



# Solar Water Heating Systems Fact Sheet



## About Solar Water Heating

Kentucky has a good climate for using solar energy. A solar water heater can provide 50—80% of the energy needed by a home or business for heating water. For a typical Kentucky family, this can mean savings of \$150 to \$400 per year on their utility bills. By harnessing the energy of the sun, a solar water heater provides security against rising fuel prices.

Solar water heaters are very durable, require little maintenance, and have a long track record in the United States and around the world. Systems typically operate for over 25 years.

Solar water heating systems normally include a back-up conventional water heater (electric or gas) to ensure that there is hot water day and night, year-round, in the winter and on cloudy days.

### Environmental Benefits

Solar water heaters are not only a good investment, they are good for the environment. By using the sun's energy, a freely available, renewable resource, solar water heaters reduce our demand for energy from conventional sources such as fossil fuels and nuclear power. This means cleaner air and water, healthier communities, and reduced emissions of carbon dioxide, the main contributor to global warming and climate change. By reducing demand for coal, solar water heaters also help protect our mountains, streams, and forests. When you install a solar water heater, you help create a cleaner, safer environment for our children and future generations.

## Solar Water Heaters are used for:

- ♦ Residential water heating
- ♦ Heating swimming pools
- ♦ Radiant space heating systems

### Commercial applications for solar hot water:

- ♦ Hotels
- ♦ Laundries
- ♦ Car washes
- ♦ Apartment complexes
- ♦ Restaurants
- ♦ Food processing facilities
- ♦ Factories

**Public facilities** with high demand for hot water, such as schools, dormitories, public housing, and YMCA's, are also excellent candidates for solar water heating systems.

### Solar Access

Solar collectors need to be mounted in a sunny location that is free of shade throughout the year, especially between the hours of 10 a.m. and 2 p.m. The collectors must have a southern exposure, ideally facing within 45° east or west of due south. Consider how future developments, like tree growth and new construction, could potentially shade collectors.

Solar collectors are usually mounted on roofs. When mounted flush with the roof, they can resemble large skylights.

## The Kentucky Solar Partnership

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## Efficiency and Conservation First!

Before investing in a solar water heater there are many things you can do to use hot water more efficiently and reduce your demand for hot water. These steps will not only lower your monthly utility bills, but may allow you to install a smaller, and therefore less costly, solar water heater. Remember, saving energy is generally cheaper than producing energy, so start with conservation and energy efficiency.

Some simple ways to conserve hot water include installing low-flow showerheads, lowering the thermostat on your water heater to 120°F, adding insulation to your existing water heater, replacing an old washing machine with a high-efficiency Energy Star-rated washer, installing a timer on an electric water heater, and learning ways to use less hot water. To learn more, see [www.kysolar.org](http://www.kysolar.org).



High-efficiency front-loading washers save energy and water.

## Solar Water Heating Basics

The primary components of a solar water heater include solar collectors, a hot water storage tank, and a circulation system. Flat plate and evacuated tube collectors are the most common type of solar collector used for residential systems in northern climates. A heat transfer fluid is circulated through the collectors and then through insulated pipes to a heat exchanger. At the heat exchanger, the fluid transfers its heat to the home water supply. This heated water is then stored in an insulated tank until needed.

In Kentucky and other climates where freezing temperatures occur, solar water heating systems must provide protection against freezing. This is accomplished in a *pressurized glycol system* by using a non-toxic antifreeze solution (e.g. propylene glycol) in the solar collector and exterior plumbing, or by using a *drainback system*. In drainback systems, water (or propylene glycol) is pumped through the solar collectors only when there is heat to be gained from the sun. At night or during freezing conditions the water drains completely out of the collectors into a storage tank, preventing the system from freezing.

Pressurized glycol and drainback solar water heating systems have proven to be very reliable. The collectors and plumbing can last the life of the home. The circulating pump, storage tank, non-toxic antifreeze solution, and other components are subject to wear and need to be replaced periodically. The system should be

checked every five to ten years by a qualified technician. Average annual maintenance costs over the life of the unit are commonly about \$25.

When choosing solar collectors or hot water systems, look for the SRCC label and expect a minimum ten-year warranty on new solar collectors. The SRCC (Solar Ratings and Certification Corporation) tests and certifies solar collectors and package systems (which include the collectors, storage tank, pumps, and other components). The SRCC label assures that the system meets minimum industry standards for durability and performance.

Installing a residential solar water heater in Kentucky will typically cost \$4,000 to \$6,500 and will save a family about \$150 to \$400 per year on their utility bills. The price range for installing a system depends on the amount of hot water used each day, whether a new water storage tank is required, the size of the home, whether the system is installed by the homeowner or a professional contractor, and other factors.

The actual financial savings will depend upon the type of fuel used by the conventional water heater, the cost of fuel or electricity, the amount of hot water used in the home, and other factors. As energy costs rise, financial savings will increase as well.

**To find a solar installer near you** or to learn more about solar energy, contact the Kentucky Solar Partnership at 888-576-6527 or visit our website at [www.kysolar.org](http://www.kysolar.org).

## Federal & State Tax Credits for Solar & Energy Efficiency

### Federal Tax Credits for Solar Energy

**Residential Tax Credits** — For solar electric (PV) systems and solar water heaters placed in service after December 31, 2008, the tax credit is 30% of the equipment and installation cost, with no maximum tax credit. For systems placed in service *before December 31, 2008*, there is a \$2,000 cap on the tax credit. **Expiration date:** December 31, 2016.

**Commercial Tax Credits** — For solar water heaters, solar electric systems, and solar hybrid lighting, the tax credit is 30% of the equipment and installation cost, with no maximum limit. **Expiration date:** December 31, 2016.

### Kentucky State Tax Credits for Solar & Energy Efficiency

For equipment installed after January 1, 2009 and before December 31, 2015, Kentucky offers individual and corporate tax credits for the following: solar PV, solar water heating, active solar space heating, passive solar buildings, and wind turbines. For PV, the credit is based on \$3/watt and for the other technologies, the credit is valued at 30% of the cost of the system. The maximum credit is \$500 for individuals or \$1,000 for commercial properties. Tax credits are also available for various energy efficiency improvements and Energy Star homes.