Tiger Neo modules combining higher efficiency and wattage lowers PV LCOE in Singapore

During the project design phase, a PVsyst simulation was conducted comparing Tiger Neo bifacial to conventional p-PERC bifacial. Singapore (1.3°N, 103.8°E) is taken as the project site. The information for conventional 78-cell bifacial and Tiger Neo bifacial module is shown in Table 1.

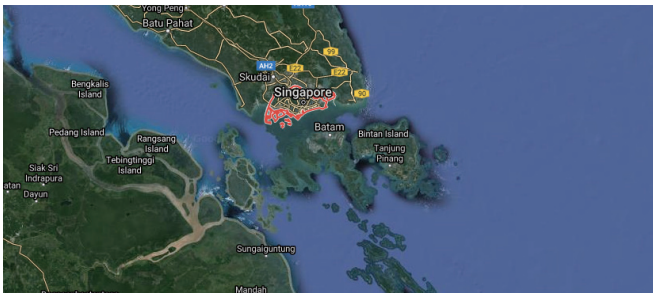

Figure 1.The location information of Singapore

	Standard Module	Tiger Neo78N
Module Power	590W	605W
Module Efficiency	21.1%	21.68%
Dimension/mm	2465*1134	2465*1134
Number of cells	78	78

Table 1. Technical specifications of the PV modules

To reach 11MW capacity, 18175 pieces of Tiger Neo 605W modules are installed -727 strings in parallel covering 50805m^2. In case of conventional p-PERC 590W panels of same size, 18625 pieces are needed -745 strings occupying 52063m^2 area. This means that in case of defined system capacity, Tiger Neo can reduce the amount of modules by 2.5% , reducing the overall land requirement and the associated cost. Upfront CAPEX reductions reduce LCOE and increase project IRRs.

Project Capacity 11MW	Standard Module-590W	JKM605N-78HL4-BDV
Nb. of Modules (pcs)	18625	18175
In Parallel (Strings)	745	727
Module Area (m^2)	52063	50805

Table 2. The project design information

The selected inverter type is Sungrow SG225HX. With no shading, installation tilt and Azimuth of 0°, the albedo value is 30%.

Result:

As depicted in Figure 2 , the 11 MW Tiger Neo bifacial system generates more energy than its 11MW p-PERC counterpart, producing 15791MWh/year as compared to 15218MWh/year. The average yield gain is about 3.76% (kWh/kWp) over the whole year. The PR (performance ratio) of Tiger Neo is at 88.16% versus 85.02% with p-PERC.

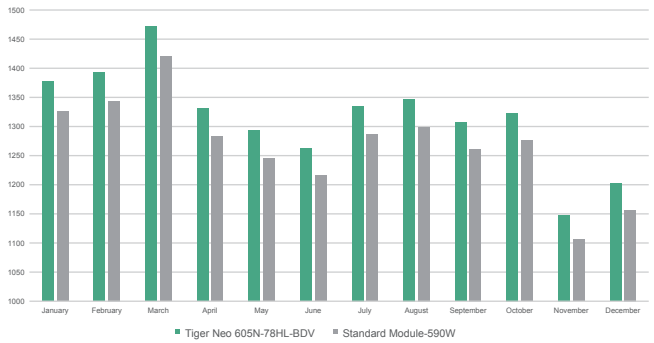

Figure 2. The power production results

The bifacility factor of Tiger Neo bifacial is 20% higher than that of p-PERC modules. Therefore, the energy gain of Tiger Neo is significantly higher based on the same irradiation from rear side. In addition, according to the loss diagram across the year, the most prominent difference is in temperature. The operating temperature of Tiger Neo module adopting n-type technologies will be lower, benefiting from lower temperature coefficient, and thus the power loss due to high temperatures is significantly reduced. This is a huge benefit in tropical regions. Furthermore, the difference in produced energy between Tiger Neo and p-PERC will increase almost linearly with time owing to Neo' s low degradation rate. These product features enable Tiger Neo to boast of a 30-year premium warranty.

Conclusion:

The Tiger Neo bifacial modules show dominant advantage in energy generation. While the record efficiencies of 22% or above demonstrated the achievable performance of PV modules, it is suggested immediate adoption of the corresponding process technologies in the industry could result in significant additional value. The value of module efficiency is much more at the PV system level.