



Solar monitoring systems

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To maximize your solar panels, consider investing in a solar monitoring system. This technology tracks energy production and usage in real-time, so you won't have to guess how well your system performs. It can also alert you to dips in output or problems with individual panels, batteries, or other system components.

Many of the best-rated solar companies offer solar monitoring systems. We researched the most popular systems on the market to understand how they work, what to look for, and the best options for homeowners. After investing in a high-performing residential solar system, you'll want to make sure you can be aware of its health and performance using a monitoring system.

Solar monitoring systems use sensors and communication devices attached to your solar arrays. The sensors are often integrated into the inverter and track production data from each panel. They transmit information about the voltage, current, and power output to and transmit it to a communication device like a gateway. From there, the data uploads to a cloud-based software via ethernet, WiFi, or a cellular network.

In addition to real-time monitoring, many systems will proactively notify you of any solar system issues, from system faults to declining power production. These alerts help you address problems quickly, reducing system downtime. Some systems even provide weather alerts for low-sunlight days or incoming storms. These features allow you to plan for emergencies and ensure you have efficient stored solar power for later use.

Three main types of solar monitoring systems are available from solar equipment manufacturers, professional installers, and third-party monitoring companies. We'll explore each monitoring type below.

Solar manufacturers may enhance their products with a built-in monitoring system. This equipment-integrated technology can be built into either the solar panels or the inverter, which converts the DC output from your panels into AC power for your home. Solar inverter monitoring systems are the more common of the two. They typically offer easy-to-read results on a website or mobile app.

Inverter-based monitoring systems typically track energy production, basic home energy use, and system performance data. Most companies use either string inverters (connected to multiple panels) or microinverters (installed on individual panels). A microinverter monitoring system offers module-level monitoring, allowing you to see individual panel performance.

Many inverter manufacturers include monitoring software with their equipment. Though this software is tied



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to a specific inverter brand, it will typically work with many solar panel brands. However, module-level monitoring or more advanced features may come at an additional cost.

Some solar installers offer monitoring apps alongside their energy systems. These apps often customize and enhance the data provided by your inverter's built-in monitoring. Installer-run apps offer clear insights into daily production, upcoming electric bills, and easy online payment options. However, their detail may not be as granular or insightful as module-level systems.

Some installer-based software directly connects to customer support for troubleshooting and maintenance scheduling. They may also provide local weather alerts to help you prepare for low-sun days or dangerous conditions. You can usually access this data via a dedicated website or downloadable app for your phone.

Third-party or standalone energy monitoring systems come from companies that don't manufacture solar equipment or offer installation services. These systems focus on your entire home's energy picture, not just solar. They use your electrical panel's current transfer (CT) sensors to track energy flow. Some can even monitor individual major appliances or integrate with smart home devices for deeper insight into where your energy goes.

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