

## Fujian Putian Offshore Solar: N-Type TOPCon Modules Excel Over P-Type BC, Up to 2.56% More Power

Against the backdrop of rapid growth in global PV installations, offshore PV systems are gradually becoming an emerging field that has attracted much attention in the industry. As an innovative mode of energy utilization and resource development, offshore PV provides an effective solution to the problem of increasingly limited land resources with its remarkable features of high power generation and low land occupation. However, to operate stably in the marine environment, PV modules must be able to withstand harsh environmental conditions such as strong winds, extreme alternating temperatures, seawater submersion, seawater corrosion, and marine biological attachment.

Recently, in order to verify the actual power generation performance of different technology modules in offshore PV, JinkoSolar conducted a comparison of the power generation of each string of the power station for a newly built offshore PV project in Putian, Fujian. The comprehensive analysis results show that N-type TOPCon modules have the highest gain of 2.56% in power generation per watt compared to P-type BC modules!



Figure 1: Project Picture

## 1.Project Background

In today's diverse application scenarios, the reliability requirements for photovoltaic modules are increasingly high. The mudflat area in Putian, Fujian Province, with its unique marine climate characteristics, including complex environmental conditions such as tides, water vapor and salt spray, provides an ideal test bed for PV module performance evaluation. JinkoSolar N-Type TOPCon Bifacial Modules and another manufacturer's P-Type BC Bifacial Modules were installed in this area for this project, with the aim of comparing the power generation of these two advanced technologies in an actual marine environment, thereby providing stronger data support for the owner.

## 2.Project Introduction

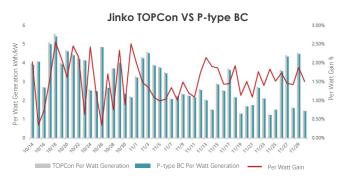
In this test, a total of 26 JinkoSolar N-Type TOPCon bifacial modules and 26 P-Type BC bifacial modules from another manufacturer were deployed. These modules were installed in a mudflat area about 100 meters from the coastline, using fixed mounting systems and installed at an angle of 20 °, 5 meters above the ground. Each string of modules is equipped with high-precision voltage and current sensors at the output end to achieve accurate monitoring and comprehensive analysis of power generation performance, ensuring that the collected data is both accurate and reliable, providing a guarantee for subsequent performance assessment and comparative analysis.

Module Type	JKM575-72HL4-BDV	P 型 BC
Module Specifications	2278mm*1134mm*30mm	
Module Technology	Bifacial N-Type TOPCon	Bifacial P-Type BC
Power	575W	580W
Quantity	26	26

## 3.Test Results

From October 14, 2024, to November 30, 2024, the total power generation of JinkoSolar N-Type TOPCon modules was 148.32 kWh/kW, while the power generation of P-Type BC modules was 146.08 kWh/kW, with an average per-watt power gain of 1.53% for JinkoSolar N-Type TOPCon. Additionally, TOPCon modules performed particularly well under low light conditions on cloudy days. For example, on October 18, the average power generation of JinkoSolar TOPCon modules was **2.56%** higher than that of P-type BC modules. On the remaining cloudy days, JinkoSolar's TOPCon modules also averaged a gain of more than **2%**.

Despite the challenges posed by these marine climates, JinkoSolar TOPCon modules demonstrated their power generation performance in high humidity and high salt fog environments. The analysis shows that the advanced design of TOPCon effectively improves reliability in aquatic environments, further enhancing its performance under harsh conditions.



Through this series of innovations and practices, JinkoSolar Tiger Neo offshore solar modules combine industry-leading N-Type TOPCon technology with innovative encapsulation processes, ensuring the module's outstanding performance and reliability in marine environments. This not only highlights JinkoSolar's leading position in the photovoltaic technology field but also signifies a substantial step in the offshore solar sector. In the future, JinkoSolar will continue to commit to R&D and innovation to address new application scenarios such as marine conditions. With the continuous enhancement of product strength, JinkoSolar's high-efficiency, low-degradation offshore solar modules will continue to bring higher returns to customers and contribute significantly to the optimization of the global energy structure and the development of environmental protection causes.