

# Solar Domestic Hot Water

## Frequently Asked Question for homeowners

**Question:** Does my home have to be totally unshaded to use a solar domestic hot water system (SDHW)?

**Answer:** For optimum efficiency of your SDHW system there should be no shade on the panels from 10:00 am to 3:00 pm on a summer day. A solar hot water panel is roughly 27 sq. ft. (2.5 sq. m.), so you will need a non-shaded space on a south-facing roof that will accommodate the number of panels required for your hot water needs. A sloped roof can be used or a flat roof with panels mounted on racks is also possible. The amount of shading on the collectors four hours before or after solar noon is important to the performance of the solar panels. The position and height of trees and structures must be taken into account when locating the solar panels. Thought must be given to the effects of snow accumulation on or around the solar collectors. A flat plate panel only needs minimal sun to start the snow melting process from the panel.

**Question:** Do panels have to face due south?

**Answer:** In an ideal installation the panels will face due south and should be mounted at an angle equal to the latitude of the installation (44 degrees in the Kingston area). A deviation of 30 degrees either side of South or a deviation in angle plus or minus 15 degrees will only cause slight losses of performance. If an optimum orientation is desired, it often makes much more sense to add another solar panel than it does to purchase and build a roof rack to face the collectors due south and at the optimal angle. Normally, not only do these racks look ugly and have the potential to cause problems (e.g. wind loading), they also can cost as much as adding another collector. Usually in these situations, you will get more heat by installing another collector than by using an angle-correcting rack.

**Question:** Do SDHW systems work well here in Ontario?

**Answer:** SDHW systems work very well in Ontario. With proper installation and maintenance a solar water system can work trouble free for more than 20 years.

**Question:** How large a solar water heating system do I need?

**Answer:** Sizing a solar domestic hot water system for residential can be done by using two methods. The CSA standards rate systems for 150, 225 and 300 liters (33, 50, 66, Imperial gallons) per day. These ratings roughly correspond to the daily hot water consumption of 2-3, 3-4, and 5-6 adults. The second method is the number of square metres of solar panels per adult using hot water. Typically this number is 1 - 1.5 square metres per adult. This will achieve a

solar contribution of approximately 50% towards the hot water load. Larger solar fractions can be achieved by adding solar panels.

**Question:** How much maintenance is required on a solar water heating system?

**Answer:** A SDHW system requires very little maintenance. A closed loop SDHW system circulates a food-grade anti-freeze through the solar panel and a heat exchanger in/or at the solar storage tank. This fluid must be checked occasionally to verify that the fluid is still in good condition. The solar storage tank must also be checked occasionally. This could include a tank flush and anode check. The panels do not need to be cleaned as rain will do this. A monitoring device can be added to the SDHW system to determine the performance of the system.

**Question:** How much money will a SDHW system save?

**Answer:** Most SDHW systems are designed to provide approximately 50% of a home's hot water heating load. The actual amount of money that can be saved is based on the designed percentage and the type of fuel currently being used to heat your water. Typically if you are heating your hot water with electricity the savings will be 75% higher than those who heat with natural gas. Adding collectors to achieve higher production levels does not work if the hot water load and storage volume does not change. For example, adding a third collector to a 2 panel system will not provide 50% more energy. A gain of 20% to 25% will be achieved by doing this.

**Question:** Are there any government programs that pay part of the cost?

**Answer:** On the purchase of a system the Provincial government has a PST rebate on all solar equipment. Also a combined Federal and Provincial program makes it possible to receive up to \$1,000 (\$500 Federal, \$500 Provincial) back on "Approved" SDHW systems. To be eligible for the rebate you must have an energy audit performed on your home by an approved inspector. After the solar SDHW system is installed it will be inspected again to approve the rebate. An energy audit costs between \$250 and \$400 with a \$150 rebate also available.

**Question:** Do I still need my conventional hot water tank?

**Answer:** Yes your conventional hot water tank will stay in your home. SDHW systems are normally installed as pre-heaters, preheating the cold water that supplies your conventional water heater. The energy savings provided by the SDHW system depends upon how close the temperature of the cold water is raised to the hot water heater's delivery temperature.

**Question:** Can I combine a solar water heating, pool heating and space heating system?

**Answer:** Yes. Using the solar system to supply heat to several loads, available at different times of the year, is a smart way of improving the productivity of the solar system - as well as significantly improving its return on investment. Combined systems are more complex and must be built to meet the most severe conditions any of the different applications could present. For

example, the solar collectors normally used for outdoor swimming pools are unglazed and plastic. This type of solar collector will not collect heat in the winter and must be replaced with a glazed metal solar collector. Glazed metal collectors should not have residential pool water circulated through them. Because of this a heat transfer fluid loop, using antifreeze and a heat exchanger will have to be incorporated. This is okay because it facilitates providing heat to the other loads - the hot water and the space heating system.

### **Tips for Choosing an Installer**

Choosing an installer is vitally important. It will affect both the price you pay and the quality of the installation. Here are some suggestions of things to ask or to look for when looking for an installer:

- A reputable company will be happy to provide proof of training or accreditation of all employees that will be involved in the installation.
- Ask to which trade associations the workers belong. You can contact the association to ensure they are a member in good standing.
- Ask how long the company has been in the solar/geothermal/wind installation business under the same name.
- Ask for references from recent installations.
- Speak to the residents and visit the installations, if possible.
- Be sure you are clear on what guarantees are offered on installation and get it in writing.
- Determine how much of the work will be sub-contracted – get the same information on these companies.
- A written site inspection should be provided by the installer.
- Ask for an itemized quote – be sure the equipment you specified in the purchase is in the quote.
- Discuss timing and be sure you understand the phases of installation and how long it might take.
- Determine who is responsible for clean-up of the outside and inside, and to what degree.
- Ask if the company will come out to inspect the site after installation to ensure the equipment is working properly.