

CGC Sanya Test: TOPCon Bifacial Modules Show Significant Power Gain of 3.6% Over BC Bifacial Modules, with Morning and Evening Increase Reaching 8.92%

an
differ
current
TOPCon a
and analyz
Hainan provinc



Figure1 Jinko Sanya Empirical Project

The environmental parameters were under ambient conditions. Irradiance influencing parameter in the system.

Each of the 10 modules in Jinkosolar' s TOPCon and N-type BC modules, the average measured power of TOPCon and N-type BC modules (shown as Table 1)

Sample type	Experimental group	Control group
Norm	JinkoSolar TOPCon	N-type BC
Number	10	10
规格	2382*1134*30mm	2382*1134*30mm

Table 1 Module Parameters

The two solar arrays were installed in the same location, under the same ambient conditions, at a height of 2 meter above the ground, with the tilt angle of the module was 15° to the south.

For three months from May 1 to July 31, 2025, the irradiance, as well as the module, and ambient temperature were monitored. Additionally, the electrical parameters for the modules were compared in the different hours per day and different irradiance conditions during the study period.(shown as Table 2)

Testing location	Sanya	Calculate latitude	20°
stand type	Fixed bracket 固定支架	Row spacing	2.9m
Number of PV arrays	2	Inverter	SUN2000-30KTL-M
Environmental Monitoring	Base Automatic Weather Station	Ground condition	Grassland
Measurement	In 2 photovoltaic arrays, thermocouples were affixed to the top and bottom of the back of the module at the same location and under the same irradiation conditions for comparative analysis of the operating temperatures of the modules of the arrays.	地面条件	

Table 2 Basic Parameters of the Empirical Base

The energy yield (kWh/kWp) from the two test group modules cell were compared.

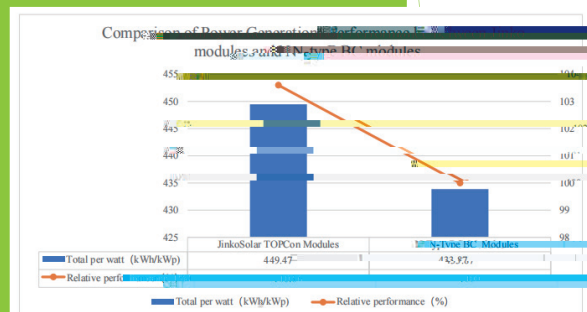


Figure 2 Comparison of Power Generation Performance of JinkoSolar TOPCon Modules and N-Type BC Modules

Figure 3 Comparison of power generation between TOPCon and BC modules at different time periods

Figure 4 Comparison of power generation between TOPCon and BC modules under different irradiance levels

These analysis results revealed that the lower the irradiance the higher the energy yield of TOPCon versus N-type BC to a value higher than that obtained in present study (+3.6%).

The loss mechanism for lower yield of N-type BC was attributed to low bifaciality and poor low irradiance performance due to cell properties (multiple leakage current effects and grid on the back side). These analyses also revealed that the TOPCon energy yield gain over N-type BC can be increased further to 8.92% in early morning 6am-7am and later afternoon 6pm-7pm respectively. The average energy yield gain of TOPCon over N-type BC module is 3.6% in dusk and dawn. This study can contribute to achieving higher energy yield from PV systems during field applications. This can contribute to the design of products with higher energy yield and lower LCOE in the PV industry.