

A-si Myths, the Truth...

Myth 2: A-si panels are less efficient so they produce less energy???

Wrong again, efficiency of a solar panel, at STC, is NOT related to the actual output of energy from these panels. It is NOT the working efficiency.

STC efficiency, means the efficiency, measured at **“Standard Test Conditions”**. These conditions are the Exact, Perfect, Ideal, conditions, at which ONLY 'Mono / Poly Crystalline', silicon, panels, will give their absolute MAXIMUM output.

Special Laboratory Conditions, to suit Crystalline Silicon panels. Conditions which do NOT happen in REAL life. Giving 'Laboratory efficiency', NOT 'REAL efficiency'.

A-si and Thin Film modules, work MUCH Better, at Conditions in the REAL World – The Working Efficiency.

(STC, suitable only for Crystalline Silicon panels, is still used, to measure the efficiency of Thin Film panels. These laboratory conditions are not suitable, to give a good output from A-si or Thin Film panels, so give a false impression, a Laboratory efficiency and an incorrect efficiency, for Thin Film modules.)

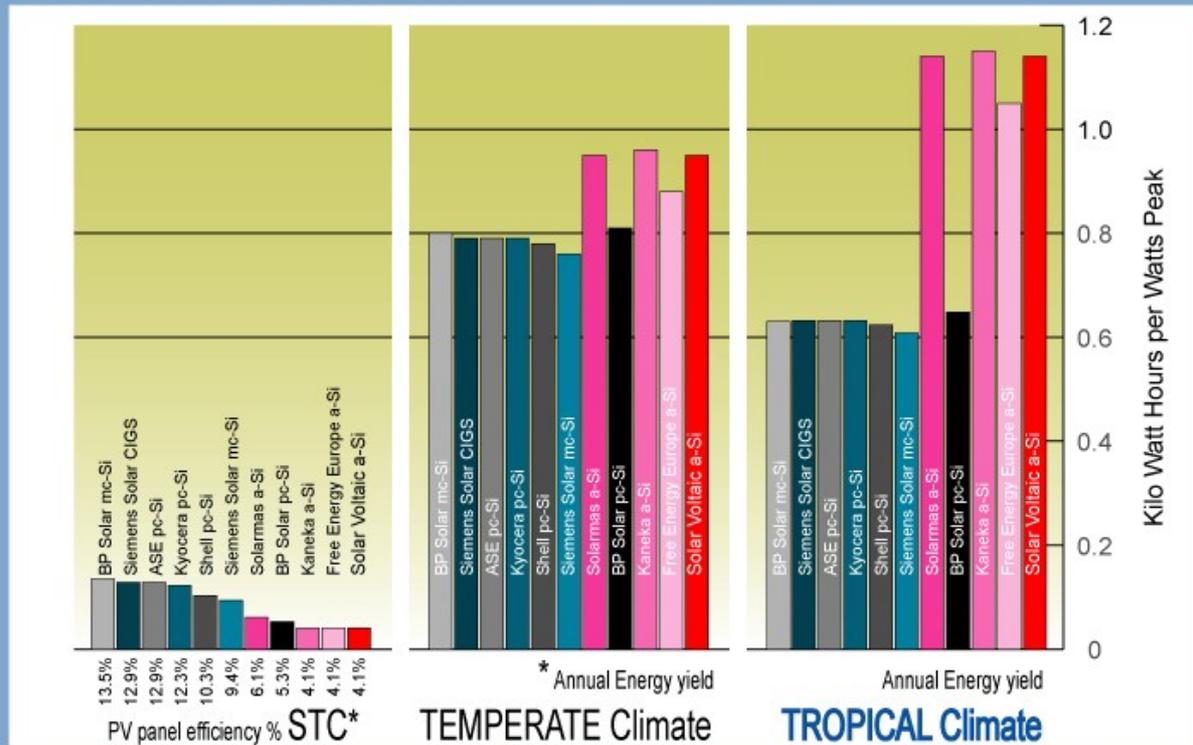
Here is a list of 'STC', compared to 'Real Operating Conditions', in Kuala Lumpur, Malaysia at 1pm. You can see that REAL life makes a big difference to the Annual Energy yield of PV panels.

| STC <i>(Standard Test Conditions, in Laboratory)</i> | Real Operating Conditions <i>(in Kuala Lumpur, Malaysia)</i> | Types of PV Panels | |
|---|--|---|--|
| Under these conditions the Crystalline & Thin Film panels are measured and this is the 'Watts Peak' measurement. | Under these conditions the Crystalline & Thin Film panels output is measured and this is the 'Real Watt Hours output' that a customer will receive. | A-si / Thin Film | Mono / Poly Crystalline |
| Air conditioned Laboratory. Solar Panel Surface Temperature reduced to 25°C. | Real Hot SUN shining on Solar Panel. Average Surface Temperature is 60°C. <i>(Surface Temperature, is generally Air Temperature plus 25°C.)</i> | A-si or Thin Film Panels give FULL output at 60°C and show NO LOSS with heat, Output 130% to 160% of Wp. | Crystalline panels suffer a high voltage DROP when Heated by the Sun. <i>(Crystalline panels lose power, for each degree above 25°C.)</i> At 60°C they lose approximately 30% power. Output only 60% to 70% of Wp. |

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|---|---|--|--|
| <p>The Sun simulator is perpendicular to the panel.</p> | <p>The Real SUN moves across the sky. Changing at 15 degrees per hour.</p> | <p>The FULL output can still be obtained over 4 hours or 30 degrees either side of perpendicular. <i>(A-si or Thin Film Panels still give high power at angles less than 30 degrees to the Sun)</i></p> | <p>Crystalline panels have less output as the angle of the Sun moves from perpendicular. Output drops proportionally as the Sun angle changes during the day.</p> |
| <p>Only Direct Sunlight is Simulated.</p> | <p>Real Sun is Diffuse or reflected or direct. Cause, Pollution, moisture, weather changes, etc..</p> | <p>Diffuse or reflected Sunlight gives very good output on Thin Film panels also.</p> | <p>The Air has moisture and pollution. These make the Sunlight diffuse and the Crystalline panel drops more output. Output is low in diffuse light.</p> |
| <p>Sun simulator must Flash for 1/10 second only. 3 Flashes are used for each test.</p> | <p>Real Sunlight does not flash. It is Constant but varies in intensity and direction during the day.</p> | <p>Thin film panels work under continuous Sun without any loss. The Sun shines more than 1/10 of a second and so the real output is high.</p> | <p>Crystalline Panel will drop in output after 1 second, due to heating of the surface, by the Sun. The Real Sun shines for more than 1/10 of a second and so the real output is low.</p> |
| <p>No Shadow in the test.</p> | <p>Buildings, Trees, Telephone lines, Leaves, Birds, All can cast shadows on the Panel.</p> | <p>Thin Film panels are Not Affected by shadows. Only a small loss, of the area covered, will occur. Example, if 7% is covered by shadow, then only 7% is lost.</p> | <p>Small Crystalline cells have to be arranged in series to make a panel. So if any one cell, in the chain is blocked by shadow, leaf, bird, etc, then No Output at all is provided from the whole string of cells. There is Total 100% loss of output, from shadows of less than 7% of the panel area.</p> |
| <p>Area of Solar Panel is Not measured.</p> | <p>Irradiation per square Metre varies during each day.</p> | <p>Depending on the weather, the type of panel, Amount of Sunlight, etc., the panels can be different areas. Thin film will give the Most Annual Energy output over the smallest area.</p> | <p>Because the real weather is nothing like the Simulated STC, a larger area of Crystalline panels is needed to give the same Annual Energy output, In real life.</p> |

Annual Energy Yield at real environmental conditions from different modules

* (Source: PHOTON International November 2000)



The chart above shows the STC efficiency of several makes of Solar Panel.

Note; Thin Film, A-si or Crystalline.

The Crystalline Panels show the highest efficiency at STC, which is suitable for Crystalline panels only. See the laboratory efficiency first, at the left (STC).

Note that in Hot or Tropical climates (*the graph on the right*), that some panels show a much higher output, measured in Kilowatt Hours, produced over each year. Average 1.1 of the Kilowatts Hours per Watts Peak. Other panels show only 0.6 of the Kilowatts Hours per Watts Peak is produced.

If you look at the types of panel, it soon becomes obvious, that ALL the higher producing panels are the A-si or Thin film type and all the lower producing panels are all Crystalline type. There is no doubt about this.

In Cold climates there is less difference between the types of PV panel. That is because neither type produces power in Winter, so their output remains the same. Only the Summer months show a higher output for all A-si panels because this is the only time power is produced in any reasonable amounts.