Generation Performance Comparison of N-Type and PERC Bifacial

In order to verify the energy gains of N-type Topcon modules in different environments, JinkoSolar cooperated with customers to share data or build pilots projects since 2020. Among them, Blue Sun Group 1.5MW C&I industry park roof project in Australia primarily studied and compared the difference of bifacial PERC and bifacial N-type modules under white painted steel roof conditions. This pilot project has accumulated more than 6 months of data since January 2020. The case study will conduct specific analysis based on the power generation data.

Located in Queensland, east north coast of Australia with tropical wet and dry climate, specific information of the project is shown in the below picture.

Figure 1.The location information of Blue Sun project in Queensland

Project Information:

This analysis system is comparing the power generation performance of P-PERC and N-TOPCon 60-cell module both based on 163" wafer. The total capacity is 1.5MW. The model type of inverter Growatt 80kW. All the modules are fixed bracket with 15 ° inclined-mounted and 1m high above the steel roof. All the bifacial modules are installed on the white painted steel roof, as shown in the figure below:

Figure 2.The project picture of Blue Sun project in Queensland

Result:

The power generation of the two type modules from January 2020 to December 2020 is shown in Table 1: Compared with PERC bifacial modules, the power generation gains of the N-type bifacial modules are 5% due to the increased per watt and rear-side power generation. The N-type bifacial modules are obviously higher than PERC bifacial modules by 5.5% in October, November which is the summer in Australia, and slightly higher than PERC by 4.3% in May and June which is the winter there. It derived from the superior power temperature coefficient and low irradiance performance of the N-type module. According to the monthly data, the power generation gain is generally stable. Due to the prolonged rainy season in December 2020, the power generation gain is lower than the normal value, but the N-type still generates 5.3% more than PERC modules.

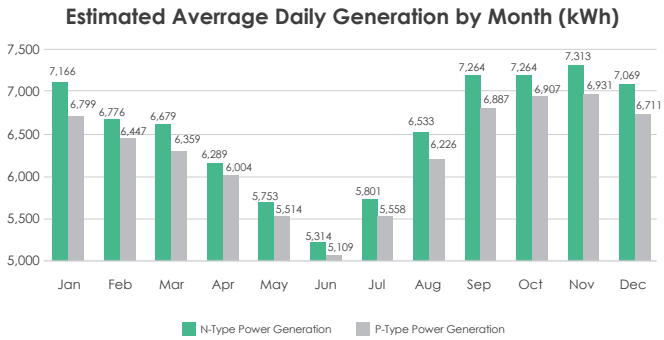
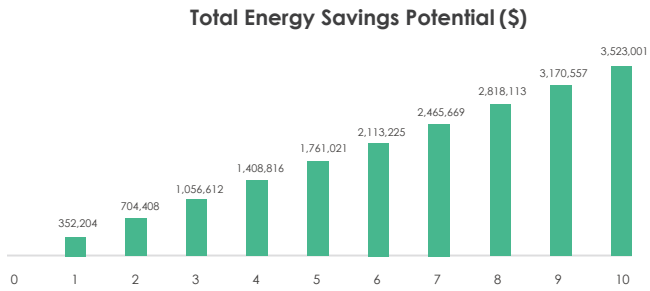


Table 1. Power generation performance of two type modules

It could be inferred from Figure 1 that the two different modules vary similarly in produced energy with the season. May, June, July is winter for Australia. The curve of produced energy is consistent with irradiation diation because irradiation is the most critical factor affecting power generation. But on average, the N-type TOPCon modules show a dominant advantage in energy generation over P-PERC modules. The difference is greater in summer as temperature increases thanks to TOPCon' s lower temperature coefficient.



Conclusion:

In summary, in the tropical climate on the east north coast of Australia, Jinkosolar' s N-type bifacial can reach power gain ranging from 4.3-5.5% than PERC modules on the white paint surface condition. The power generation performance of N-type bifacial module with higher bifaciality and lower temperature is obviously in summer. Since the cost of N-type bifacial has become more and more competitive with the expansion of production capacity, N-type modules will soon dominate in the Australia PV market.