

## Solar Panels and Systems



### Overview

Installing solar panels for your home and undergoing a home energy retrofit to reduce your electrical consumption at the same time is a smart way to make yourself more energy independent. Generating solar power in an efficient home will maximize the amount of power you generate and potentially sell back to your utility.

### Solar Panels, Solar Water Heaters and Passive Solar

**Solar Panels:** There are a lot of ways to capture the sun's natural energy and use it to power and heat your home. The most commonly known systems are solar panels, which are also known as solar energy systems or photovoltaic systems. A solar energy system consists of photovoltaic cells in a solar panel array, a solar inverter that converts solar energy into AC power (which you can use to power your home), monitoring equipment, and an updated electricity meter that keeps track of any power sold back to your electric utility.

Under the right conditions, a solar panel system is a good choice for generating renewable energy for your home. In order for the system to be cost-effective, you should contact a solar installer who can analyze the potential site for overall sun exposure. If a large tree or building shades the site for most of the day, reducing the system's overall sun capture, solar panels may be a poor choice, and you might want to consider a different type of renewable energy. The U.S. Department of Energy's, Energy Efficiency & Renewable Energy website, has more information about solar, as well as a map where you can see your region's solar potential.

**Solar Water Heaters:** While solar panels can convert the sun's energy into electricity, solar water heaters, also known as solar thermal systems, use the sun's heat to pre-heat water. The water runs through pipes that are exposed to the sun (usually on a rooftop) before flowing into the hot water heater. Solar water heaters do not produce electricity, but by pre-heating the water, your hot water heater uses a lot less energy overall to heat your water.

**Passive Solar:** Passive solar heating relies on direct sunlight warming parts of the house that absorb, retain and slowly radiate heat. You don't need solar panels for this kind of "free" heating, just well-placed windows and a heat absorbent mass like an interior brick wall or an interior wall of water jugs. Sunlight shining through windows warms the water or brick during the day and the mass slowly releases that heat during the night. If you own a pool, using passive solar can save you a lot of money on your utility bills because pools, on average, are the number one energy consumers on a residence. To help take advantage of the naturally heated water, there are tanks that can be added to your pool system that will store heated water for later use.

Taking advantage of solar can be a major investment, and it's recommended that you consult with an energy auditor or energy retrofit contractor to find additional ways to minimize your use of electricity. You may find that by making your home more efficient, you can get a smaller – and therefore less expensive – solar panel system and still meet your home's electricity needs. Furthermore, if your utility supports "net metering" and pays full value for excess energy that you sell back to it, this will have a major effect on the return on investment for your solar panel system.