7.83% Gain! CGC's Rainy Season Test in Hainan Proves TOPCon Modules' Outstanding Performance on Cloudy Days

Based on the Outdoor PV Performance Validation Station in Haikou, Hainan, the performance in rainy season from November 15, 2024 - Mar 21, 2025, regarding low-irradiation condition performance of N-type TOPCon and N-type BC modules has been analyzed and studied by CGC. The results show that, the advantages of TOPCon' s low-irradiance performance is fully played in the gloomy days and conditions (100-400W/m²) . **The overall yield gain is 7.83% over n-type BC modules in 127 days (November 2024-March 2025), among when 76 days are cloudy or rainy, representing 60%**.

Figure 1: Project Picture

Project Background:

The project is implemented by the well-known third party appraisal agency, China General Certification Center. The Outdoor PV Performance Validation Station is located in Meilan District, Haikou City, HainanProvince, which operates as a distributed photovoltaic field test power station, and crucially, the surrounding buildings do not obstruct the test arrays. The validation station is equipped with a fully automated, high-precision environmental monitoring system that meticulously tracks and records meteorological conditions such as irradiance (GHI、DNI、DHI、GTI), as well as temperature, humidity, wind speed and direction, and rainfall.

This specifically purposed study on low-irradiation performance outdoor comparison started from November 15 2024 to March 21 2025, across 127 days including, 45 cloudy and 31 rainy days. The gloomy days account for 60% with light condition of 100-400W/m².

Month	Sunny	Overcast	Rainy
2024.11	6	2	8
2024.12	12	16	3
2025.1	19	10	2
2025.2	9	9	10
2025.3	5	8	8
Total	**51**	**45**	**31**

During the 127-day detection period, there were a total of 76 cloudy and rainy days, accounting for

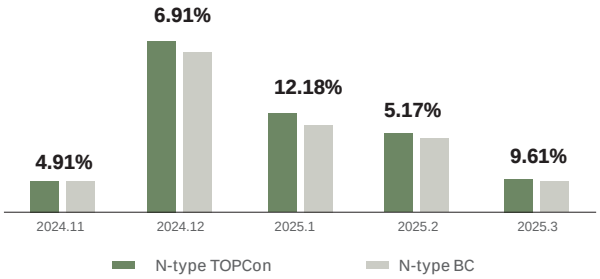
Table 1: Weather conditions

Module Information:

For this field test, Two types of modules were selected: 10 N-type TOPCon modules and 10 N-type BC modules. The modules were fix-mounted on the roof and are equipped with high-precision sensors to monitor power generation data in real time. This setup ensures the accuracy and credibility of the test results.

Technology	Module Numbers	Module type
Jinko TOPCon	10	Bifacial
N-type BC	10	Bifacial

Table 2: Product Information

Conclusions:

It serves as real-world evidence that, attributable to its optimized leakage current path, superior fill factor and enhanced shunt resistant, N-type TOPCon results in an approximate 7.83% increase in energy yield over N-type BC during the rainy season with irradiation below 400w/m². It underscores TOPCon' s superior all-day production, especially .on overcast days.