

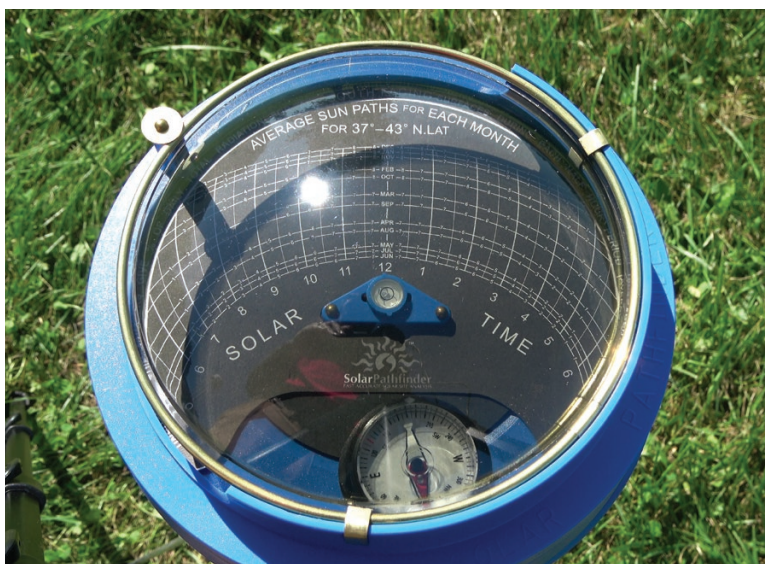
Q We are doing a whole-house remodel for a client who wants to add rooftop solar. There are a couple of places on the house facing west and south where it seems like solar panels would work well, but there are also quite a few trees on the site. We would like to advise our clients on the best location for the panels. How does one go about evaluating a site for placing photovoltaics?

A *Drew Schiavone, energy conservation and technology specialist at the University of Maryland, responds:* South-facing rooftops are ideal for solar installations in the northern hemisphere as they receive the most sunlight throughout the day, maximizing energy production and efficiency. The sun rises in the east and sets in the west, reaching its highest point in the southern sky around noon. South-facing panels are oriented to capture this path, ensuring they receive direct sunlight for the longest period each day. West-facing rooftops can be suitable in some cases, particularly if your energy consumption peaks in the late afternoon and early evening. Although west-facing systems generate less power overall compared with south-facing panels, they can help meet peak demand times.

You're right to consider the impact of trees on the efficiency of the solar panels. Panels should be placed in areas with minimal shading, and any trees that cause significant shading (often referred to as nuisance trees) should be removed or regularly trimmed to prevent shadows. By doing a solar assessment using tools like a Solar Pathfinder (which helps identify shading patterns), drone surveys, and/or lidar (light detection and ranging), you can get an accurate picture of what can be produced from solar panels in a specific location. These tracking methods will show you what energy you will be able to capture throughout the year. With that information, you can begin to design the size of the solar system needed to meet the clients' goals.

I tend to look at this with a holistic approach, however. If the shading from trees is going to reduce the efficiency of the solar system, clear-cutting a bunch of trees from the property may not be the route you want to go. A balance needs to be found to maintain both the efficiency of the solar system and the environmental benefits of the trees. So, perhaps looking at adding panels on the west side also may be a better overall option. If you discuss with the clients upfront what their goals are and maximize efficiency throughout the home, then the capacity of the system will be easier to manage. Perhaps shading will be less of a problem.

One of the issues I run into is that expectations of the system are not always thought out. Many people will look at the maximum output of the system as what they should expect every day, but that won't be the case; factors like weather conditions, seasonal changes, and shading can all affect the system's efficiency. Solar is not a silver bullet but a part of meeting the client's goals, such as cost savings, energy efficiency, carbon footprint, and so forth. Also think about possible future needs. Will there be a heat pump or vehicle charging in the coming years? Before you even start designing the system, it's important to have these conversations to establish realistic expectations.



The Solar Pathfinder houses a sun-path diagram within a plastic dome. For a detailed description of its use, go to @EnergyUME on YouTube.

Photo by Drew Schiavone