Trinasolar

Live recording

TRINA SOLAR SHOWCASE WITH AFSIA

With

SAM OGUNNIYI

Thursday, 4th March 2021
10am GMT | 11am WAT | 2pm DXB

AFSIA
Africa Solar Industry Association

AFSIA

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AFRICA SOLAR OUTLOOK 2021

A COUNTRY-BY-COUNTRY REVIEW OF THE STATUS OF SOLAR IN AFRICA

FEBRUARY 2021

BROUGHT TO YOU BY

AFSIA
Africa Solar Industry Association

WITH THE SUPPORT OF

DUPONT JA SOLAR JinkoSolar UL LONGi Trinasolar greenyellow

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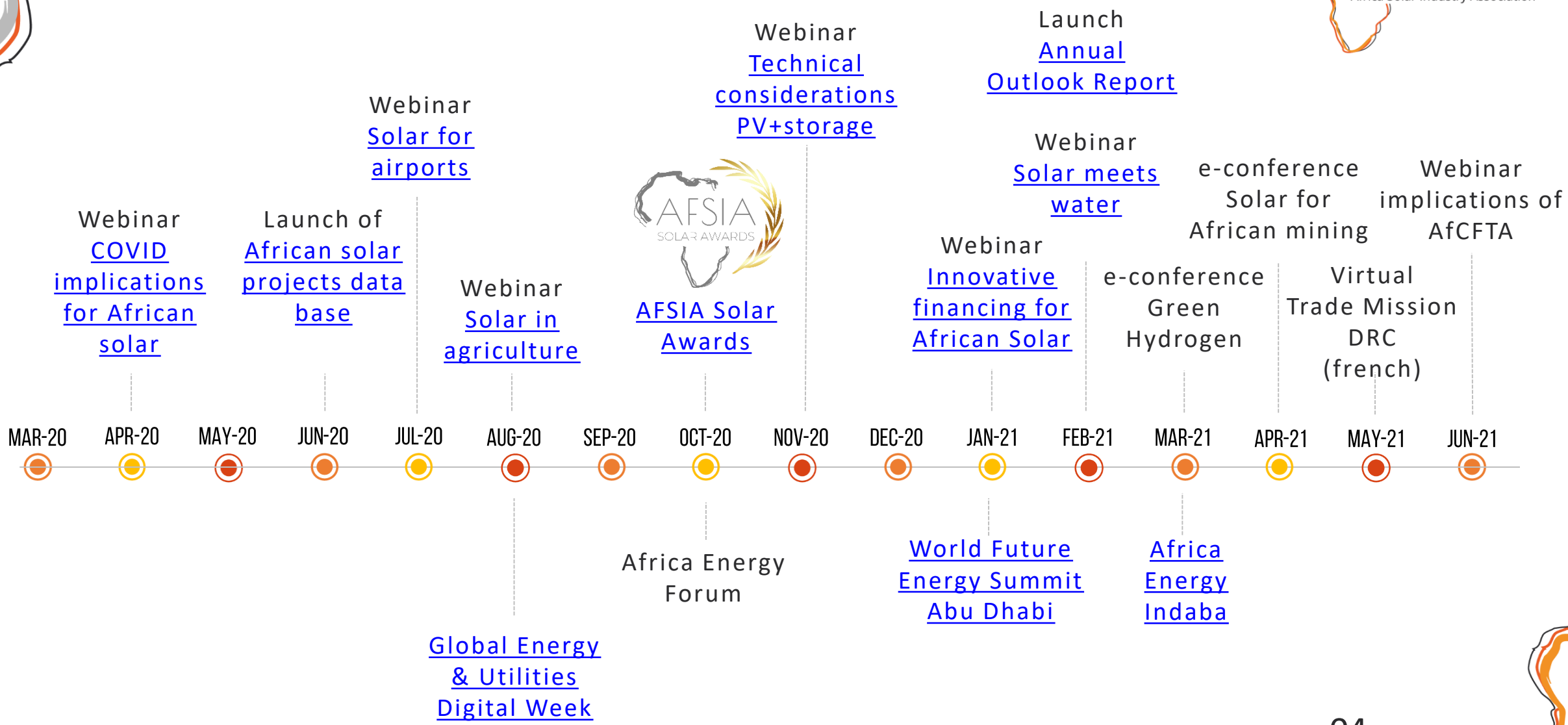
AFSIA ACTIVITIES HIGHLIGHTS



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Africa Solar Industry Association

Sam Ogunniyi

Sales Manager West & Central Africa

Nigeria

Trinasolar

AFSIA
Africa Solar Industry Association

- **15 years Commercial and Project Management experience spanning across FMCG, Telecom and Renewable Energy**
- **MTN Nigeria, Lumos Global, Jinko Solar, A4&T**
- **1st Degree from University of Ibadan, Nigeria and Post Graduate Degree from Anglia Ruskin University, Cambridge, United Kingdom**
- **supporting developers and EPCs with PV modules in different application use, ranging from Utility projects to C&I, Irrigation and roof top installation**

Optimizing BOS and LCOE cost with High Power Panels: RT Installers, MG and C&I Application

Trinasolar

AFSIA
Africa Solar Industry Association

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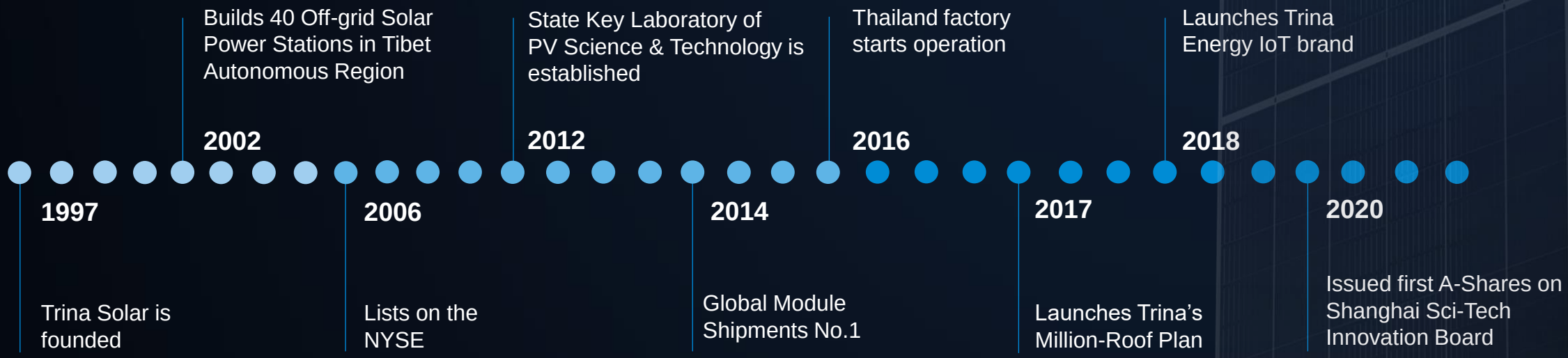
TrinaSolarMEA

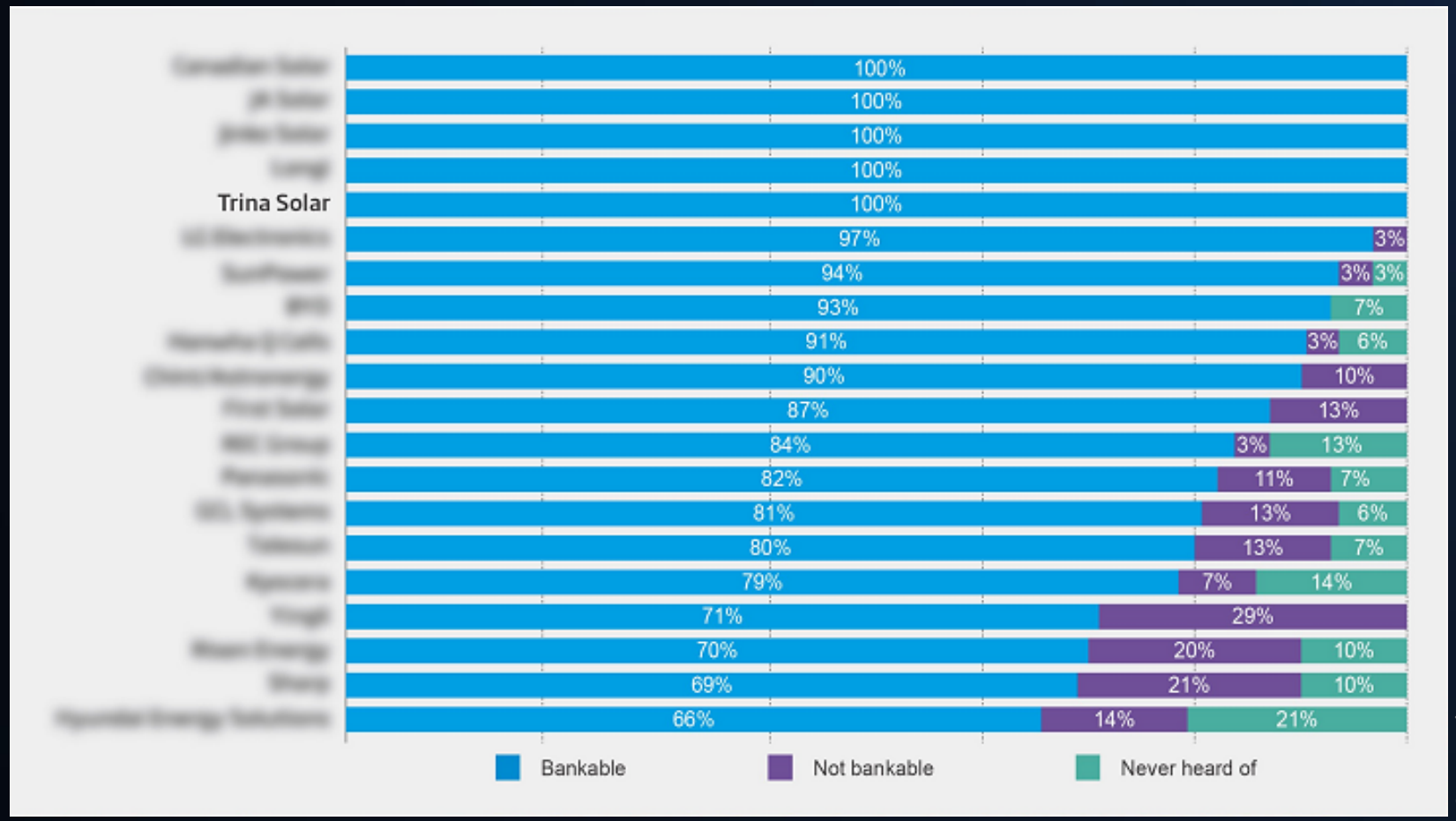
The World Leading PV And Smart Energy Total Solution Provider

Tier 1 company ranked as the
“Most Bankable Module Brand”
in Bloomberg New Energy Finance’s (BNEF) Module Bankability Report



The most reliable Brand

BloombergNEF's PV module bankability results



"Top Bankable Module Supplier"
2016 -- 2020

Five times in a row

Source：BloombergNEF

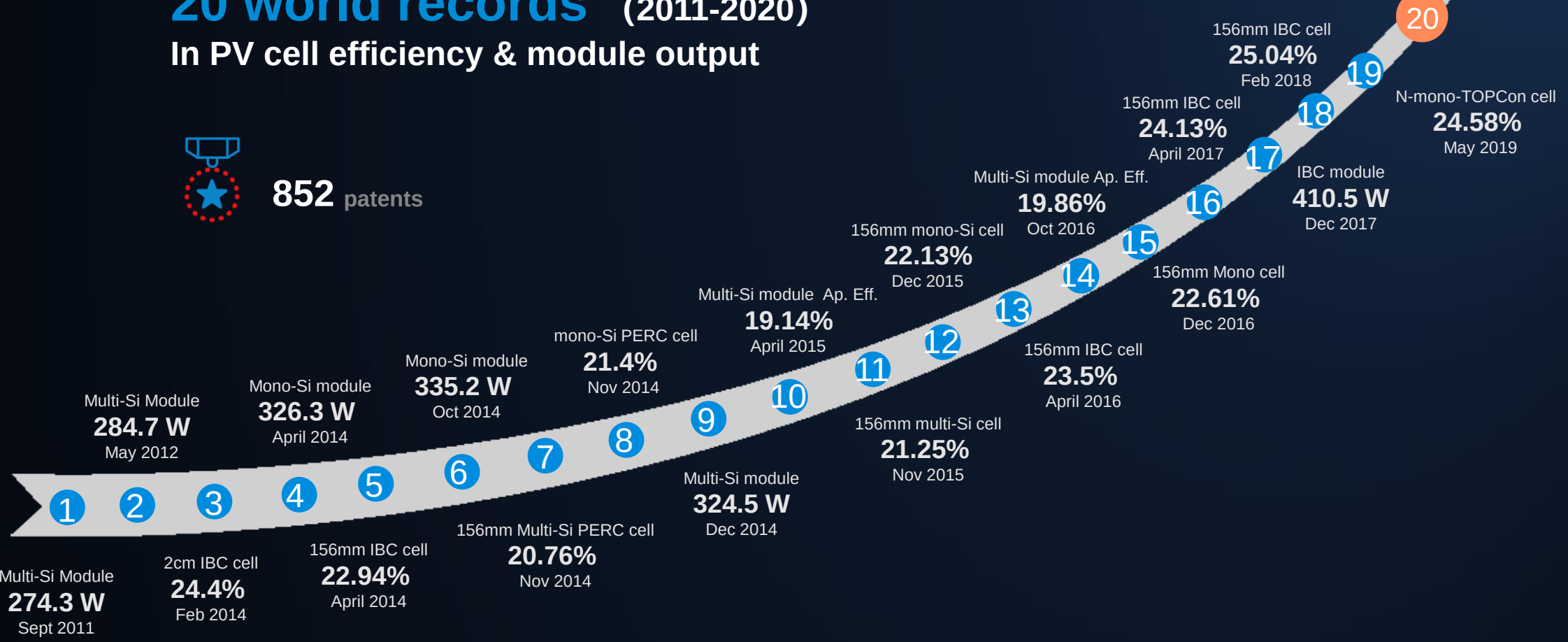
Companies with an equal ranking are shown alphabetically

The leader in technology

20 world records (2011-2020)

In PV cell efficiency & module output

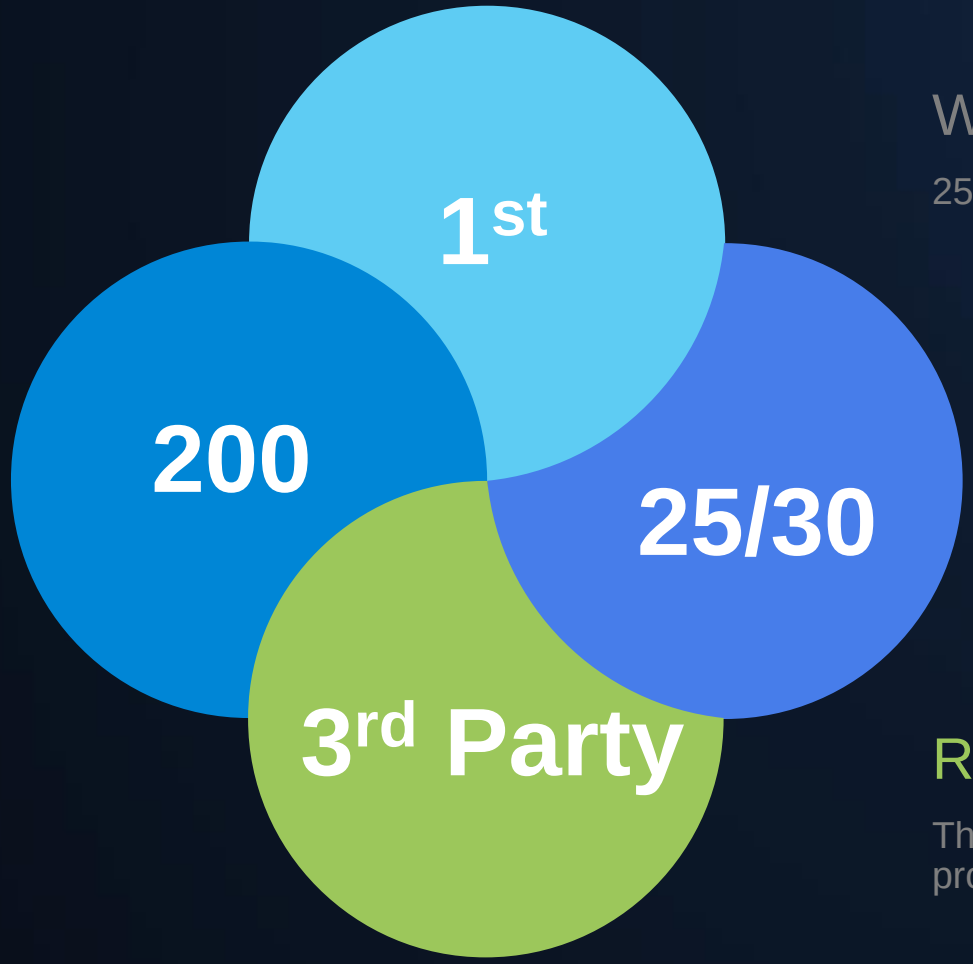
852 patents



Provider of top quality products

Global Standard

The first PV company to receive UL's Client Test Data Program Certification



Warranty

25-30 Years warranty

Testing

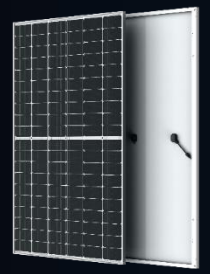
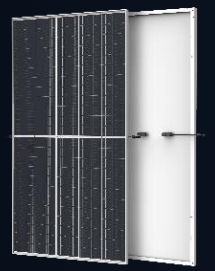
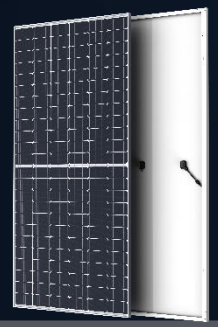
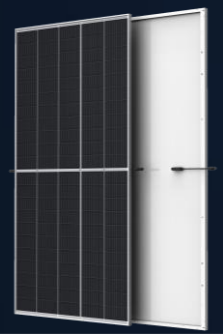
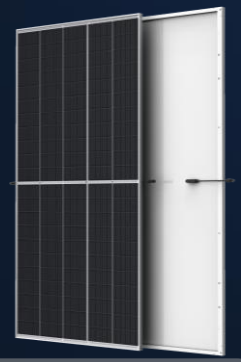
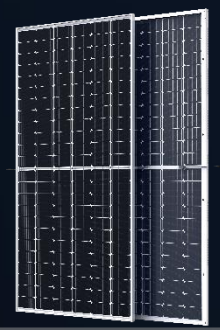
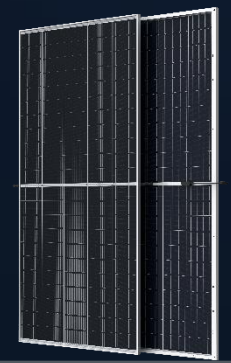
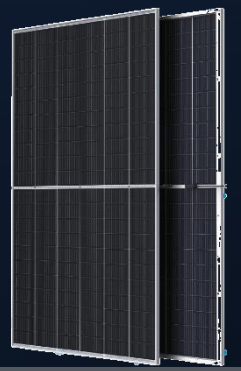
Over 200 In-house quality tests

Reliability

Third party testing certificate for all products

Product portfolio

Trinasolar

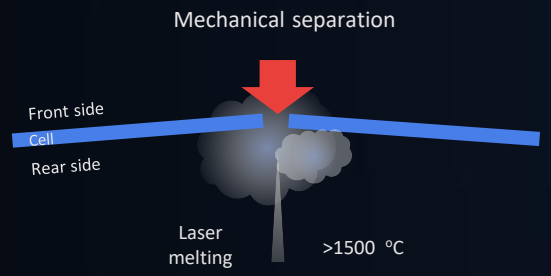
370W	400W	460W	500W	550W	660W
	Vertex S		Vertex	Vertex	Vertex
166mm Half cut	210mm Third cut	166mm Half cut	210mm Third cut	210mm Half cut	210mm Half cut
					
DE08M(II)	DE09	DE17M(II)	DE18M(II)	DE19	DE21
					
		DEG17MC.20	DE18M(II)	DEG19C.20	DEG21C.20

Vertex technology overview:

Technical characteristics

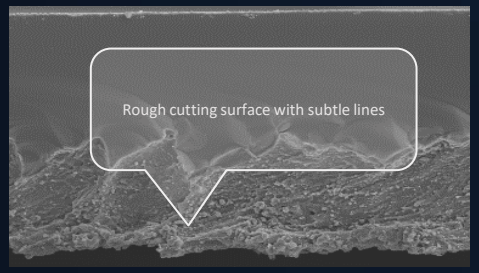
Trinasolar

Non-destructive cutting(NDC)

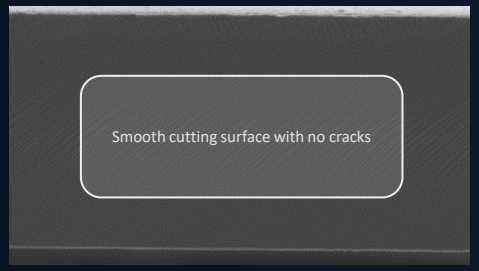


Low Temperature
Non-destructive cutting(NDC) Process

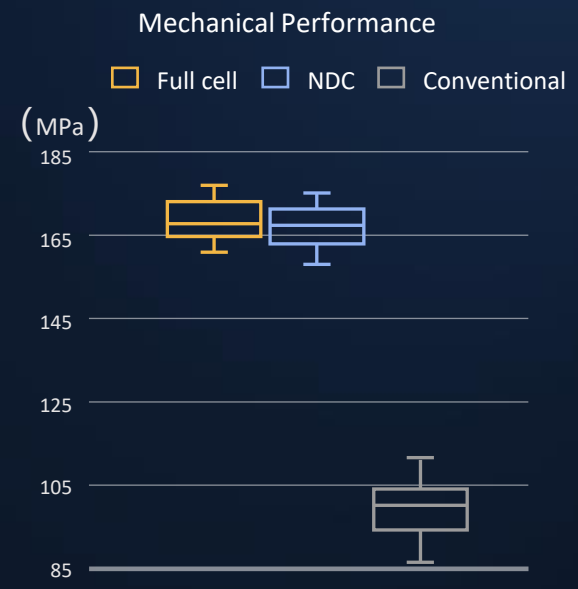
Mechanical strength as a full cell



Section after traditional cutting



Section after Non-destructive cutting



High quality cells to avoid micro cracks & hot spots

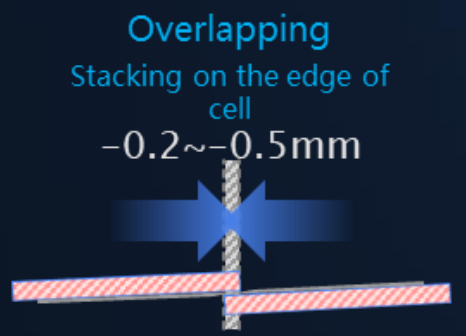
Vertex technology overview:

Technical characteristics

High-density interconnection → Lower thermal stress

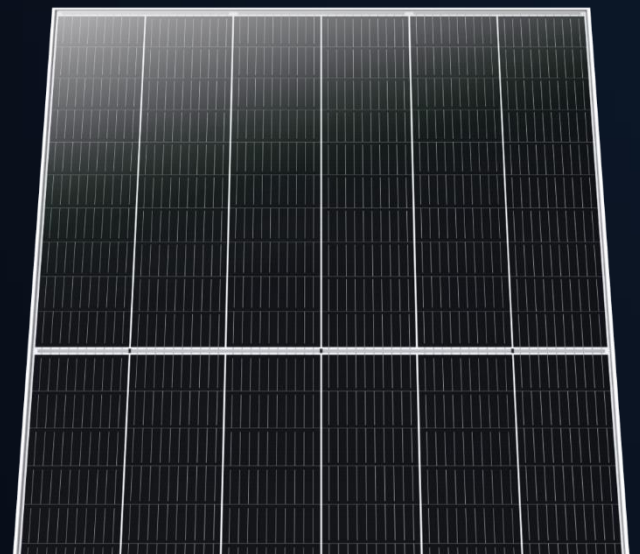
Trinasolar

Same or better efficiencies than overlapping



Other modules

Risk of micro cracks in overlapped areas



Example: Trina Solar 600W efficiency is 21.2%.

Competition module of 580W is 21.2%

Vertex technology overview:

Technical characteristics

Lighter modules than any comparable module → Lighter structures

		Trinasolar			Other modules
		400W	550W		535W
Backsheet	Module weight	21.0 kg	28.6 kg		28.9 kg
	Power / weight	19.3 W/kg	19.2 W/kg	**More power per kg**	18.5 W/kg
	Weight / m2	10.92 kg/m2	10.96 kg/m2	**Les weight per m2**	11.42 kg/m2
Double glass	Module weight		32.6 kg		32.3 kg
	Power / weight		16.9 W/kg	**More power per kg**	16.7 W/kg
	Weight / m2		12.49 kg/m2	**Les weight per m2**	12.63 kg/m2

Vertex technology overview:

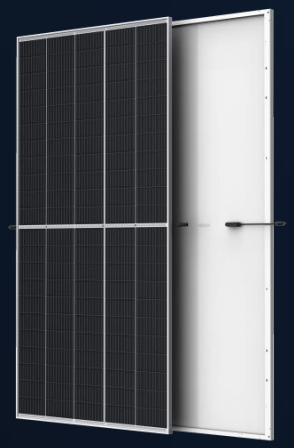
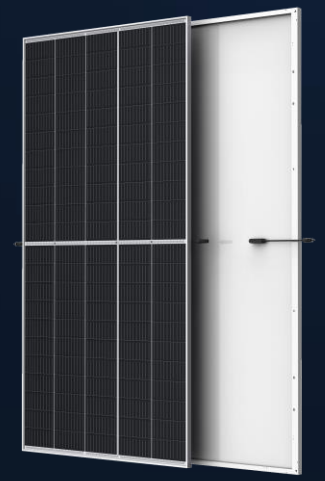
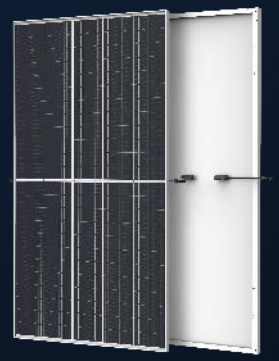
Technical characteristics

Trinasolar

More power in each container provides savings in logistics

<300 | 308 | 320 | 330 | 340 | 375kW

Power fitting in a 40 ft container

	DE17M(II)		DE18M(II)	DE19	DE09
	682 pieces / ct		620 pieces / ct	620 pieces / ct	936 pieces / ct
Most of the modules		Best in class competition			
	Vertex		Vertex	Vertex	Vertex S

Vertex technology overview:

Technical characteristics

Trinasolar

Products adapted to West Africa local climate conditions

Double glass

Double glass provides full insulation against humidity and chemicals.

Trina Solar double glass modules have been used for years in floating plants.

Huaibei Mining Subsidence
Huaibei,Anhui
40 MW / 120,000 Panels / DUOMAX / Floating / 2018

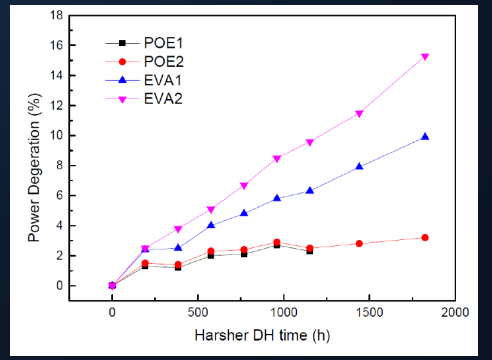
Yingshang Mining Subsidence
Fuyang,Anhui
130 MW / 400,000 Panels / DUOMAX / Floating / 2017

Backsheet with PoE

KPX backsheet

Trina Solar uses a best in class Kynar backsheet with a layer that minimizes humidity penetration.

In addition, modules uses PoE, an encapsulant which is not sensitive to moisture.



Damp heat test shows that using PoE as encapsulant reduces the degradation of the module compared with traditional EVA.

- Oxygen and water vapor
- EVA reacts to oxygen & hydrolysis but PoE do not

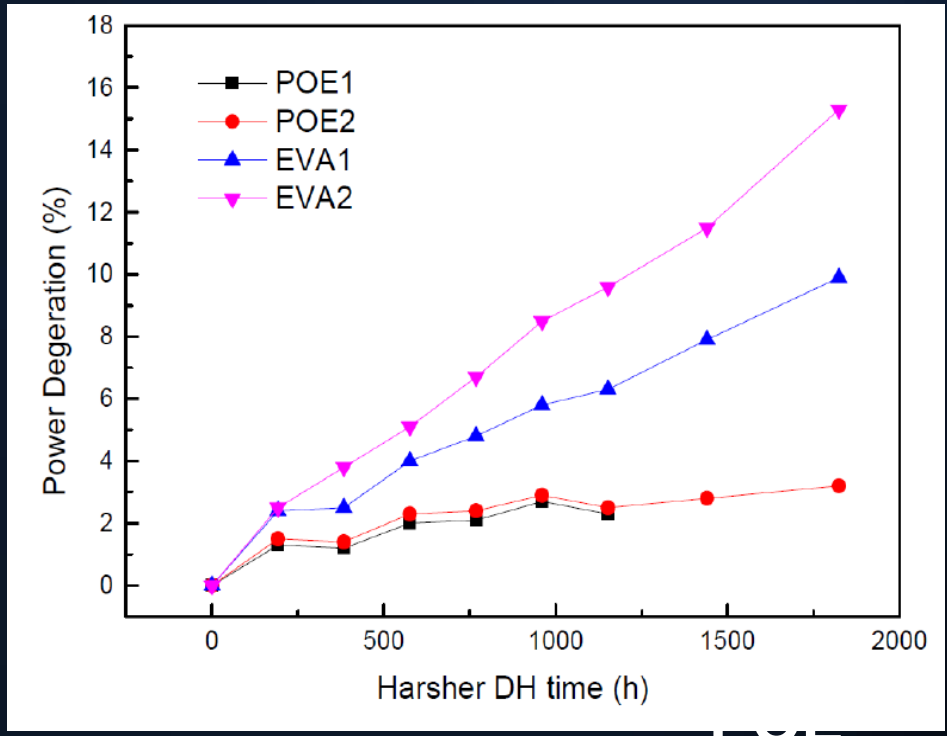
Critical Materials in Solar Panels: PoE (Poly Olefin Encapsulant) Vs EVA (Ethyl Vinyl Acetate)

On performing IEC-61215 Damp Heat Test and various other tests on EVA and POE based products to determine the module's ability to resist the effects of long-term moisture penetration, some major effects were realized.

Permeability:
Under high humidity high temperature conditions water vapor and oxygen enter the module through the backsheet, which agitates the permeability characteristics of the module.
EVA reacts with water vapor and hydrolyzes to acetic acid, whereas PoE does not react with vapor. This major factor is the reason for use of Dual glass modules with PoE+PoE design in these conditions.

Degradation & Performance Characteristics
Acetic acid formed due to hydrolysis in EVA products, tend to corrode metal parts, producing lead acetate, resulting in solder strip blackening and excessive power degradation tampering the modules performance .

Thermal Stability:
Under harsher damp heat testing (85% humidity and 85℃ temperature), it was determined that the finger grids on EVA based modules tend to loose their withholding properties and break away from module grid. This further leads to power degradation.
PoE products on the other hand have better damp heat resistance leading to better module output.



POE
does not produce acetic acid on its own accord"

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Vertex

Low Module Voltage,
High String Power

Vertex technology overview:

Technical characteristics

Higher current significantly reduces the number of strings

	166mm Half cut		210mm Third cut		210mm Half cut	
	DE08M(II)	DE17M(II)	DE09	DE18M(II)	DE19	DE21
Isc	11.5 A		12.3 A		18.4 A	
String power	12.5-13.8 kW		13.3-14.7 kW		20-22 kW	
Number of strings	106		100		66	
	Legacy		Compatible current with 182 modules		Important savings in BOS	

Vertex technology overview:

Technical characteristics

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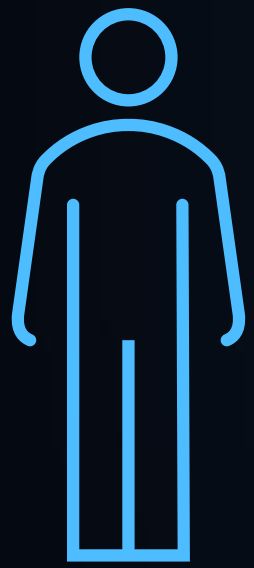
Two options give better results in any project



Vertex S

1754x1096mm

210

40

Optimum small roof and remote location

Similar currents

Best logistics

Low weight

Flexible configuration

2279x1135mm

182

72

More power per module

Less strings & BOS savings

Vertex

2382x1096mm

210

55

Optimum large roof or ground installation

Vertex Compatibility technology overview:

Trinasolar

Vertex half cut modules are compatible with current inverters and trackers

Inverters

- SUNGROW
- HUAWEI
- Ingeteam
- SMA
- TMEIC We drive industry
- SINENG
- FIMER

Trackers

- nextracker A Flex Company
- ARRAY TECHNOLOGIES
- Arctech Solar 中信博新能源
- IDEEMATEC
- PVH

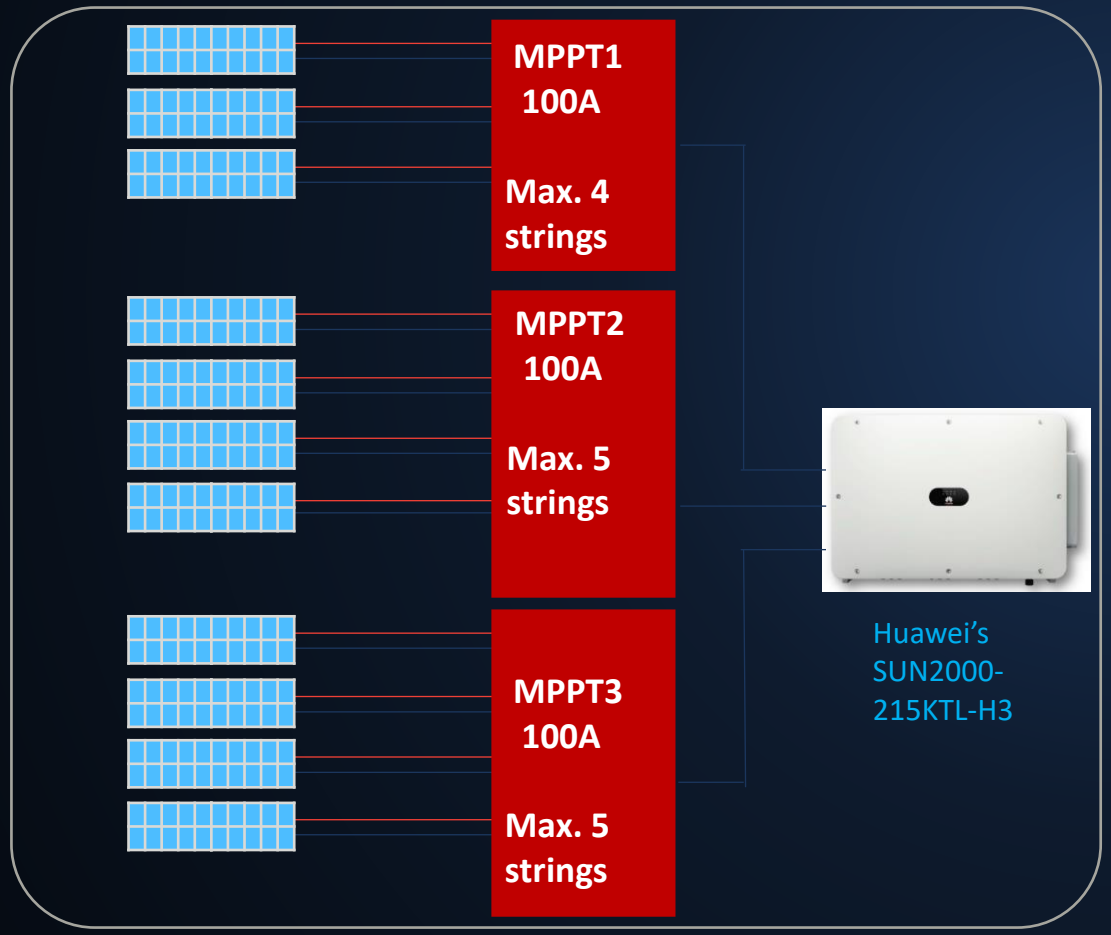
Please, check with us for any product not mentioned

Vertex technology overview:

Compatibility

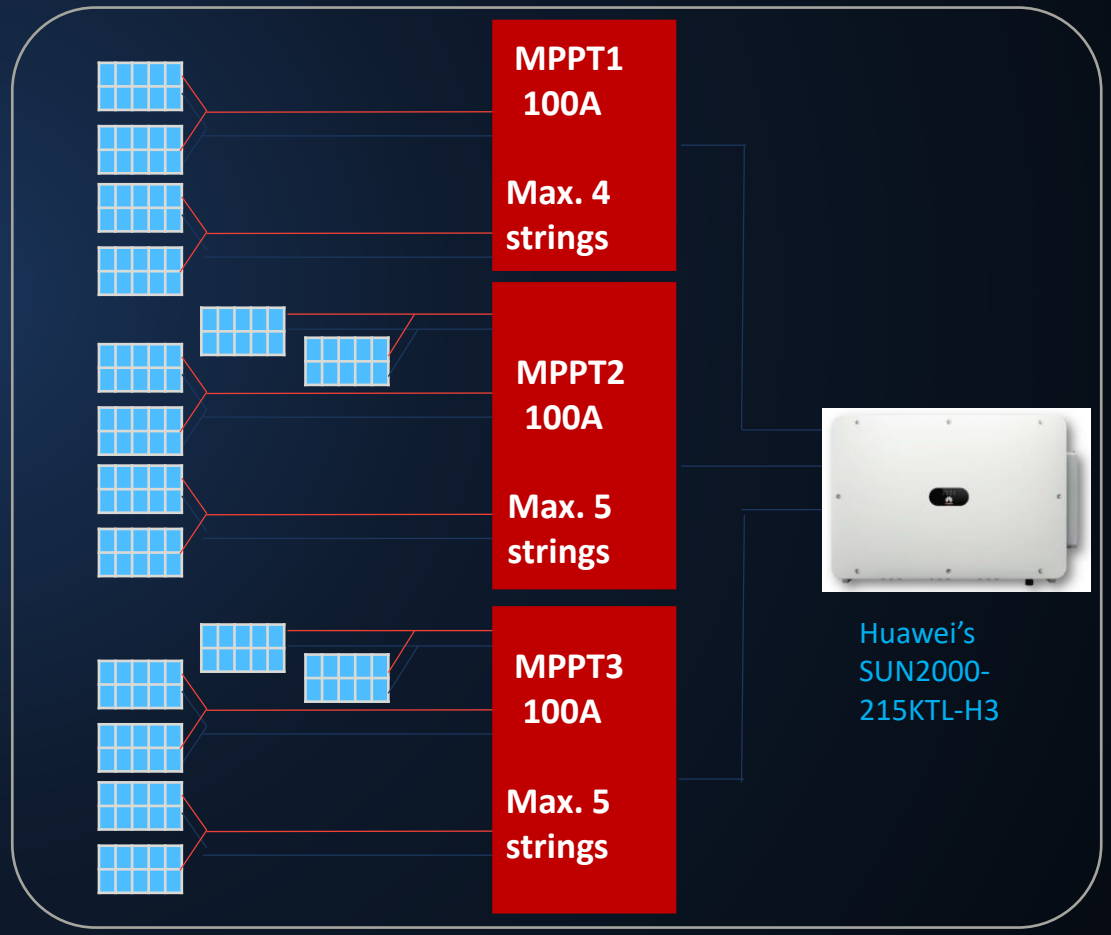
Vertex half cut modules is optimum with one string per input

Vertex half cut 545W



Total power: 244.97kW, 1.25x, 11 strings

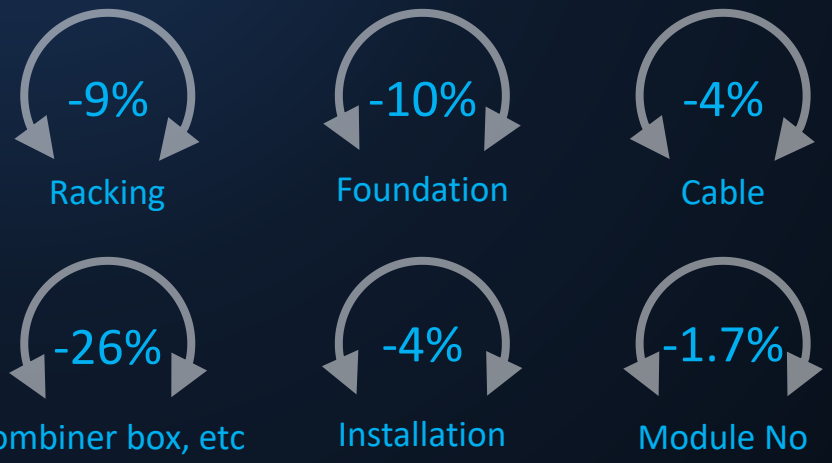
182mm 530W modules



Total power: 244.4kW, 1.25x, 16 strings

BOS analysis of 550W Vertex PV system

	Module type	Reference Module	Trina Solar VERTEX	Diff.
	Power （W）	540	550	
BOS （￥/W）	Racking	0.279	0.253	-0.026
	Foundation	0.123	0.111	-0.012
	Cable	0.046	0.044	-0.002
	Combiner box, etc	0.015	0.011	-0.004
	Installation	0.137	0.131	-0.006
	Sum	0.8248	0.7741	-0.05
LCOE （￥/W）				-2 %



3rd party assessment

Project site : Texas, US Latitude: 34.36° Longitude: -99.89°

Annual GHI: 1,865 kWh/m2 Average temperature: 17.5°C

Project size : 100MW

String inverter, 1P tracker design

Module price is assumed to be the same for comparison.

Bi-facial	535	545
String	26pcs/String	35pcs/String
BOS $/kwh	0.6015	0.5625
BOS	Base case	-6.49%
LCOE $/kwh	0.0434	0.0418
LCOE	Base case	-3.78%

*The result is highly dependent on the input assumptions, and should not be taken as a guidance for specific projects.

Vertex, the product you can depend on

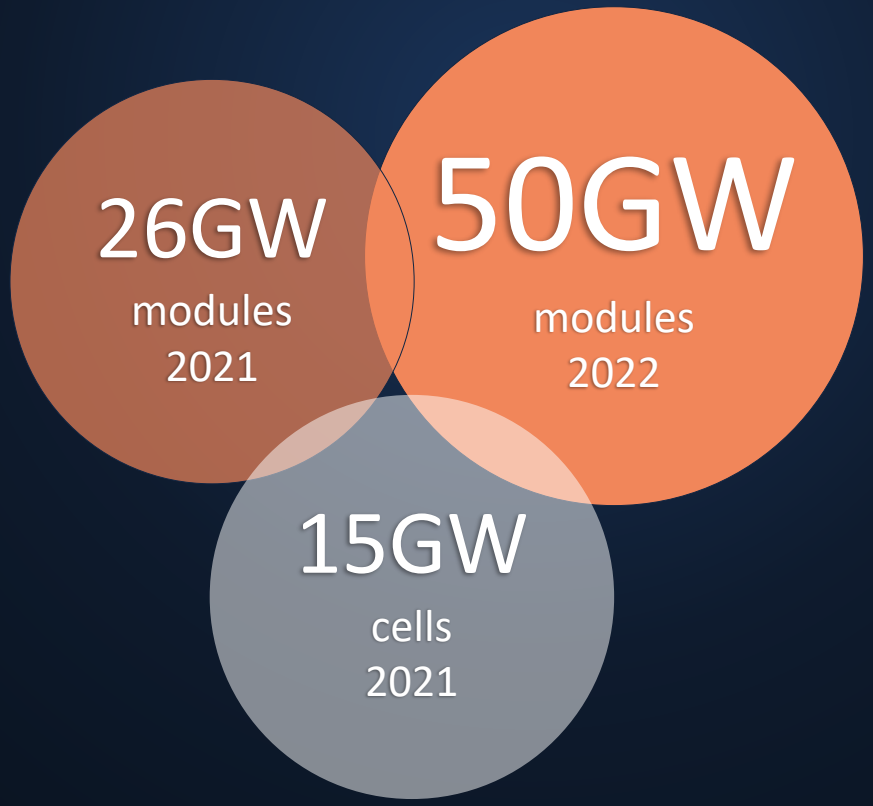
Trinasolar

More experience than competition

1GW+
2020

Delivered!!

Large manufacturing capacity



Secured material supply

Glass
85million m2

Wafers
2 billion ud.

Conclusion

Trinasolar

- Bankable
- 24 years and more than 60GW of experience
- Financially strong company traded in NYS and Shanghai stock exchange
- Superior R&D and module technology
- Most advanced manufacturing facilities
- Best quality processes
- Reliable supply of materials
- Local support in West Africa

Vertex

- Best technology
  - Highest power
  - NDC to avoid microcracks and hot spots
- Compatible with inverters and trackers
- Product adapted to local environment
  - Double glass module
  - Backsheet with PoE+PoE
- Savings in the project
  - High power per string
  - More power per container
  - Reduced BOS and lower LCOE

Trinasolar

Thanks for watching!

Trinasolar

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Africa Solar Industry Association

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