E³A: Solar Electricity for the Home, Farm or Ranch

Steps in the Solar Electricity Series

Building and site assessment

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

Do you have a south-facing roof?

Photo credit: DOE NREL

Because Missouri is in the northern hemisphere, PV panels need to face south 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.

- Yes — Move to the next question.
- No — Options: PV panels can be used on structures, such as porch covers or window awnings, on the ground or on poles. If you cannot place PV panels such that they face south, a solar electric system might not be a good investment.

Does your roof have enough space for PV panels?

As a rule of thumb, PV panels need 100 square feet of space for every kilowatt (kW) of electricity produced. Thin-film PV materials such as solar shingles need about 175 square feet of space per kW.

- Yes — Move to the next question.
- No — Options: If your roof does not have enough space, review the options for the previous question.

Is your roof unshaded?

Photo credit: DOE NREL

Any shading will dramatically reduce electricity generation. Installers use a device called a solar pathfinder to determine if there are shading concerns from trees (consider how tall they will grow to be, not just how tall they are), chimneys, nearby buildings, etc. Additionally, 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. to 3 p.m.

- Yes — Move to the next question.
- No — Options: If the shade is from landscaping, consider removing the plants. Check state and local laws regarding solar access rights if a neighbor's property might cast shade on any solar system you are considering. See the *Installation* section of this series of guides for more information. If some shade is inevitable, ask the installer about microinverters.

What is the angle of your roof?

Installers typically mount panels flush on an existing south-facing roof for aesthetic reasons. To maximize electricity generated year-round, mount modules at an angle equal or close to your site's latitude (38 degrees for Columbia, 37 degrees for Springfield, 40 degrees for Trenton). Installers can tilt at an angle suited to your site, system type and electricity needs.

For greater summer electricity production, tilt at latitude minus 10 to 15 degrees. For

greater winter production, tilt at latitude plus 15 degrees.

Panels can be angled on flat roofs often found on commercial, industrial and institutional buildings. However, they should not be placed flat because snow buildup will block sunlight.

Is your roof in good condition?

Most roofs can safely support PV panels and mounting system weight. The rule of thumb is 2 to 5 pounds per square foot depending on the panel type and installation method. For example, a 230-watt crystalline panel (3½ by 5½ feet) weighs about 50 pounds. An installer should determine if the structure can handle the added weight. Innovative mounting systems can make panel removal easy, but panels can last more than 30 years, so it might be less expensive and labor-intensive to make needed roof repairs before installing panels.

- Yes — Move to the next question.
- No — Options: Complete any needed repairs first. If considering a new roof, contact a PV system installer or contractor for roof options and recommendations that might make panel installation easier or less expensive.

What's next?

If you answered yes to every question or can make adjustments where you answered no, your site is a good candidate for a solar electric system. 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.

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