

# Helpful information about choosing a solar water heater



## i. Choosing suitably licensed contractors

It is your responsibility to ensure that the contractor(s) you engage to supply and install your system are suitably licensed.

### BSA licences

The installation of solar water heaters constitutes 'building work'. This means the person(s) arranging and/or undertaking installation of these items are required to hold a suitable Building Services Authority (BSA) licence.\*

As the installation of a solar water heater involves a building's structural and waterproofing integrity, a BSA licence in one of the following classes is required:

1. Builder Open
2. Builder Medium Rise
3. Builder Low Rise
4. Plumbing and Drainage

If the contractor holds a BSA licence (1, 2 or 3 above) then the installing plumber must also have a BSA licence.

### Plumbing

Only an occupationally licensed plumber through the Plumbing Industry Council can connect the hot water system to the building's water supply.

As of 1 January 2011 all plumbers need to have the new occupational licence endorsement to install solar or heat pump water heaters. The endorsement will be noted on their licence card.

### Gas

Only a gas fitter occupationally licensed through the Department of Employment, Economic Development and Innovation can install a gas hot water system including connection to the building's gas supply. That person must also hold, or be employed by a business or organisation holding, a current BSA gas fitting licence.

### Electrical

All electrical work must be undertaken by an electrical contractor licensed through the Electrical Safety Office.

### Restricted licences

Licensed plumbers, gas fitters and electricians are not permitted to fully install solar hot water systems by themselves. This includes plumbers with a restricted gas fitter's or electrical worker's licence, electricians with a restricted water plumber's or gas fitter's licence, or gas fitters with a restricted water plumber's or electrical worker's licence.

Under their restricted licence they can only replace or repair a hot water system in the same location and of the same type.

\* All solar hot water installations, regardless of value, require a BSA licensed contractor to enter into the contract to have the unit installed, and the contractor must be BSA compliant according to the full value of the installed system.

Therefore, every installation will require **both** an appropriately licensed electrician, and an appropriately licensed plumber to complete their respective installation components. If the system is gas boosted, an appropriately licensed gas fitter is **also** required.

## Checking licences

### *Building Services Authority:*

Ph: 1300 272 272  
www.bsa.qld.gov.au

### *Plumbing Industry Council:*

Ph: 1800 682 021  
Email: plumbers@dip.qld.gov.au

### *Petroleum and Gas Inspectorate:*

Southern (07) 3238 3725  
Central (07) 4938 4683  
Northern Region (07) 4760 7402  
Email: gassafe@dme.qld.gov.au  
www.deedi.qld.gov.au

### *Electrical Safety Office:*

Ph: 1300 362 320  
www.eso.qld.gov.au

## ii. Types of solar water heaters

There are three main types of solar water heaters available:

- the roof-mounted solar hot water system
- the split solar hot water system
- heat pumps.

Whether you choose a split or roof-mounted solar hot water system or a heat pump is a decision for you and will depend on your individual property and household needs.

## Roof-mounted solar hot water system

The roof-mounted system is made up of solar collectors and a water storage tank. Both of these are installed on the roof.

The system's design is based on a principle called 'thermosyphon'. This simply means cold water is heavier than hot water, and so cold water will fall and hot water will rise.

The cold water in the solar collectors receives warm heat from the sun and so it rises into the tank. This heated water shifts cold water in the tank which then falls into the solar collectors where the process starts again.

The hot water is stored in the water storage tank until it is needed for use in the home. Any unused water that cools in temperature, simply returns back to the collectors for re-heating.

Roof-mounted systems are often referred to as 'passive' solar systems because they rely on the principle of thermosyphon, rather than an electric pump, to move the water through the solar collectors.

## Split solar hot water system

A split system consists of five key pieces of equipment:

- Solar collectors—which are mounted on the roof
- a water storage tank—installed at ground level and includes
  - a solar controller
  - small electric circulating pump
  - an electric or gas booster.



If you are considering applying for the Queensland Government Solar Hot Water Rebate, please note that each contractor (e.g. supplier, electrician, plumber etc.) involved in the supply and installation of your system must complete and sign the relevant section of your Application. Make sure you read the rebate Guideline and Application carefully before you purchase a system so that you understand the information you and your contractor(s) must provide.

The electric pump circulates water from the storage tank on the ground up to the collectors on the roof, where the water is heated by warm rays from the sun. It is then returned to the water storage tank, where it stays until it is needed for use in the home.

Often referred to as an ‘active’ solar system, the split system uses an electric pump to circulate the water through the collectors. A solar controller—which is designed to avoid energy wastage and overheating water in the storage tank—decides when the pump should run.

With the water storage tank installed discreetly on the ground, split systems have minimal visual impact, particularly when the solar collectors are mounted flush with your roof. They can be installed on any roof pitch, as the pump is responsible for moving the water through the solar collector. However, on some roofs, the panels may need to be angled with a pitch stand to maximise performance.

## Heat pump

Heat pumps are another clean energy option for heating water and are suitable regardless of roofline. Due to the fact that heat pumps do not require direct sunlight, they will produce hot water in any weather condition.

Heat pumps are also an option if a home’s design or location makes it difficult to install solar panels, or for homes in areas where there is a lot of frost. Heat pumps are also a good option for existing apartment complexes.

Heat pumps use proven technology which has been around for a long time in air-conditioners and refrigerators. They work by capturing heat from the surrounding air.

They are made of a water storage tank and a heat pump. The heat pump is either mounted on top of, or next to, the water storage tank. The heat pump consists of a condenser located around the outside of the water storage tank, a compressor and an evaporator.

Like an air-conditioner in reverse cycle, the heat pump works by absorbing heat from the air into the refrigerant gas within the evaporator. The compressor increases the pressure and temperature of the gas, and sends it through the condenser which is located in the water tank casing. Here heat energy is transferred to the water, the gas cools and then flows back to the evaporator in a continuous cycle.

Unlike solar collector systems, heat pumps cost a little more to run and make some noise, similar to a ducted air-conditioning system or pool filter when operating. Therefore it is recommended that heat pumps are not placed near bedroom windows or the bedroom windows of neighbouring properties.

## iii. Installation considerations

### Noise regulations

You should carefully consider where your system will be installed. You should also discuss with your supplier and installer any potential noise issues so that you are not in breach of noise control regulations.

### Building requirements

Depending on the structure of your house, some water heating technologies may not be suitable or may require structural modification. In these instances you should check requirements under the relevant building codes and seek independent professional advice.

Householders installing a solar water heater on a home in a cyclone zone – coastal areas from Bundaberg north – will require additional fixtures as part of their system installation. This is a compulsory requirement for residents in cyclone regions who install a system. This measure is aimed at protecting your household and the community in case of severe storms.

## Pitch stands

Depending on the shape of your roof (flat or curved) and the direction your roof faces, you may require a pitch stand to correctly orient your system. Your contractor(s) can confirm this after conducting an assessment of your home.

## Frost areas

Participants living in locations subject to frost should discuss this with their contractor(s) because standard 'open loop' solar collectors can be damaged by frost. Suitable flat collector solar systems are available, which are constructed with a 'closed loop' heating circuit running through the collectors filled with an anti-freeze liquid (such as ethylene glycol). Evacuated tube solar collectors and heat pump systems are usually suitable for use in all conditions, including frost areas.

There are other devices for standard solar water heaters such as frost valves and suppliers can provide more information about this.

If you are unsure if you live in a frost area, the Bureau of Meteorology has an indicative map available at [www.bom.gov.au](http://www.bom.gov.au). Please note that even if you live outside the identified area, your property may still be subject to occasional frost events. It is recommended you talk to long-term neighbours (and seek their experience), as well as your contractor(s).

Living in a frost area may have a significant impact on the warranty of the system you purchase. Please be sure you fully understand the implications frost may have before you purchase a system.

## Hard water

If the water you use is hard (typically from a bore or similar), a standard system may not be suitable. There are systems (such as flat collector solar systems) available that are constructed with a 'closed loop' heating circuit running through the collectors filled with an anti-corrosive liquid (such as ethylene glycol). This will ensure the hard water is not run through the smaller pipes in the collector circuit, reducing clogging from the build-up of scale and salts from the water. Other solutions may also be available, so talk to your contractor(s) as well.

Using hard water may have a significant impact on the warranty of the system you purchase. Please be sure you fully understand the implications hard water may have before you purchase a system.

## iv. Local council inspections

Some local councils have specific rules covering the installation of hot water systems. Check with your local council before installing your system to ensure you are complying with their requirements.

As of 1 January 2011 **all** plumbers need to have the occupational licence endorsement to install a solar or heat pump water heater. Your plumber must provide details of the work by submitting a Form 4 (Notifiable Minor Work) to your relevant local council.

An inspection may be undertaken by your local council as part of a random audit process.



### Hints on choosing the right system for you and your household:

- Get to know the market and find out about the range of solar water heaters, retailers, suppliers and installers.
- Determine the best system for your needs.
- Shop around for the best deal and obtain written quotes.
- Check your preferred system and installation meets the rebate eligibility criteria (see the Guideline and Application for more information).

Your local council may impose other fees and requirements (e.g. mandatory inspections to determine building code compliance). You should consult with your proposed contractor(s) and local council about all potential fees before you purchase a system.

For information on inspection fees and any rebates or discount vouchers that may be available, please contact your local council.

## v. Electricity tariffs

Installing a solar hot water system means you will only occasionally need to take electricity from the grid for water heating. However, switching to an economy tariff can help you save even more on your energy costs.

Connecting your new hot water system's booster element to the economy Tariff 33, offers electricity supply for 18 hours a day at a rate that is 40 per cent cheaper than Tariff 11 (which supplies electricity continuously).

The guaranteed 18 hours of electricity supply offered by Tariff 33 is, in most cases, more than enough time to heat the water in your hot water system if the sun isn't shining or at night. Electricity supply to appliances connected to Tariff 33 is restricted during times of peak electricity demand which usually occur between 4 pm and 9 pm.

Check your electricity bill to see which tariff your current system is connected to.

## Connect to Tariff 33 if your electric system is currently connected to Tariff 11

If your current hot water system is connected to Tariff 11, your new hot water system can be transferred over to Tariff 33, in most situations, with minimal work.

In some cases, additional wiring is required to hardwire the new hot water system to the switchboard, or to make room for a separate meter—in this case, you could choose to pay the additional cost and connect to an economy tariff. If you don't wish to pay for the extra work, your new solar hot water system booster will remain connected to Tariff 11 at no additional cost to you.

Before making any decision to change to Tariff 33, you need to consider how your household uses hot water.

Also, if you use very little hot water and plan to manually switch your booster on and off as needed, you may not realise full financial benefit from connecting your booster to Tariff 33 as a minimum charge may apply.

If you choose to transfer to Tariff 33 you need to let your electricity provider know so that the new rate is applied to your account, and your electrician will need to lodge relevant forms. Your electricity retailer may also charge a fee.

## Considerations if your water heater is connected to Tariff 31

Some hot water systems are connected to Tariff 31, which guarantees electricity supply for eight hours a day, generally between 10.00pm and 7.00am.

**Table: Domestic electricity tariff charges in Queensland**

|                  |                               |                                 |  |  |
|------------------|-------------------------------|---------------------------------|--|--|
| <b>Tariff 11</b> | 21.35 cents per kilowatt/hour | \$8.22 per month Service Fee    | Continuous electricity supply            | No restrictions                                |
| <b>Tariff 33</b> | 12.83 cents per kilowatt/hour | \$5.72 per month minimum charge | Electricity supplied min. 18 hours a day | Supply generally restricted 5.30 pm to 9.00 pm |
| <b>Tariff 31</b> | 8.71 cents per kilowatt/hour  | \$5.72 per month minimum charge | Electricity supplied min. 8 hours day    | Supply restricted 7 am to 10 pm                |

Rates current as at 1 July 2010 and subject to change.



If your existing electric water heater is connected to Tariff 31, it is strongly recommended you have it changed so that the booster is connected to Tariff 33. This does not require rewiring, only a visit by ENERGEX or Ergon Energy to re-program the tariff information at your meter box. This can be arranged by your electricity provider. If you prefer that your new system remains connected to Tariff 31, please notify the electrician that carries out your installation. You should consider this decision carefully, because although Tariff 31 is very economical, the restricted supply hours may result in you being without hot water from time to time.

If you decide to transfer to Tariff 33, you need to let your electricity retailer know so that the new rate is applied to your account and the metering re-programmed.

If you are unsure about which tariff to choose, you can contact your electricity retailer or ask the plumber and electrician installing your system for advice.

## **vi. Phase out of electric hot water systems**

Around 30 per cent of electricity used in the average Queensland household is for heating water, making hot water systems one of the highest single energy users and greenhouse gas contributors in the home.

Replacing an electric hot water system with a greenhouse efficient system is one of the most effective ways to save money on your energy bill. Most greenhouse efficient hot water systems generally have lower running costs than standard electric systems.

Electric hot water systems are being phased out all over Australia.

For Queensland, the second phase of the national hot water system phase out will begin in 2012, and will prohibit the installation of electric hot water heaters in all houses and townhouses. For households in reticulated

gas areas, please be aware of the current requirements as outlined below.

More information on the phase out of electric hot water systems can be found at [www.dip.qld.gov.au](http://www.dip.qld.gov.au)

### **Homes in reticulated gas areas**

In Queensland, since 1 January 2010 owners of existing houses and townhouses in Queensland located in natural gas reticulated areas have been required to install a greenhouse efficient hot water system (ie gas, solar or heat pump) when an existing electric hot water system needs replacing.

This initiative, part of Queensland's Climate Change Strategy, is the first of its kind in Australia and follows action by the Queensland Government to ban installation of electric hot water systems in all new houses and townhouses (class 1 buildings only) which came into effect on 1 March 2006.

If your residence is in an area with access to a reticulated gas network, any replacement system must be a greenhouse gas efficient water heater (ie gas, solar or heat pump). You are unable to replace an existing electric storage hot water system with another electric storage hot water system unless the electric system being replaced is still under warranty, when it can be replaced with another electric system.

Please note, the State Government has relaxed its rules under the Queensland Plumbing and Wastewater Code for households in a reticulated gas area that urgently need to replace an electric hot water system due to it being damaged by a natural disaster event. The amendment to the code allows households in this situation to replace their damaged electric hot water system with a like-for-like replacement. For more information please visit [www.dip.qld.gov.au/plumbing](http://www.dip.qld.gov.au/plumbing)

[www.qld.gov.au/solar](http://www.qld.gov.au/solar)

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