A New Approach to Redefining Solar Energy for East Africa

Tuesday 22 August 10.00am to 10.30am CAT

Ash Pirzadeh
Regional Manager
East Africa
AFSIA services
Member's resources and benefits

Market Intelligence
01. Company database
02. Project database
03. Tender database

Capacity Building
01. B2B match-making
02. Job portal
03. Business inquiries

Events
01. Events promotion and management
02. Webinars
03. Showcases

Marketing & visibility
01. Who’s who interview
02. Branding featured in various supports
03. Share PR

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- CROSSBOUNDARY
- ENERGY

#### STRATEGIC
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- ALER
- AGS
- STIFTUNG SOLARENERGIE
- JCH
- Solplanet
- SEEPE
- nextracker

#### PARTNER
- DASOLAR
- INFINITY Power
- Seetek

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Events Coordinator

Aline
Market Intelligence Manager

Vestine
Digital Comms Manager

Josée
Community Manager

Kersy
Research Coordinator

John
CEO

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## AFSIA EVENST & ACTIVITIES 2023

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<tr>
<td>18 JAN</td>
<td>Launch Annual Outlook report 2023</td>
<td>16-18 JAN</td>
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<td><strong>FEB</strong></td>
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<td><strong>MAR</strong></td>
<td>21-22-23 MAR</td>
<td>Green H2 e-conference</td>
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<td>5 OCT</td>
<td>AFSIA Solar Awards 2022 (Nairobi)</td>
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<td><strong>APR</strong></td>
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<td><strong>MAY</strong></td>
<td>4 MAY</td>
<td>Launch of PUE Catalog</td>
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<td><strong>JUN</strong></td>
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<td>Renewables Investment Forum (Nairobi)</td>
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<td>AFSIA Solar Awards 2022 (Nairobi)</td>
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<td>15 NOV</td>
<td>White Paper Net-metering &amp; Wheeling for Africa</td>
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<td><strong>DEC</strong></td>
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**Upcoming Webinars**

- Solar e-waste management
- Focus on PUE – Solar refrigeration
- Focus on PUE – Trending PUE applications
- Focus on PUE – Solar irrigation
- Focus on C&I – Solar for telecom
- Focus on C&I – Solar for mining
- Solar Street Lighting
- MG in Nigeria
- Carbon Credit Mechanisms
A New Approach to Redefining Solar Energy for East Africa
The Longest History Sees the Most Reliable products

The PV supplier of longest history
The PV Supplier Of Longest History

- **1997**: Trina Solar was founded
- **2002**: Built 40 off-grid solar power stations in Tibet, China
- **2006**: Listed on NYSE
- **2008**: Built Trina Solar PV Industry Park
- **2012**: Established State Key Laboratory of PV Science & Technology
- **2014**: Became world’s largest PV module supplier
- **2015**: Started the layout for storage business
- **2016**: Started Thailand factory operations
- **2017**: Launched Million-Roof Plan in China
- **2018**: Launched 600W+ ultra-high power new modules, setting benchmark for PV 6.0 era
- **2019**: Acquired Spanish tracker company Nclave
- **2020**: Listed on SSE STAR market
- **2021**: Launched energy IoT brand Trina IoT
- **2022**: 50GW+ company-wide production capacity
- **2023**: 60GW+ production capacity for industry-leading 210 Vertex module
- **2024**: 70GW+ production capacity for industry-leading 216 Vertex module
- **2025**: 80GW+ production capacity for industry-leading 220 Vertex module
- **2026**: 90GW+ production capacity for industry-leading 224 Vertex module
- **2027**: 100GW+ production capacity for industry-leading 228 Vertex module
- **2028**: 110GW+ production capacity for industry-leading 232 Vertex module
- **2029**: 120GW+ production capacity for industry-leading 236 Vertex module
- **2030**: 130GW+ production capacity for industry-leading 240 Vertex module
Globalization

140GW+ Shipments
10GW+ Grid-connected
150+ Regions/Countries
23,000+ Employees

By the third quarter of 2022
3GW+ Quarterly deliveries

12 Offices in the region

100+ Distributors & Employees

20+ Countries with active utility partners

TRINA SOLAR EMEA
Looking for Trina Solar Reliable Modules in East Africa?

Order directly from our
Kenya Warehouse

Ash.Pirzadeh@trinasolar.com
africa@trinasolar.com
Most Bankable And Reliable Brand According To Experts
Reliable Brand

BloombergNEF's PV module bankability results

<table>
<thead>
<tr>
<th>Company</th>
<th>Bankable</th>
<th>Not bankable</th>
<th>Never heard of</th>
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<tbody>
<tr>
<td>Trina Solar</td>
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<td>80%</td>
<td>13%</td>
<td>7%</td>
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Source: BloombergNEF
Companies with an equal ranking are shown alphabetically
RANKED AAA

HIGHEST CATEGORY IN PVTECH BANKABILITY REPORT
TOP PERFORMER MODULE MANUFACTURER FOR 8 CONSECUTIVE TIMES
OVER 140GW OF CUMULATIVE WORLDWIDE PV MODULES SHIPMENTS

RANKING FIRST FOR 210MM MODULES SHIPMENT
Leading The Industry With n-type i-TOPCon Cell Technology
Vertex 210 Modules

Vertex 210 modules Leading Capacity

95\textsubscript{GW+} Module Production Capacity end of 2023

75\textsubscript{GW+} Cell Production Capacity end of 2023

75\textsubscript{GW+} Vertex modules had been shipped throughout the world

95%+ 210mm module production capacity accounts of the total company capacity

No. 1 World’s largest 210mm module production scale

Outstanding customer Value

Compared with same-class products on the market

0.004-0.014 USD/W \textgreater 1%-3\%

Lower system costs \textless Lower LCOE

Comprehensive Product Family

Product family cover all solar application scenarios

Residential  Commercial & Industry  Utility

Vertex 580W  Vertex 675W  Vertex N605W  Vertex N695W
Latest technologies

- **210mm Wafer**
- **NDC (Non-destructive Cutting)**
  - Reduce the risk of Hidden crack and loss
  - Improve the mechanical strength of modules
- **Half Cut Design**
  - As the cell size developed
  - MBB is the key direction
- **Flexible Layout**
- **High Density Encapsulation**
  - Reduce the cell spacing and improve the Module efficiency 0.2~0.3%
- **Flexible N Type Design and Layout**
- **Half Cut design product**
- **Best Wafer size of the product from semiconductor industry**

**Vertex** was developed based on Trina Solar Vertex advanced technologies which enable module to optimize the performance and extend the power output and product warranty.
Enhanced Tests
670W - Proven Mechanical

- High reliability ensures extended power generation
- All tests conducted by independent 3rd parties
- All test samples are randomly picked from mass production (DEG21C.20)
- Mechanical load and warranty should comply with latest official Trina Solar User Manual and Trina Solar Warranty
Product portfolio

Big range of P-type & N-type products
The most suitable product based on the job specs
Product Portfolio

210R Cell

- Vertex S
  - TSM-DEG9R.08
  - Up to 435W
  - N type

- Vertex S+
  - TSM-NEG9R.28
  - Up to 445W
  - N type

- Vertex
  - TSM-DEG19RC.20
  - Up to 575W

- Vertex N
  - TSM-NEG19RC.20
  - Up to 605W

210mm Cell

- Vertex
  - TSM-DEG21C.20
  - Up to 670W

- Vertex N
  - TSM-NEG21C.20
  - Up to 695W

Residential

C&I - Utility

Utility
The variety of wafer sizes in the photovoltaic industry leads to difficulty on module selection for customers.

The 210mm will be the ultimate size for the photovoltaic industry in the next 5~10 years.

210 production lines are compatible with 210 and smaller products.

All manufacturers along the value chain are investing in 210 capacity.
**Vertex – 210**

Maximum Power Output

Up to **665W**

Maximum Efficiency

Up to **21.4%**

Electrical Parameters

- Open Circuit Voltage: 46.1V
- Short Circuit Current: 18.50A

Mechanical parameters

- Dimensions: 2384*1303*33mm
- Weight: 38.3kg
Vertex N- 210

Maximum Power Output
Up to 695W

Maximum Efficiency
Up to 22.4%

Type - 670W Module: NEG 21C.20

Electrical Parameters
• Open Circuit Voltage : 48.2V
• Short Circuit Current : 18.28A

Mechanical Parameters
• Dimensions : 2384*1303*33mm
• Weight : 38.3kg
**Da Chaidan, Qing Hai Province, China**

120MW Utility Scale Project

<table>
<thead>
<tr>
<th>Vertex Projects</th>
<th>210</th>
<th>670W</th>
<th>2021</th>
<th>Gobi saline-alkali land</th>
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<tbody>
<tr>
<td>Size</td>
<td>120MW</td>
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<tr>
<td>Module</td>
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</table>
Vertex – 210R
Evolution with Rectangular cells
First ever non-square cells (210R Cells)

Width like 182 benefits almost like 210

Vertex 210R
- 66 cells
- 575W
- 1.134m
- 2.384m

182
- 72 cells
- 545W
- 1.134m
- 2.278m

VertexS 210R
- 66 cells
- 575W
- 1.134m
- 1.762m

182
- 435W
- 1.134m
- 1.722m
First ever non-square cells (210R Cells)

Width like 182 benefits almost like 210

Vertex N 210R

- G12
- 1.134m
- 2.384m
- 66 cells
- 605W

182 N

- 1.134m
- 2.278m
- 72 cells
- 580W

VertexS + 210R

- 1.134m
- 1.762m
- 445W

182 N

- 1.134m
- 1.722m
- 430W
Vertex – 210R

Product Portfolio

- **Vertex S**
  - TSM-DEgR.08
  - Up to 435W

- **Vertex S+**
  - TSM-NEGgR.28
  - Up to 445W

- **Vertex DE9R.08**
  - TSM-DE9R
  - Up to 580W

- **Vertex DEG59RC.20**
  - Up to 575W

- **Vertex N**
  - TSM-NEG59RC.20
  - Up to 605W

Residential

C&I - Utility
Vertex 210R Roof Top Projects
**Type - 435W DE09R.08**

**Vertex S – 210R**

**Maximum Power Output**
Up to **435W**

**Maximum Efficiency**
Up to **21.8%**

**Electrical Parameters**
- Open Circuit Voltage: 50.4V
- Short Circuit Current: 10.67A

**Mechanical Parameters**
- Dimensions: 1762*1134*30mm
- Weight: 21.8kg
**Type**: NEG9R.28

**Vertex S⁺ - 210R**

**Maximum Power Output**

*Up to 445W*

**Maximum Efficiency**

*Up to 22.3%*

**Electrical Parameters**

- Open Circuit Voltage: 52.6V
- Short Circuit Current: 10.71A

**Mechanical parameters**

- Double Glass - Monofacial
- Dimensions: 1762*1134*30mm
- Weight: 21.1kg
Residential rooftops

Installed capacity improve 5.1% on same rooftop

Ref. Module 22pcs(2*11) 2MPPT 9 kW

Vertex S 430W 22pcs(2*11) 2MPPT 9.46 kW
8kw inverter AD:DC = 1.2

269,400kWh

Ref. Module 410W

+5.1% 13,100kWh

16kWh/100km

+81,875KM
Vertex S – 210R is more Durable and Reliable than conventional modules.
Lower carbon footprint and costs for transportation

Vertex S– 210R

435W Module

Capacity per container

Ref. Module 410W

Vertex S 430W

kW/container

384 kW

384 kW

340 360 380 400 420

936 pcs per container

5-8% less containers
Extended Vertex S Warranty

15 Years
Product Workmanship Warranty

25 Years
Performance Warranty

2%
1st year max degradation

0.55%
Max annual degradation from year 2 to 25
Vertex 210R
C&I Projects
**P type - 580W Module (Monofacial): DE19R**

**Vertex – 210R**

- **Maximum Power Output**: Up to 580W
- **Maximum Efficiency**: Up to 21.5%

**Electrical Parameters**
- Open Circuit Voltage: 46.3V
- Max Power Current: 14.86 A

**Mechanical parameters**
- Dimensions: 2384*1134*35mm
- Weight: 29.1kg
P type – 575W Module (Bifacial): DEG19RC.20

**Vertex – 210R**

- **Maximum Power Output**: Up to 575W
- **Maximum Efficiency**: Up to 21.3%

**Electrical Parameters**
- Open Circuit Voltage: 46V
- Max Power Current: 14.87A

**Mechanical Parameters**
- Dimensions: 2384*1134*30mm
- 36pcs/pallet, 720pcs/container
- Weight: 33.7kg
NEG19RC.20 (N type, Bifacial)

**Vertex N**

**Maximum Power Output**
Up to **605W**

**Module Efficiency**
Up to **22.4%**

**Electrical Parameters – \( P_{\text{max}} \geq 605 \text{W} \)**
- Open Circuit Voltage : 48.7V
- Maximum Power Current : 14.94A

**Mechanical parameters**
- Dual Glass, Bifacial
- Dimensions : 2384*1134*30mm
- 36pcs/pallet; 720pcs/container
- Weight : 33.1kg
✓ Higher string power  ➔  Lower BOS costs

- 15% higher string power
- Fewer strings. BOS savings

All 182 (even n-type) have similar string power. No savings
BOS assessment – 210R N-Type

Trina Solar 210R N-type will provide
✓ 4.5% savings comparing to 182 N-type
✓ 5.5% savings comparing to 182 P-type

Trina Solar 210R P-type will provide
✓ 3.7% savings comparing to 182 N-type
✓ 4.7% savings comparing to 182 P-type
1) **Compatible Tracker Fixation Structure**: Module width is the same as 182 module. Clamp fixing spots can be the same.

2) **Save in cables**: 1 pair of cables of 4mm² per string saves copper, and losses.

3) **More connector saving**.

4) **Reduce labor costs**: Less modules and strings.

---

**System configuration for a Tracker System**

|-------|-------|-------|-------|-------|-------|------|------|------|------|

26~28 pcs 182 N-type Panels

31-33pcs Vertex N G12R-Series Panels

- **Trina Solar Vertex – G12R series**
- **Conventional 182 N type**

---

Start saving today. Move from 182 to Vertex G12R 590W
Vertex – 210R

Where benefits of 210mm & 182mm meet

- Compatible width with 182mm modules
- 15% Higher string power vs 182mm
- 11% Higher power-to-weight ratio vs 182mm
- High Packing Efficiency
- Boosted mechanical performance
- Extended warranty Vertex S
THANK YOU

Trina solar