

# CONSUMER GUIDE TO A SOLAR SYSTEM

The future of energy, now.



## WHAT IS SOLAR ELECTRICITY?

Solar electricity or photovoltaics is the use of sunlight to generate electricity. The process, although somewhat complicated, is familiar to most of us in the form of solar powered calculators which use small photovoltaic (PV) cells to power the device.

## DOES SOLAR ELECTRICITY MAKE SENSE IN MINNESOTA?

Virtually every region in the United States has sufficient solar energy to produce electricity from the sun, and Minnesota is no exception. Today, there are over 4,000 kilowatts of installed solar electric capacity in Minnesota. In 2008, the U.S. Department of Energy named Minneapolis-St. Paul as one of 25 Solar America Cities.

## WHAT ARE THE BENEFITS OF SOLAR ELECTRICITY?

Solar electric systems have low maintenance and operating costs and can produce electricity for 30-50 years. Solar electric is a source of non-polluting power and helps mitigate climate change by reducing fossil fuel consumption. It also diversifies the energy supply and increases Minnesota's energy independence. Solar electric investment creates local jobs and stimulates the local economy, as well.

## WHAT ARE THE CHALLENGES OF SOLAR ELECTRICITY?

Siting a solar electric system can be a challenge since any shading from obstructions significantly reduces the system's performance. Our NABCEP certified installers will perform a site assessment and choose the best location based on their findings.

## WHAT DOES SOLAR PV COST?

The first step in a solar electric project is to implement efficiency and conservation measures to reduce overall energy use. Solar investment can be reduced by thousands for every 1,000 kWh per year eliminated. The cost of a solar electric system varies with the size and type of system and available incentives. A typical 2 kW residential system (which might provide 2,400 kWh per year) costs about \$14,000- \$18,000 installed, before incentives.

## WHAT INCENTIVES EXIST FOR SOLAR ELECTRICITY?

There are federal tax credits for business or residential solar PV systems installed before 1/1/2016. In addition, Minnesota exempts solar equipment from sales and property tax. Many solar electric systems will also qualify for Energy Efficient Mortgages through the FHA. Some utilities offer a rebate as well.

## FOR MORE INFORMATION...

To learn more about solar energy options, check out: National Renewable Energy Laboratory: [www.nrel.gov](http://www.nrel.gov) Department of Energy: [www.eere.doe.gov](http://www.eere.doe.gov) Database of State Incentives for Renewables and Efficiency: [www.dsireusa.org](http://www.dsireusa.org) Minnesota Renewable Energy Society: [www.mnrenewables.org](http://www.mnrenewables.org) Minnesota Dept. of Commerce, Division of Energy Resources: <http://mn.gov/commerce/energy>

## WHAT IS SOLAR THERMAL ENERGY?

Solar thermal technologies use sunlight to provide heat for domestic hot water, space heating, industrial process heat and heating swimming pools. Solar thermal systems generally fall into two categories: passive solar design, which allows heat from the sun to be absorbed and stored by building components (like concrete or stone surfaces) and active systems, which use collectors and mechanical components to provide thermal energy to a building. Solar thermal systems are meant to supplement a building's primary hot water and space heating systems; they are not intended to replace them.

## IS SOLAR THERMAL ENERGY EFFECTIVE IN MINNESOTA?

Solar energy is plentiful in Minnesota. For example, a typical solar water heating system in Minnesota can provide 50 to 75% of the total energy required for domestic hot water. Space heating requires a larger system, but is effective in significantly reducing a building's need for other energy resources like natural gas, fuel oil, or propane. Space heating can be achieved with solar hot water or solar hot air panels (which use solar radiation to heat air inside the collector and transfer warmed air into the interior space). Minnesota has manufacturers of both technologies.

## WHAT ARE THE BENEFITS OF SOLAR THERMAL ENERGY?

Solar thermal energy is a renewable, sustainable energy source and can be a cost effective and reliable way to provide hot water and heat for buildings. Passive solar building design can make your building more comfortable. In addition, solar thermal is a strategy for addressing climate change, diversifying our energy supply, increasing Minnesota's energy independence, and boosting the state's economy.

## WHERE SHOULD SOLAR THERMAL SYSTEMS BE LOCATED?

Not every site is well suited for solar thermal applications. Still, solar thermal siting requirements are much more forgiving than those of solar electricity. Therefore, solar thermal is more versatile and appropriate for a greater number of locations. If you have a roof (for solar thermal) or vertical wall space (for solar hot air) with good southern exposure, free of trees, buildings and other obstructions, your site might be suited for a solar installation. A more formal site assessment done by a solar contractor can more accurately determine the solar potential of your site.

## HOW MUCH DO SOLAR THERMAL SYSTEMS COST?

Solar hot water is one of the most cost-effective solar technologies available; solar hot air collectors can be cost-effective, too. The installed cost of a solar hot water system is approximately \$8,000 - \$12,000 for a typical residential installation (before incentives). For a residential system that combines both water and space heating, the range is \$18,000 - \$25,000 or more. Solar hot air installations for space heating start at \$5,000.

Energy efficient mortgage financing is one way to make a solar thermal system more affordable. Rolling the cost of the system into a mortgage alleviates the need for a large upfront expense and distributes the cost of the system over a number of years. The FHA 203(k) program enables a home buyer or investor to obtain a single loan to finance both property purchase and complete major improvements (like a solar thermal system) after closing.

## WHAT INCENTIVES EXIST FOR SOLAR THERMAL TECHNOLOGIES?

There are often state and utility rebates available to business and residential installations; check [www.dsireusa.org](http://www.dsireusa.org) for the latest information.



*The information contained in this brochure is from the  
MN Dept of Commerce, Office of Energy Security.*

ZENERGY by West Central Telephone 1-888-ZEN-RG4U  
[www.ZenergyGuide.com](http://www.ZenergyGuide.com)