

# The distance between the main and secondary beams of photovoltaic panels

How to reduce the distance between solar panels?

Castellano et al. (2015) proposed a simple estimation method to minimise the distance between rows of PV panels while avoiding the inter-row shading. The shadow pattern is determined for each solar hour through 3 directions, and the graphical representation of the shadow is an exact curve or a so-called envelope.

What are the parameters of a solar panel?

The parameters of the solar panel: the tilt angle is  $\nu = 35^\circ$ , the relative row distance (i.e., the ratio of the row distance to the tilted width) is  $d = 1.5$ . According to the diagrams, the solar cells located farther from the ground get increasing global irradiance in all four cases.

Why should solar panels be separated between rows?

In this case, the type of solar panels in our solar power system should be more robust to resist mechanical impacts due to the weather conditions. The separation between rows of PV panels must guarantee the non-superposition of shadows between the rows of panels during the winter or summer solstice months.

Why are solar panels in parallel rows?

The solar panels are in parallel rows on the horizontal ground. Infinitely long rows are assumed as the ends of the rows are neglected. The first row is passed by because it is unshaded as there is no row in front of it, but it has only a little contribution to the overall production.

Where should a shadow be placed on a solar panel?

Under these conditions, the shadow reaches a horizontal distance  $D$  from the first row of panels (for  $h = 30^\circ$ ), and therefore the second row should be positioned at  $PV\ 2h$ , whereas if the sun has a height of  $h = 10^\circ$ , the shadow reaches a horizontal distance  $D'$  and the second row should be placed at  $PV\ 2h$  ?.

Why is inter-row spacing important in photovoltaic systems?

The inter-row spacing in photovoltaic (PV) systems is an important design parameter affecting the inter-row shading and the diffuse radiation masking losses and hence, reducing the electric output of the PV system.

The energy yield of the AbPV is calculated as a function of the surface azimuth and the distance between two consecutive PV rows, pitch ( $p$ ), which was varied from 5.0, 7.5, and 10.0 meters. ...

Arrangement and geometry of PV arrays: obscuring angle ( $\psi_s$ ), the angle between the boundary of the shaded part of the ground and the plane of the PV modules ( $z$ ), tilt angle ...

(Estimated) energy output/thermal behaviour: The air temperature measured on the GR with PV panels was  $1.4^\circ\text{C}$  cooler in the system with the larger distance of 18 cm between substrate and PV panels in ...

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The minimum distance between rows of PV panels when placed on the ground in an open space or on a flat roof is important to avoid the shading effect over the panels. It should be 1.2 times the height of the solar ...

A study for the use of reflecting panels with conventional solar collectors and photovoltaic panels was provided by Pucar and Despic [22], while Karthick et al. [23] provided ...

Solar power plants have long been an integral part of the energy balance of the largest economies in the world. According to IRENA, over the past 10 years the installed ...

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