

Modeling and Analysis of 100 MW Solar Photovoltaic Plant Using Tiger Neo 560W and P-type 540W Module at Weinan, Shanxi, China

This comparison test is proposed to evaluate the variations in the performance of Tiger Neo n-type bifacial module 560W and conventional p-type bifacial 540W in a 100MW project in Weinan, Shanxi Province, north West China (latitude: 34 ° 50 N, longitude: 109 ° 50 E). The solar irradiance intensity at the site is 1436 kWh/m², and the ambient average temperature is about 13 ° C. In this research, the performance ratio and different power losses like soiling, PV module losses, inverter, and losses due to temperature are taken into account and calculated by using PVSyst.



Figure 1.The location information of weinan, shanxi, china

Two PV systems (P-type, N-type) of identical design parameters were collected. Technical specification of PV panels for the two systems are described in Table 1.

	P-type Bifacial	Tiger Neo Bifacial
Module Power	540W	560W
Module Efficiency	21.1%	21.68%
Dimension/mm	2256*1134	2278*1134
Number of Cells	72	72

Table 1. Technical Specifications of the PV Panels

These data were analyzed in the following way. Estimated specific energy yield (kWh/kWp/year) for the two different PV systems was calculated depending on the measured value of solar irradiance and technical specifications of the installed solar modules and inverters, then the actual energy yield over one year was compared with the estimated value. Knowing that the two PV Systems have identical design parameters (tilt angle, azimuth angle, type and dimensions of mounting struc-

ture and inverter size) and same cleaning method and schedule. The modules are vertically installed 2*13,The distance between the middle of the module and ground is 2.5m. Installation information are shown in Table 2.

Irradiance Intensity	1436kWh/m ²
Land type	Deserted mountain slope
Systemcapacity	100MW
Mounting Structure	Ground mounted with elevated structure, 2.5m above the ground
Azimuth angle	0° (Directly south oriented)
Tilt angle	11°

Table 2. Installation information

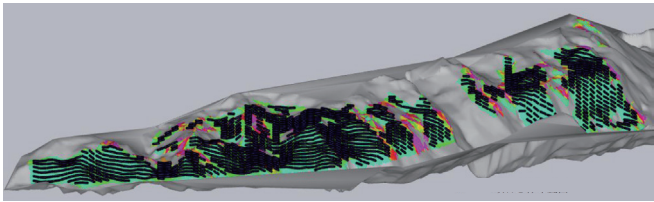


Figure 2. Project Layout

From the simulation results, the value of peak sun hour and yearly energy generation of two systems are shown in Table 3.

The system installed with Tiger Neo 560W module of efficiency of 21.68% has a total energy generation of 132498 MWh/year while system installed with p-type 540W bifacial module of efficiency 21.1% has a total energy generation of 126800 MWh/-year. The results demonstrates that Tiger Neo shows exceptionally high efficiency and energy yield, the yield gain of Tiger Neo module is about 4.5% over p-type counterpart.

	P-type Bifacial	Tiger Neo Bifacial
Module Power	540W	560W
Module Efficiency	21.1%	21.68%
Specific Production (kWh/kWp/year)	1268	1325
Module size (mm)	2256*1134	2278*1134
Number of half cell	144	144
Yearly energy generation (MWh/year)	126800	132498
Yield gain	100%	104.5%

Table 3. Simulation results

Source Data: Power China Northwest Engineering Corporation Limited—HuiXing

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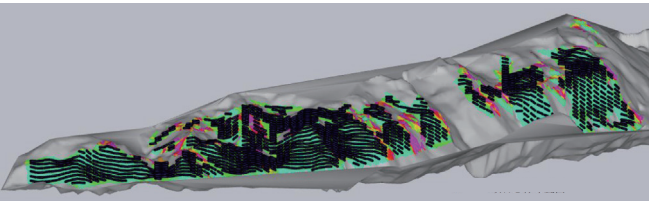


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