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Solar Thermal System Buying Guide

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When it comes to cutting down on your energy use, the benefits are clear – you save money and decrease your negative impact on planet Earth. Those who want to get serious about home energy use will look at options for generating their own power at home. Options here include harnessing the energy in wind, water, geothermal, or sunlight.

Given that one big source of energy use in the home is hot water, and that traditional electric hot water tank use a lot of electricity to keep upwards of 40 gallons of water hot for when you need it, solar thermal water heaters are often a good investment. In fact, of all the renewable energy options, solar thermal will probably give you the greatest return on investment. So, here's your buying guide for home solar hot water heaters.

Understanding the Basic Types of Solar Thermal Systems

Active/Passive: All solar thermal systems are either *active* or *passive*. A *passive* system works without you needing to do anything, like when your car is parked in the sun and it heats up. An *active* system, on the other hand, uses some kind of equipment to collect and store solar energy.^[i] In the case of solar hot water heaters, those that are active will use a pump to circulate the heated water throughout the house while a passive system will rely on convection or gravity. Active systems can reduce the cost of heating water as much as 90% while passive systems can decrease those costs by as much as 75%.^[ii]

Active Direct/Active Indirect: Active solar thermal systems come in two types. *Direct circulation systems*, also called *open loop active systems*, pump water directly through the solar collectors for heating and then throughout the house. *Indirect circulation systems*, also called *closed loop active systems*, pump a heat transfer fluid into the solar collectors for heating. The heated fluid then goes into a heat exchanger to heat water that is then pumped throughout the house. Direct systems are ideal for climates that rarely experience freezing temperatures. Indirect systems are suited for multi-purpose needs (home, pool, spa, etc.) and climates that experience freezing temperatures.^[iii]

Passive Integral/Passive Thermosyphon: Passive solar thermal systems also

come in two types. The *Integral collector* system, also called a *storage passage system*, heats cold water in the collector and then sends it into the conventional back-up water heater. It is ideal in climates that rarely experience below-freezing temperatures. The Thermosyphon system relies on a collector being installed below the storage tank so that as water is heated, it naturally rises into the tank and cold water sinks down to be heated.[\[iv\]](#)

Steps for Installing a Solar Hot Water System

1. **Calculate potential savings:** The US Department of Energy has a page that provides detailed information on [Estimating the Cost and Energy Efficiency of a Solar Hot Water Heater](#). If you'd rather use an online calculator than do the math yourself, check out [The Rheem Solar Calculator](#).
2. **Find a qualified installer:** If you decide to buy a solar hot water heater, you want to be sure it is installed by a qualified person. The North American Board of Certified Energy Practitioners (NABCEP) offers a [Certified Locator](#)

database of individuals who have satisfied its professional certification standards.

3. **Take advantage of tax incentives:** There are often both state and federal tax incentives for installing solar thermal systems, so be sure to find out what's available to you using our guide to [Green Energy Saving Tax Incentives, Rebates, and Programs](#).

More Information on the Benefits of Solar Thermal Systems

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The US Department of Energy has a great information page about [Solar Hot Water Heaters](#).

- SolarHot has a 48-page downloadable PDF publication called [A Guide to Selecting and Installing a Solar Hot Water Heater](#).
- The US Department of Energy also has a 20-page downloadable PDF publication called [A Consumer's Guide: Heat Your Water with the Sun](#).
- Mother Earth News has an extensive article about systems that meet home

heating and hot water needs at [Heat Your Home with Solar Hot Water](#).

[i] [How Solar Thermal Power Works](#), by Maria Trimarchi, HowStuffWorks. Retrieved from <http://science.howstuffworks.com/environmental/green-tech/energy-production/solar-thermal-power1.htm>

[ii] [Types of Solar Hot Water Systems/Solar Thermal Systems](#), from Superior Solar. Retrieved from <http://www.superiorsolar.com/types-solar-hot-water-systems-solar-thermal-systems>

[iii] [\(Types of Solar Hot Water Systems/Solar Thermal Systems, from Superior Solar\)](#)

[iv] [Solar Water Heaters](#), from the US Department of Energy. Retrieved from <http://energy.gov/energysaver/articles/solar-water-heaters>



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