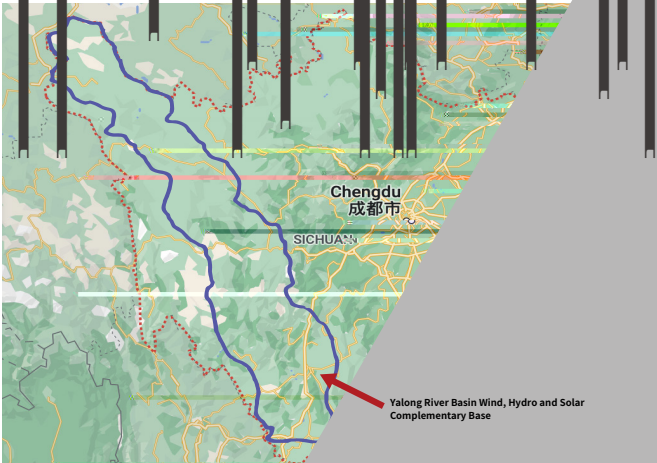


5.52% Yield Gain of JinkoSolar's N-type Achieved in the World's Largest Hybrid Solar-Hydro Plant on the Tibetan Plateau

The world's largest hybrid solar-hydro power plant, with an installed capacity of 1 GW of solar panels and 3 GW of hydro power generators, has begun producing electricity in the eastern Tibetan Plateau. Located in Kelu town, Yajiang county, Garze prefecture, Sichuan, the plant's first phase is empowered by 287.4 MW of JinkoSolar's N-type TOPCon bifacial panels and was connected to the power grid at the end of June 2023. After the station's operation stabilized, a comparison study was conducted between N-type and P-type modules in the high-altitude area from July 15 to August 15, 2023, in order to investigate their outdoor performance.

The study revealed a 5.52% yield gain of JinkoSolar's N-type TOPCon bifacial panels (570Wp) over P-type PERC bifacial panels (545Wp) in this massive project.

Situated at an altitude of 4,000 - 4,600 meters (15,000 feet) above sea level, on a mountain in Yajiang county (N29°56' 50.75", E100°31' 1.94"), Garze prefecture, Sichuan, the Kelu solar-hydro power plant is the highest altitude project of its kind in the world. It benefits from an annual average irradiation of 444.8 MJ/m².



Pic.1: Project Location

Spanning a total area of 28.57 square miles (28.57 square miles), the plant consists of 149 square miles with single-axis support and ±45° tracking tilt and 163 fixed-mounted arrays with angles of 26.5°. The spacing between arrays is 10.5 meters. The plant uses JinkoSolar's N-type inverters with each string connected to one inverter. The DC-AC ratio is set at 1.2 for the fixed-mounted arrays and 1.15 for single-axis solar arrays. The plant is located in the lowest part of the plateau, where the ground is covered with the same vegetation. The same region, one is a P-type array, and the other is an N-type array.

Component Models	Total Power Generation (kWh)	Unit Power Generation (kWh/kW)	Relative Gain
N-Type 570Wp Bifacial	532046.15	137.55	5.52%
P-Type 545Wp Bifacial	471000.17	130.35	

Table 1: N-type and P-type module power generation and comparison of yield gain

From July 15 to August 15, 2023, a comparison study was conducted between N-type TOPCon bifacial panels and P-type PERC bifacial panels. The results show that the N-type TOPCon panels achieved a 5.52% higher yield than the P-type PERC panels. This can be attributed to the N-type TOPCon panels' higher output, high generation efficiency (as shown in the table above), lower temperature coefficient, and lower degradation. The results of the investigation further prove the superiority of the N-type technology.



Figure 1: Comparison of single-day power generation and yield gain between N-type and P-type modules