



Steps in the Solar Electricity Series

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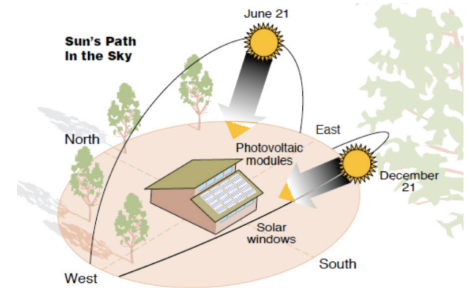
For more energy information, go to <http://energy.tennessee.edu>.

Building and Site Assessment

Answering these questions will help you determine if a solar electric system will work for your building or site.

1. Do you have a south-facing roof?

Because Tennessee is in the northern hemisphere, PV panels (modules) need to face south for maximum performance. This placement allows panels to take full advantage of the sun's path in the sky. The sun shines longest on a building's south side. Southeast- and southwest-facing panels will perform about 5 percent less efficiently. "Sun tracking" solar systems are also available that will follow the sun's path throughout the day and year and are more efficient but more costly.



Courtesy of DOE/NREL

Yes! — Move to Question #2

No — Other options: PV panels can be used as structures such as a porch cover, window awnings, or be ground or pole-mounted. If you cannot place PV panels to face south, a solar electric system will likely not be an efficient investment. Panels can be mounted on east- or west-facing roofs to face south, but they stick up, are highly visible, and can be unattractive. Architects and builders can address this by designing "solar ready" buildings and integrating solar technology components into their designs.



Courtesy of DOE/NREL

2. Does your roof have enough space for PV panels?

The rule of thumb for PV panels is 100 square feet of space is needed for every kilowatt (1kW = 1,000 watts) of electricity produced. For thin-film PV materials (such as solar shingles), about 175 square feet of space per kW is needed.

Yes! — Move to Question #3

No — Options: If your roof does not have enough space, review the Options section under the previous question.



Courtesy of DOE/NREL

3. Is your roof unshaded?

Photovoltaic panels are very sensitive to shading. Any shading will dramatically reduce electricity generation. Installers use a Solar Pathfinder device to determine if there are shading concerns from trees (consider mature height), chimneys, nearby buildings, etc. Keep in mind the sun's path changes throughout the year. For maximum electricity production, make sure panels will be unshaded year-round (especially from 9 a.m. until 3 p.m.).

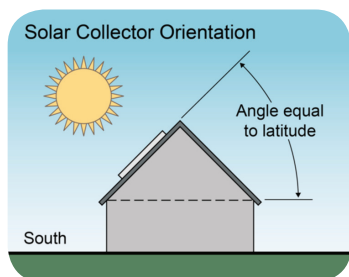


Yes! — Move to Question #4

No — If the shade is from landscaping, consider removing the plants. However, before removing, consider the age and location of the tree because large, mature trees can help to lighten air conditioning load in hot summer months and remove carbon dioxide from the air. Check local and state codes regarding "solar access" rights if a neighbor might produce shade on any solar system you are considering. Also, some neighborhood associations and local governments have restrictions on the construction and use of solar electric systems which are

addressed in some states with “solar access” rights. For additional information on solar easements, see the Pre-Installation section of Factsheet 7. If some shade is inevitable, ask the installer about micro inverters. These allow for some panels to continue working while others are shaded, whereas a single shaded module in a string of modules essentially takes the entire string out of production.

4. What is the angle of your roof?



Courtesy of DOE/NREL

Installers typically mount panels directly (flush) on an existing south-facing roof for aesthetics. To maximize electricity generated year-round, mount modules at an angle equal to or close to your

site's latitude (35-36 degrees, or a roof pitch of 8-12 for Tennessee). A tilt of plus or minus 10 degrees from ideal will not significantly reduce the output of your system.

Flat Roofs: Panels on flat roofs often found on commercial, industrial and institutional buildings can be mounted at any angle to maximize energy production and should not be placed flat (horizontal) because of significantly reduced efficiency.

5. Is your roof in good condition?

Most roofs can safely support PV panels and mounting system weight. The rule of thumb is 3 to 5 pounds per square foot depending on the panel type and installation method. For example, a 230-watt crystalline panel (3.5 feet x 5.5 feet) weighs about 50 pounds. An installer should determine if the roof/structure can handle the added weight. Innovative mounting systems can make panel removal easy, but because panels can last 30-plus years, it may be less expensive and labor intensive to make needed roof repairs before installing panels. Never install a PV array over a roof that needs replacement.

Yes! — Move to What's Next?

No — Options: Complete any needed repairs first. If considering a new roof, contact a PV system installer/contractor for roof options/recommendations that might make panel installation easier or less expensive. PV cells can also be incorporated directly into the roof through the use of thin-film solar shingles.

What's Next?

If you answered yes to every question, or can make adjustments where you answered no, your building or site may be a good solar electric system candidate! A system supplier or installer can provide a more detailed assessment. Next, consider how conservation and efficiency measures can result in an efficient and affordable system; then, learn about system options.

References

- Department of Energy's Database of State Incentives for Renewables and Efficiency (DSIRE). (2013-2014). Solar Access Laws. Retrieved Jan. 10, 2014, from <http://www.dsireusa.org/solar/solarpolicyguide/?id=19>.
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- National Renewable Energy Laboratory (produced) for U.S. Department of Energy. (2009, January). Own Your Power! A Consumer Guide to Solar Electricity for the Home. DOE/GO-102009-2656.

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