

RESOURCE
EFFICIENCY GUIDE FOR
**NEW HOME
OWNERS**



**National
Environment
Agency**

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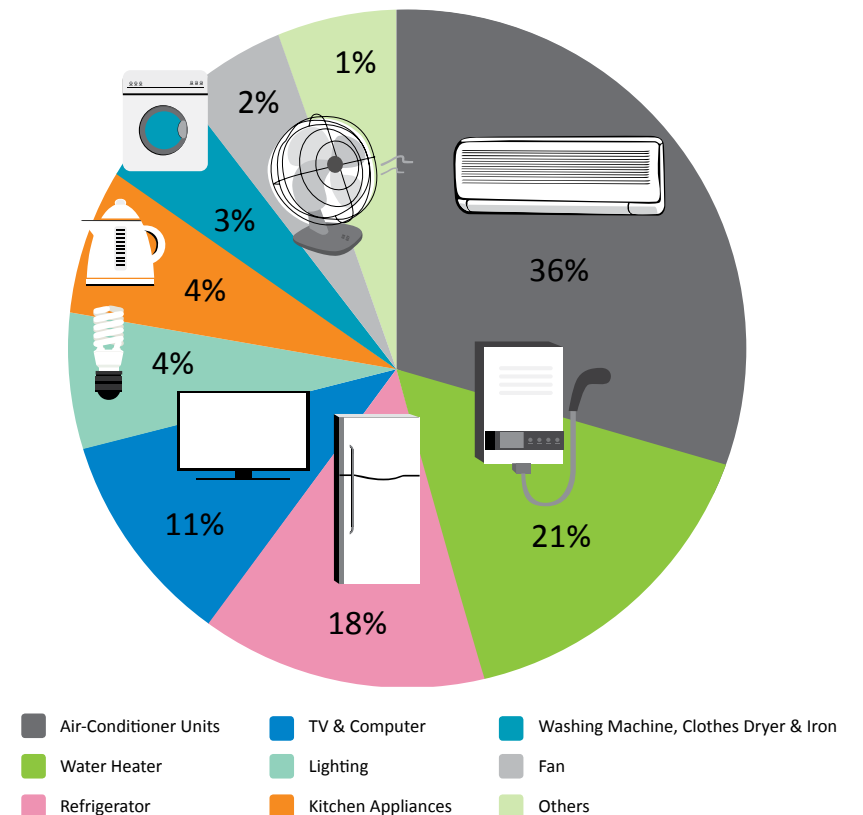
Renovating or buying a new home can be an overwhelming task, but you can start by designing your home to be resource efficient.

A home that is well-designed and well-equipped with energy and water efficient appliances will not only allow you to save on your utility bills, it can also greatly enhance your quality of life.

Air-conditioners, water heaters and refrigerators account for about 75% of the total electricity consumption in a home, as seen in the Household Energy Consumption Profile below.

Make use of the practical tips and solutions in this guide while coming up with plans for your new home.

Household Energy Consumption Profile



All cost savings in this guide are based on an electricity cost of \$0.27 per kWh, unless otherwise stated.

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Tips on Interior Design



DESIGNING FOR A COOLER HOME

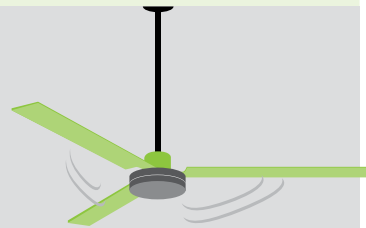


To stay cool and keep your energy bills low, consider the following tips when designing your home:

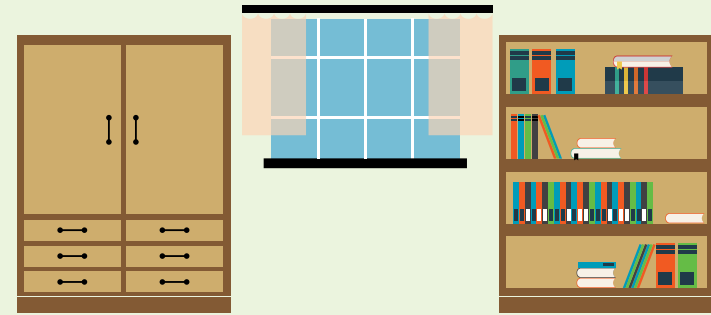
- **Install fans to keep cool and save on air conditioning.** Using a fan instead of an air-conditioner can save you \$460 a year!
- **Choose light colours** such as cream, white or beige for walls and large furniture. These reflect heat better than dark colours.
- **Use curtains or blinds over windows, or solar window films** to block unwanted heat from the sun, especially for east and west-facing windows.

Did You Know?

Ceiling fans are more effective than standing fans for cooling purposes and they come in a wide variety of colours, shapes and styles to match any home interior design.



- **Avoid obstructing windows and pathways** with large furniture pieces as they block airflow for natural ventilation.



Keep windows clear of large furniture

- **Use partitions to minimise the space to be air-conditioned.** Less energy is required to cool a smaller and more targeted space.



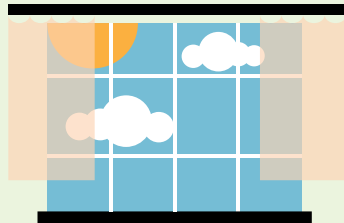
Use partitions to minimise space to be air-conditioned

DESIGNING FOR A BRIGHTER HOME



To reduce general lighting use, consider the following tips when designing your home:

- **Choose light colours** such as cream, white or beige for walls, curtains and large furniture. These reflect light better than dark colours, brightening up the room.
- **Use light-coloured, loose-weaved curtains** on your windows to allow daylight into the room while preserving privacy.



What is task lighting?

Task lighting refers to lighting directed at a specific work area to support a visual activity (e.g. reading, working).



- **Consider task lighting** to reduce lighting use.
- **Place floor or table lamps at corners** as the reflection off walls will give more light.
- **Install light dimmers** to improve ambience of your home and to save electricity.

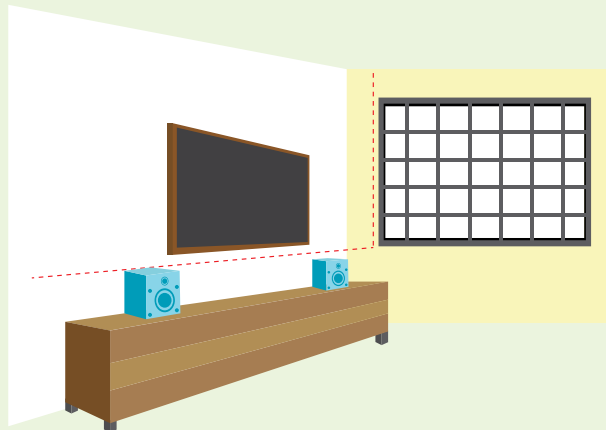


Place lamps at corners

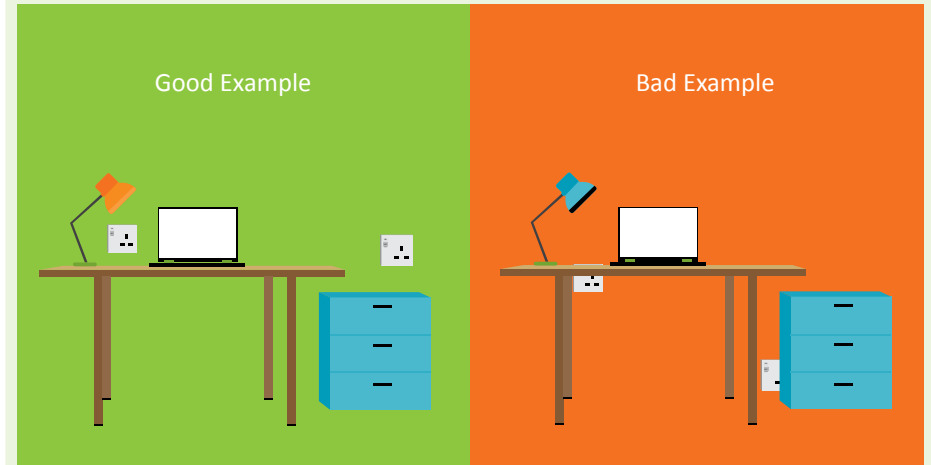
PLACEMENT OF APPLIANCES, POWER SOCKETS



- **Position your TV and computer screens to be perpendicular to your windows.** This reduces glare and minimises the need to increase screen brightness.

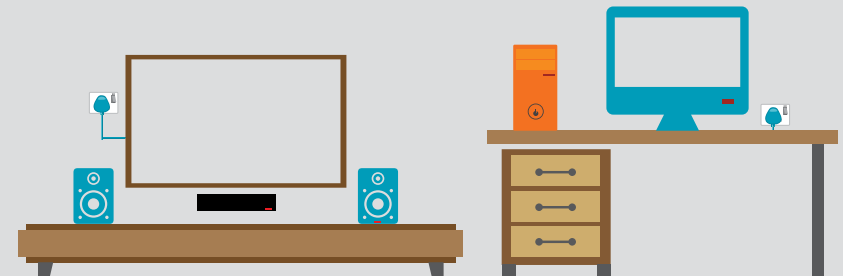


- **Ensure that power sockets are easily accessible and visible,** so that turning off appliances at the socket after use becomes more convenient.



Did You Know?

Many appliances such as TVs, set-top boxes, DVD/CD players, computers and home projectors continue to use electricity if they are not switched off at the power socket.



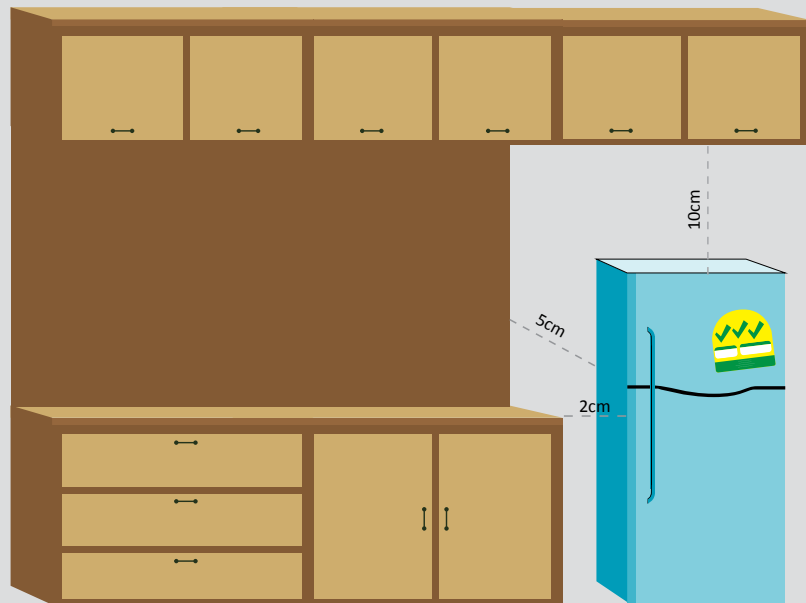
- **Allow sufficient space around the refrigerator to ensure adequate ventilation.**

For example, allow spaces of 2cm on both sides, 5cm at the back and 10cm above the refrigerator, or follow the manufacturer's recommendations.

- **Place the refrigerator away from heat sources** such as direct sunlight, cookers and the ovens.

Did You Know?

Insufficient spacing will decrease the cooling efficiency of refrigerators, resulting in higher energy use.



Energy Label & Life Cycle Cost



Energy Label

- Applies to air-conditioners, refrigerators, clothes dryers, televisions and lamps.
- Helps you identify energy efficient models; the more ticks, the more energy efficient.

Appliance	Highest Tick-rating
Air-conditioner	✓✓✓✓✓
Clothes Dryer	✓✓✓✓✓
Television	✓✓✓✓✓
Refrigerator	✓✓✓✓
Lamp	✓✓✓

Assumptions to annual energy cost:

Air-conditioner



Refrigerator



Electricity Cost

\$0.27
per kWh

TV



Clothes dryer

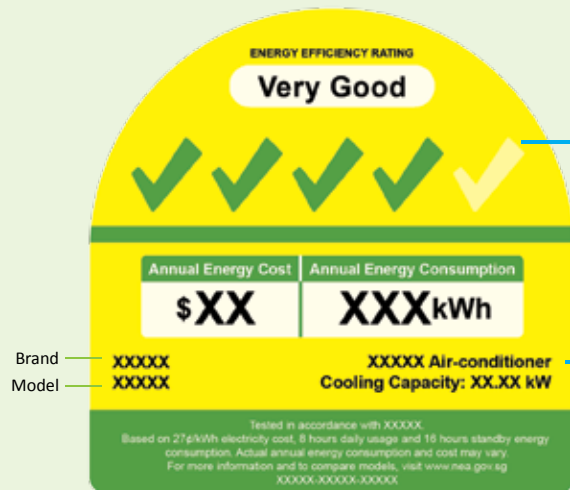


Energy Label on Lamps



Lamps Energy Efficiency Rating	
Fair	✓
Good	✓✓
Very Good	✓✓✓

Energy Label on Air-conditioners, Clothes Dryers, Refrigerators and Televisions



Energy Efficiency Rating

✓	Low	✓✓✓✓✓	Very Good
✓✓	Fair	✓✓✓✓✓	Excellent
✓✓✓	Good		

Types of Appliances & Capacities

Air-conditioner
Cooling capacity in kW



Refrigerator
Capacity in litres (L)



Clothes Dryer
Capacity in kg

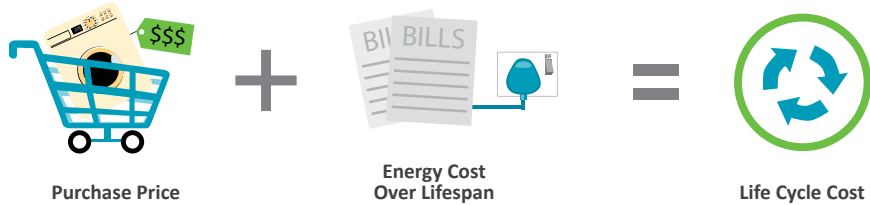


Television
Diagonal screen size in inches



Life Cycle Cost

- Life cycle cost* of an appliance is computed by:

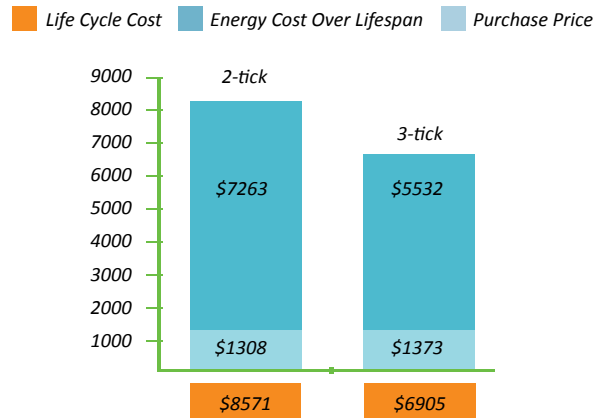


$$\text{Energy Cost over Lifespan (\$)} = \text{Annual Energy Cost (\$/year)} \times \text{Appliance Lifespan (years)}$$

- When choosing appliances, do not only consider the purchase price. Energy efficient models have lower energy costs so you save more over the lifespan of the appliance.

- Choose models with more ticks on the energy label and with a lower life cycle cost.

Life Cycle Cost for Air-Conditioners
(6.0kW - < 8.0kW Cooling Capacity)



- Use the Life Cycle Cost Calculator in NEA's myENV mobile app to calculate and compare the life cycle costs of different models of air-conditioners, refrigerators, clothes dryers, televisions and lamps.

Download myENV app here:



*Maintenance costs of appliances are not considered in life cycle costs.

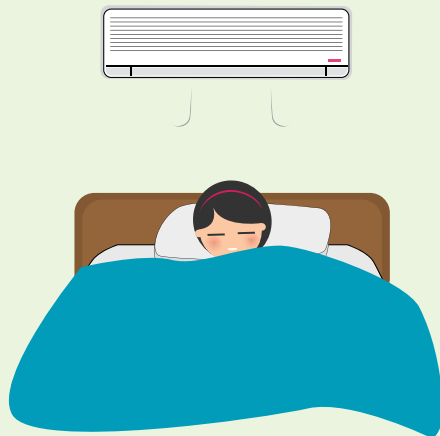
Buying Energy & Water Efficient Appliances



Air-conditioner



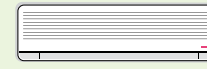
- Choose an energy efficient air-conditioner with **more ticks on the energy label and with a lower life cycle cost.**
- Air-conditioners are designed to control both the air temperature and humidity. **Choose the right cooling capacity for your air-conditioner.**



To determine the cooling capacity required, a useful rule of thumb is to divide the area of the space to be air-conditioned by 5, i.e.:

$$\text{Cooling capacity required in kW} = \text{Total area to be air-conditioned [m}^2\text{]} \div 5$$

Room	Floor Area	Total Floor Area	Cooling Capacity Required
Master Bedroom	15m ²	35m ²	35 ÷ 5 = 7kW
Bedroom 2	10m ²		
Bedroom 3	10m ²		



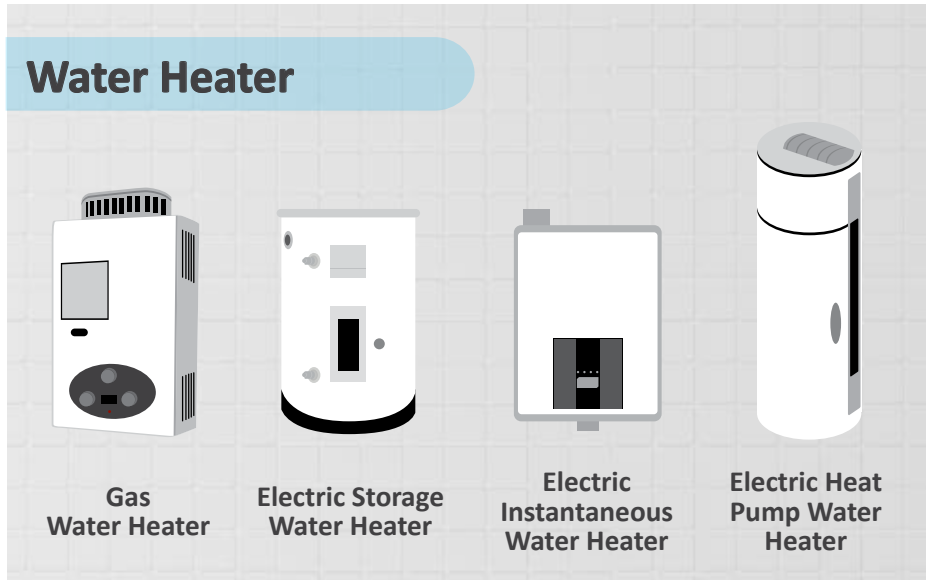
For illustration only.



*To convert from ft² to m², multiply the area in ft² by 0.093.
To convert to Btu/hr, multiply the kW result by 3412.*

Points to note:

- A larger air-conditioner may be needed for rooms with:
 - Double volume (i.e. double ceiling height)
 - A large window area (e.g. full-height glass windows)
 - Windows orientated towards the sun (i.e. east-west direction)
 - Additional heat sources such as bar fridges
- Total cooling capacity of a multi-split air-conditioning system is usually the sum of the cooling capacities of the individual rooms. However, a smaller total cooling capacity may be sufficient if all the room units are not turned on at the same time.
- For a more detailed assessment of the cooling capacity required, consult your air-conditioner supplier.

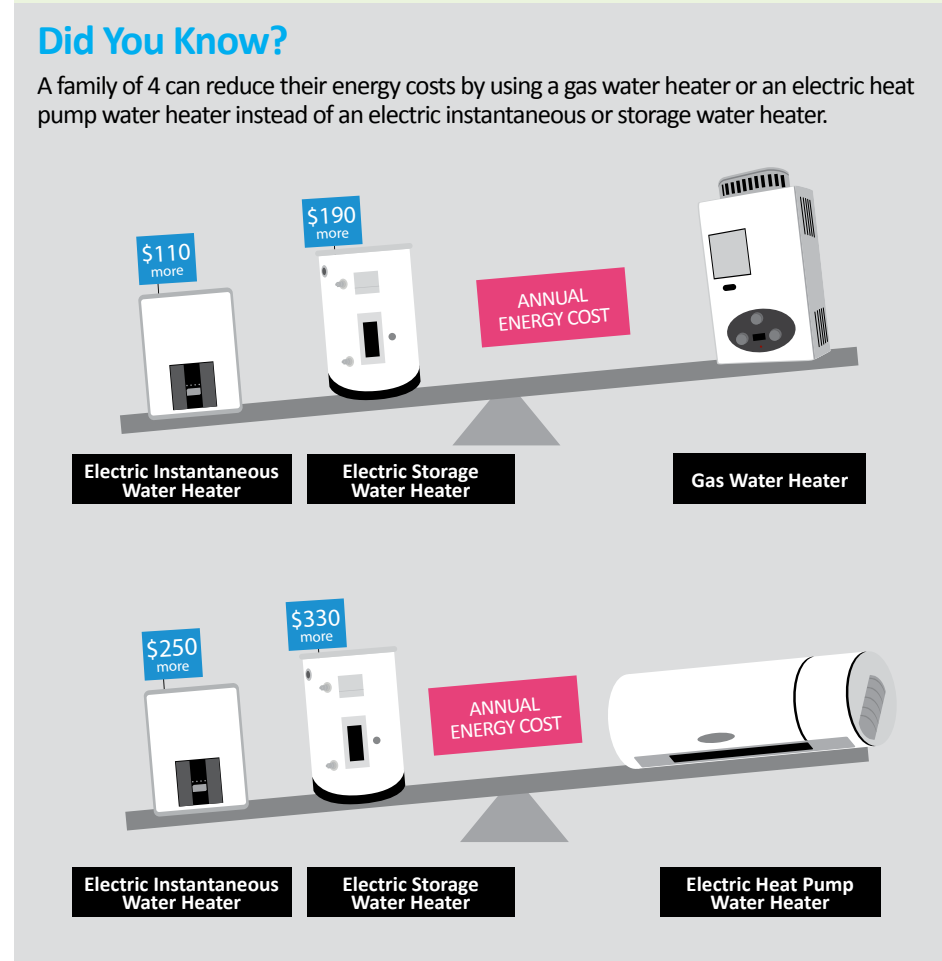


- Design your hot water distribution system such that the **hot water appears quickly at the taps when turned on**. This prevents excessive wastage of water which cools while sitting in the pipes.
- **Choose an instantaneous water heater** over a storage water heater as it is more energy efficient. If you prefer a storage water heater, choose a capacity that meets your needs.

Did You Know?

- Storage water heaters continue to use energy to heat water when they are left switched on, while instantaneous water heaters only use energy to heat water when it flows through the unit.

- If space and budget permit, consider an electric heat pump water heater. It is more energy efficient than an electric instantaneous and storage water heater.

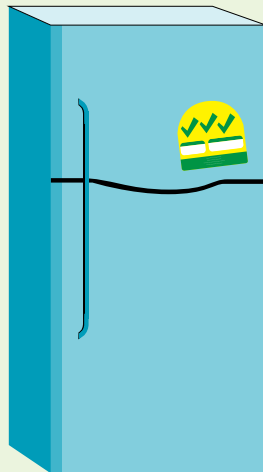


- Energy savings were calculated based on two showers per person daily, and energy cost of \$0.27 per kWh of electricity and \$0.19 per kWh of town gas.
- Savings may vary according to actual hot water usage and the difference between town gas and electricity costs.
- When installing gas instantaneous water heaters, it is important that the water pressure is sufficient. Otherwise, the water flow rate at the taps and showerhead may not be sufficient for satisfactory usage of gas instantaneous water heaters. To understand the required water pressure, and for other queries on requirements/ guidelines on gas water heaters, please contact City Gas' Residential Sales & Project Marketing Branch at residentialsales@citygas.com.sg
- Gas water heaters can cost more over their lifespan for 1/2-room HDB apartments due to low water consumption and private condominiums/ landed properties due to high upfront cost.

Refrigerator



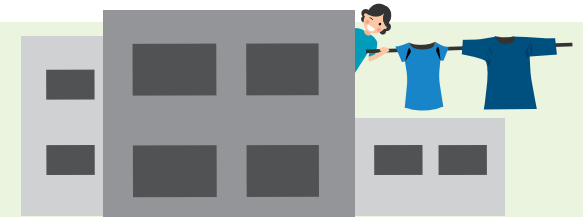
- **Buy the smallest refrigerator model that meets your needs.** Generally, larger refrigerators use more energy to operate.
- **Consider whether additional features, such as automatic icemakers and through-the-door dispensers, are needed as they increase energy use.**
- Choose an energy efficient refrigerator with **more ticks on the energy label and with a lower life cycle cost.**



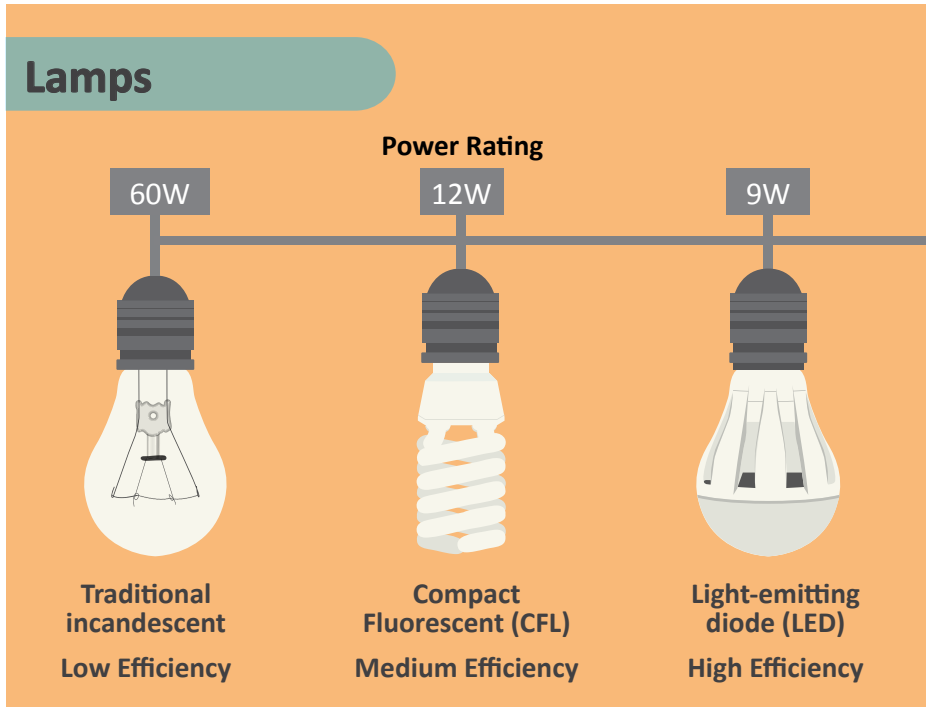
Clothes Dryer



Consider the need for a clothes dryer as air-drying your clothes is completely free! But if you really need one, consider the following tips:



- **Buy a clothes dryer of suitable capacity that meets your needs.** The capacity of the clothes dryer (kg) should not be larger than that of the washing machine.
- **Select a model with energy-saving features** such as a moisture sensor that turns off the dryer when clothes are dried.
- Choose an energy efficient clothes dryer with **more ticks on the energy label and with a lower life cycle cost.**



- **Choose energy efficient lamps** such as LED bulbs. Using an incandescent light bulb (60W) instead of a LED bulb (9W) can cost you about \$15 more per bulb per year*.

Did You Know?

LEDs use up to 85% less electricity than incandescent light bulbs to produce the same amount of light, and can last about 20 times longer!



*Based on 3 hours daily usage



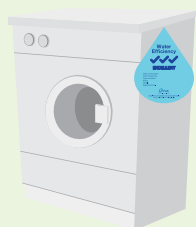
- **Choose a TV with more ticks on the energy label.**
- **Consider buying a laptop** rather than a desktop as it consumes significantly less energy.





Washing Machine

- Buy a washing machine of suitable capacity that meets your needs.
- For greater water efficiency choose a washing machine model with more ticks on the water efficiency label.



Water Efficiency

1 2 3 4

Zero Tick Good Very Good Excellent

Water consumption
Type of product
Brand
Model
Registration No.

How to Read

- 1 Zero-tick products are not water efficient.
- 2 Products with the most ticks are recommended as they save more water.
- 3 The labels show the products' water consumption, type, brand and model.
- 4 All labels carry a registration number for validation.



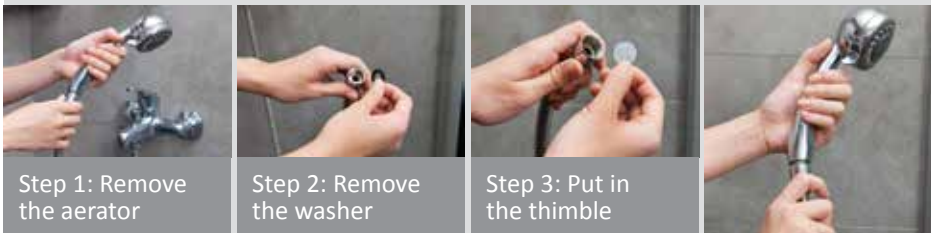
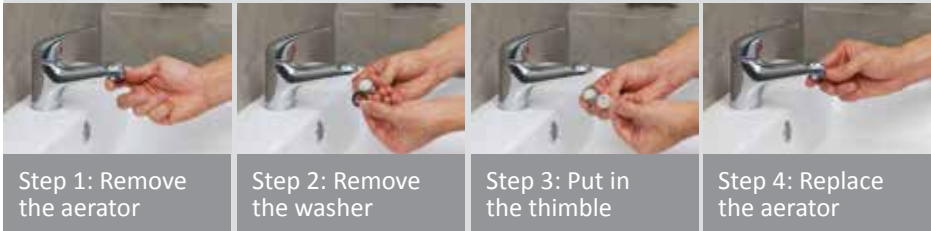
Other Kitchen & Bathroom Appliances

- Use thermal cooking pots and pressure cookers as they cut down the energy required for cooking.
- Use water efficiency labelled fittings to conserve water. The rating given to a product is determined by its category and its flow rate/flush capacity. The more ticks on the label, the more water efficient the model is.
- Use a thermos flask instead of an electric air-pot to keep hot water hot.



• **Install thimbles or water saving devices** at taps and showerheads to reduce the flow rate of water.

How to Install Thimble



For enquiries, please call PUB 24-hour Call Centre at **1800-2255782**

Step 4: Replace the aerator

Energy-saving Products



• Energy-saving products such as energy monitoring devices, standby power killers and timers can help reduce household energy use.

Type of Product	Function(s)
Energy monitoring devices	<ul style="list-style-type: none"> • Provide information on total household energy use and energy use by appliance • Allow better understanding and management of household energy use
Home automation solutions	<ul style="list-style-type: none"> • Automate energy-saving practices to provide convenience and energy savings
Standby power killers	<ul style="list-style-type: none"> • Eliminate standby power
Timers	<ul style="list-style-type: none"> • Automatically turn appliances on/off according to preset timings

For more info, visit www.e2singapore.gov.sg/Households/Saving_Energy_At_Home/Energy_Management_Solutions.aspx



Energy & Water Efficient Home Checklist



Here's a simple checklist that outlines ten actions to take to achieve energy and water efficiency in your home!

S/N	Area(s)	Action Item(s)	Checklist (✓)
1	Home cooling	Install fans to keep cool	
2	Furniture layout	Avoid obstructing windows and pathways with large furniture pieces as they block airflow for natural ventilation	
3	Placement of appliances	Allow sufficient space around the refrigerator to ensure adequate ventilation	
4	Location of power sockets	Position power sockets to be within easy reach	
5	Colour scheme	Choose a light colour scheme (cream, white, beige etc.) for your home to reflect heat and light	
6	Choice of air-conditioner	Choose a 3-tick or better air-conditioner (based on energy label)	
7	Choice of water heater	Choose an electric instantaneous water heater, gas water heater, or a heat pump water heater (if space and budget permit)	
8	Choice of refrigerator	Choose a 3-tick refrigerator (based on energy label)	
9	Choice of lamp	Choose a 3-tick lamp (based on energy label)	
10	Choice of washing machine	Choose a 3-tick washing machine (based on water efficiency label)	

Daily Environmentally-Friendly Practices at Home



Follow these five simple steps to reduce your energy bills.

Beat the heat with a fan instead of an air-con.
Save around \$460 a year!

Energy used by 1 air-con is the same as 13 fans

It's not cool to let the air-con run for a long time.
 Switch to a fan after a short while and **save** about \$400 a year.

Take a stand against standby power.
Save around \$25 a year when you switch off at the power socket.

More than 75% of households practise this tip

Leaving the storage water heater on can land you in hot water.
Save an additional \$110 a year by switching off the storage water heater after use.

More than 80% of households practise this tip

Don't let your electricity bills boil over.
 Use a thermos flask instead of an electric air-pot and **save** around \$300 a year.



There are more ways for you to save energy!
 Learn more household energy-saving tips at
<http://www.e2singapore.gov.sg/Households.aspx>

REDUCE.REUSE.RECYCLE



REDUCE

Avoid excessive or unnecessary purchases for your new home.



REUSE

Consider reusing the cardboard boxes you used when you moved into your new home for other purposes, such as for storage or consolidation of recyclables.



RECYCLE

Recycle your packaging waste such as shrink/bubble wrap and cardboard boxes (flattened) instead of throwing them away. Set up recycling points using a bin, plastic bag or a box to contain recyclable waste around your home.

1 Set up a recycling point at home to collect recyclables such as paper, plastics, metal and glass.



2 Empty recyclable containers of content. Rinse them if necessary. Place them into the recycling bin or bag at home.



3 Deposit the recyclables into the recycling chutes or recycling bins. Leave nothing outside.



4 Do not put any food and liquid waste, tissue, ceramics, porcelain, light bulbs or batteries into the recycling bin or recycling chute. Do not leave furniture or bulky items beside the recycling bin or chute opening.



Good Water Saving Habits to meet the 10-litre challenge

You can start with these simple tips:



Monitor your water bills

Check your water bill to monitor your family's water consumption. If your consumption is more than the average, re-look your family's water usage habits.



Take shorter showers

Keep showers to under 5 minutes and turn off the tap while soaping.



Wash in a filled sink

Wash vegetables and dishes in a filled sink instead of under a running tap.



Wash on a full load

Fill your washing machine on a full load.



Reuse

Collect rinse water from the washing machine for flushing the toilet or mopping the floor.



Repair leaks promptly

Repair leaks and dripping taps immediately to prevent water wastage.



Reduced flush

Use reduced flush for liquid waste

Start with the little things

Small changes in your daily routine can help save 10 litres of water a day.

Take the 10-litre challenge
Log on to www.pub.gov.sg/conserves/households



Tel: 1800 2255 782
(PUB-One)
www.pub.gov.sg