Efficiency vs. Energy

April 10, 2012 | Issue: 1017

Energy yield, not efficiency alone, is what matters.

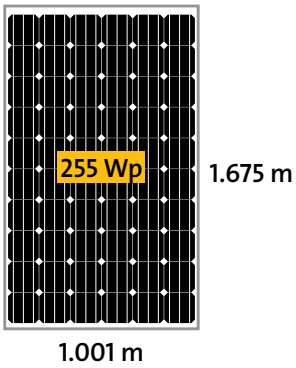
Definition:

Efficiency values published by module manufacturers are defined as the nominal power of the module divided by the physical area of the module at Standard Test Conditions.

$$\text{Efficiency} = \frac{255\ \text{Wp}}{(1.001\ \text{m} \times 1.675\ \text{m})} = 152.09\ \text{Wp/m}^2$$

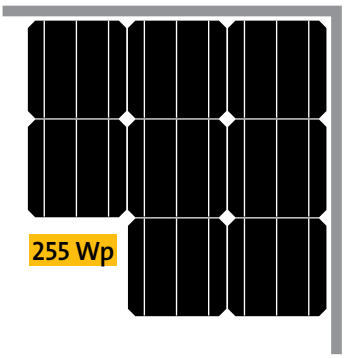
$$\frac{152.09\ \text{Wp/m}^2}{1{,}000\ \text{W/m}^2} = 15.2\ \%$$

Efficiency = 15.2 %

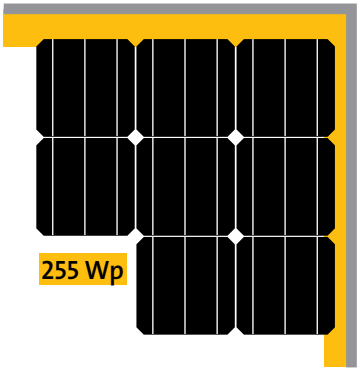


Sometimes two modules with the same nominal power rating can have different efficiency values. The only reason being the design and corresponding size of the modules may vary.

A difference of 2.5 cm or 1" in each direction of the module can change the efficiency value of a module 0.63 percentage points. (Based on example of 255 Wp modules).



Competitor's module



SolarWorld module

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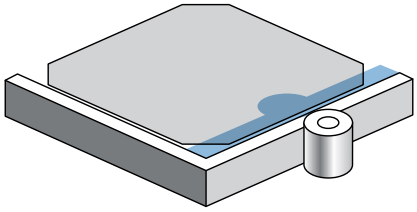
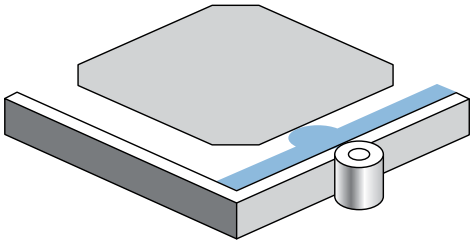
When designing a module, it's important to consider the placement and spacing of the cells relative to each other and the frame. Crowding cells together and up against the frame can reduce the overall energy output of the module.

Mounting hardware used to affix the module to the mounting system can cause shading of the outer cells if they are placed close to the frame.

Mounting hardware can cause shadowing

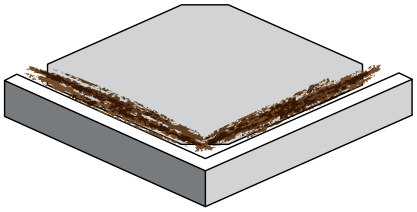


SolarWorld modules avoid shadowing issues

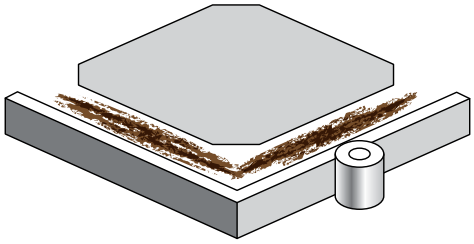


Dirt and debris can build-up on modules along the frame of a module. This build-up can start to shade the outer cells if they are placed close to the frame. Shading of the cells can reduce the overall output of a module and affect the performance of a string of modules.

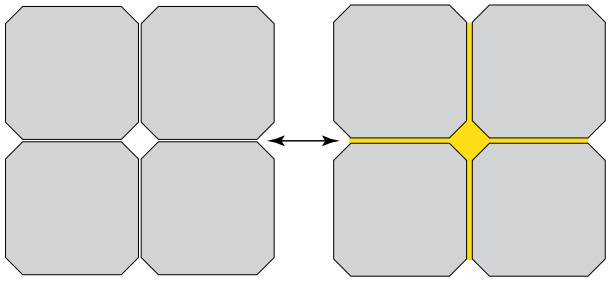
Soil and debris build up, shading cells



SolarWorld module cell spacing prevents soil shading



The spacing of cells is optimized for light capture, energy production, and the expansion and contraction of the materials. These considerations provide for long-term, reliable performance.



Cell spacing is optimized for circuit design and energy output

For these reasons, SolarWorld has designed the Sunmodule plus with these real-world issues in mind to help maximize energy output and offset electricity costs.

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SolarWorld

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