

1.7% Yield Gain of TOPCon Over BC in Rooftop Installation

voltage, current, power, module temperature, irradiation of front side, wind speed, orientation, ambient temperature, relative humidity, atmosphere pressure were collected for each day since June 01, 2024. After one month operation, TOPCon module compared to BC module, showed initially a yield gain of 1.7%.

Results and Analysis:

Since in back contact (BC) solar cell, all the electrical contacts are located at the rear side (back side) of the device, which results in stress concentration, back side deformation or bending and local temperature rise. This deformation temperature resulted from stress concentration at the rear side will negatively affect the performance of BC cells. The phenomenon is observed more obvious in days of higher temperature in Laizhou, where the temperature could be 38-39 Celsius degrees and the module temperature could reach up to 55 Celsius degrees at noon.

This stress-induced damage tends to occur and propagate. Furthermore, there is a high possibility of back surface bending or even broken during transport and load/unload handling and initial stage of installation. Moreover, the high humidity high salt spray coastal environment will deteriorate its reliability.

Conclusion

As the new mainstream cell technologies in solar industry, this paper proposes an experimental study on TOPCon PV modules' energy yield compared to BC in rooftop scenario which is supposed as the ideal application for BC technology. It realizes that the TOPCon module has **1.7%** higher energy yield performance compared to BC modules, the majority of the contribution from its low-temperature, better stability and robust reliability.



Figure 1: Project Picture

The outdoor energy generation was measured by DC meters in a 1-min interval. The data of each panel including DC

