

# SUN

How solar energy can heat your house and water

By Deborah R. Huso

Sunshine feels good anytime, but it's especially nice when it offsets your home heating and cooling expense. While many of us may associate solar energy with high-cost photovoltaic systems, passive solar energy systems take advantage of the sun's energy through design, site placement and thermal mass.

While it's easier to take advantage of passive solar energy in new construction, homeowners can also use some of its concepts in existing homes. Leigh Seddon, president of Solar Works, Inc., in Montpelier, Vt., says the first thing homeowners should consider is the building envelope. Good insulation and good insulating glass are important for holding in the heat gained by the sun. The second key, he says, is the orientation of the home. The long axis of the home should face south and have many windows to take in the warmth of the sun on winter days. And thirdly, homeowners should build in a storage capacity for the sun's natural warmth by tiling floors or even building on a south-facing sunroom. "You can reduce energy consumption by up to 30 percent by building a passive solar home," Seddon says.

Francis Wessel of Goochland County, Va., uses lots of south-facing glass on his home as well as tile floors to draw in and store heat in winter. Ken Schaal, owner of Commonwealth Solar in Ashland, Va., says the Wessels can enjoy 70-degree warmth in their home on a winter day with exterior temperatures in the 40s just by taking advantage of passive solar gain without any auxiliary heat running.

But even if you're living in a house that doesn't meet the site orientation or design that's ideal for solar gain in the wintertime, you can still make some small, low-cost adjustments to your home to take advantage of solar energy. "The placement of trees, for example, can make a big difference," notes Schaal. The south side of a home should have minimal coverage from trees, while trees can be beneficial on the west side of the home by cutting down on heat gain in the summer.

Another option for shading your home from sun in summer are solar screens, which are relatively inexpensive but can cut down significantly on the sun's infiltration through windows. Even standard window shades will help as long as they're white and, therefore, reflect light. In winter, you can

reduce heat loss by using window quilts on a track system, which can provide an insulating benefit as good as many double-paned insulated windows, according to Schaal.

"If you have a well-insulated, high-mass house, even a heat pump can do pretty well," he adds, not-



Kenneth Schaal, Commonwealth Solar


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ing that homeowners need to pay attention to air infiltration. An often-overlooked area is the crawlspace, which, if vented and uninsulated, can lead to cold floors and major heat loss.

Seddon says other commonly overlooked areas of heat gain in summer and air infiltration in winter are old or poorly installed skylights and recessed lights. Big skylights can let in a lot of heat in summer; and often, recessed lights lack insulation and can let in cold air from roof and attic spaces.

Even a home that wasn't designed to take advantage of southern exposure can benefit from a well-placed sunroom on the home's south side that will draw in a lot of natural heat in winter. Seddon says installing tile floors over concrete will create a storage area for the heat to preserve its warming effect even once the sun has gone down.

Homeowners can use the sun to decrease energy costs even more by installing a solar water heater. The water heater works by having active solar collectors on the roof with a metal plate under glass that helps heat water. While a solar water heater can cost anywhere from \$4,000 to \$7,000, long-term savings can be substantial. "Hot water is the second-highest energy consumer in a home after the HVAC system," notes Seddon. North Carolina offers tax credits to homeowners who install solar water heaters, thus minimizing the initial financial outlay.

However you try to beat rising energy costs, remember that the home functions best when all of its parts are working together. That means preserving the benefits of an efficient HVAC system by closing up air gaps, insulating properly, installing energy efficient windows, or sealing leaks around those already installed. It also means taking advantage of natural warmth when it's available and the natural cooling effect of shade through roof overhangs and trees. 

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## TO LEARN MORE

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