RENEWABLE ENERGY

Solar hot water systems

FACT SHEET

BIOMASS

SOLAR

WIND

To learn more about Focus on Energy, call 800.762.7077 or visit focusonenergy.com

PHOTO COURTESY OF JEREMY BELOT

These roof-mounted flat plate solar collectors are connected by copper pipes to a heat exchanger plumbed to a solar storage tank, shown in the photo on reverse side.

Water heating is one of the largest energy expenses in the home, accounting for about 15 percent of residential energy costs. Today, more and more people are turning to solar hot water as a practical and sensible way to make a positive impact on the environment.

Solar hot water systems connect to a home's existing gas or electric water heating system to provide a renewable source for hot water. These systems can supply about half of the hot water needs of the typical Wisconsin residence. They're efficient, reliable and well proven for use in Wisconsin's climate.

ENERGY EFFICIENCY FIRST

Before investing in a solar hot water system, it is important to first make the existing hot water system as efficient as possible. Simple conservation steps can reduce the hot water requirements of the home and enable the conventional equipment to operate more efficiently.

These steps include:

1) Installing low-flow showerheads or flow restrictors in showerheads and faucets
2) Replacing older water heaters and insulating all hot water pipes
3) If you don't have a dishwasher, or if your dishwasher is equipped with its own automatic water heater, lower the thermostat on your household water heater to 120°F

SOLAR HOT WATER BASICS

Solar hot water systems consist of three major components: the solar collectors (panels), a storage tank and a circulation system. Collectors for solar water heating come in two main types—flat plate and evacuated tube collectors. Flat plate collectors are composed of an insulated aluminum box with a tempered glass front. Behind the glass is a flat black absorber plate connected to a grid of copper pipes. Evacuated tube collectors use a row of sealed glass tubes, with each tube containing an absorber plate to soak up the solar energy.

Insulated pipes connect the collectors to a liquid-to-liquid heat exchanger which is plumbed to the solar storage tank. This tank, which is usually slightly larger than that of a traditional water heater, stores the solar-heated water and supplies it to your existing water heater.

Most cool-climate solar hot water systems circulate a non-toxic antifreeze mixture to heat the water in the storage tank. When the sun shines on the collectors,

PHOTO COURTESY OF MITCHELL'S HEATING AND COOLING

(above) **These ground-mounted evacuated tube collectors consist of rows of parallel, sealed glass tubes. Each tube has an absorber plate that carries the heat up to the insulated header pipe.**

(right) **Solar collectors send pressurized solar fluid here—to a solar storage tank located in the homeowner's basement near the conventional water heater.**

PHOTO COURTESY OF CHET'S PLUMBING & HEATING INC.

the fluid absorbs the solar energy and becomes hot. A pump circulates the fluid from the collectors through the insulated pipes to the heat exchanger, which transfers the heat from the fluid to the water in the solar storage tank. The fluid is then pumped back to the collector and the process begins again.

Solar hot water systems are very reliable, with a long and successful track record in Wisconsin. The collectors and insulated piping can last the life of the home. The circulating pump, the tank, the non-toxic antifreeze mixture and other minor components are subject to wear and tear and may need to be replaced eventually. The system should be checked every five to ten years by a qualified service technician. Expect the average annual maintenance costs to be around $30.

Solar hot water system costs vary depending on a number of factors, such as the layout of your site and the hot water needs of your home. When purchasing a system, Focus on Energy recommends obtaining bids from three contractors to help you find the installer that's right for you. Typical return on investment, with current incentives, averages between 5 percent and 15 percent, saving $100–$400 per year in energy costs, depending on the type of fuel your conventional water heater uses, the cost for water-heating fuel and the amount of hot water your household uses.

SOLAR ACCESS IS IMPORTANT

To benefit from a solar hot water system, you will need to ensure that your site receives adequate sunlight. If you are uncertain whether your property is suited for a solar hot water system, you can request a site assessment by calling the Focus on Energy Info Center at 800.762.7077 or visiting focusonenergy.com/siteassessments.

Solar hot water panels require approximately 100 square feet of roof or ground area, and they work best when placed within 30 degrees of due south. For maximum daily power output, solar collectors should be exposed to the sun for as much of the day as possible, especially during the peak sun hours of 10 a.m. to 2 p.m. Consider both summer and winter paths of the sun, as well as tree growth and future construction that may cause shading. The southern exposure should be free of obstructions such as trees, hills and buildings. Also, check with your city and county zoning offices and your homeowners association to find out about any local zoning laws or covenants that may restrict solar collector placement.

FOR MORE INFORMATION

Focus on Energy
focusonenergy.com

Midwest Renewable Energy Association (MREA)
the-mrea.org

Solar Energy Industries Association (SEIA)
seia.org

American Solar Energy Society (ASES)
ases.org

Solar Rating and Certification Corporation (SRCC)
solar-rating.org

The New Solar Home Book, B. Anderson and M. Riorden, Brick House, Amherst, NH, 1996.

"Solar Water Heating Technical Spec Sheet," Wisconsin Public Service Corporation, 1999

Focus on Energy works with eligible Wisconsin residents and businesses to install cost effective energy efficiency and renewable energy projects. Focus information, resources and financial incentives help to implement projects that otherwise would not be completed, or to complete projects sooner than scheduled. Its efforts help Wisconsin residents and businesses manage rising energy costs, promote in-state economic development, protect our environment and control the state's growing demand for electricity and natural gas. For more information, call **800.762.7077** or visit **focusonenergy.com**.

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