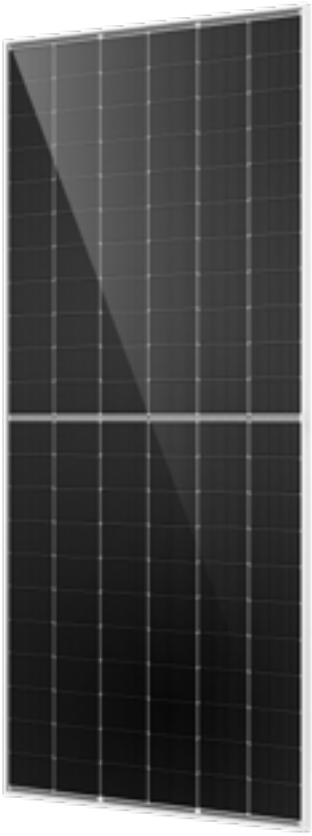


# High-Voltage 2000V PV System **Equals Lower LCOE**

## An LCOE Assessment of Trinasolar's Vertex N 2000V Module

After leading the solar industry into the 210mm n-type TOPCon era, Trinasolar has now introduced its Vertex N 2000V high-voltage module, further broadening the application settings of the Vertex family to meet customers' ever-evolving needs.

Based on the same advanced n-type TOPCon technology and 210mm platform, the Vertex N 2000V module delivers up to 620W power output and 22.7% efficiency. These advancements significantly increase string power and enhance system performance for utility-scale solar projects, lowering Balance of System (BOS) and labor costs, improving levelized cost of energy (LCOE), and shortening payback periods. A reputable and neutral 3rd party conducted an estimated LCOE analysis to demonstrate the potential impact of different system design voltages on comparable values for a traditional 1500V system design and a hypothetical 2000V one.

## Project Site & **Assessment Details**

The hypothetical project and the following high-level assumptions were provided by Trinasolar and agreed upon:

| | |
|---|---|
| **Location** | Gainesville, Florida<br>Latitude: 30.02 °N<br>Longitude: -82.30 °W |
| **Annual GHI** | 1,746 kWh/m2 determined by project site locations and data source (Clean Power Research) used by neutral 3rd party |
| **Project Size** | 125MWdc, 100MWac at point of interconnection |
| **Project Life** | 30 years |
| **Inverter** | Generic 440kVA – 1500Vdc Power Conversion Unit and Generic 5867kVA – 2000Vdc Power Conversion Unit |
| **Interconnection DC/AC Ratio** | 1.25 (determined by 3rd Party) |
| **Ground Coverage Ratio (GCR)** | 35.0% (determined by 3rd Party) |
| **Terrain** | Flat (square lot) |
| **Tracker Configuration** | One-in-portrait (1P) |
| **Module** | Bifacial, half-cut cell, Generic 620[Wp] module rated for 1500V and TSM-620NFG19RC.20, 620[Wp] rated for 2000V |

# Key **Findings**

- Longer strings, more modules per string
- 25% decrease in DC wiring, or 8.2% cost savings
- 25% fewer inverters, or 17.5% cost savings
- Lower LCOE

# High-Level **Overview**

A high-level overview of the reputable and neutral 3rd party's typical modeling process involves the following:

- A performance model for the project is constructed using module and inverter performance characteristics, system design, array and site layout configurations, shading models, and various other losses and assumptions.
- Solar resource and weather data are then input to the model, the model is run, and the output is stored as intermediate results.
- The intermediate results are then post-processed using industry-accepted algorithms to account for post-inverter losses, auxiliary consumption, losses due to terrain contours, and other losses to produce the final results.
- Many inputs are held constant throughout both voltage project types; however, the project costs, acres, lease costs, capacity, and electricity output vary slightly. The assumptions vary slightly due to differences in the number of modules needed to meet a consistent assumed capacity, project site size, and generation output.

# Results & **Conclusions**

By reconfiguring the internal cell wiring and arrangement to maintain the same cell count as a 1500V module, the Vertex N 2000V module features additional parallel connections between cells in the super multi-busbar technology. The innovative high-density, high-voltage interconnection enables systems with longer strings with up to 37 Vertex N 2000V modules per string compared to only 28 generic 1500V modules.

The third-party analysis estimated LCOE ($/MWh) of the two solar PV systems through the first 10 years of project operation:

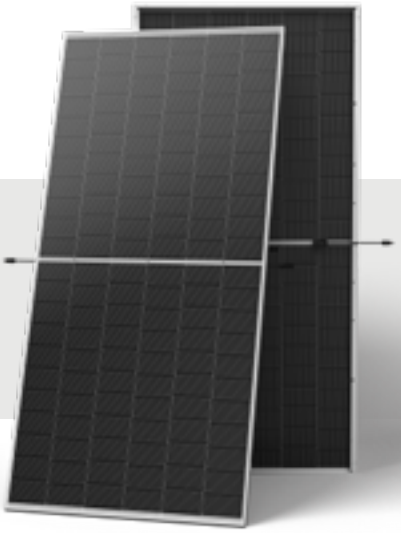
| 1500V | 2000V |
|---|---|
| $54.66 | $53.80 |

The 2000V system delivers **$2.3M in overall CAPEX savings** resulting from two key reductions in balance-of-system (BOS) and construction costs due to significantly fewer inverters required and longer strings.

**Inverter Count** - Inverters are, in general, sized based on current flow, not power output, so the 2000V system can use the same inverter operated at a different KVA rating in proportion to the change in voltage – **requiring 25% fewer inverters for $1.2M in savings, a 17.5% difference.**

**DC Wiring** - The higher system voltage conveys more power at the same current flow. Since wires and other current-carrying equipment are sized for current flow, the amount of DC wiring for a 2000V system should **decrease by approximately 25%, saving $865K in BOS costs, an 8.2% difference.**

The differences in the total energy generation vary only slightly. However, power loss due to DC voltage drop will likely decrease due to reduced circuits. Both systems have the same AC voltage, so these drop losses will likely remain the same, since the AC cable size and the number of collector circuits will not change significantly.



## Reliable and Smart Solar

Trinasolar offers a variety of modules and solutions to fit all projects' needs. Scan this code to learn more.

# About **Trinasolar**

Trinasolar was founded in 1997. As a leading global provider of photovoltaic (PV) modules and smart energy solutions, Trinasolar delivers PV products, applications, and services to promote sustainable development for the benefit of all humanity. By the end of June 2024, Trinasolar has shipped more than 240GW of modules, and its global business footprint has delivered clean energy to more than 170 countries and regions.

Trinasolar invests heavily in research and development (R&D). After launching the Vertex series based on the 210mm technology platform, Trinasolar ushered in the n-type TOPCon era, based on its golden dimensions concept and all-scenario highly reliable and high-performance Vertex n-type products. Combining 210mm technology and n-type TOPCon Advanced technology, Trinasolar is now leading the way into the high-voltage age with the Vertex N 2000V.

Trinasolar has obtained extensive technical and brand recognition from renowned independent institutes worldwide, demonstrating the PV market's strong confidence in Trina's product value, technological innovation, and financial performance. It has scored 100% in the BNEF Bankability Survey 7 years in a row, has won "Overall Highest Achiever" by RETC for four consecutive years, was awarded the highest ranking, AAA, 5 times in a row in the PVTech Bankability Ratings report, and has been awarded "Top Performer" by Kiwa PVEL for 11 consecutive years.

Committed to its mission of "Solar Energy for All," Trinasolar will continue to drive the energy transition through technological innovation, contributing to a more sustainable and net-zero future. For more information, please visit www.trinasolar.com.

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