

Solar Hot Water Systems Explained

And a comparison of solar collector technologies

Solar hot water systems are the most efficient way to heat your hot water on the market today. The technology is mature and widespread, and is proven to negate rising energy costs and reduce greenhouse gas emissions. Conventional hot water systems are generally cheaper upfront than solar, but their lifetime running costs are significantly higher.

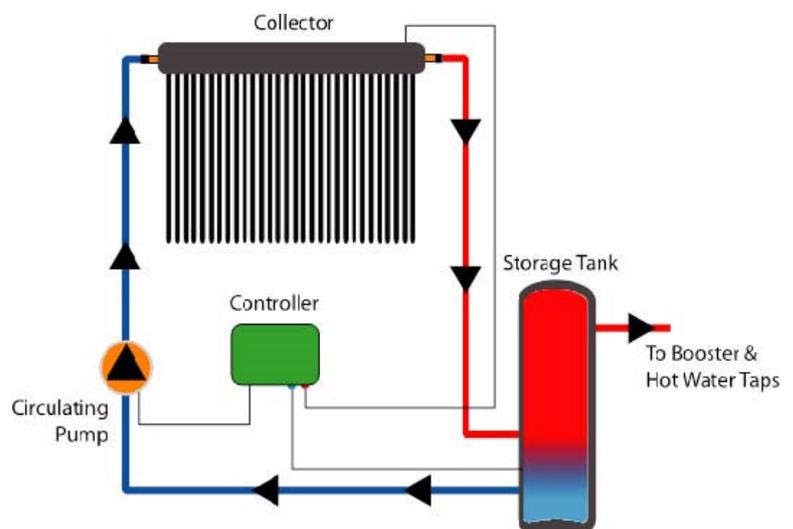
Benefits of solar hot water systems include:

- A reduction in energy use and savings of up to 90% off water-heating costs on an ongoing basis, depending on the climate and the model of the heater. This could potentially add up to thousands of dollars of savings over the lifetime of the system.
- Conserving our natural resources and reducing carbon pollution by more than 2,000kg per household per year. In Australia, most electricity is generated from coal-fired power stations and conventional electric hot water systems emit the most greenhouse gas emissions.

Conventional electric hot water systems are responsible for up to a third of a household's power use. ***"Electricity prices have risen significantly in recent years, and will continue to rise 20-40 per cent over the next few years."*** (Clean Energy Council)

Solar hot water heaters include a storage tank (mounted either on the ground or on the roof) and solar collectors. Solar hot water systems follow the basic heating process:

1. Sunlight is absorbed by the solar collector(s).
2. Cold water is circulated from the solar storage tank through the solar collector(s).
3. As water travels through the solar collector(s), it absorbs the sun's heat radiation, and returns to the solar storage tank ready to be used for showering, washing up, and other hot water needs in the home.
4. Process (1) and (2) continue throughout the day until the temperature in the solar storage tank reaches a predetermined level.



5. If there is inadequate sunlight to heat the water in the solar storage tank, a gas or electric booster is used to provide hot water to the house when you need it.

In Australia, there are different solar hot water heaters available. The two main types of solar collectors are evacuated tubes and flat plate panels.

Evacuated Tubes vs. Flat Plate Panels

As detailed above, in an evacuated tube system, water from the tank circulates through the solar loop and back to the tank. In a flat panel system, special heat transfer fluid called glycol is fed through a separate solar loop, which adds complexity and requires additional components.

Using a separate loop for the glycol fluid brings additional points of failure:

- The system requires scheduled maintenance, with regular top-ups
- Constant monitoring is required, to ensure correct levels and absence of leaks
- Should the glycol leak and mix with the water in the tank, the entire system must be flushed
- Glycol is poisonous! 16ml in an 80kg adult is considered a toxic dose requiring medical treatment

 <p>Endless Solar Evacuated Tubes</p>	 <p>Flat Plate Panels</p>
<ul style="list-style-type: none"> • More efficient than flat plate panels. Due to the round shape, more sunlight is captured. • Are able to capture sunlight at all angles. • Covered by longer warranties (Endless Solar Collectors carry a 15 year warranty). • Suitable for roofs North, East or West facing. • Naturally frost tolerant. They can withstand very low temperatures without the need for an antifreeze fluid (such as glycol). • Better at retaining the sun's energy due to the vacuum (i.e. experiences minimal heat-loss). • Will still operate normally with one or more tubes removed. Each tube is affordable and easy to replace. • Requires less roof space (generally ~5m²). • Effective during the winter months, and in cloudy conditions. • If damaged, replace only the broken collector (1 of 20 tubes pictured above) • Generally higher initial investment than flat panels. 	<ul style="list-style-type: none"> • Less efficient than evacuated tubes. The panel will capture most energy when sunlight is directly facing the panel. • Covered by shorter warranties (generally 5-7 years). • Generally only a North facing roof is suitable. • May require anti-freeze fluid (e.g. glycol) when installed in frost prone areas, which requires ongoing maintenance. • Susceptible to higher heat-loss especially during cooler periods of the year. • Can be quite costly to purchase and replace panels. If a panel is damaged, the entire panel may need replacement. • Require more roof space (generally ~8m²). • Much less efficient during the winter months • Flat panels are heavy, being one piece • If damaged, the entire panel may need to be replaced. • Generally less upfront cost than evacuated tube systems.



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The Endless Solar Difference

It is for the reasons above that Endless Solar chooses to only stock evacuated tube solar hot water systems. We are satisfied that the benefits far outweigh a small price premium, and would not supply our clients with an inferior product.

Furthermore, our unique collector design is one of the most efficient on the market today. Several independent international tests indicate our collector is up to 10% more efficient than our rivals (our angle of incidence modifier is 0.94 at 50 degrees).

For more information or to further discuss solar hot water systems,
feel free to call, email, or visit our website;

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Sources:

Clean Energy Council

<http://www.cleanenergycouncil.org.au/>

Australian Government - Living Greener

<http://www.yourenergysavings.gov.au/>

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Australian Government - Your Home page

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Sustainability Victoria – Household Energy Efficiency

<http://www.sustainability.vic.gov.au/services-and-advice/households/energy-efficiency>

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Choice Magazine – Solar hot water system buying guide

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