

PV Panel Characteristics

CRYSTALLINE or THIN FILM

(includes A-si)

The Thin Film or Amorphous Silicon, type of panel, is most COST effective for TROPICAL applications. Thin Film panels always give 30% more energy per year, in Hot Climates, than Crystalline panels. Smart consumers now pay for photovoltaic panels, based on the *Kilowatt hours "produced", annually, by the system, NOT on the Watts Peak value.* Crystalline panels always give much LESS energy than the Watts Peak indicates, while Thin Film panels will produce at least what they were rated for. None silicon, Thin Film panels, produce MORE energy than silicon but cost more also.

***Warning:** The Watts Peak figure, given for any Photovoltaic panels, is NOT the output from that panel. The actual output, depends on the surface temperature, Amount of Light reaching the panel and the angle of the Sun to the panel. WATTS PEAK is a figure obtained under LABORATORY CONDITIONS that can NOT occur in real life. It is the MAXIMUM output of the panel, under the PERFECT, IDEAL CONDITIONS for Crystalline panels to be at MAXIMUM output. These Laboratory Conditions do NOT suit Thin Film or A-si panels.*

PV Panel Characteristics Comparison

CRYSTALLINE	THIN FILM
<p>ZERO shadow Tolerance.</p> <p><i>(Crystalline panels, have individual crystalline cells, arranged in a series configuration, joined by wires, which results in a drastic LOSS of output, if any one of the small series cells is overshadowed.)</i></p>	<p>EXCELLENT Shadow Tolerance.</p> <p><i>(Thin Film panels will produce high output when a shadow is cast across the panel surface, eliminating any shadow losses.)</i></p>
<p>100 Watt Peak Crystalline panel would be 25% smaller BUT produces 35% LESS power per Annum in hot summer or tropical climate.</p>	<p>100 Watt Peak Thin Film panel is 25% bigger BUT produces 35% to 60% MORE energy per Annum in hot climates. It gives more energy per area.</p>
<p>Crystalline panels suffer a high voltage DROP when HEATED by the Sun.</p> <p><i>(A Crystalline panel that is 16% efficient at 25°C, will be 9% efficient at 100°C - Source: National Renewable Energy Laboratory, U.S.A.)</i></p>	<p>Thin Film panels retain a HIGHER voltage output, under direct HEAT and can still produce over 20 Volts at 75°C surface temperature.</p> <p><i>(Malaysia average surface temperature is 60°C.)</i></p>

<p>Crystalline panels can not provide full power unless under direct Sunlight, Perpendicular to the sun and BELOW 25°C.</p>	<p>Thin Film panel, retains a higher voltage output in cloudy conditions and can even provide a small output, in rain.</p> <p><i>(This means that the Photovoltaic Storage Unit can still receive some charge in the rainy season, using Thin Film panels.)</i></p> <p>It gives Higher yield at low angles to the sun and at high temperature.</p>
<p>Average Annual Yield of Crystalline panels is 1 Kilowatt, per Watt Peak.</p>	<p>Average Annual Yield of Thin Film panels is 1.3 Kilowatt, per Watt Peak.</p>
<p>Crystalline panels suffer from an average deterioration of 1.5% per year, from the stated Watts Peak Value.</p> <p><i>(Sometimes more, in TROPICAL climates.)</i></p> <p>The original rated output is given as the output BEFORE any deterioration.</p>	<p>Thin Film panels suffer from an average deterioration of less than 1% per year, from the stated watts Peak Value.</p> <p>The Thin Film panel rated output is given as the output AFTER the initial 30% deterioration. This is a 30% BONUS value above the WP rated value.</p> <p><i>(This will be 30% MORE than the output of the same Watts Peak of Crystalline panel. This is lost during the first part of the Panel's life. After an initial deterioration of about 3 months, a Thin Film panel suffers no further deterioration and in hot temperatures, it can increase its output, due to an annealing effect of the Sun, on the Silicon Structure.)</i></p>
<p>Crystalline cells are EXPENSIVE.</p>	<p>Thin Film cells are LESS costly. A great advantage.</p>
<p>Crystalline Panels are very expensive to make in smaller sizes and this increase in cost, prevents them from taking advantage of the smaller Modular format.</p>	<p>The Advantage of using small Modular format SOLAR VOLTAIC Thin Film panels:</p> <ul style="list-style-type: none"> - Avoid Wind Resistance. - No system failure occurs. <p><i>(A small Module is broken, it makes very little difference to the total output.)</i></p> <ul style="list-style-type: none"> - Cost effective and more Reliable. <p><i>(Replacing a small Module is very much LESS than replacing a large broken panel.)</i></p>

Mould Growth occasionally occurs, in-between the individual Crystalline cells, of a standard Crystalline panel and quickly overtakes and destroys the Crystalline cells.

Thin Film panels have no internal space and are composed of photovoltaic material impregnated directly onto glass at high temperatures. This prevents mould growth, permanently.

In Malaysia the Sun tracks from North to South during the year and East to West during each day. It is therefore, inevitable that the panels will be facing away from the Sun at some time during the year. SOLAR VOLTAIC, arrange panels, on BOTH sides of any structure, to ensure that full output is incoming from at least one set of panels, at any time, during the year. You can see from the Chart below that the Panels have to Face North for 6 months and then South for the next 6 months.

