Japan Kagoshima Field Test Data Released: TOPCon Achieves 8.82% Long-Term Energy Yield Gain Over N-Type BC Modules

8.82%

9.84%

1. The rainy season in Kagoshima from October to December 2024 resulted in predominantly cloudy and low-irradiance conditions, providing an ideal setting to showcase the superior low-light performance of TOPCon modules. For instance, during a continuous 15-day stretch of rain from October 15 to October 29, TOPCon modules achieved a remarkable average daily energy gain of 9.13% per watt.

2. On sunny days, the high bifaciality of up to 80% gave TOPCon modules a distinct edge. The reflective gravel surfaces in Kagoshima amplified this advantage, bouncing more light onto the rear of the modules and boosting energy production.

3. Installed just 2 km from the coastline, the modules endured challenging environmental conditions, including high humidity and salt spray. Reliability is particularly important under such conditions. TOPCon modules have proven their high reliability and durability in nearshore and offshore scenarios, maintaining efficient energy yield and extending the system' s lifespan in such demanding settings.

Background of the project:

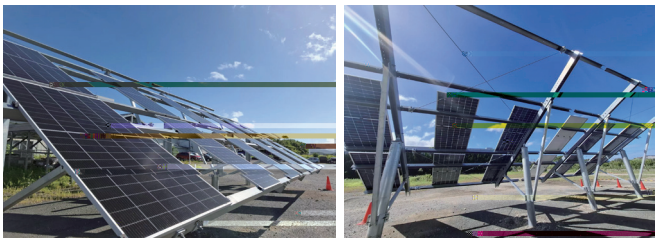


Figure 1:

Project Introduction:

Base in Japan (32° 3′ 57″ N, 130° 19′ 53″ E). Two types of modules

facturer installed on fixed mounts at a height of 1.2 meters

(DC) data were collected using the high-precision CR1000X

Cell Technology	Module Size(mm)	Module type
	7 11	
	7 11	

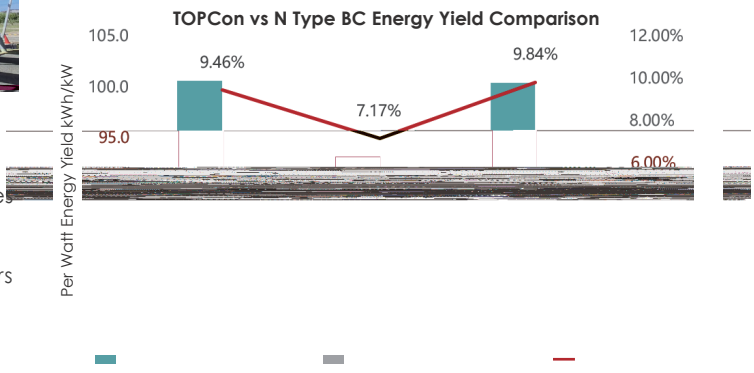
Test Results:

From October 1 to December 31, 2024, the performance of

reached 294.2 kWh/kW over the three months, compared to 270.2 kWh/kW for N-type BC modules. On average, the

Month	N Type TOPCon Normalized Energy Yield kWh/kW	N Type BC Normalized Energy Yield kWh/kW	Gain Per Watt
	100.6	91.9	9.46%
	93.2	86.9	7.17%
	100.4	91.4	9.84%

irradiance levels were below 1000 W/m². Under these condi

ules reached 8.05%. Under high irradiance conditions (above 1000 W/m²), the total three-month energy yield of TOPCon modules was 174.04 kWh, with a yield gain per watt of 8.10%

97.8%, while that of N-type BC modules was 89.9%. This demon