

## Shade Effect on Photovoltaic Systems: A Comparison between String and Module-Based Solution

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**Abstract :** In general, shading will reduce the electrical power produced from PV modules and arrays in locations where shading is unavoidable or caused by dynamic moving parts. This reduction is based on the shade effect on the I-V curve of the PV module or array and how the DC/AC inverter can search and control the optimum value of power from this module or array configuration. This is a very complicated task due to different patterns of shaded PV modules and arrays. One solution presented by the inverter industry is to perform the maximum power point tracking (MPPT) at the module level rather than the series string level. This solution is supposed to reduce the shade effect on the total harvested energy. However, this isn't necessarily the best solution to reduce the shade effect as will be shown in this study.

**Keywords :** photovoltaic, shade effect, I-V curve, MPPT

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