Just the Facts About ...

Solar Hot Water

Energy Wise Homes

Solar Energy

Solar energy is a clean renewable source of light, heat and electricity. Now it is easier than ever to harness the power of the sun for use in your home.

Developments in solar technology, and experience gained by industry professionals, have increased the efficiency and reliability of solar energy systems. Proven technologies are now more affordable to homeowners and businesses. In addition, state tax incentives make solar energy a wise investment for everyone.

There are two primary types of solar energy systems: solar thermal systems and solar electric systems. For more information on solar electric systems, see our Fact Sheet on "Solar Power."

Environmental Benefits

Solar thermal energy systems help prevent global climate change by reducing carbon dioxide (CO2) emissions. Carbon dioxide is a primary greenhouse gas that causes global warming. Solar energy systems can provide heat or hot water without producing any carbon dioxide emissions.

For example, if you install a solar domestic hot water heater with a 100 gallon capacity, and use the system for one year, you reduce carbon dioxide emissions by nearly 12,000 lbs. That is the amount equal to the emissions produced from driving approximately 15,000 miles in an average passenger car. It is also equal to the amount of carbon dioxide absorbed by two acres of trees in a year.

Solar Thermal Systems

Solar thermal systems use solar collectors to absorb the sun's light and change it into heat energy. Solar collectors heat a fluid, which is then used to provide either hot water for household use or heat for the home. Some thermal systems produce warm water that is used to heat swimming pools.

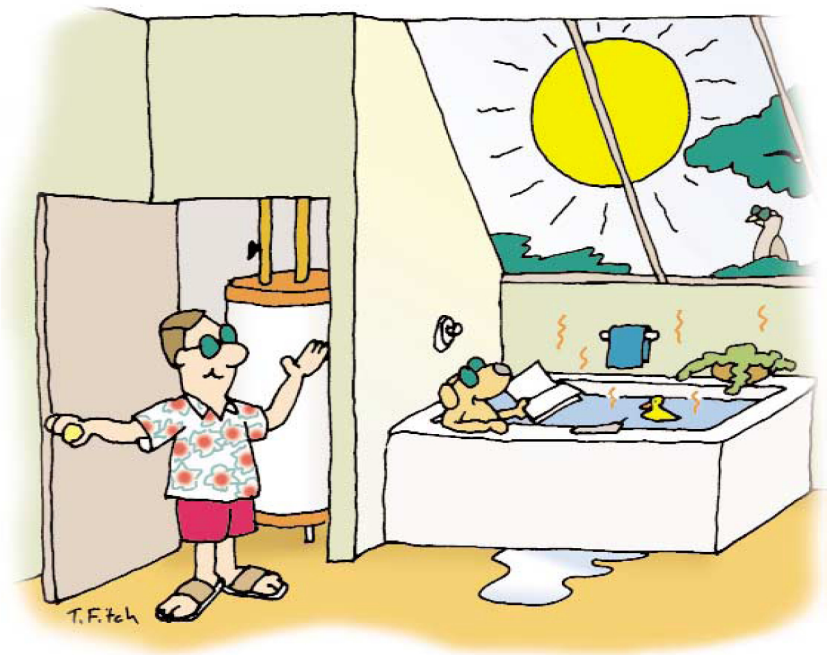
Domestic Hot Water

Solar domestic hot water systems use the sun to heat either water or a heat-transfer fluid, such as a water-glycol antifreeze mixture. This is done in collectors, which are usually mounted on the roof. Some systems use an electric pump to circulate the fluid through the collectors.

In systems with heat-transfer fluids, the fluid absorbs heat from the collector and then passes through a heat exchanger. The heat exchanger, which generally is in the water storage tank inside the house, transfers heat to the water. Such designs are called "closed-loop" (or "indirect") systems.

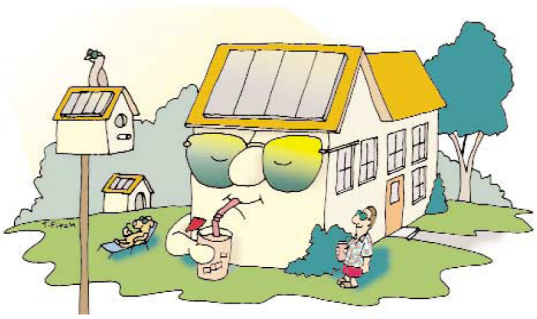
Once the water is heated, either directly or via heat transfer, it is stored in a tank similar to a conventional gas or electric water heater tank.

The two main types of solar collectors are flat-plate collectors and evacuated-tube collectors.



Flat-Plate Collectors

Flat-plate collectors are the most common collector for residential water-heating and space-heating installations. A typical flat-plate collector consists of an insulated metal box with a glass or plastic cover, called "glazing," and a dark-colored absorber plate. Sunlight passes through the glazing and strikes the absorber plate, which heats up, changing solar radiation into heat energy. The glazing allows the light to reach the absorber plate but reduces the amount of heat that can escape.



The heat energy produced in the collector is used to heat a liquid as it flows through tubes, in or adjacent to the absorber plate. The simplest liquid systems use household water, which is heated as it passes through the collector and then flows to the house to be used for bathing, laundry, etc. This design is known as an "open-loop" or "direct" system.

In areas where freezing temperatures are common, liquid collectors must either drain the water when the temperature drops, or use an antifreeze type of heat-transfer fluid.

Evacuated-Tube Collectors

Evacuated-tube collectors consist of rows of parallel transparent glass tubes, in place of the absorber plate in a flat-plate collector. The absorber tubes are cylindrical in shape. Therefore, the angle of the sunlight is perpendicular to the absorber for most of the day, which enables these collectors to perform well even when sunlight is diffuse, and are particularly useful in areas with cold, cloudy winters. Evacuated-tube collectors usually heat water to fairly high temperatures.

In evacuated-tube collectors air is evacuated from the space between the tubes, forming a vacuum. This vacuum minimizes heat losses to the outdoors, making the collector more efficient.

Evacuated-tube collectors are available in a number of designs. While they can achieve both higher temperatures and higher efficiencies than flat-plate collectors, they are also more expensive.

State Tax Credit

Maryland residents can now receive state income tax credits for installing solar energy systems on their homes. Homeowners can get a credit of up to $2000 for a solar photovoltaic (PV) system, and up to $1000 for a solar hot water heating system.

The tax credit is based on 15% of the total cost of the system (before any grants). This program will be available through the end of 2004.

Forms to file with your income tax return are available through the State Comptroller's Office, or at the Montgomery County Department of Environmental Protection.

For more information on the tax credit, call the Maryland Energy Administration at:

1.800.72ENERG

Old Solar Systems

During the 1970s a number of people utilized federal tax credits and had solar water heating systems installed. Unfortunately, the incentives were so great that some businesses sprang up almost overnight to take advantage of them. The solar industry is still recovering from the image problems created by these "fly-by-night" companies. During this period some of the systems were put in by inexperienced installers, and some of the companies that sold the systems went out of business before any needed repairs could be done.

Luckily, a lot of older solar systems can be repaired or refurbished with very little expense. If you have a solar system that is not functioning, or not functioning well, call DEP to find out about making it work.

Local Companies

MDV-SEIA is the local association of solar energy companies. MDV stands for Maryland, D.C., and Virginia, and SEIA stands for Solar Energy Industry Association. There are currently about 40 member companies.

You can find a local company to provide information or installation of a solar system through MDV-SEIA, by going to their web site at:

www.mdv-seia.org

For a list of MDV-SEIA members, call the Department of Environmental Protection, and ask for the Energy Planner.

For more information:

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