

## A comparison of the performance of N-type bifacial and PERC bifacial PV module in Haining

The objective of this study is to compare the performance of two PV modules technologies (PERC and N-type Topcon) operating under the same fluctuations of solar irradiance and subtropical monsoon climatic condition of Haining. Performance and meteorological data for each type of modules were collected and analyzed for the period between August 2019 to December 2019.

The PV system under the study is installed on the roof of factory buildings at Haining, (30° 15' ~ 30° 35'N, 120° 18' ~ 120° 52'E). The region is characterized with a subtropical monsoon climate accompanied with warm summers and cold winters.

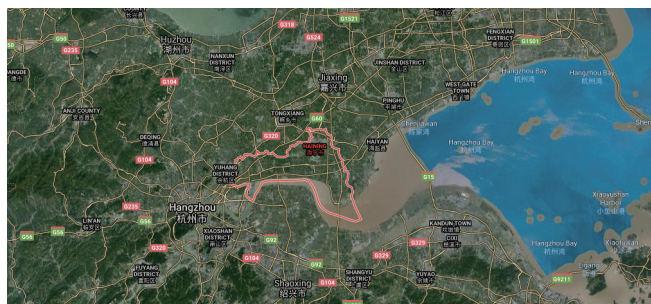


Figure 1. The location information of Haining

The modules are fixed, inclined in an angle of 30°, facing south, 0.7 m above the ground. The grid-connected PV array is composed of 36 modules. It is divided into 2 strings with 18 modules each, mounted in series. The installed capacity of PERC and N-type modules is 6.93 kWp and 7.11 kWp respectively.



Figure 2. The project picture

Inverters are selected from Sungrow. These are single phase inverters with high-frequency transformer power of 2000W, and efficiency of 97%. Furthermore, it is tested that they can run at the ambient temperature from -25°C to 60°C.

### Project Information

Module Type	Capacity (kW)	Mounting System	Declination	Ground	Location
Cheetah	7.20	Fixed Mounting System	30°	Concrete	Haining China
P-type Swan TV	6.93				
N-type Swan TV	7.11				
P-type Swan BDVP	6.93				
N-type Swan BDVP	7.11				

### Conclusion:

Results obtained from comparing data between PERC and N-type module technologies with the same cell quantity and size show that N-type modules consistently produce more electricity than PERC modules, especially at higher ambient and module temperatures. The N-type bifacial modules have shown an average 2.95% higher electricity output than PERC bifacial modules. It is also concluded that the output power of modules increases linearly with the increase of solar irradiance. Furthermore, the N-type modules have shown higher average output power as well as higher normalized output power in low irradiance condition.

### N-type Swan TV vs P-type Swan TV

