Radiator Key

Stopwatch

Fridge/Freezer Thermometer

The fridge and freezer thermometer in the Home Energy Saving Kit can help you save energy in your kitchen by allowing you to measure the temperature of your fridge and freezer accurately and adjust it accordingly.



Fridge/Freezer Thermometer

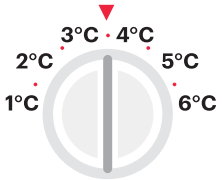
1

Place thermometer onto middle shelf of fridge. Avoid placing it too close to other items or into the fridge door and make sure you have not recently placed a warm dish into the fridge.

2

Wait 30min for the thermometer to adjust to the fridge temperature while the fridge door is closed.

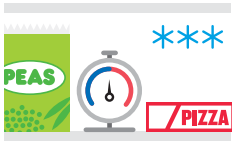
3



Check that fridge is between 3 to 5°C. You may need to amend the temperature wheel of your refrigerator to a different setting and then repeat Step 1-2.

Step-by-Step Guide

4

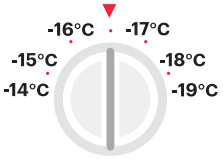


Place thermometer onto middle shelf of freezer. Avoid placing it too close to other items.

5

Wait 30min for the thermometer to adjust to the freezer temperature while the freezer door is closed.

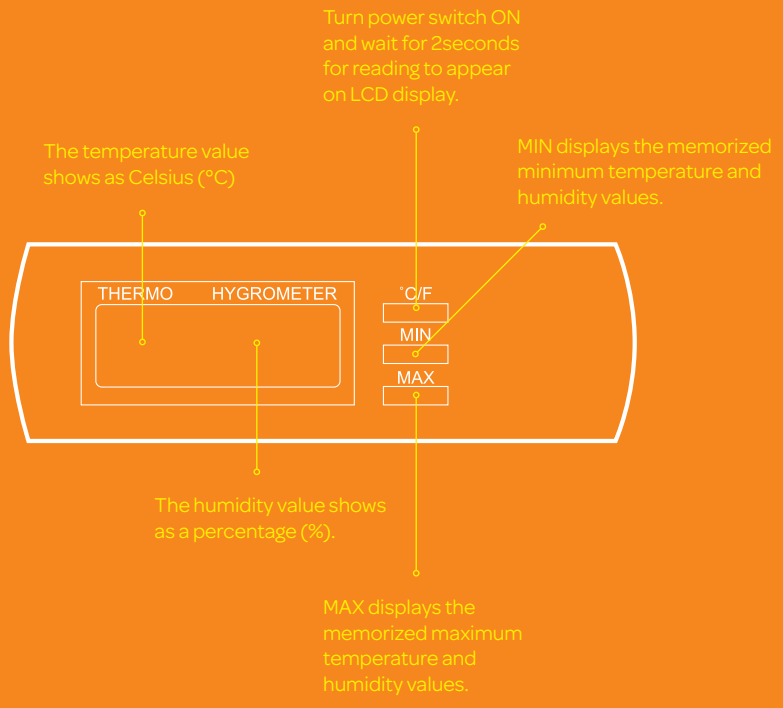
6



Check that freezer is between -15 to -18°C. You may need to amend the temperature wheel of your freezer to a different setting and then repeat Step 4-5. Please note that not all freezers have a separate temperature setting. You will therefore have to amend depending on your appliance setting.

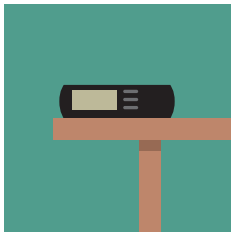
Temperature & Humidity Meter

The thermo hygrometer pen helps you identify both the temperature as well as the humidity level in your home.



Step-by-Step Guide

1



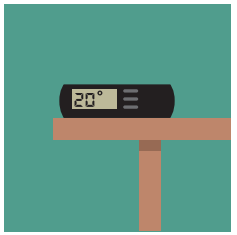
Place temperature and humidity meter on a surface away from windows, radiators and fireplaces. Do not keep temperature and humidity meter in your hand, as your own body temperature can impact the accuracy of the measurement.

2

Measure the humidity in each room to identify whether the environment you live in provides a healthy humidity level. Ideal humidity levels are between 40% - 60%.

Note: High humidity levels can come from poor ventilation systems, insufficient heating, lack of insulation, and poor window quality. Remember that bathrooms can have higher humidity levels as residual moisture remains on surfaces. Ensure sufficient ventilation to prevent mould growth.

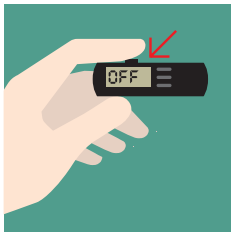
3



Measure the temperature in each room to identify whether your rooms are sufficiently heated during colder months but not overheated which can lead to high energy bills. Aim for an ideal temperature of 18-20°C in your living room and 15-18°C in bedroom and hallway.

Note: The temperature in your rooms may be low due to insufficient insulation or inefficient heating systems. It can also feel much colder due to draughts and poor window quality.

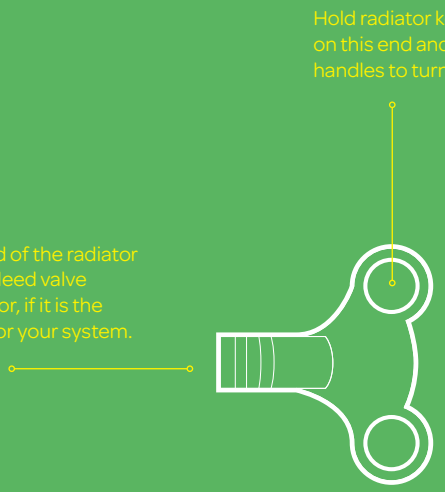
4



Turn off temperature and humidity meter before returning it to the Home Energy Saving Kit.

Radiator Key

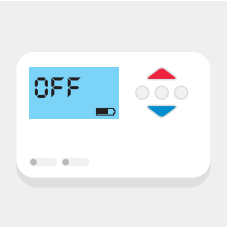
Bleeding your radiators can be very useful if your home runs on a wet central heating system, which means that hot water circulates through a system of pipes that connect to the radiators in your home. These radiators may be running inefficiently, as trapped air can obscure the flow of water through the system. The radiator key will help you release the trapped air.



Warning !
Do not allow the radiator key near children, as there is a danger of swallowing it.

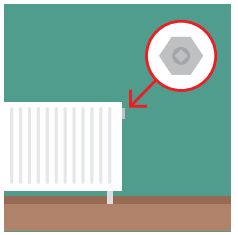
Step-by-Step Guide

1



Ensure your central heating system is fully turned off at least 1 hour before bleeding your radiator. Your radiator should be completely cold, as the water needs to settle in the system.

2



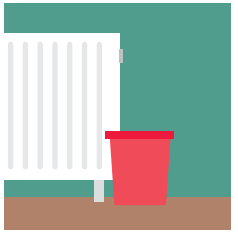
Locate the bleed valve on your radiator which is usually located on the top of one end of the radiator.

3

Check the size of your radiator valve. The radiator key may not fit your heating system.

Note: Some modern radiators are equipped with valves that are designed to be turned with a simple flathead screwdriver.

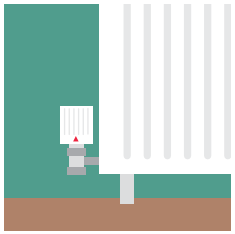
4



Use a kitchen towel or bucket under the radiator valve to catch any water dripping on the floor. This may happen as the radiator refills with water while you bleed the valve.

Radiator Key

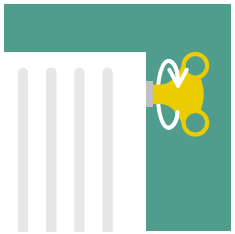
5



Ensure that the intake valve or TRV is turned on. The valve is located at the bottom of the radiator and allows it to fill up with water again once the air has escaped.

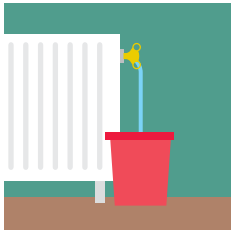
Note: Newer radiators may have a thermostatic radiator valve (TRV), which is a self-regulating valve fitted to hot water heating system radiators to control the temperature of a room by changing the flow of hot water to the radiator.

6



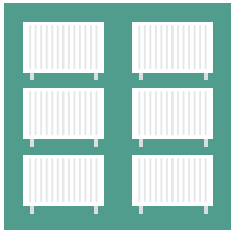
Insert radiator key into bleed screw and turn counter-clockwise to open the valve. You should hear a hissing sound as air escapes from your radiator.

7



Tighten the bleed valve once a steady stream of water squirts through it. This indicates that you have released all of the air trapped in your radiator. Ensure that there are no leaks and dry any water splashes on the radiator before turning on the central heating again.

8



Repeat process on all radiators in your home to ensure a well-maintained heating system.

Note: It is recommended to bleed your radiators at least once a year or after your heating system has been serviced.

Step-by-Step Guide

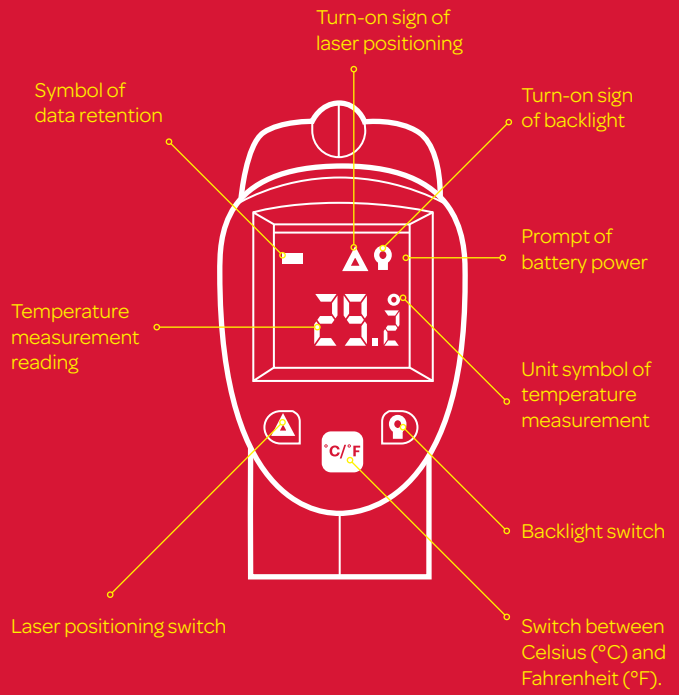
9

Ensure that the radiator key is dry before returning it to the Home Energy Saving Kit.

Note: If air is constantly building up in your heating system, this may indicate a possible leak and a plumber should be consulted to investigate further.

Laser Temperature Gun

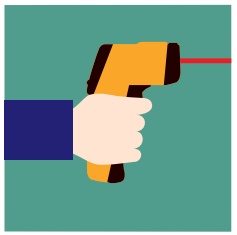
The laser temperature gun is a useful tool for measuring the temperature of your walls, windows, radiators and hot water. It will help you spot thermal air leaks and draughts, insufficient insulation and glazing.



Warning!
Do not point laser directly at eye or indirectly off reflective surfaces.

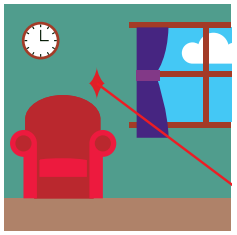
Step-by-Step Guide

1



Point the thermometer gun at the target surface and pull the trigger to turn on the unit.

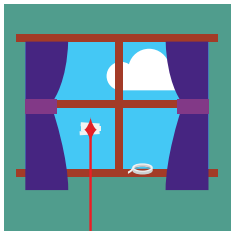
2



Measure the temperature of your walls and compare with other walls in your home. This will help you find out which wall is unusually cold.

Note: You may be losing heat through beams, external and exposed walls or poor insulation.

3



Measure the temperature of your windows and frames. Before you measure the surface temperature, cover it with masking tape as inaccurate readings will arise from measuring shiny or polished metal surfaces.

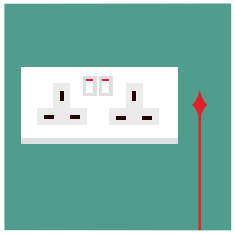
Consider the following when taking your reading:

- **Glazing** – How does single, double and triple glazing influence the temperature reading?
- **Frames** – How does the temperature vary between timber and steal framed windows?
- **Draught** – Are there any draughty areas around your windows?
- **Position** – How does a skylight compare to a regular window? Do the windows with a lot of sun exposure measure differently?

Note: The difference between the temperature of a surface and your room temperature should not be greater than 5°C.

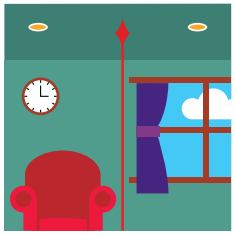
Laser Temperature Gun

4



Point the thermometer gun at sockets, light switches, and recessed lights as they can be the cause of heat loss if poorly installed.

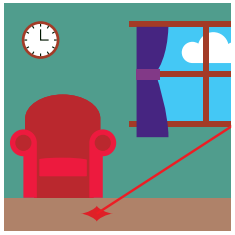
5



Measure the temperature of your ceiling as hot air rises but may escape through uninsulated lofts and leaky loft doors, beams, ceiling lights or roof leaks.

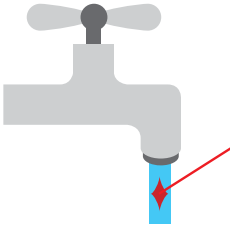
Note: Apartments which are not located on the ground floor may benefit from the heating of their neighbours below them.

6



Measure the temperature of your floors by pointing at the floors in different rooms. Compare the temperatures of rooms with underfloor heating, tiles, timber, carpets and rugs.

7

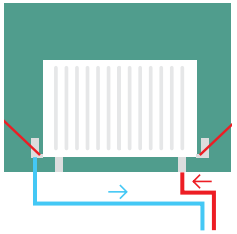


Measure the temperature of your water taps as you can safely keep it at between 45°C to 50°C. This may require an adjustment of the temperature of your water heating unit to approximately 60°C to 65°C. Note that the smaller the object you are trying to measure, the closer you need to be to it.

Note: The temperature between your water heating unit and water taps should drop no more than 15 °C as this may indicate significant heat loss through your pipes.

Step-by-Step Guide

8

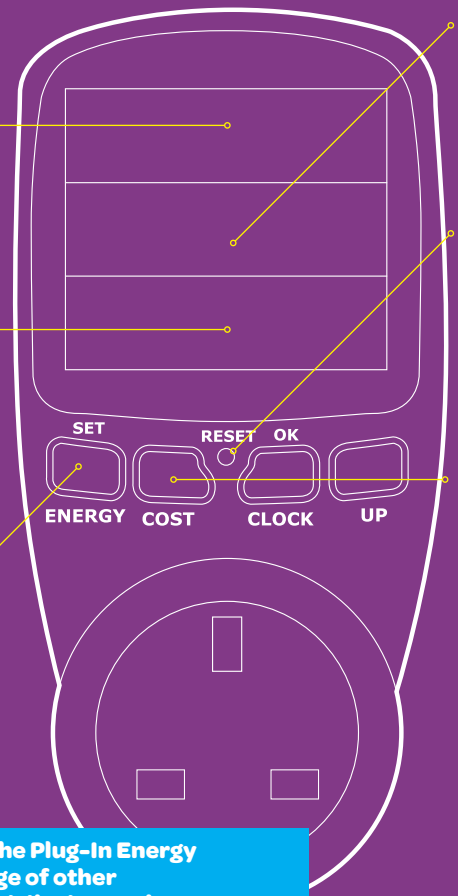


Measure the temperature of your radiator pipes as there should be a significant difference between the input and output pipe. This confirms that your radiator gives off the heat efficiently.

Please read the manufacturer's guidelines for the laser temperature gun before use, which are provided in the ziplock pocket in the Home Energy Saving Kit!

Plug-In Energy Monitor

An energy monitor can be helpful to understand how much energy the appliances in your home use and help you calculate their running cost. By identifying the biggest energy consumers in your home and understanding your standby energy, you can reduce your energy consumption very effectively.



Middle Display
Shows total electric consumption in kilowatt per hour (kWh).

Top Display
Shows time or accumulative time.

Reset button
Allows the reset of the device to zero.

Bottom Display
Shows electricity consumption of an appliance in wattage (W).

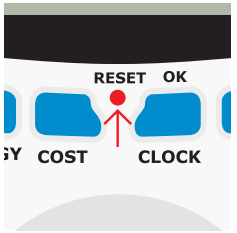
COST button
Press button to change middle display. To change to kilowatt hours, press once and display will show 0.000KWh.

ENERGY button
Press button to change bottom display. It shows wattage (W) by default.

Please note that the Plug-In Energy Monitor has a range of other functionalities and display options, which are provided in the manufacturer's guidelines in this Home Energy Saving Kit.

Step-by-Step Guide

1



Reset the energy monitor first to ensure it is set to zero. Simply push a pencil, paperclip or needle into the red reset button on the energy meter. The display will light up and then set to zero.

2

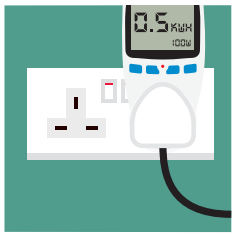
Press the COST button once to switch to kWh. This will show the total energy consumption of the appliance in kWh and accumulate over time.

While the plug-in energy monitor allows you to set up your energy tariffs on the device, you can follow this simple step-by-step guide, which will explain how to manually calculate your energy cost.

Note: Kilowatt-hour (kWh) is a unit of energy equivalent to one kilowatt of power expended for one hour.

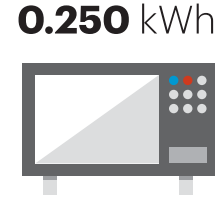
Example: A 1,000 Watt microwave will use 1 kilowatt per hour of use, which is displayed as 1 kWh.

3



Plug the energy monitor into the power socket and then plug the electric appliance you want to measure into the socket of the energy monitor. The energy monitor will show the appliance's wattage (W) in the bottom display and the accumulated kilowatt hours (kWh) in the middle display for the time you use it.

4

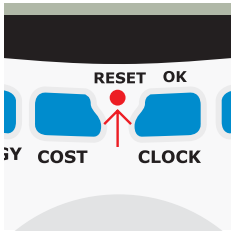


Start using electric appliances to measure their energy consumption. You can see the accumulated kWh in the display for each appliance.

Example: Using a 1,000 Watt microwave for 15min will measure an energy consumption of 0.250kWh.

Plug-In Energy Monitor

5



Reset the energy monitor before measuring the kWh of other appliances.

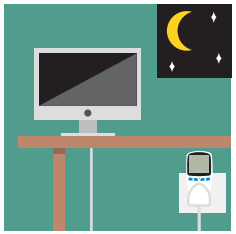
Try to measure the following daily actions to see how much energy they use:

- Boil 1 cup of tea
- Use the TV for 20min
- Iron 2 items of clothes
- Toast 2 slices of bread, etc

Note: The Watt of an appliance is the rate at which it uses electrical energy. This amount does not change but varies a lot across appliances e.g. 1,000W microwave, 1,800W kettle, 200W TV, etc.

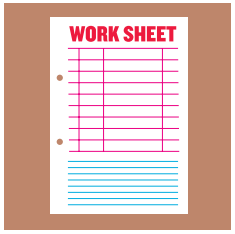
Only kWh will measure the energy consumption of the appliance over time.

6



Measure standby energy of appliances by leaving the plug-in energy monitor in the socket overnight when the appliance is not in use. This would be particularly useful for your TV, computer, internet connection box, game console, etc.

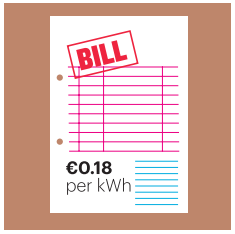
7



Use the Energy Appliance Worksheet to note down the consumption of each appliance and help you compare their energy use.

See example on next page or download from www.codema.ie/thinkenergy

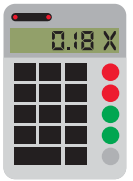
8



Check unit cost of your electricity on your energy bill for your calculation. The unit cost of electricity is stated in kWh. Example: €0.18 per kWh

Step-by-Step Guide

9



Calculate the cost of energy per appliance by using the calculation below.

This will give you the total cost per electrical appliance per week. You can simply multiply this by 52 weeks to get the annual cost per appliance and compare them with each other.

Energy consumption of appliance (kWh)	x	Electricity cost (€/kWh)	x	Times used per week	=	Cost per week (€)	x	Weeks used per year	=	Cost per year (€)

Example

Energy Consumption (kWh)
Write down the energy consumption you measured with the plug-in energy monitor in kWh.

Times used per week
How often do you use the appliance for the action you monitored?

Cost per week (€)
This gives you the cost of the appliance's electricity use per week.

Cost per year (€)
This gives you the cost of the appliance's electricity use per year.

Appliance	Energy consumption	x	Electricity cost	x	Times used per week	=	Cost per week (€)	x	Weeks used per year	=	Cost per year (€)
Charging iPhone (overnight)	0.008 kWh	x	€0.18	x	7	=	€0.01	x	52	=	€0.52
Coffee machine (10cups)	0.185 kWh	x	€0.18	x	7	=	€0.23	x	52	=	€12.12
Hair straightener	0.008 kWh	x	€0.18	x	1	=	€0.001	x	52	=	€0.07
Vacuum Cleaner (2 rooms)	0.284 kWh	x	€0.18	x	1	=	€0.05	x	52	=	€2.66
Juicer (1 jug of juice)	0.010 kWh	x	€0.18	x	7	=	€0.01	x	52	=	€0.66
Kettle (1 cup of tea)	0.150 kWh	x	€0.18	x	14	=	€0.38	x	52	=	€19.66
Toaster (2 slices)	0.032 kWh	x	€0.18	x	7	=	€0.04	x	52	=	€2.10
TV (20 min)	0.044 kWh	x	€0.18	x	14	=	€0.11	x	52	=	€5.77

Appliance
Note down the appliance you use and for how long or for what action.

Electricity Cost (cent/kWh)
Note down the unit cost of your electricity based on your electricity bill.

Weeks used per year
Add up the number of weeks you use the appliance for per year.

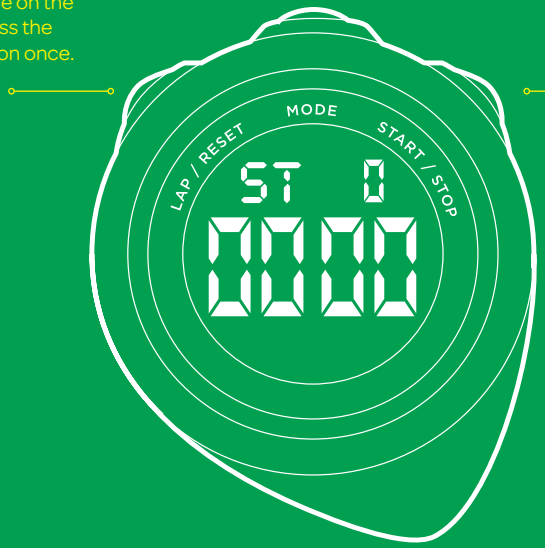
Note: You can pick up an Energy Appliance Worksheet from your local library or download at www.codema.ie/thinkenergy

Stopwatch

The stopwatch can be useful to measure the flow rate of your water taps, shower and bath to ensure you are not wasting water and energy at the same time by heating too much water. This exercise can also help you identify areas of where you can install low flow taps or aerated taps and shower heads.

Mode
Press button to change display mode from Real time to Stopwatch. Other display options available are Daily alarm and Time Setting.

Lap/Reset
To clear the time on the Stopwatch, press the Lap/Reset button once.



Start/Stop
Press button once to start the Stopwatch. The watch will start counting from 00'00"00 if the watch is cleared, otherwise it will pick up from where it last left off.

Step-by-Step Guide

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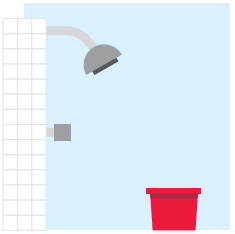
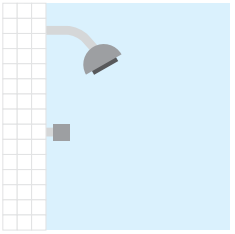


Place bucket under showerhead or tap, depending on where you would like to measure the water flow.

2

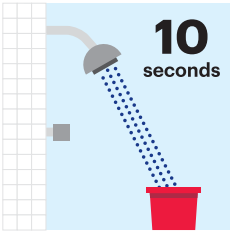
Get stop watch ready by pressing the Mode button once. Have your finger ready on the Start/Stop button to start counting.

3



Turn on the showerhead or tap to full flow.

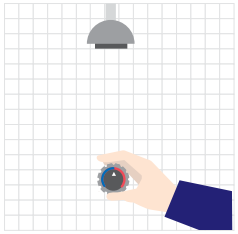
4



Move bucket under water steam for 10 seconds. You will have to press the Start/Stop button on the stopwatch to start counting and press again to stop after 10 seconds.

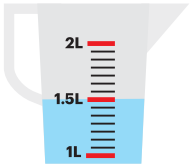
Stopwatch

5



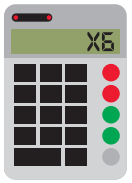
Turn off the tap immediately.

6



Measure the amount of water captured. You could use a jug with litre markings to do this.

7



Multiply this amount by six to calculate the flow rate per minute.

Note: If 10 seconds was too quick for measuring, simply wait for 15 seconds and multiply water amount by four.

8

Check that water flow is 9 litres per minute or less. This means your water is running efficiently.

Note: Old and inefficient taps and showerheads can run at a flow rate of between 15 to 22 litres of water per minute

Step-by-Step Guide

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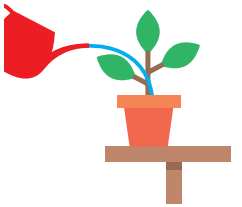


Water your plants with the water you captured.

Note: The following could have an impact on the water flow of your home:

- You have a gravity fed hot water system
- You live in a location that has low mains pressure
- Your current showerhead may already be water efficient
- Limescale build up in shower heads can also restrict flow

What next?

This Home Energy Saving Kit has been developed to help you take the first step on your energy journey. We recognise that many issues are not fixed overnight, however the Home Energy Saving Kit should help you focus on the most relevant issues in your home. Once you have started your own journey, why not tell your neighbours, family and friends about this and start an energy movement in your community? Before you know it, your village, town or city is moving towards renewable energy!

Background

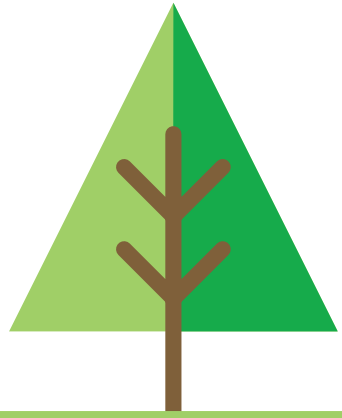
The Home Energy Saving Kit has been developed by Codema, Dublin's energy agency, in cooperation with Dublin City Council and Dublin City libraries. Codema aims to improve energy efficiencies in buildings and promote the use of sustainable and renewable energy in Dublin City as part of its involvement in the European initiative ACE (Academy of Champions for Energy), which is co-funded under INTRREG IVB NWE. ACE aims at increasing the uptake of sustainable and renewable energy across North West Europe through citizen engagement and community energy. To find out more about the initiative, please visit www.aceforenergy eu. You will be able to access a Citizen Engagement Tool as well as useful case studies and videos developed as part of this project.

Codema
Dublin's Energy Agency

Disclaimer

While Codema considers that the information given in this manual is sound, all parties must rely upon their own skill and judgement when making use of it, Codema does not make any representation or warranty, expressed or implied, as to the accuracy or completeness of the information contained in this manual and assumes no responsibility for the accuracy or completeness of such information. Codema will not assume any liability to anyone for any loss or damage arising out of the provision of this Home Energy Saving Kit.

Before use, please read the manufacturer's guidelines on each of the energy saving tool provided in this Home Energy Saving Kit. Copies of these are located in the zip lock bag within the Home Energy Saving Kit. Codema will take no responsibility for damages or issues caused by the use of these energy saving tools.



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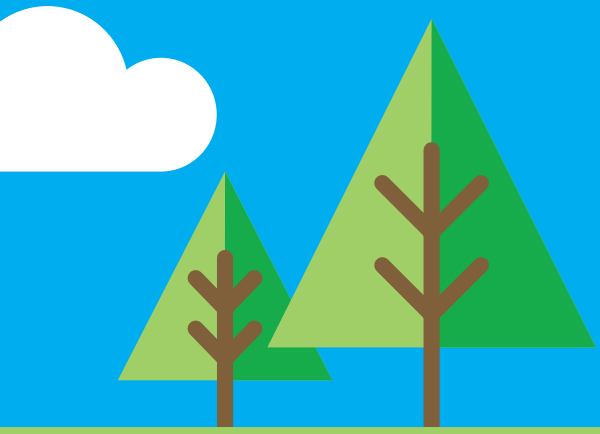

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