GREENServicesWA

Supporting West Australian households, small businesses, community associations & schools to
- **save electricity, gas & water**
- **set up sucessful backyard composting**

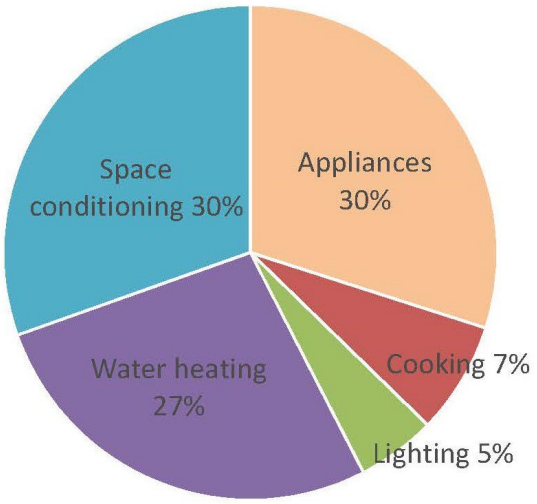
Rob Gulley with Brenda Conochie
PO Box 1067 Denmark/Kwoorabup
Western Australia, 6333
greenserviceswa@gmail.com
ABN 49 953 364 921

Revised April 2023. This booklet covers Electricity, Gas and Water – hopefully helping you to slash your use of all 3 utilities!

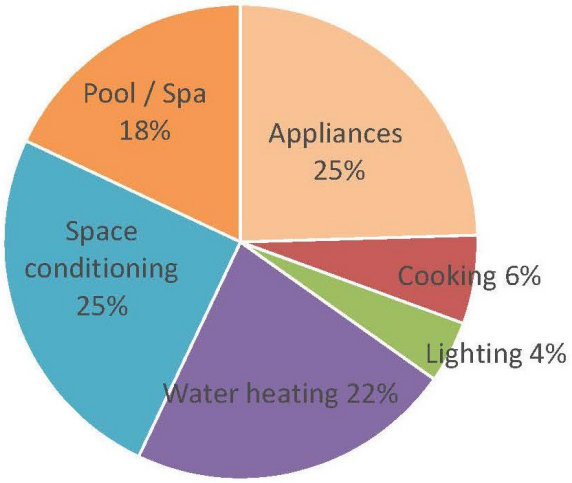
This booklet has been a 'work-in-progress' since 2009 when we were running Home EcoAuditing projects from Environment House, Bayswater (WA). In its early years it was translated into ten community languages (translations funded by Lotterywest and the City of Stirling). We've revised it half a dozen times over the years, and tailored it for the Cities of Albany and Cockburn to include in their DIY auditing kits (which include useful small devices) available for loan through their Libraries.

Energy use @ your place!

Does electricity and gas use change much at your place during the year?
Is your home a higher summer or winter ENERGY user? (Ave daily Units of electricity + Units of gas)
Have you talked with friends or family about their average daily units?
Is their house like yours? Do they have more or less people at home more or less of the time?



Homes with NO pool or spa



Homes WITH pool or spa

You might use energy in different proportions at your place vs the 'typical' households represented in these pie charts. You could take the challenge to create a pie chart that really reflects your household's energy use. But even if you don't, these charts may help you prioritise your actions. You will **save the most energy with the least effort by making changes in the bigger slices of the pie!**
https://www.energyrating.gov.au/industry-information/publications/report-2021-residential-baseline-study-australia-and-new-zealand-2000-2040
https://www.energyrating.gov.au/consumer-information/products/pool-pumps (derived)

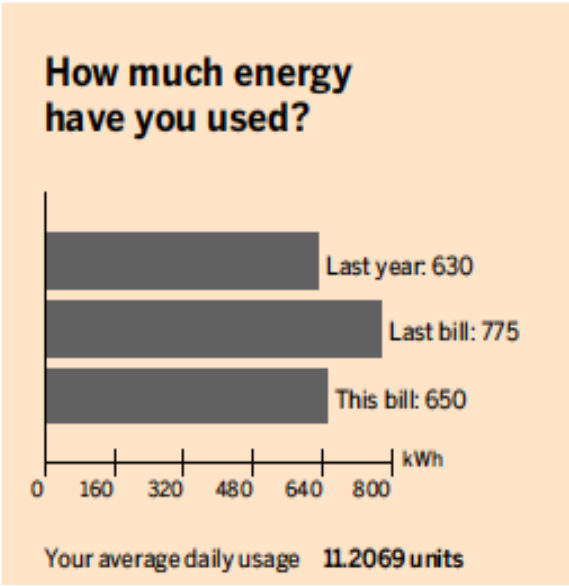
Your energy bills

Your Synergy electricity bills and most retailers' gas bills will show you how much energy you have used in this **latest** billing period (approx 2 months for electricity, 3 months for gas), the **last** billing period, and the billing period at **this time last year.**
See your **average daily usage** under the bar chart in Units, aka kWh = kiloWattHours). This is the part of your bill that is in your hands! *You can't change the supply charges, currently $1.08 (Synergy A1 standard home tariff) and approx 30c for gas supply.*

If you have solar power, note that the '**average daily usage'** shown on your bill is just what you have **imported** from the grid when your solar wasn't enough; **it doesn't include the solar energy you have used.**

Synergy's MY ACCOUNT is a good tool for keeping track of everything! When you've signed up, click **Usage** for a graph of usage for past year, then **Summary** for exact details of usage (and solar export if applicable).

Your gas retailer's 'My Account' may show your history and/or just a record of your bills. Most WA gas bills show 'Units' of gas used; a Unit of gas is the same quantity of energy as a Unit of electricity.



This Synergy electricity customer used 650 Units in their latest two-monthly bill period. In this case it was 58 days (shown at top right of bill) from the last meter reading.) 650/58 = **ave daily usage 11.2U.** This was very close to (same period) 'Last year' (630U) but lower than the last bill for 775U.

If you don't know the exact number of days, just divide by 60; it will be near enough. For gas, 90 days.

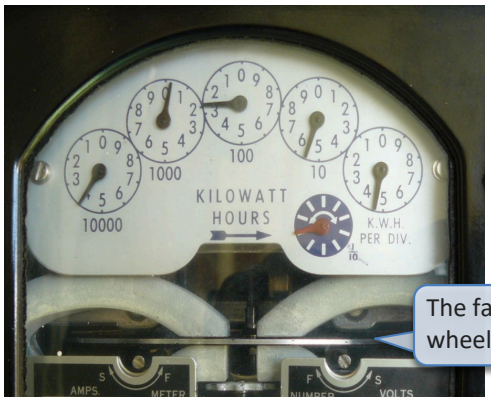
Reading your METERS

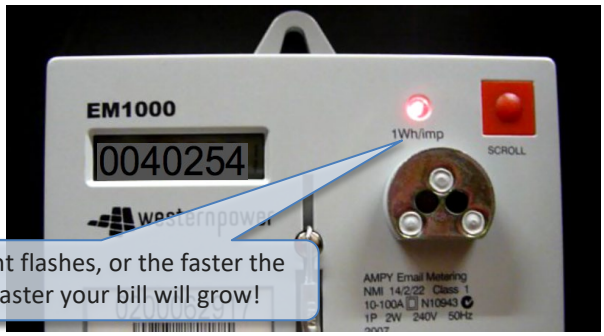
The gas, electricity and water that you are billed for is counted by your meters, which are read by workers doing the rounds every 2 months (electricity and water) or 3 months (gas) unless you already have one of the new AMI electricity meters which report your use directly to Western Power, who report it to Synergy. **Getting familiar with your meters will boost your effort to reduce your use!**

Your electricity meter is likely to look like one of these. The display shows <u>how much energy has ever flowed through the meter, until now</u>**.** If you read your meter now, and again tomorrow at the same time, then subtract the new reading from yesterday's reading, you'll have a snapshot of energy use at your place in past 24 hrs.
Or subtract today's reading from the reading shown on your last bill. Divide by no. days since that reading to see how many average Units per day since then.

Our meter reading charts may help if you decide to have an efficiency blitz!

Both these meters below show that 40,254 kWh (kiloWattHours) or 'Units' have been used since that meter was installed.





The faster the light flashes, or the faster the wheel spins, the faster your bill will grow!

TIPS on READING YOUR OLDER STYLE METER (above left) **You may find it easier to read dials Right to Left writing numbers down as you go**								The ***default*** display in the meter above is the total kWh (Units) imported from the grid. With other electronic meters, you may need to scroll to **code '07' for 'Total kWh consumed'.** *Other figures on the scroll display include voltage, current, time, date.*
1kWh dial (right)	The pointer is past the 4, so it reads 4					**4**		
10kWh dial	The pointer is past the 5, so it reads 5				**5**			
100kWh dial	The pointer is past the 2, so it reads 2			**2**				
1,000kWh dial	The pointer is past the 0, so it reads 0		**0**					
10,000kWh dial	The pointer is past the 4, so it reads 4	**4**						
	Altogether, the meter shows 40,254 kWh	**4**	**0**	**2**	**5**	**4**		

New 'AMI' electricity meters

Western Power has been rolling out these new AMI meters (Advanced Metering Infrastructure) throughout our grid in the past couple of years. These new meters, use 4G technology, enabling:

- Western Power to read your meter remotely (no more dog bites for their workers!)
- power cuts and supply problems to be visible to Western Power within half an hour
- Solar owners to see online their 30 minute 'interval data' . However, this data arrives in your Synergy 'My Account' 1-2 days later, handy for seeing the patterns of use and how well you are using your solar power. *Apps supplied by your solar installer or inverter company (free or for a modest fee) give REAL TIME data, even remotely. You can check that your teens at home in summer aren't overdoing the air conditioning!*

Reading your GAS METER

The display shows what volume of gas has ever flowed through the meter until now, in this case 322.936 cubic metres (m^3).

- Regular testing of the gas supply measures how much energy is in a m^3 of gas. This figures varies, **usually between 10-11 Units/m^3.** If it's 10.75, **your meter reading (322.936m^3) x 10.75** = **3471 Units ever used**. A Unit of gas is equivalent to a Unit of electricity, making it easy to compare gas and electric appliances. *WA is rare in using 'Units' of gas (vs MegaJoules (MJ) – it's from a time when the SEC (State Energy Commission) supplied both.*

MEPS, Energy Rating and Energy Star labels

MEPS (Minimum Energy Performance Standards): The Australian government ensures that a specific list of appliances, lighting and electrical products meet defined energy efficiency standards. From time to time, MEPS are reviewed and upgraded. This process leads to continuing improvements in appliance energy efficiency. **Pool pumps** are now included under the MEPS. Most of the domestic (vs commercial or industrial) appliances governed by MEPS also have compulsory Energy Rating and associated Energy Star labelling. These products must carry this Energy Rating and/or Energy Star Labelling at the point of sale in Australia • Clothes Washers • Clothes Dryers • Dishwashers • TV's • Refrigerators • Freezers • Computer monitors • Pool/spa pumps *However compulsory labelling does not apply to goods sold online. (So take care there!)*

New ZERL: *Zoned Energy Rating Label* There is a new kind of energy rating label for air conditioners (split system and ducted) which takes climate into account. Perth is in the middle zone. https://www.energyrating.gov.au/industry-information/understand-requirements/labelling/understand-zoned-energy-rating-label

Using the Energy labels to compare products

The Energy Rating label makes these 'assumptions' about how you use your appliance:

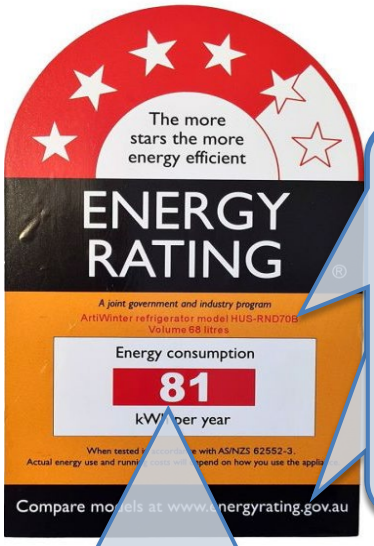
Appliance	Assumption
FRIDGE	1 year, door closed, 32˚C room temp.
WASHING MACHINE	1 load each DAY, on NORMAL cycle
CLOTHES DRYER	1 load each WEEK, hot cotton program
DISHWASHER	1 load each DAY, on NORMAL cycle
TELEVISION	10 hours each DAY normal mode
POOL/SPA PUMP	50,000 litres pumped each DAY

AIR CONDITIONERS The main assumption for Zoned Energy Rating Label for Air-conditioners:

Zone	Annual Cooling Hours	Annual Heating Hours
Hot	2247	277
Average	840	1291
Cold	545	2660

(https://www.legislation.gov.au/Details/F2019L00490)

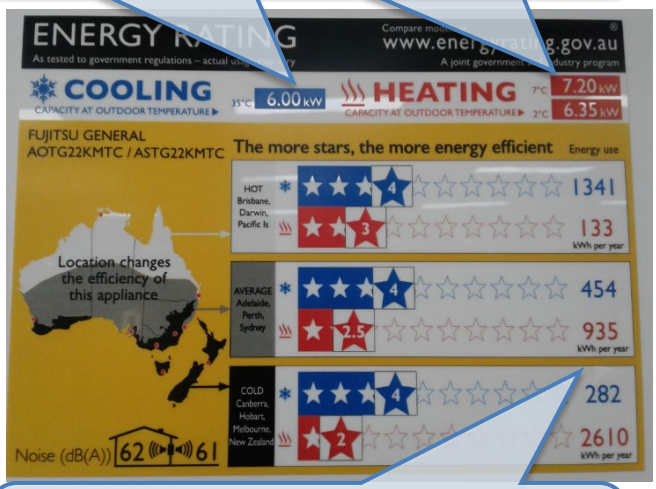
Are these assumptions true for your house? They may be a LOT different from how often you use your appliances, **but the important use of these labels is to COMPARE models of the same size!**



The most recent standards update, indicated by the black band, requires usable volumes to be shown (ie excluding internal fixtures)

81 Units per year/365 days = 1.05 Units per day for this **small bar fridge.**
What proportion of your total Average daily Units is your (combined) refrigeration?

How much Heat can this machine pump out, or in?



As a heater in Perth, this machine will add 935 Units to your *annual* bill **(*lots* of assumptions)**. Using 935 Units for 1291 annual heating hours, ***averages*** out to **0.73 Units/hr.**

The POWER label: all electrical appliances shd have one

*'Power' is the rate of energy use (how **fast** an appliance uses energy). In this example, the power of this appliance is 20 Watts.*

*Because most air conditioners are now **variable speed,** the label **does not** include 'Power' because this changes a lot with changing air temperatures.*

In use, this appliance would cause the little light on your Western Power meter to flash 20 times in an hour.

Making the most of a Power-mate loan - if your Library can lend you one.

Use the Power-Mate:

- to check Energy use of appliances that turn themselves on and off during the day, such as fridges and freezers

  FRIDGES: If you can hear your fridge running when you unplug it, **then wait half an hour before you turn it on again**, so that the compressor does not try to start 'with a load' (which may overload the motor).

  Check fridges over 24 or 48 hours. They may run more during the day than the night.
- to measure the Energy use of 'events', such as one load of clothes washing or drying
- to compare Energy usage of appliance cycles: eg dishwasher 'eco', versus 'normal'
- to check Power use of appliances that don't have a Wattage label, and that you use for very variable lengths of time *eg HiFi soundbars and woofers, pool pumps and pool salinators*

You can also use your own Western Power meter anytime
to check the Power use of your whole house, using stopwatch (on your phone) pen + paper
See set of meter reading charts in our www.greenservices.com.au /DOWNLOADS

Electronic meters	'Spinning wheel' meters
Find the RATE written on meter. eg **1Wh/imp** *Most domestic e-meters 'pulse' at 1Wh per impulse (flash)* 1000 flashes =1kWh imported from grid. When the meter pulses (light or icon flashes, or turns on), **START your stopwatch. When it flashes ON again, STOP your stop watch!** If the lamp is flashing fast, count 10 flashes then STOP! *When you start the stopwatch, that is **'count zero'**, and the next flash is **1** etc.* **Record how many seconds** between flashes, (or 10 flashes) ***If you have solar power,** and the lamp is not flashing during sunshine hours, then that means you are **not importing** any energy from the grid. (Good!). If the lamp IS flashing, that means that you using more power than your panels can supply at that moment, so you **are importing** from the grid.*	You will find the RATE printed on it, 266.6 Revs/kWh or 133.3, or 66.6. **START** your stop watch when the black mark on the edge of the spinning disc comes to the centre front. **STOP** when the same black mark comes to the front again. If wheel is spinning fast, count 10 turns! **Record how many seconds** one turn took, or 10 turns if it was going fast!...

After recording the time between flashes or turns…

• Find the corresponding time, **on the correct Meter Reading Chart,** and read across to find out how much power your house was using on average during that very short time.

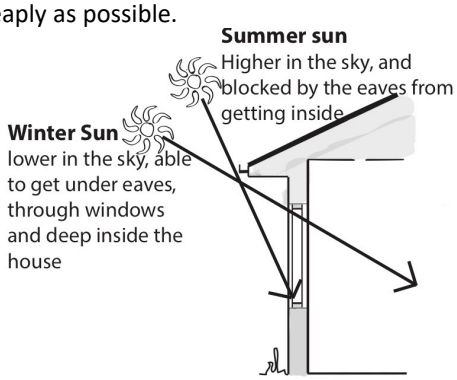
• Go around your house now and find all the things that are on, eg 6 lights, a laptop, that add up to the Power you have measured.
***NOTE: There will be some things that you can't count, or find,** such as security systems, IR sensors on security lights, standby on air conditioners, garage doors, electric gates, some telephone systems, touch lamps… So don't expect to find every last Watt!*

• **Repeat the test** because some appliances might have turned themselves on or off during your test (eg fridges or hot water systems)

• **For big appliances that you can't unplug** (eg spa, hot water system), you could measure (by flashes/turns) the house's use when this appliance is OFF (other normal items are still on.) Switch the big appliance ON and repeat the measurement. Subtract the Off reading from the On reading to see how much that appliance uses.
***Note:** You would have to do this several times over the first 15 minutes of turning it on, to assess its maximum Power, as power demand can vary a lot during starting and running cycles. It would be simpler to measure its Energy use over a few hours by counting Units (Energy) on your Western Power meter.*

Keeping COOL or COSY, naturally!

Your whole house is really a 'major appliance' with the job of keeping you comfortable! If planning to build a new house or buy or rent an existing house, make sure, using Google Maps or a compass, that the house is properly oriented, and with appropriate glazing. For a while however, you may need to make the best of poor orientation, as cheaply as possible.

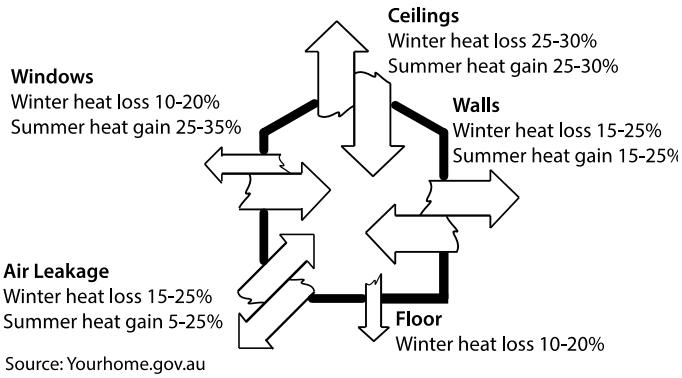


Using a compass (Perth)

• North facing windows with a suitable eave will let low winter sun in but keep the high summer sun out!
• Unshaded East and West facing windows can let in unwanted summer sun. (~ 700 Watts per m^2 Jan-Feb mornings and afternoons in Perth)
• Tinting East and West windows can dramatically reduce unwanted summer heat gains. See: agwa.com.au (films)
• A reliable afternoon sea breeze comes from the SouthWest in many parts of Perth, ☺ in Summer, but ☹ in Winter!

Compass direction	Shading options for windows and glass doors
NORTH	fixed eave or adjustable horizontal shading above window, such as a deciduous pergola
EAST & WEST	adjustable vertical screens outside windows, eg awnings or deciduous pergolas
NE & NW	adjustable shading
SE & SW	planting of trees and shrubs
yourhome.gov.au/passive-design/shading	

***HEAT LOSS** and **HEAT GAIN** (%)*
*for an **un-insulated, uncurtained house**.*



Source: Yourhome.gov.au

Understanding HEAT FLOW & insulation

Rule 1 Heat flows from where it is warm to where it is cooler.
Rule 2 Heat flows faster when the temperature difference between the warm and the cool place is greater.
Rule 3 Insulation slows down the flow of heat.

R VALUES
Insulation is sold with an 'R' value (for how well it **RESISTS** the flow of heat) **New homes in Perth must have roof insulation of at least R4.1.**

Some of your insulation may need replacing because:
• it has been moved by an electrician or by animals!
• it is old or thin • it has blown away
If you don't know whether you still have full ceiling insulation coverage and can't ask someone you know to bring a ladder and have a look thru the 'man hole', ask us for a quote to send someone to check with an infrared camera. If only a small area is missing, you can choose to DIY with bags of insulation batts to fill the gaps.

JUST PASSING THROUGH….

1 Unit of energy will:

• pass in or out of an uncurtained $3m^2$ glass/aluminium window (eg laundry sliding glass door) in **10hrs**, if the temp. difference is 6°C (inside vs outside)

• pass (in) through $2m^2$ of ordinary glass with full sun shining directly on it, in **45 mins**.

• pass through a 3.2 x 3.2 **UN**insulated plasterboard ceiling (R0 .08) in **1hr**, if temp difference is 8°C.
NOTE: If this same ceiling is insulated (R4.1) it will take 50hrs to pass through!

• pass through the bathroom exhaust fan (300mm diameter, not turned on) in **1hr** with an air flow rate of 0.1m /sec and air temp difference of 5°C.

Letting COOL AIR into your house:

You DO want this in summer!

• **Security screens** on the right doors and windows mean you can open up to allow cool air in at night, with peace of mind! A great investment and **some Councils have rebates on security items!**

But you DON'T want this in winter!

• Do your exhaust fans turn by themselves sometimes? *That is heat coming or going from your living spaces!*
• Are there 'holes' in the ceiling, eg vents behind light fittings?
• Can draughts get around bathroom/toilet/laundry doors into or out of living areas?

To test for draughts Shut all windows and go around the house with a lighted stick of incense. Work out where those draughts are coming from that are making the smoke dance!

Draught-stopping products

• Door snakes are handy, but can be a trip hazard.
• **Measure gaps carefully** before choosing products so you don't buy strips that are too thick for the gap.
• A hardware salesperson can help you find the right product for the windows or doors that are allowing draughts
raven.com.au *makes a wide range of draught products. See their website. Note that rubber lasts longer than foam.*

Need EXTRA HEATING OR COOLING? Getting best value for your money?

NOTE: Reverse Cycle air conditioning is now cheaper to run than gas heating.
We urge you not to buy any more gas appliances!

Air conditioner (Reverse Cycle)

	HEATING	COOLING	
CAPACITY **(kW)**	8	6	
EFFICIENCY	320%	300%	
calculated INPUT **(kW)**	2.50	2.00	kW
electricity price per Unit	30	cents	
hourly running cost	heating 75	cooling 60	cents/hour
price per Unit of HEAT delivered	**12.0**	cents	

The specific efficiency of an air conditioner varies with temperature, and temperature difference. 320% is a good average estimate for moderate use.
This means: if you put in 1 Unit of electricity (energy), you get out 3.2 Units of HEAT

Gas Heater

INPUT	25	mJ/hour (divide by 3.6)
	6.9	Units per hour
efficiency	85%	
calculated OUTPUT	5.9	Units per hour
gas price per Unit	15	cents
hourly running cost	104	cents/hour
price per Unit of HEAT delivered	**17.6**	cents

Electric Resistance Heater

(eg: fan heater, oil-filled, radiator, ceramic heater)

INPUT	2400	Watts
	2.4	Units per hour
efficiency	100%	*100% is not good these days!*
calculated OUTPUT	2.4	Units per hour
electricity price per Unit	30	cents
hourly running cost	72	cents/hour
price per Unit of HEAT delivered	**30.0**	cents

Heaters come in different sizes (capacities).
To compare apples with apples,
the thing you want is the 'heat'.
So how much does it cost to get the same amount of heat (1 Unit) from each of these appliances?

Wood Heater

tonnes per season	1.5	
price per tonne	$ 500.00	
HEATING DAYS	100	
energy content of wood	16	Mj/kg
energy content of wood	4.4	kWh/kg
average INPUT per heating day	15	kg
average INPUT per heating day	67	kWh
fire efficiency	65%	
price per Unit of HEAT delivered	**$ 0.17**	cents
daily cost	$ 11.54	*

Houses that use firewood as a heating source typically use a LOT of energy, typically, much more than would be used by replacement heating devices.

CHOICE have a buying guide to help you choose an air conditioner.
choice.com.au/home-and-living/cooling/air-conditioners/buying-guides/air-conditioners
The full version of Choice is available online through libraries so you can check unbiased product reviews!

Don't forget the humble fan!

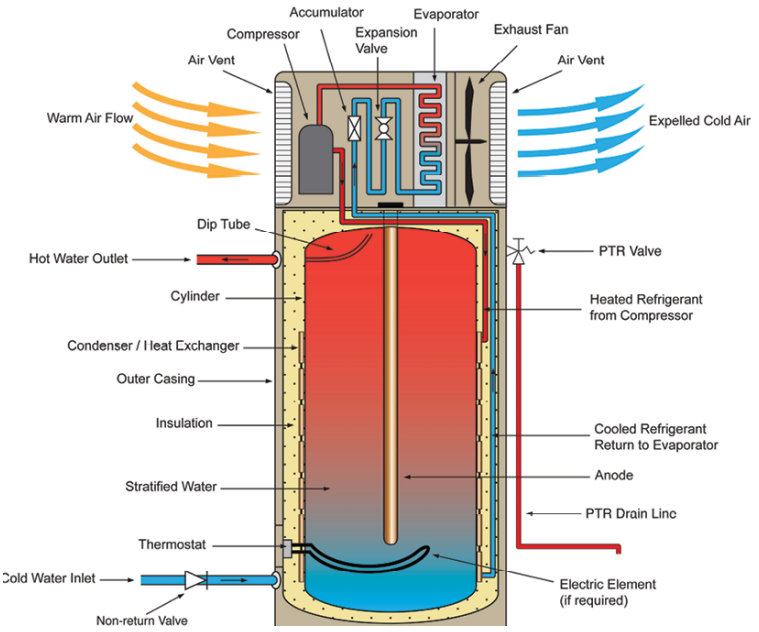
A cheap **pedestal fan** uses about 50Watts, and will cost about 1c/hr to run, or even less on low speed. A **ceiling fan** uses about 100W (at high speed) and will only cost about 2c/hr to run!
(Warning: Ceiling fans are NOT SAFE for low ceilings!)
Fans don't actually cool the air - but the air flowing across your skin helps your body cool itself.

Evaporative air conditioners ducted through the whole house have a large fan and a small water pump inside. They use only about 900W on high speed so cost about 25c/hr to cool everyone in the house - less on low speed or **fan only** setting.

Evaporative coolers must be able to blow the air out through an open window or door, or special large ceiling vent. On very humid Perth days, an evaporative air conditioner won't work well, as it adds moisture into the air.
But it can be run on FAN ONLY mode, which will be considerably better than nothing!

As your HOT WATER SYSTEM (HWS) can die quite suddenly…
it's wise to research and decide in advance what you will replace it with!

If you've got PV (solar power) or are considering it, you'll probably be covering all or most of your sunniest roof sections with panels. In this case a **heat pump hot water system** is highly recommended. Yes it needs electricity, but if its timer is set so it does its heating in the sunny hours of the day – storing it for when you need it at night and/or next morning - this HWS is essentially solar-powered!



For a family, the heat pump is the most efficient HWS, even if you don't have PV.
For a single or couple who don't use much hot water, electric instant could be appropriate and is much cheaper upfront.

Electric HEAT PUMP HWS

A heat pump is a **very** efficient (300%) electric storage hot water system. ***300% efficient means its energy output is 3 times the energy input.***
It works like a reverse cycle air conditioner - collecting heat from the surrounding air - but instead of putting that heat into your home, it puts heat into the water in the tank.

Heat pumps make a noise like a fridge or small air conditioner when they heat water. (Note: The latest models are **much** quieter than earlier models.)

https://www.yourhome.gov.au/energy/hot-water-service

Managing your hot water for highest efficiency & lowest cost!

Hot water is an energy AND water usage issue of course!

STORAGE hot water - electric or gas

Gas or electric storage HWS's keep water hot all the time in a tank. A storage tank is **always** losing heat. Up to 30% of energy can be wasted, or more if the tank is near an air-conditioner in heating mode.

STOP LEAKS from wasting water, energy & money!
• Fix dripping hot taps as a priority!
• If the storage tank is leaking a lot (say 750mls or more a day) call a plumber to replace the **'relief valve'.**
• Turn off your storage hot water system when you go away on holidays, and save energy and money.

INSTANT electric or gas

These HWS's heat the water every time you turn on the hot tap, but don't store it. They may need at least 5L/min running through it to stay turned on. If your shower is running **hot-cold-hot-cold**, it probably means not enough water is flowing through the heater.

SOLAR HOT WATER SYSTEM (SHWS)

Whether you've got the standard 'flat plate' or less common evacuated tube SHWS, **managing the BOOSTER should be your top priority,** or you can wipe out savings from the sun!

If your booster is electric:

Make sure the automatic booster clock (if it has one)
• is set to the correct actual time of day
• is set to boost for 1 or 2 hours
. is set to AUTO or OFF (rather than manual ON)
Don't boost in the morning or daytime, unless for immediate use, because the sun can do the job!
Try to keep the booster OFF from November to April and let the sun do all the work!

If your booster is gas instant:

Then *every* time you turn on the hot tap, the first few litres will *always* be gas heated!
• Consider turning *off* the gas instant booster from November to April

Is your hot water system wasting electricity gas and water?

1. Replace guzzler showerheads!

Using a standard 9L garden bucket and your phone's stop-watch, run the shower at full strength for 30 seconds. Measure Litres collected, and x2 for the approx flow rate/ min. OR Just see if the bucket overflows in a full minute.

If your showerhead is 9+Litres/min , replace it with a lower flow one. Showerheads now on sale range from 5.5L - 9L per minute. You might like to check Choice's buying guide: https://www.choice.com.au/home-improvement/water/saving-water/buying-guides/showerheads

This might be handy too!

How to Install a New Shower Head For Dummies
https://www.youtube.com/watch?v=fiv4Zq9v4co

2. Insulate/'Lag' exposed hot water pipes.

Hot water pipe insulation is now compulsory for new installations. But in older houses, you could be losing quite a bit of heat through a metre or two of exposed hot water pipe. (See photo at left)

Your solar hot water pipes may also be exposed.

A self-seal product is easier to manage than cutting and taping insulating hose yourself. You can buy 2m lengths with tube walls of 13mm for pipe diameters of 13mm, 19mm and 25mm @ Reece Plumbing outlets.

https://www.reece.com.au

3. Lower the thermostat and SAVE!

Note: A **STORAGE hot water system (gas or elec) needs to be set at 60°C** to prevent Legionella bacteria growth.
A higher temperature than this is just a waste of energy as it can keep the HWS on for an unnecessary hour or two costing an extra dollar or more every day!

Adjusting the temperature on your STORAGE HWS
Gas storage HWS
The dial is usually at the base of the tank, maybe behind a cover you can lift up.
Electric storage HWS
There may be a visible control for you to use, OR some kind of WARNING that you must ask an electrician to lower it for you.

INSTANT HWS controls vary:
*Note: older **electric instant** HWS may not be adjustable. Some newer ones **are** user-adjustable.*

Gas instant HWS

Newer systems may have an option of a 'remote' control inside your house.

Older systems have sliders or dials, under a cover that you can lift or unscrew. There may be two controls, one for flow and one for temperature.

Try to adjust your gas instant HWS so that you don't have to add cold water in the shower.

When planning for new appliances

GAS vs ELECTRIC?

We strongly encourage you to plan for the phase-out of gas at your place! To use gas is to use 100% fossil fuel. There are also indoor pollution concerns, especially for children and anyone with asthmatic problems.

Gas producers have many ways to calculate their emissions for government and the public. The actual carbon and methane emissions of gas over its whole life cycle (Stages 1, 2 and 3 emissions) are likely to be higher than the official version.

Having a plan ready to replace your gas hot water system, stove and/or heater with electric alternatives is smart! Appliances can die suddenly and unless you have done your homework about what to buy next, you'll be tempted to take a plumber's suggestion to 'replace like with like' because everyone wants hot water tomorrow!

Yes you are allowed to disconnect from gas! Future residents of your house can reconnect if they wish. As well as the gas you won't be using, you will save ~$100 per year in (gas) service charges if you do say Goodbye to Gas! This may involve:

- your Hot water system See **page 10** re Heat Pumps.
- your Space heating See **page 9** re Reverse Cycle A/C
- Cooktop and/or oven

Modern electric cooktops

Check out the latest range of electric cooktops (ceramic and induction) that may be able to wean you off your cooking-with-gas habit! look out for whitegoods stores offering demonstrations so you can look and consider. Don't take your credit card the first time you look at new stoves. Lots to consider. eg Are the dials easy to read? Is there a good set of instructions?

CERAMIC cooktops are relatively inexpensive, and easy to clean, but care needs to be taken to avoid cracking with heavy pans handled roughly. There are A range of protective heat diffuser products to help.

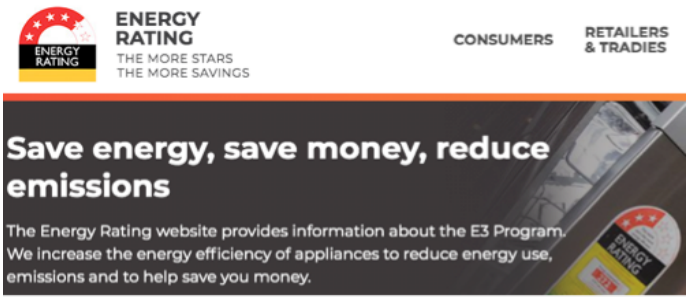
INDUCTION cooktops are more expensive upfront but cheaper to run. Electromagnets heat the pan but not the surface of the stove. The pan is heated instantly and transfers the energy to the food inside efficiently, saving cooking time. You will need to use only pots and pans that attract a magnet, on your induction stove.

WARNING! People with pacemakers should avoid induction cooktops as the magnets can interfere with them.
ref Induction hobs and pacemaker risk - British Heart Foundation

More tips re new appliances

These two sites are well worth consulting!

www.energyrating.gov.au



CHOICE www.choice.com.au

Choice is Australia's leading consumer advocacy group. Funded entirely by members (@$83.95 (digital version) per year) it is truly independent of commercial influences. As a non-member, you can access buying guides from their website, but the review ratings require membership to access. Your local library should provide full access, when you're researching your next appliance purchase.
Note that you won't find reviews for all product classes, as it's a work in progress!

If you have PV (solar power) try to choose less powerful (lower wattage) appliances

eg pool pumps or airconditioners.
Could the job be done with a less powerful machine used over a longer time? A very powerful appliance (or combinations), may use more power than the panels can supply **in the moment,** so you will be importing some electricity from the grid. A small single room split system airconditioner in one room, (eg the home office) could be a good strategic option instead of a whole-of-house system. (If you're getting a ducted system, make sure it has room-by-room controls of course.)

Pool pumps

Older pool pumps may use 900W, nearly 1 Unit every hour and be on for many hours a day. In their life, **running them will have cost many times their purchase price.** When the time comes for replacement, you will save the extra money you spend on an efficient pump, in the reduced lifetime running cost.

Setting up energy-efficient pumping arrangements will also help. eg disconnecting pool vacuum when not actually needed.

You can get variable-speed pumps rated at 8-10 stars, starting from about $1400. Of course there are much cheaper less efficient pumps, but they will cost you more over time! If a new pump doesn't have a star rating, don't buy it! Compulsory Energy Star labelling for pool pumps was introduced in 2022 so you can compare pumps using these labels.

Fridges & Freezers

Minimise the number of fridges you are running. If you keep one for BBQ's etc. make sure it's mostly OFF as it wastes energy running in hotter places such as verandahs and sheds.
See buying guide: choice.com.au/home-and-living/kitchen/fridges/buying-guides/fridges
and login to read to see their latest reviews (Jan 2023)
Remember you can log in to Choice at a Library!

A few tips on buying LED lighting

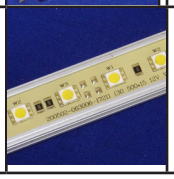
You may have chosen lights based on Wattage - but LEDs produce many more ***lumens per Watt*** (how much light is emitted) than incandescent, halogen or fluoro ***AND*** last much longer.

Incandescent or halogen	Fluorescent globe or tube	LED globe, downlight or tube
12-24 Lumens per Watt	45-75 LpW	80-110 LpW

LED's come in soft 'social' colours such as 'Warm White', or 'task' colours such as 'Cool White', or 'Daylight' - but it is *best to take notice of the 'K' number rather than the description.* **Try a 4000K globe**, then see if you want warmer or cooler whites for different purposes. Most people need 4000K or higher to read, sew, cook, use tools, or find clothes in the brm!
At our energy audits, Green Services installs 10W GE Bright Stik LED's Cool or Warm (standard bayonet & screw fittings) Their Cool is a nice mid-cool (4000K). Note NO cash for comment!

Appearance	Colour names used by manufacturers *(could be misleading)*	Colour: K *(Kelvin)*
Yellowish	'Warm White'	2700-3000K
Neutral white	'Cool White'	4000K
Bluish white	'Cool'/'Natural'/'Daylight' can be very harsh	5000-6500K

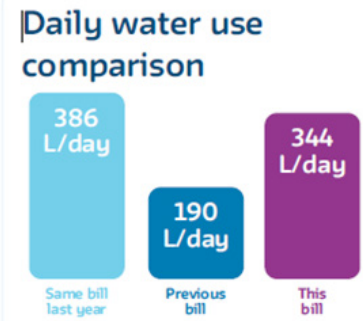
LED lighting comes in a wide range of shapes & fittings. **Be sure to buy the right base for your sockets!**

LED BC (Bayonet cap) Globes in various shapes		Standard base B22. Narrower base, B14. You change these yourself, replacing old incandescent, fluoro, halogen
LED ES (Edison Screw) Globes in various shapes		Standard size **ES27.** Narrower base **ES14.** You change these yourself, replacing old incandescent, fluorescent, halogen
LED GU10 Down-light to replace halogen		You can replace these yourself, replacing energy-hungry halogens.
LED MR16 Down-light to replace halogen		An electrician might be needed to change these 12V downlights over from halogen to LED.
Rigid LED strips (T5 or T8) in cool warm colour to replace fluoro tubes.		An electrician must install these and will buy the right type and length for your house. *Note* that *the popular cheap soft strips are DIY however!*

Downlights are good for lighting a small work area for a short time (eg over your kitchen bench) but some homes have too many downlights in living areas that turn on from just one switch. If you have halogen downlights, replace them with LED downlights for big savings!

Outdoor lighting can use a lot of energy. You can buy LED outdoor lights with sensors, so the light only comes on when it's dark and people are there.

Read your water bill carefully - it covers a lot of useful info!



These 3 bars on the front of your bill show that this household used an average 344L/day for the past 2 months, vs 386L for the same time last year, but only 190L for the bill period before this one.

Signing up to **'My Account'** helps you keep track. https://www.watercorporation.com.au. (See 'My Account' in gold at right of home page.) Once you get in to your account, you'll see coloured graphs like the one on your bill. It first shows only the 4 last bills; use the left arrowhead to see back further. 6 bills covers a whole year, so then you can take the important seasonal factors into account when checking your waterwise progress from year to year.

You may be paying more in water and sewerage service charges than for actual water use, **but it's only your Water USE Charges that you can change!**

WA's Water Corporation uses both Litres and kiloLitres (=1000 Litres) on your bills. It helps to practise using both, converting between them (x or ÷ by 1000). Kids and most adults ***get*** Litres better!

Water price 'tiers' – a financial incentive to be waterwise!

To discourage us from wasting water, Water Corporation charges for water in pricing 'tiers' (a bit like tax brackets) with each tier costing more per Litre. Once you have used what is allowed at the lowest tier, you will be charged at the 2nd tier price, and so on! Your billing year re-sets each year so if you've ended up in the 3rd tier, for the next billing year you can challenge your household to be more waterwise and stay within the 1st tier with a maximum average daily use of **411L/day** or 2nd tier. **(1370L/day Metro)**

Current prices 2022-23 in METRO PERTH

Tier 3 (500kL+) $4.75/kL
Tier 2 (151-500kL) $2.54/kL
Tier 1 (0-150kL=150,000L) $1.90/kL

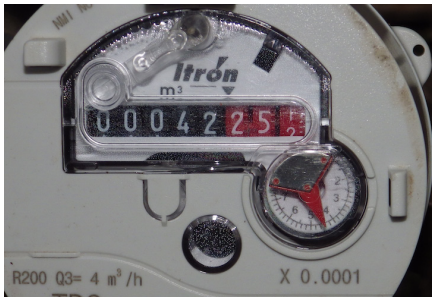
Water Corp's South & North regions have 4 price tiers with-towns divided into 5 'classes' eg A**lbany is a 'Class 4' town.**
Tier1.(0-150kL) $1.90/kL. Tier2 (151-300kL) $2.54/kL
Tier3 (301-550kL) $4.79/kL, Tier4 (550kL+) $7.18/kL
https://www.watercorporation.com.au/Help-and-advice/Bill-and-account/Rates-and-charges/Understanding-your-water-use-charges

Reading your water meter

White-on-BLACK numbers are kiloLitres (kLs) White-on-RED numbers are the Litres.

This meter shows:
42.2514 kL (kiloLitres)
OR 42251.4L (Litres)

The small round dial measures one Litre in one turn, each number representing 100mls, with 20ml divisions between the numbers.



This meter shows 4865.670kL or 4865670L

If you are keen to reduce your family's use of water, you can read and record your meter regularly – eg daily or weekly, at the same time of the day, instead of waiting 2 months for your bill!

Drip, drip, drip...

One tap dripping slowly can waste 10,000L of water in a year!

If it's a **HOT** tap, this will cost a lot in electricity or gas as well. Also, make sure that the pressure relief valve from the hot water system is not dripping all the time. (It is expected to drip occasionally.)

To test for leaks using your meter!

1. Make sure all taps are firmly off (indoor and out), washing machines & dishwashers off, and it's at least 10 minutes since the last toilet flush.
2. Photograph the meter. 3. Wait 5 minutes, then photograph again.

How much water was counted in that time? (x12 to get Litres or mls per hour.)

Looking for the leak/s

Check toilets for leaks quickly and easily by sprinkling ground pepper onto the back wall of the pan where the water normally rushes down. (Do this at least 15 minutes after its last flush.) If your toilet is leaking some of the pepper will wash away.

DIY tap repairs can be tricky. Calling a plumber may be your best option.

SAVING WATER in the GARDEN

Most of your water use may be on the garden: your billing history can confirm this.

Collate your billing history for the past year, **after signing up to 'My Account'** at watercorporation.com.au

	Bill period	ave L/day
Winter	May-Jul	250
Winter	July-Sept	210
shoulder	Sept-Nov	350
Summer	Nov-Jan	466
Summer	Jan-Mar	432
shoulder	Mar-May	350

Calculating your likely garden use vs household use:
Average Summer usage is 449L/day (466+432L) 2)
Average Winter usage is 230L/day (250+210L/2)
Likely garden use: 449 - 230L/day = 219L/day
You can ignore the 'shoulder' seasons for this purpose. They probably involve little watering for one month and full watering for the other month.

At any time you can work out your average Litres/day since last bill.
1) Find the last reading on your most recent bill.
2) Subtract that figure from your current meter reading.
3) Divide by the number of days since WaterCorp read your bill.

= (recent) Litres per day

How much does my garden use?

If you have reticulation you should only be watering **twice per week** on the right days for your street number. So multiply average daily 'garden use' (as calculated above) by 3.5 to find out how much is being delivered during each of your two retic sessions **(219L x 3.5 days + 766L)**. Does that *seem* right to you - if you aren't also doing some hand-watering?

OR Read (& photograph) your water meter before and after a retic. cycle. Is that amount what you expected?

FIRST STEPS for a new lawn or garden bed - or add later!

In sandy soils, you will probably need to add a bentonite or kaolin clay product so the soil can hold water. This is best done when you first establish your garden/lawn, or when planting a new plant.

But you can add clay afterwards, in very small amounts over many years; add a small amount to a watering can and water it in. Improving the water and nutrient holding capacity of the soils should be the first action you take.

Organic wetting agents are the other main aid to reducing your watering on sandy soils which naturally repel water. These products enable water to penetrate water-resistant sandy soils **especially on sandy slopes!**
Richgro *(a renewably-powered WA company) make these products, available at major hardware stores.Highly recommended by Green Services (Note: We don't do 'cash for comment' deals!)*

A LOT of water is wasted on gardens through reticulation systems that are inappropriate, set wrongly, not turned off in winter, or have hidden leaks!
If you have an **automatic retic.** you need to make sure that:
• the retic controller is set properly.
• that its internal battery is not flat? *A flat battery can cause many retic controllers to default to running every day!*
• it has a rain/climate sensor! *You don't want to be the neighbour who waters their garden in the rain!*

Checking water delivery from retic.

Select and run station 1. Go to the water meter and measure the flow rate of Stn 1. Can you see this amount of water coming out of your sprinkler heads/drippers? If not, there could be a buried sprinkler/dripper or perhaps a leak somewhere in Station 1. Ask yourself if every one of those sprinklers/drippers is still necessary? If your sprinklers are buried, then that usually means that your garden has 'moved on', from higher water need during establishment.

Review how many minutes that particular station runs for, and calculate how many litres are delivered in the station area. If the emitters are OK, record the flow rate on the card inside the controller for future reference.

If a station runs at 30L /min then reducing by just one minute is to save 30L ***every time*** it runs!
Repeat for all stations.

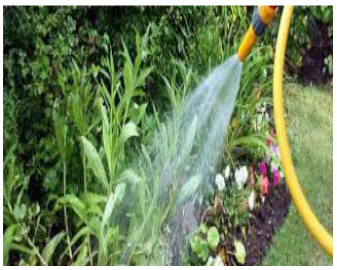
Once a year, read and record the meter reading (photograph) before and after the reticulation runs. How much water did you use? About the same as last summer? (Some controllers, if not set properly, may deliver more water than expected.)

Tips from our Water Corporation

See these short videos covering the various types of retic/ sprinkler systems and how to manage them; note that the last video of this set (sub-soil dripline) is the most waterwise.
watercorporation.com.au/Waterwise/Waterwise-advice/Garden/Sprinklers-and-irrigation

Consider low-tech alternatives!

If you have a smallish garden, before investing in or replacing an old retic system, ask yourself if you could handwater instead, enjoying your plants flowers, birds, bees, butterflies etc. As well as being a pleasant, peaceful activity, it's a chance to spot pests that might need dealing with!



You can ensure you're not overdoing it by setting a **timer on your tap** OR a **flow meter** to your hose head.

If you use a trigger nozzle - ALWAYS turn it off at the tap when finished - a burst hose, or popped-off nozzle can easily waste 10 000 litres in a day!

Watering when you're away....

Talking to new neighbours about their gardens is a chance to suggest mutual holiday watering! Or a friend or relative may be delighted to come and water your garden and refill your birdbaths, helping themselves to flowers, vegies, herbs, fruit.