



Typical solar cell efficiency


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Key takeaways about solar panel efficiency

The efficiency of a solar cell is determined as the fraction of incident power which is converted to electricity and is defined as:

The input power for efficiency calculations is 1 kW/m² or 100 mW/cm². Thus the input power for a 100 × 100 mm² cell is 10 W and for a 156 × 156 mm² cell is 24.3 W

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The conversion efficiency of a photovoltaic (PV) cell, or solar cell, is the percentage of the solar energy shining on a PV device that is converted into usable electricity. Improving this conversion efficiency is a key goal of research and helps make PV technologies cost-competitive with conventional sources of energy.

Not all of the sunlight that reaches a PV cell is converted into electricity. In fact, most of it is lost. Multiple factors in solar cell design play roles in limiting a cell's ability to convert the sunlight it receives. Designing with these factors in mind is how higher efficiencies can be achieved.

Researchers measure the performance of a PV device to predict the power the cell will produce. Electrical power is the product of current and voltage. Current-voltage relationships measure the electrical characteristics of PV devices. If a certain "load" resistance is connected to the two terminals of a cell or module, the current and voltage being produced will adjust according to Ohm's law (the current through a conductor between two points is directly proportional to the potential difference across the two points). Efficiencies are obtained by exposing the cell to a constant, standard level of light while maintaining a constant cell temperature, and measuring the current and voltage that are produced for different load resistances.

Learn more about the achievements of the PV Fleet Performance Data Initiative, the basics of PV technology, and the solar office's PV research.

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The research group led by Professor Martin Green has published Version 64 of the solar cell efficiency tables. There are 19 new results reported in the new version.



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Image: pv magazine

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