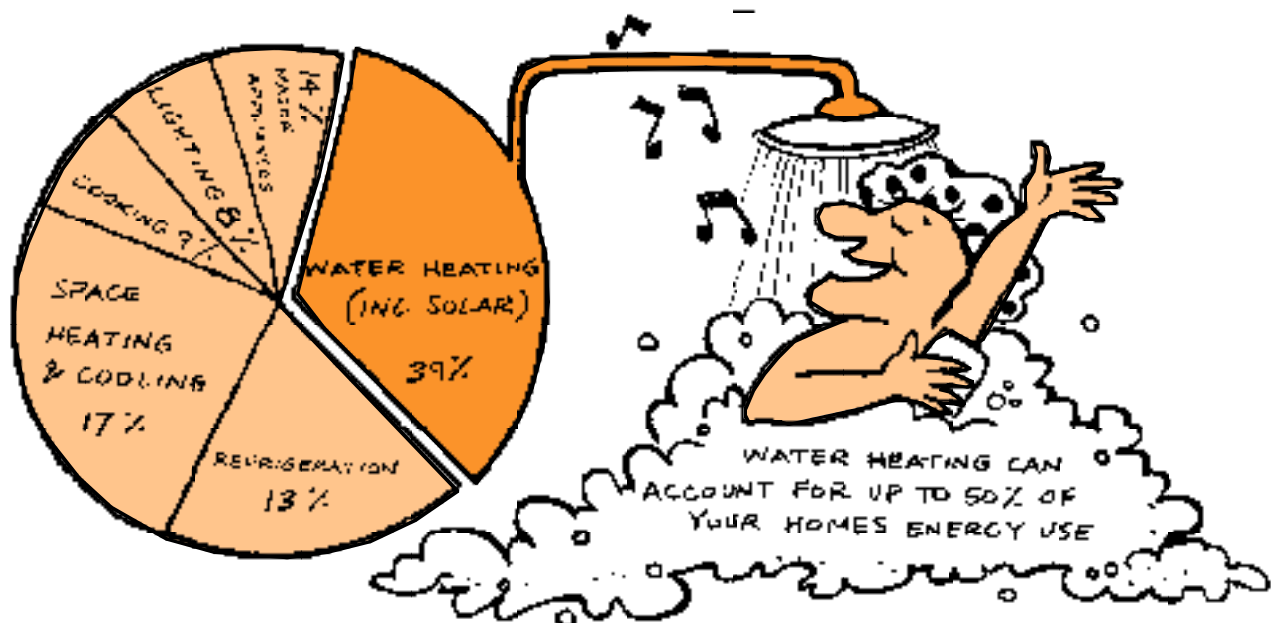


Choosing and operating a hot water system



Hot water accounts for up to a half of an average household's energy use in NSW.

The overall cost of your hot water depends not only on the type of heater and fuel used, but also on the way the unit is installed and how you use hot water. In fact, by being Energy Smart, it is possible to reduce your hot water costs by up to 70%.

Whether you are buying a new hot water system, or simply want to know the best ways to operate your existing system, this brochure will help you reduce hot water costs in your home. This in turn will save your money, our energy resources and help protect the environment.

How to select and install your Hot Water System

If you are planning to buy a new hot water system it is important that you choose one that is right for your needs. You must take into consideration not just the initial purchase price, but also the lifetime running costs of a system. Other features, such as ease of installation, simplicity of operation and warranty must also be looked at.

Ask for our brochure *Choosing a hot water system* which compares the types of systems available, making selection an easy task. Alternatively, you can contact the Energy Smart Information Centre where trained energy advisors can help you select a system that best suits your needs.

What size system should I choose?

Once you have chosen the type of heater you need, the next step is to make sure you select a system that is the right size for your requirements. A unit that is too small will continually run out of hot water, while one that is too large will be more expensive to run, as it will heat and maintain water that is not being used. Manufacturers can provide easy to follow guidelines on the size and capacity of their different systems. Our brochure *Choosing a hot water system* also provides information.

If you have a spa, it is best to use a separate hot water service for it. A spa has a large but infrequent demand for hot water, and should not rely on your domestic hot water system for its supply. A separate, instantaneous 'spa pack' can generally be purchased with your spa.

Check energy rating labels

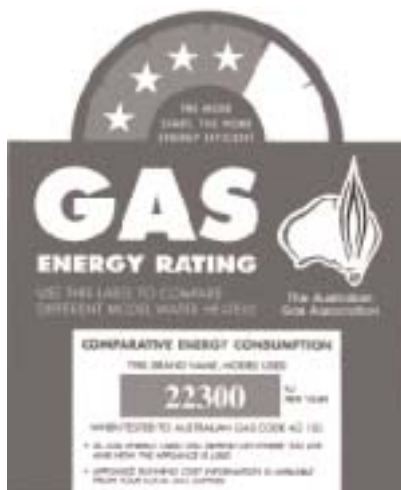
The more stars, the more you save!

When purchasing a new water heater—reach for the stars!

All gas water heaters and solar water heaters with gas boosters display energy labels with star ratings for energy efficiency. The more stars, the more energy efficient the water heater and the lower its operating costs. This also means reduced greenhouse impact.

It is important not just to select the cheapest system—consider its lifetime costing. Using a high efficiency, 5 or 6 star rated hot water system can save an average family over \$50 per year on running costs.

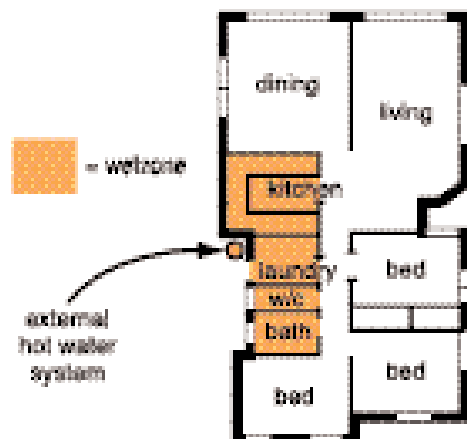
Electric water heaters at present do not carry energy rating labels.



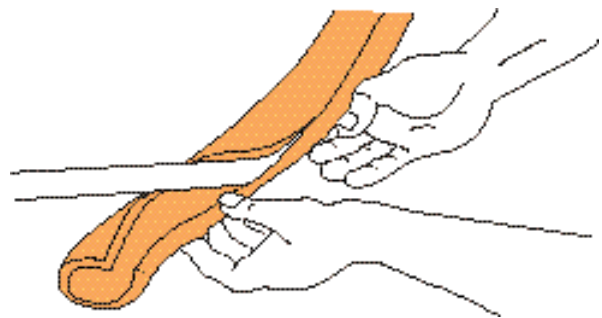
Where is the best place to install my system?

Install your system as close as possible to the kitchen, bathroom and laundry, which are the main hot water draw-off points around the home. If this is not possible, install it close to the kitchen, which typically uses small amounts of hot water throughout the day. This helps to keep pipe lengths short, minimising installation costs and heat losses from pipes. It also overcomes wastage and the inconvenience of having to wait for long periods for hot water to start flowing from the tap.

Keep the hot water system sheltered. This will help reduce heat losses from storage tanks, and will protect any pilot lights from draughts.



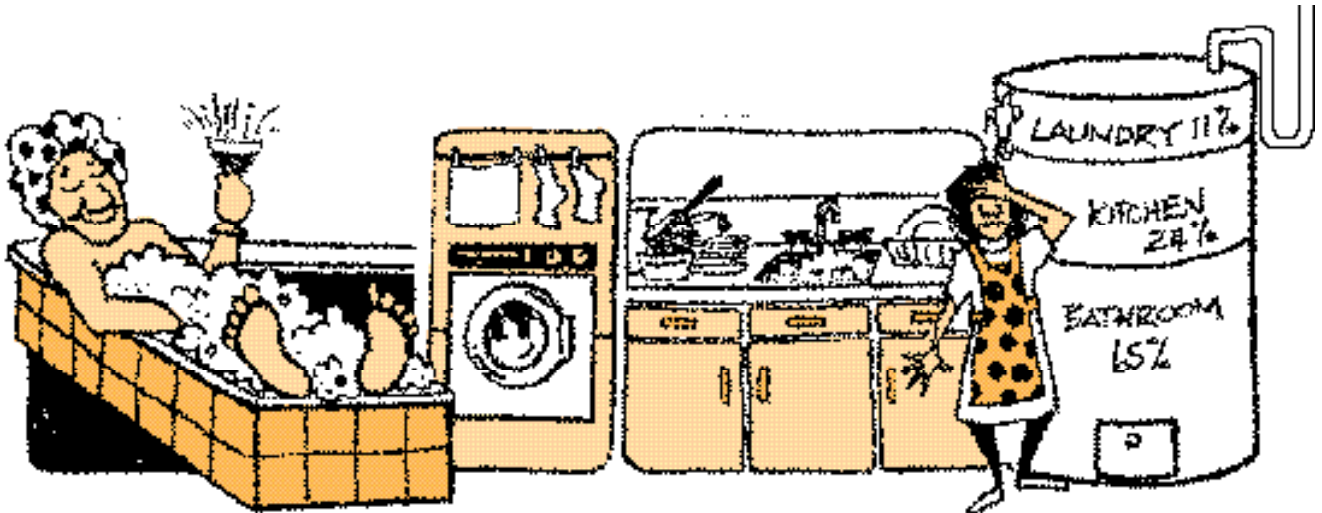
External mains pressure hot water system



Insulate hot water pipes

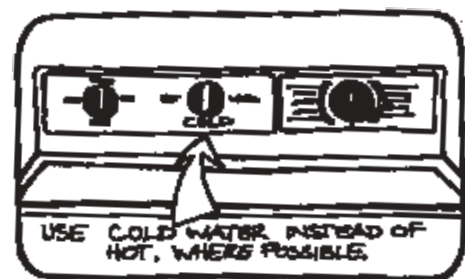
You can add extra insulation to a storage tank to reduce heat losses even further, especially if it is in a very cold or exposed position, such as the south side of your home. This could save you up to \$15 a year. Foil-backed insulation blankets wrapped around the tank are most suitable. It is important that flues or air vents are not restricted by this insulation. Always check with the manufacturer to ensure the warranty will not be affected, before installing extra insulation.

Insulate pipes leading out from your hot water system, especially for the first two metres, and any exposed piping that will be subjected to cold conditions outside. This will minimise heat loss from pipes as hot water travels to the taps. Pipe insulation can be purchased from plumbing suppliers and major hardware stores. Ordinary lagging is insufficient.



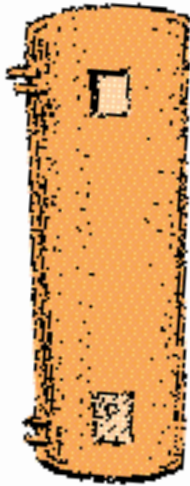
How to use hot water efficiently around your home

- Fit a AAA rated shower head. Showering usually makes up over 30% of hot water usage in the home. This can be dramatically reduced by fitting a AAA rated shower head, or a flow restrictor to an existing shower head. These devices can cut water delivery from the shower in half without affecting shower quality, saving up to \$20 per person per year.
- Take a short shower instead of a bath. You could reduce hot water usage and save around \$20 per person per year.
- Insulate around your bath during installation. This helps to keep bath water hotter for longer.
- Fix dripping taps. A tap dripping 45 times per minute wastes around 1000 litres of hot water a month, the equivalent of ten bathtubs or over \$25 a year! Standard and new maintenance-free tap washers are readily available from your local hardware store.
- Use cold water for tasks where hot water is not absolutely necessary, e.g. clothes washing with a suitable cold water detergent. This can mean savings of up to \$20 a year.
- Use a suds saving facility on your washing machine. This will let you reuse soapy water.
- Only wash with a full load in your washing machine and dishwasher.
- Use cold water to rinse dirty dishes, not hot.
- Connect your dishwasher to the cold water pipe. Although it may be more expensive for the unit to heat its own water, part of the wash cycle only requires cold water. If there is a long pipe distance from the tank to the washer, it is possible not to get any hot water into the washer and therefore the water will be heated by the washer to the required temperature. Use the economy cycle on your dishwasher whenever possible.
- Look for energy rating labels if you are buying a new washing machine or dishwasher. These will help you identify the most energy efficient units—the more stars, the more energy efficient the unit is, and the less it will cost to run.



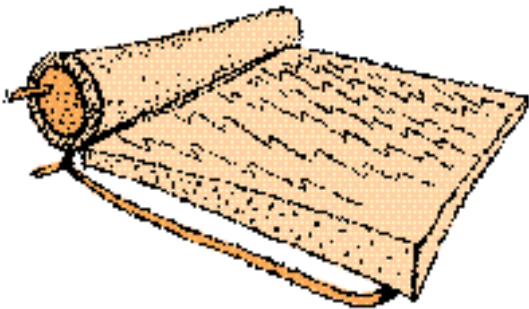
Decision 1 Storage or continuous flow?

The two main types of hot water systems available on the market today are storage water heaters and continuous flow instantaneous water heaters, sometimes referred to as instantaneous water heaters. Both types are suitable for most households. However, your decision should be based on the size of your household, purchase and installation price, the unit's efficiency and running costs, and life expectancy of the unit.



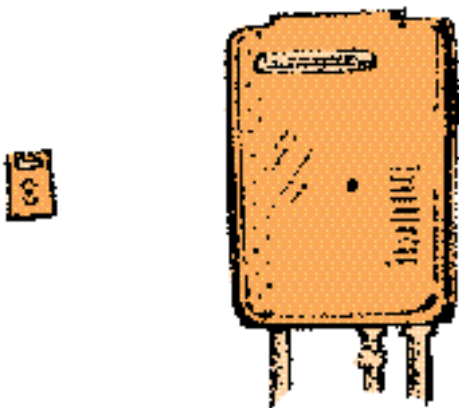
Storage water heaters

- Water is heated and stored in an insulated tank ready for use throughout the day.
- Operate most economically on solar energy, natural gas or off-peak electricity. They can also run on LPG, peak electricity or solid fuels such as wood (see Decision 2).
- Available as either:
 - (a) **Mains pressure:** hot water is delivered at a similar pressure and flow rate as the cold water. This means that more than one outlet can be turned on without affecting supply pressure. Normally located at ground level, and can be installed either inside or outside the home.
 - (b) **Constant pressure:** hot water is delivered at lower pressure than mains pressure units. They are normally located in the roof space of a home, and the pressure depends on the vertical height between the tank and point of use. Constant pressure units are often cheaper to purchase and have much longer life expectancies than mains pressure systems. Correctly plumbed, they will provide satisfactory service. Are also known as 'gravity feed' or 'low pressure' systems.



Continuous flow (instantaneous) water heaters

- Heat water as it is required, and therefore don't require a storage tank. As water is heated instantaneously, they cannot 'run out' of hot water.
- Smaller in size than storage systems, and can be installed internally (gas units must have a flue) or externally.
- Usually mounted on a wall or in a cupboard.
- Connected to the mains water supply and deliver hot water at a slightly reduced pressure.
- Standard units can generally deliver adequate hot water to one or two points at the one time.
- High powered, high efficiency units are also available, which can serve larger households.
- Some units have electronic remote controls for precise temperature control from inside the house.
- It is vital that units are sized according to the maximum number of hot water outlets likely to be used simultaneously.
- Operate most economically on natural gas, but can also use LPG and general tariff electricity (see Decision 2).



Decision 2 Electric, gas or solar?

Choosing the correct fuel to heat your water can make a significant difference to running costs and reduce greenhouse pollution. The most common fuels for hot water systems are off-peak electricity (storage units only) and natural gas. For similar sized households, both off-peak electricity and natural gas cost approximately the same to buy and run.

Natural gas

- Can be used for storage and continuous flow systems.
- Systems are rated for their energy efficiency with energy rating labels—**the more stars, the more energy efficient.**
- Internal and external models available.
- Storage gas water heaters have smaller capacities than off-peak electric systems, as water can be reheated at any time of the day or night.

Off-peak electricity

- Running costs similar to natural gas.
- Only available for use in storage systems of 160 litres capacity or greater.
- Water is heated overnight to provide adequate hot water for daily usage.
- Twin element units can operate with a 24 hour off-peak boost. If hot water runs out, water is reheated automatically on the off-peak tariff. To qualify for off-peak reheat, units must be sized according to the number of potential bedrooms in the home. Check with your electricity supplier for more information.
- Not available for continuous flow systems.
- Internal and external models available.

Solar energy

- In NSW, a solar hot water heater will provide approximately 65 – 80% of your hot water free of charge, and is very beneficial to the environment.
- Generally the cheapest systems to run, but have relatively high purchase cost with an average 'pay-back' period of around 5 – 10 years (depending on hot water usage and purchase cost.)
- All systems come with a gas, off-peak electric or solid fuel booster to supply adequate hot water during periods of low sunshine.
- Lower running costs when connected to off peak 2 or natural gas.
- Generally located on the roof of a home, with a storage tank connected to the solar collectors, but the storage tank can also be located at ground level with some systems.
- Mains pressure and constant pressure systems available.

See our brochure *Solar hot water* for more information.

Peak electricity

- Used for electric continuous flow units, and storage water heaters with a capacity of less than 160 litres.
- Can be very expensive to run so should only be used when other options are not possible.
- Common in flats, units, etc where space is limited.

Around 90% of electricity generated in NSW comes from coal. Burning coal for electricity is the main contributor to global warming. By purchasing a solar, heat pump or natural gas water heater you will be reducing your water heating bill and greenhouse pollution from your water heater by up to 70%.

LPG

- Used in areas where natural gas is not available.
- Running costs average around one-and-a-half to three times the price of natural gas or off-peak electricity.
- Look for the energy rating label with the highest number of stars.
- Suitable for storage and continuous flow units.

Solid fuels (wood, briquettes, coal, etc)

- Cost of fuels vary greatly.
- Can be used alone, or in conjunction with off-peak electricity and/or solar in constant pressure storage units.
- Water can be heated using a 'wetback' attached to a slow combustion wood heater, or a stand-alone water heater powered by solid fuel.
- Must not be used with mains pressure systems, unless a heat exchanger is used.
- Not available for continuous flow systems.

Heat pumps

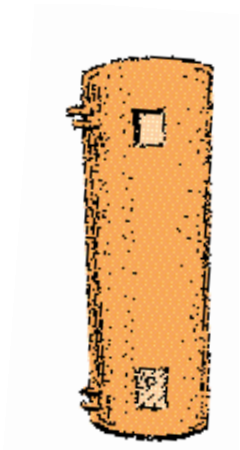
- High efficiency form of water heating which use around 70% less electricity than other electric water heaters.
- Heat is extracted from the atmosphere using a refrigerant gas and a compressor (in much the same way as heat is extracted from your refrigerator), and used to heat water stored in a tank at ground level.
- Have lower running costs than normal 'peak rate' electric storage units because of their high efficiency and when used in conjunction with a timer and the off-peak tariff, running costs are even lower.

Selecting a hot water system

Decision 3 What size?

Hot water systems must be sized to meet your household's hot water requirements. This is typically reflected by the number of people in the household. The following tables can be used as a guide to sizing hot water systems, however, consult your supplier for specific recommendations.

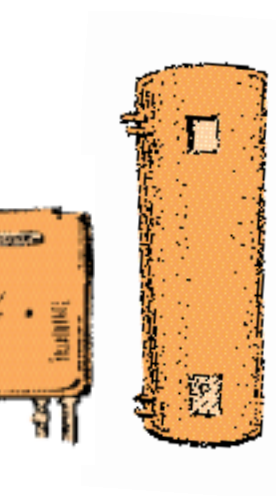
Note: High water usage households (e.g. those with spas or dishwashers) should select the next largest system size in the range. A dishwasher with a hot water connection should be counted as an extra person.



Electric storage hot water services

Off peak*		Peak rate	
Max. no. of persons served	Capacity (litres)	Max. no. of persons served	Capacity (litres)
1 – 3	160	2	40
2 – 4	250	3	63
3 – 6	315	4	80
5 – 8	400	5	125

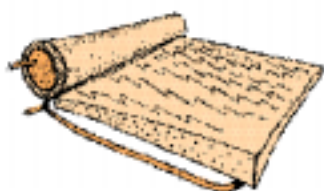
*High volume water uses (e.g. those where spas, dishwashers are used) should select the next largest system size in the range.



Gas water heaters

Storage		Continuous flow	
Max. no. of persons served	Capacity (litres)	Max. no. of outlets served at one time**	Flow rate (litres per minute)
1 – 3	90	1	16
2 – 4	130	2	20
3 – 5	170	3+	24
4 – 6	200		
5 – 9	260		

**Continuous flow systems are sized according to the required flow rate. A guide is often the number of bathrooms in the home. As always, consult the suppliers or manufacturers for specific sizing guidelines for their products.



Solar

No. of persons served	Capacity (litres)	Collector (m ²)
1 – 2	160 – 200	2
3 – 4	300 – 370	4
5 – 6	440	6

Selecting a system

Fuel	Appliance	Siting Options	Approximate Purchase Cost* [Ⓜ]	Approximate Annual Energy Cost (for a 3 Bedroom home)	SEDA Greenhouse score
Electricity	Storage Off-peak 1	Internal, external ground or roof	\$500 - \$1200	\$200	1
	Storage Off-peak 2	internal floor level commonly in a cupboard	\$500 - \$1200	\$365	1
	General Storage	Internal, external ground or roof	\$300 - \$600	\$500	1
	General Instantaneous	Internal, external ground or roof	\$300 - \$750	\$395	2
Heat pump	Storage Off peak 2	Internal or external	\$2500 - \$4500	\$120	4
Natural gas and LPG ***	Storage (high efficiency)	Internal flued or external ground level	\$750 - \$1000	\$245	4
	Storage (low Efficiency)	Internal flued or external ground level	\$600 - \$700	\$305	4
	Continuous Flow (large capacity)	Internal flued or external wall mounted	\$1000 - \$2500	\$255	4
	Continuous Flow (small capacity)	Internal flued or external wall mounted	\$750 - \$1000	\$395	4
	Solar ▲	Solar storage off-peak 2 storage electric	Tank on roof, on ground or in roof space.	\$1700 - \$4500	\$110
	Solar Storage continuous electricity	Tank in roof space, on ground or on roof space.	\$1700 - \$4500	\$150	4
	Solar gas storage	Tank at ground level or on roof	\$1700 - \$4500	\$85	5

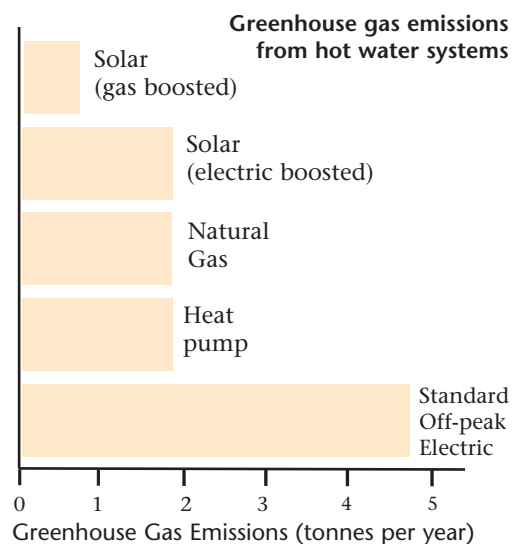
Based on the amount of Greenhouse pollution produced by a water heater. 1 = poor, 5 = excellent

* Excludes installation costs.

Ⓜ Cost range is based on drawing 180–260 litres/day. 180 litres/day is assumed for energy conscious users, 260 litres/day for high volume water users. Includes 7% pipe losses. Annual supply charges are not included. Costs are provided as a guide to running costs only. Actual costs will vary with usage, size of family and personal preferences.

*** Does not include cost of delivery and rental on LPG gas bottles. LPG prices can fluctuate widely and vary geographically.

▲ Cost range for solar hot water systems is based on 65% solar contribution.



Other considerations

Hot water and the environment

Buying an Energy Smart water heater that uses a low greenhouse impact fuel is a great start to a healthier environment.

With the exception of solar energy, every fuel that is used to heat water gives off gases which contribute to the greenhouse effect. Carbon dioxide (CO₂) is by far the main greenhouse gas, but others such as methane, nitrous oxide and chlorofluorocarbons (CFCs) also contribute.

The chart compares the amounts of greenhouse gases (CO₂ equivalents) released by different fuel combinations when each supplies the same amount of heat.

Installing and running your system for the best efficiency

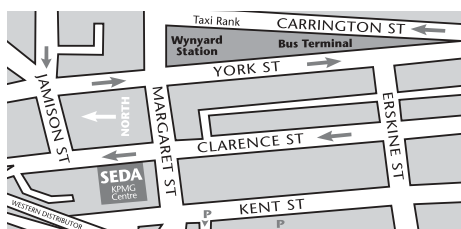
The installation and use of your hot water system has a substantial influence on the running costs and life span of the system. For high efficiency:

- ✓ have your system installed by a registered trades person, maintain it as required and have it serviced according to the manufacturer's instructions.
- ✓ for energy saving and adequate hot water supply, the optimum water temperature for storage hot water systems is between 60 – 65°C.
- ✓ have your system installed as close as possible to all points of hot water use. If this is not possible, locate it close to where small, regular amounts of hot water are drawn off (usually the kitchen).
- ✓ keep pipe runs as short as possible to minimise heat loss from pipes.
- ✓ if buying a gas water heater choose one with a 5 or 6 star energy rating or a Galaxy Energy Award winner. Check out www.energyrating.gov.au for more information.
- ✓ insulate hot water pipes, especially the first two metres leading from the hot water system. Closed cell rubber insulation (e.g. Armaflex, Bradflex, etc) is recommended—ordinary lagging is insufficient. Keep the insulation dry.
- ✓ avoid continuous flow systems with standing pilot lights.
- ✓ install a timer on peak rate electricity storage units.
- ✓ have your plumber rectify any problems of 'water hammer'.
- ✓ for solar hot water systems, install solar collectors to face true north. Make sure your roof is strong enough to support the weight of the system.
- ✓ constant pressure storage tanks boosted by solid fuel heaters should be installed directly above the solid fuel heater to make full use of the natural rise of the heated water to supply the tank.
- ✓ ensure your unit is correctly sized for your household and not oversized.

- ✓ Regularly activate the relief valves and drain cocks fitted to mains pressure storage systems. These are safety mechanisms to ensure that the system does not build up dangerously high levels of pressure inside. You should activate these two valves about once every three months to remove any sediment build-up and to ensure your system operates efficiently.
- ✓ Check the gas flame in your gas unit. When it is burning efficiently it will be blue in colour. If it is yellow you should have it checked by a service person.
- ✓ Turn off electric storage systems connected to general or peak rate whenever you can. They can be very expensive to run—up to 3.5 times more than off-peak electric or natural gas systems. Try turning your system off while you are away during the day and also overnight. The water should reheat fully in about 30 minutes after the system is turned on, providing enough hot water when required. Try to use the hot water less frequently but in larger quantities. This leaves less water to go cold in the pipework.
- ✓ Turn off any hot water storage system if you are going away on holidays. Some units have a 'vacation' setting to make this easier. Remember, off-peak electric systems need to be turned back on in the evening so they have time to reheat overnight.
- ✓ The NSW Code of Practice, Plumbing and Drainage was amended in 2000 to include laws limiting the delivery temperature of hot water from sanitary fixtures like bathroom taps and showerheads. The laws, introduced to reduce the likelihood of scalding, limit water temperatures for new domestic services to 50°C. Lower temperatures apply for day care centres, kindergartens, primary and secondary schools, nursing homes and similar facilities for the aged, sick or disabled. Speak with your plumber or hot water specialist for more information about these new requirements.

Note: It is generally not cost effective to buy a second hot water heater to service remote rooms.

The Energy Smart Information Centre is a free advisory service provided by the NSW Government. Energy experts can provide information on a wide range of topics including Energy Smart design for new homes and renovations, appliance selection, solar and wind power systems, choosing heating and cooling systems, insulation, lighting and water saving devices.



Trains: Wynyard Station is 3 mins walk away.
Buses: York & Carrington Sts adjacent to Wynyard Park.
Travel to SEDA by public transport to save greenhouse gas emissions.



www.seda.nsw.gov.au



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