



# ARCTECH SOLAR - SOLUTION PROVIDER

## Large Module Impact on Tracker Design



Olvia Malagón Pfeiffer  
[olvia.malagon@arctechsolar.com](mailto:olvia.malagon@arctechsolar.com)



**Founded**

2009

**Headquarters**

Kunshan, China

**Employees**

900+

**Installation**

19GW

**Projects**

700+

\* as of the end of 2018



# I PRODUCTION CAPACITY

**Manufacturing, Changzhou, China**



## Bankability Global



## Patentes 121

\* incluindo 16 patentes de invenção



## Certificados-ISO

ISO 9001, ISO 14001, OHSAS 18001







Tube Production



Production of steel profiles



Welding robots



Laser cut



Accessories



Aluminum parts



Effect of lightning strike



Salt spray



Dustproof check



Gear life



Water spray



Damper life



## TRACKER PRODUCTS

### SKYLINE

1 in Portrait  
1 GW Global



## SMART ROOFTOPS BAPV/BIPV



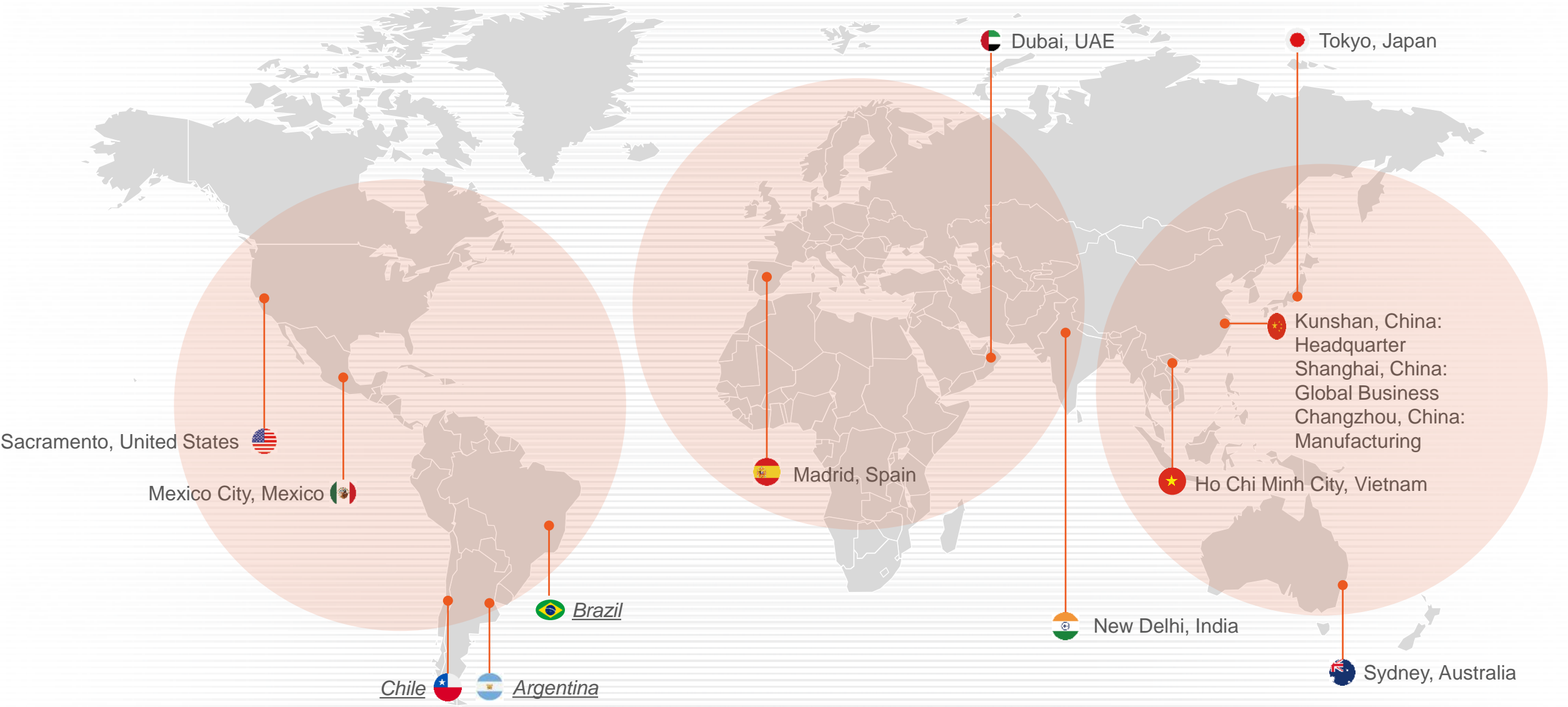
### SKYSMART

2 in Portrait  
1.2 GW Global



## FIXED STRUCTURE









**TRACK RECORD**  
1.8 GW LATAM MARKET



**Business  
Development +  
Commercial**



**Engineering  
Department**



**Project  
Management +  
Site Supporting**



**Integrated Pre And After Sales Services**

# 1. TRACKER SOLUTIONS







Brazil | 90MW | SkyLine



Mexico | 167MW | SkySmart

SKYLINE

1 in Portrait  
1 GW Global



SKYSMART

2 in Portrait  
1.2 GW Global



## SKYLINE

1 in Portrait



- Independent Row, Up to 90 modules per tracker
- Customized design per project, based upon wind tunnel tests
- Industry record of 20% slope adaptability.
- Self-powered directly by the string. Battery only back-up.
- Long Range, low-power consumption wireless communication.

## SKYSMART

2 in Portrait



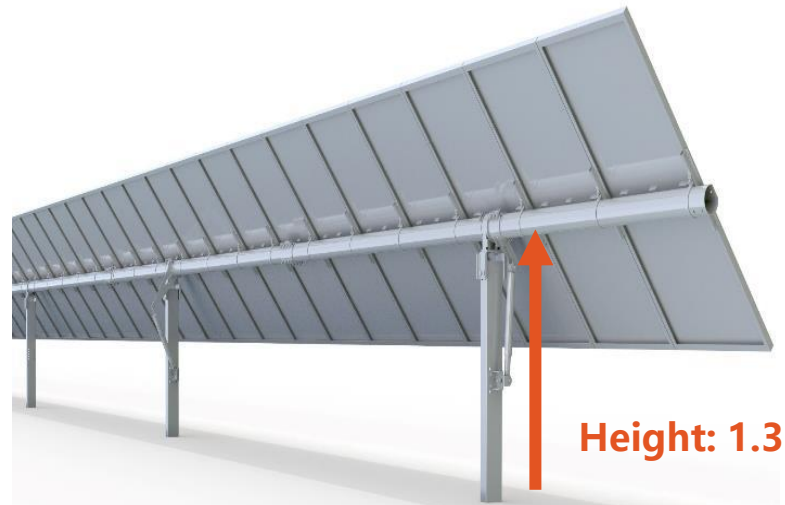
## SKYLINE 1 in Portrait



~90m



D-shape Torque  
Tube



Height: 1.3m

- Independent Row 1P
- Easier design for high wind speed locations
- **Less TON/MW = lower costs**

## SKYSMART 2 in Portrait



~45m



Square Torque Tube



Height: 2.2m

- Independent Row 2P
- Reduction Of Civil Works
- Undulated Terrain Adaptability
- **Fit for bifacial modules**



# I BIFACIAL + TRACKER SOLUTION



Oman | 125MW | SkySmart

## SKYSMART + Bifacial Module

### 20-29GW Bifacial

2020 bifacial module shipment  
forecast

\*Source: BNEF report

- Bifacial PV Modules + Tracker
- Best PV Solution – Standard from 2021 on

## SKYLINE 1 in Portrait + Bifacial Module



- 2019 Mexico 118MW
- 2019 Mexico 126MW
- 2019 Oman 575MW
- 2019 China 650 MW

## SKYSMART 2 in Portrait + Bifacial Module



- 2019 Canada 32MW
- 2018 Thailand 4.99MW
- 2019 Oman 125MW



## 2. ERA OF HIGH POWER & LARGE MODULES



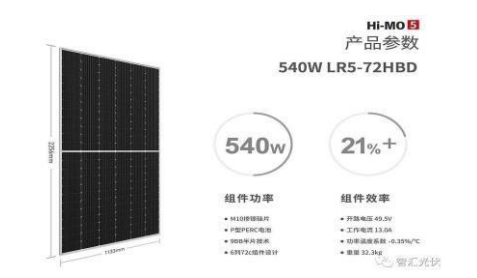
# Era Of High Power & Large Modules



December 12<sup>th</sup>, 2019.  
Risen TITAN, 500W



May 13<sup>th</sup>, 2020.  
Jinko Tiger Pro, 580W



June 29<sup>th</sup>, 2020. LONGi  
Hi-MO 5, 540W



July 16<sup>th</sup>, 2020. Trina  
Vertex, 600W+



February 27<sup>th</sup>, 2020.  
Trina DuoMax, 500W+



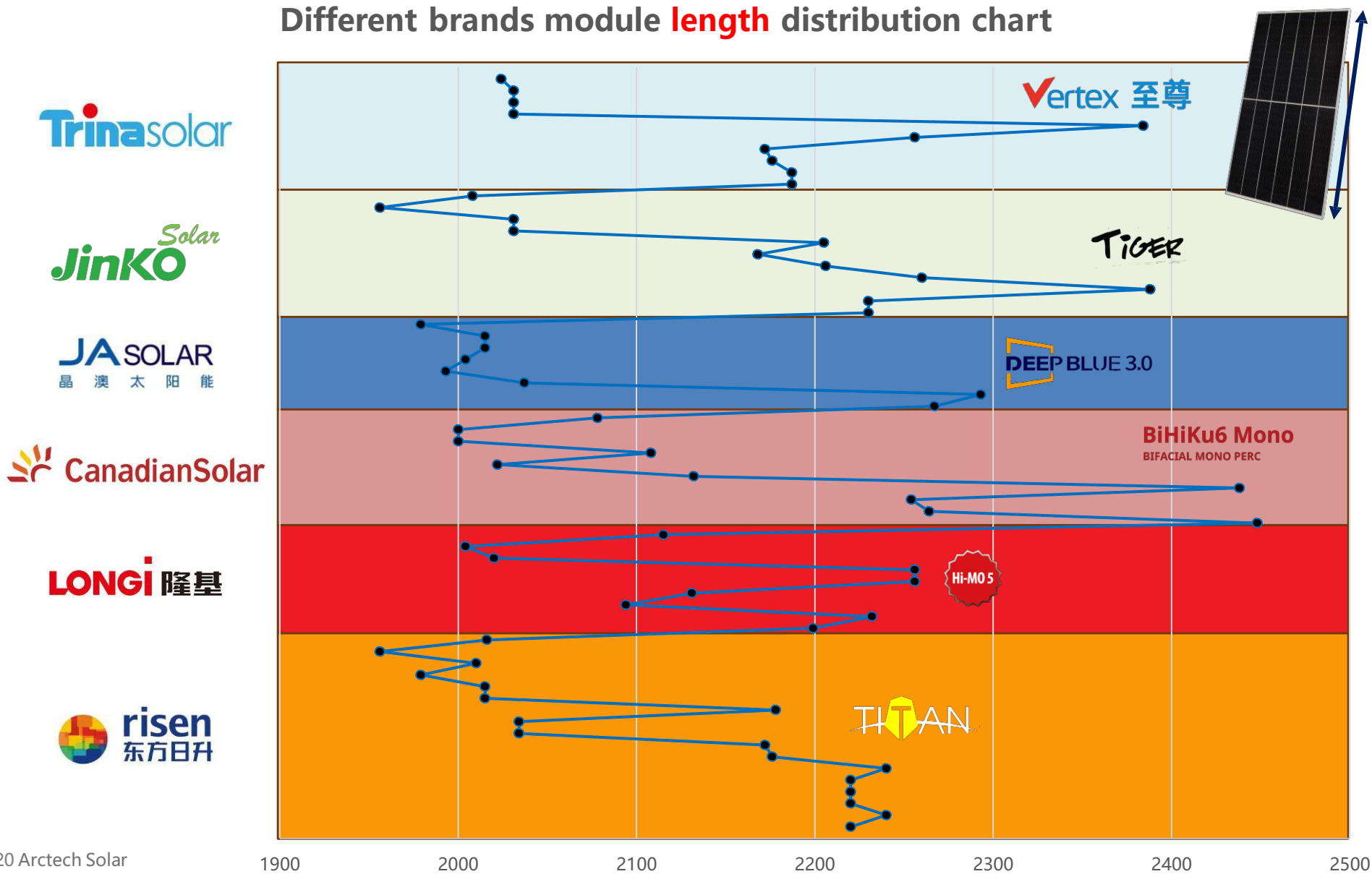
May 18<sup>th</sup>, 2020.  
JA Solar Deep Blue 3.0, 545W



July 1<sup>st</sup>, 2020.  
CSI Hiku6, 590W

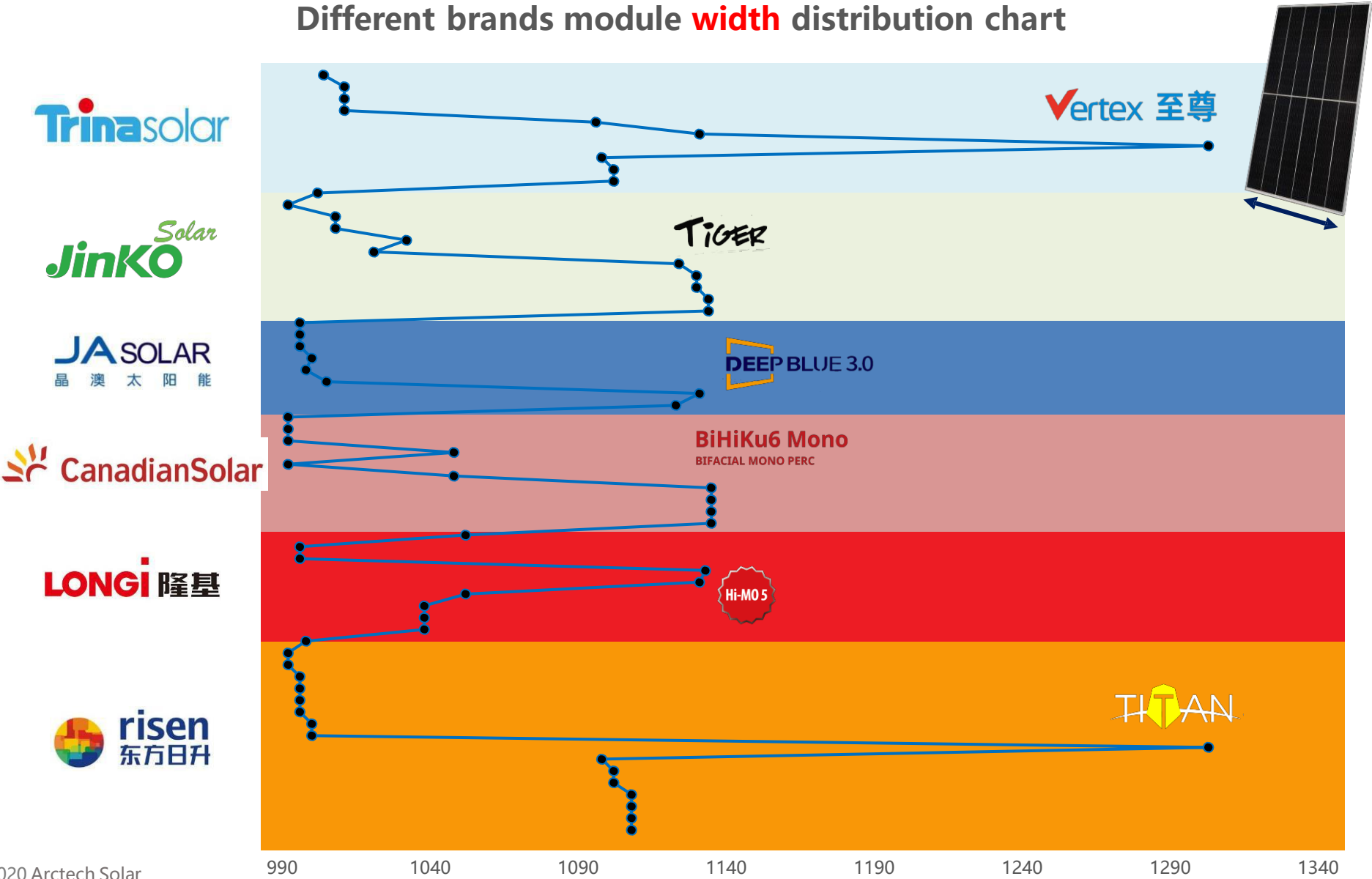


# Era Of High Power & Large Modules





# I Era Of High Power & Large Modules



# I PANELS / STRING

General PERC Module	
Power	405W
Number of Cells	144
Open Circuit Voltage	49V
Temperature coefficient of Voc	-0.29%/°C

Minimum ambient temperature	Modules per string	SkyLine & SkySmart		
		Number of strings	Number of modules	Tracker Capacity
-20°C	≤27	≤3	81	32.8kW
-10°C	≤27	≤3	81	32.8kW
0°C	≤28	≤3	84	34.0kW
10°C	≤29	≤3	87	35.2kW
20°C	≤30	≤3	90	36.5kW

- Increase of 30 % power, but similar voltage
- Larger PV panel, but same # panels / string
- Longer and taller trackers

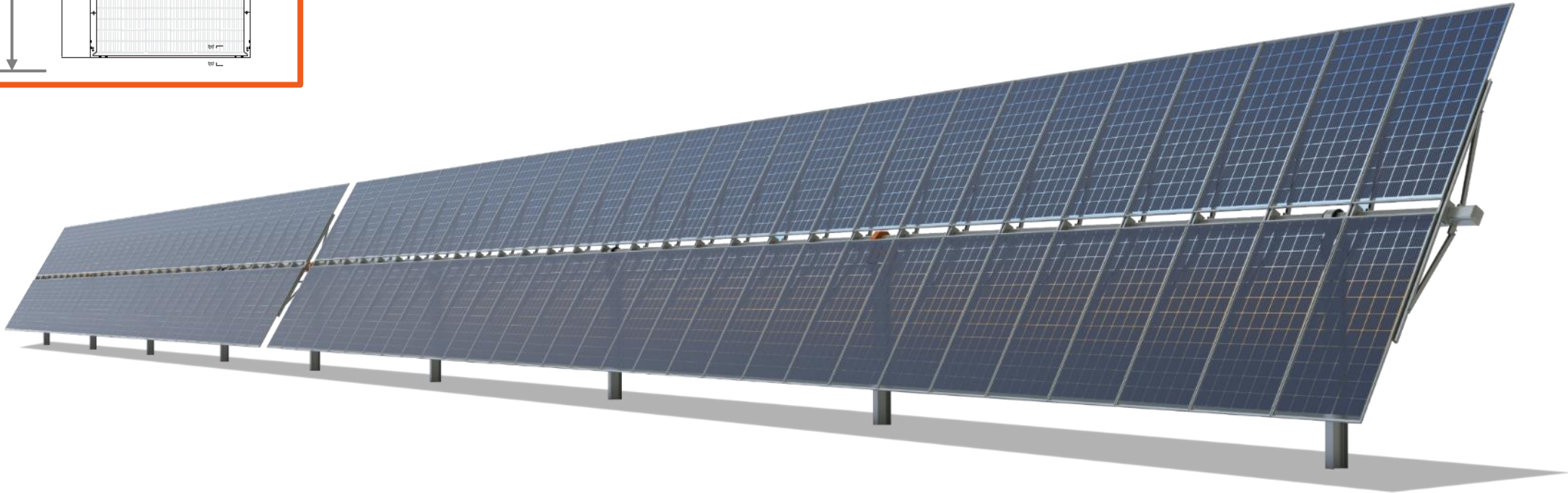
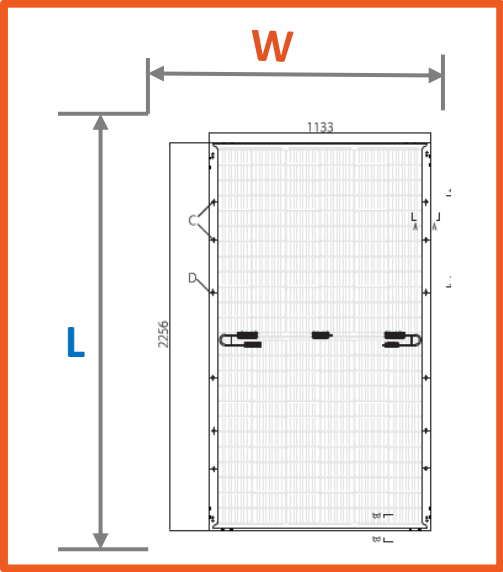


High Power Tiger Pro Module	
Power	530W
Number of Cells	144
Open Circuit Voltage	49.1V
Temperature coefficient of Voc	-0.29%/°C

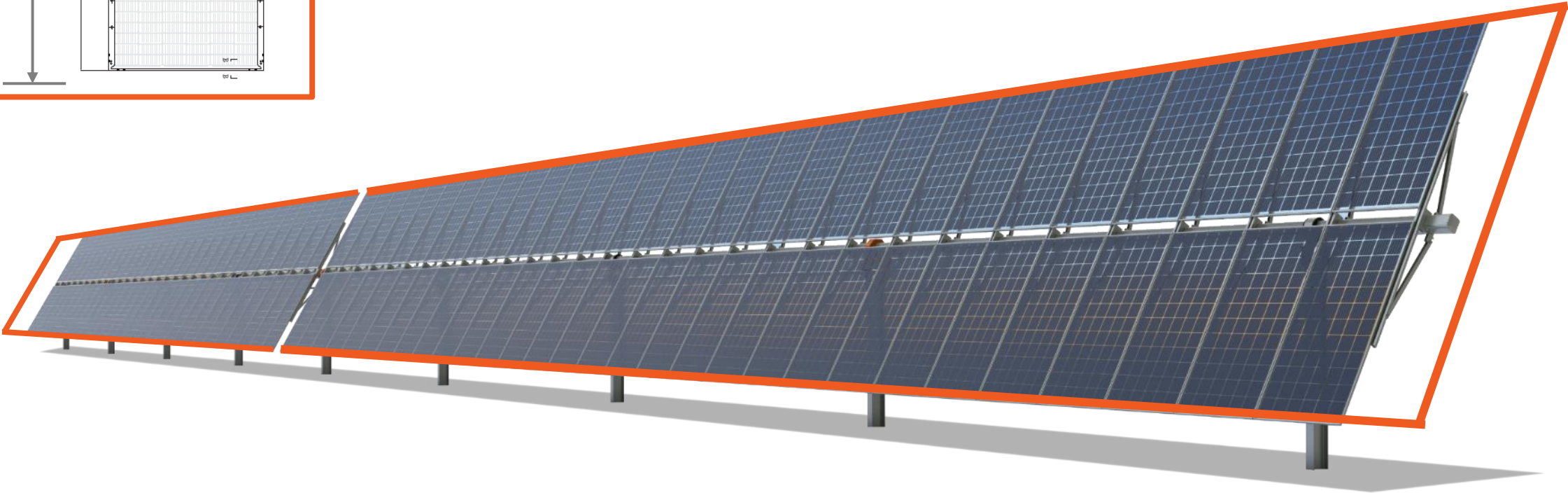
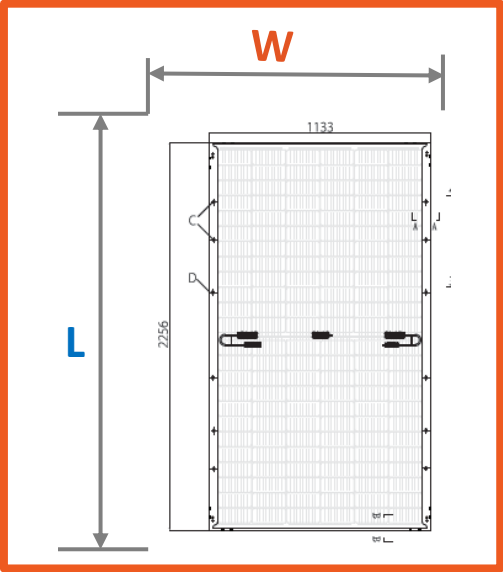
Minimum ambient temperature	Modules per string	SkySmart2		
		Number of strings	Number of modules	Tracker Capacity
-20°C	≤27	≤4	108	57.24kW
-10°C	≤27	≤4	108	57.24kW
0°C	≤28	≤4	112	59.36kW
10°C	≤29	≤4	116	61.48kW
20°C	≤30	≤4	120	63.6kW



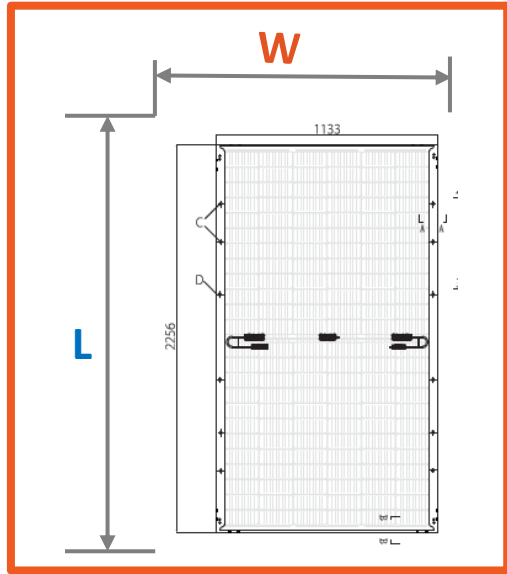
May be a problem for current tracker architectures with a single fixed point and long cantilever



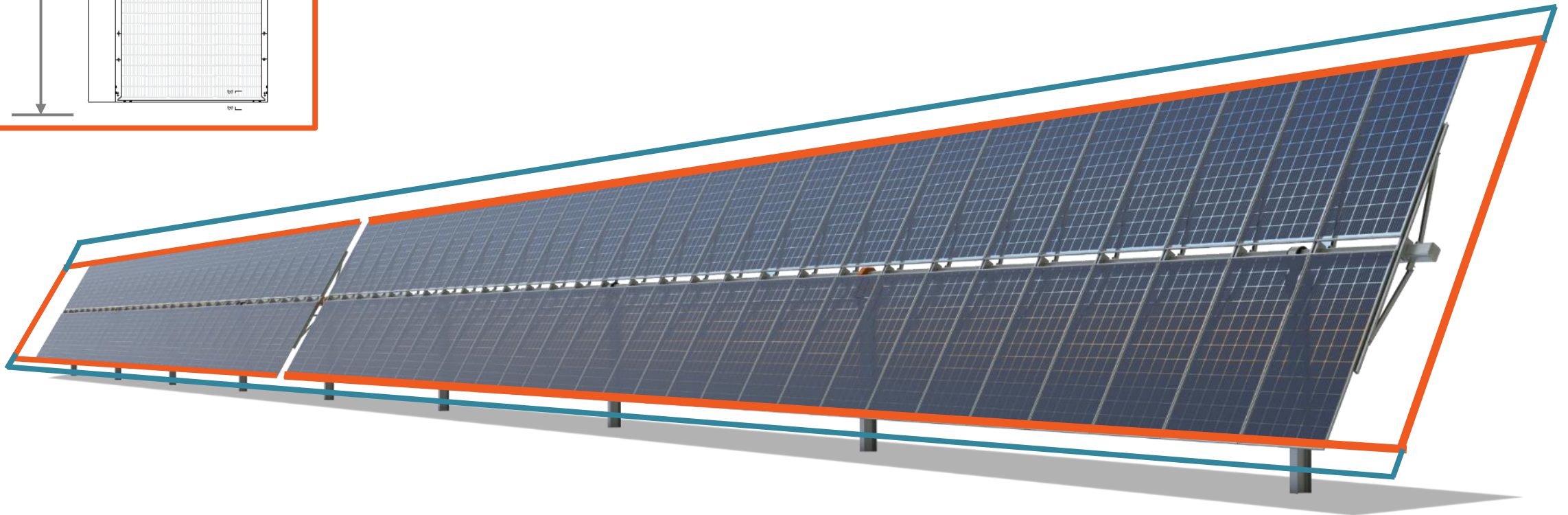




# HIGH-POWER MODULES MECHANICAL IMPACT



- **Lowers critical wind speed**
- **It violates WTT limitations and constraints**
  - coefficients no longer accurate

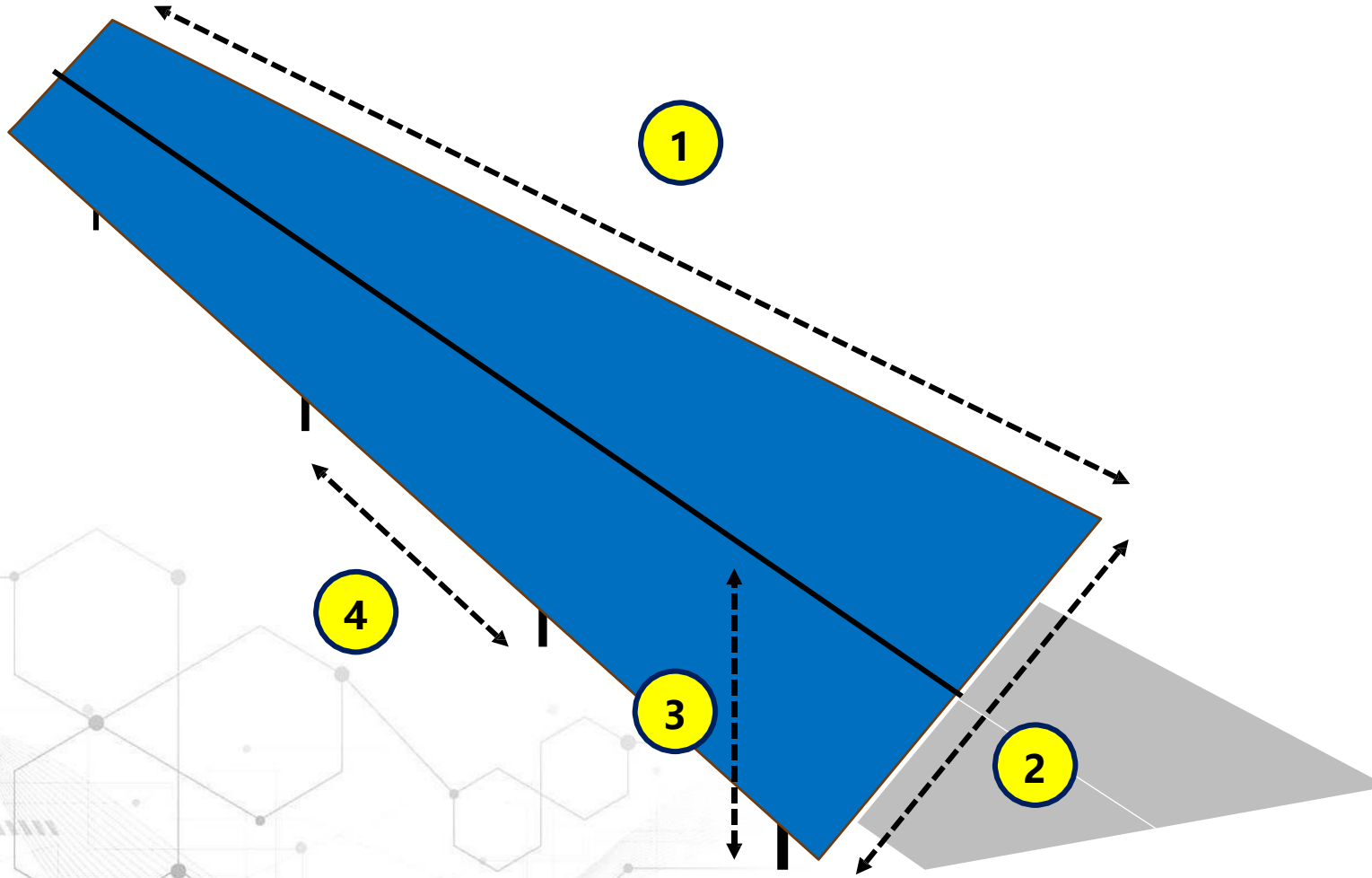


# 3. LARGE MODULE IMPACT ON TRACKER DESIGN



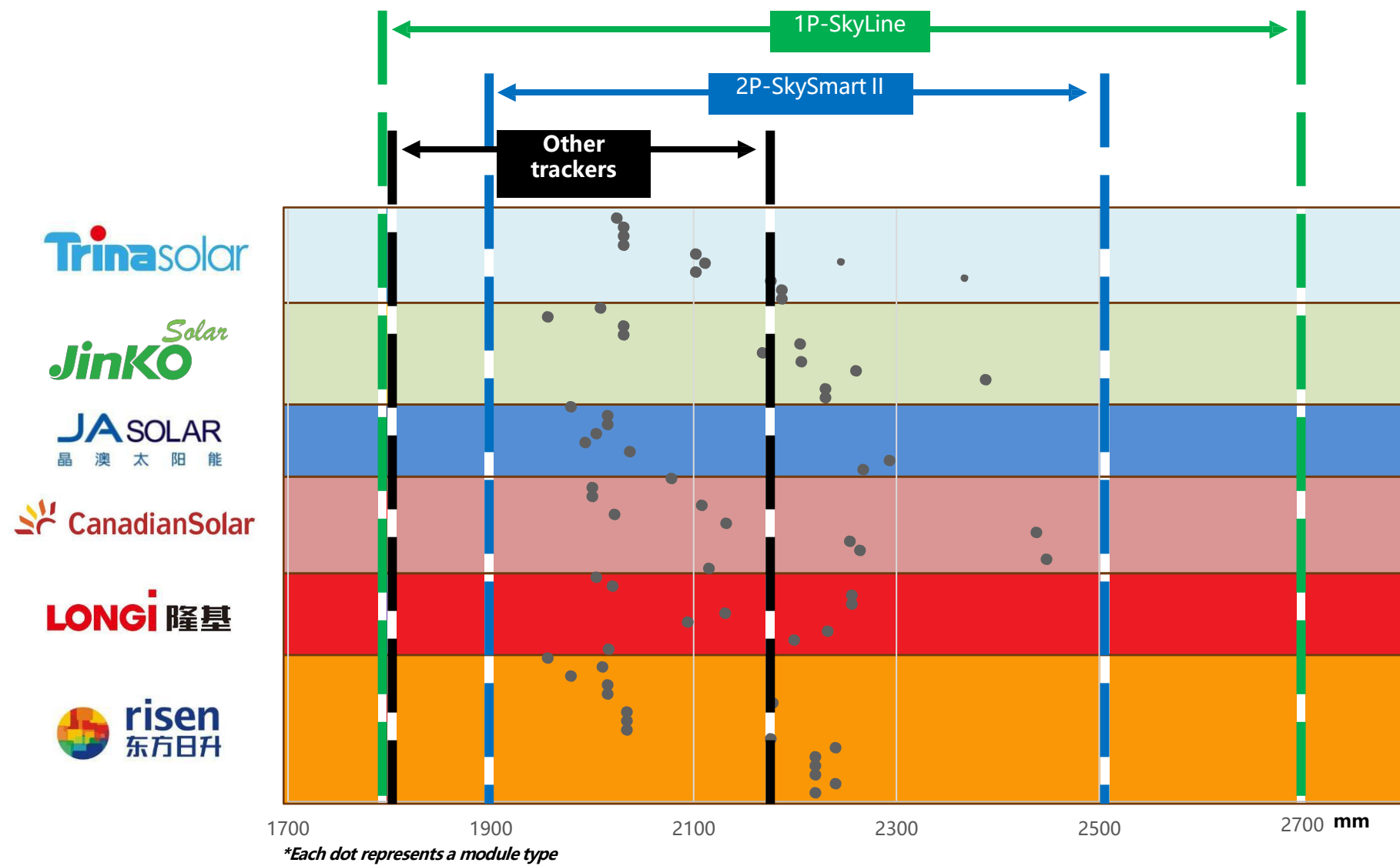


# Large Module Impact On Tracker Design-Tracker Dimension



- 1 Longer Tracker Length
- 2 Longer Chord
- 3 Taller Height
- 4 Longer Span

# Large Module Impact On Tracker Design-Bigger WTT Coefficients



# Large Module Impact On Tracker Design-Tracker Length

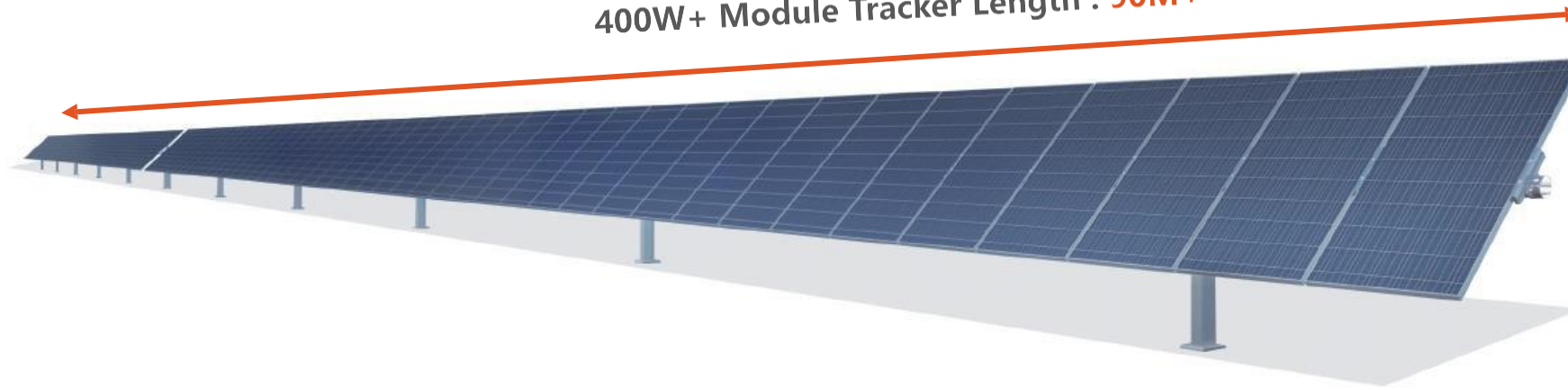
## Large module challenges to 1P tracker

Based on 30 modules/string, 1P has 3 strings and 90 modules:

600W+ Module Tracker Length: **110M+**

500W+ Module Tracker Length : **100M+**

400W+ Module Tracker Length : **90M+**



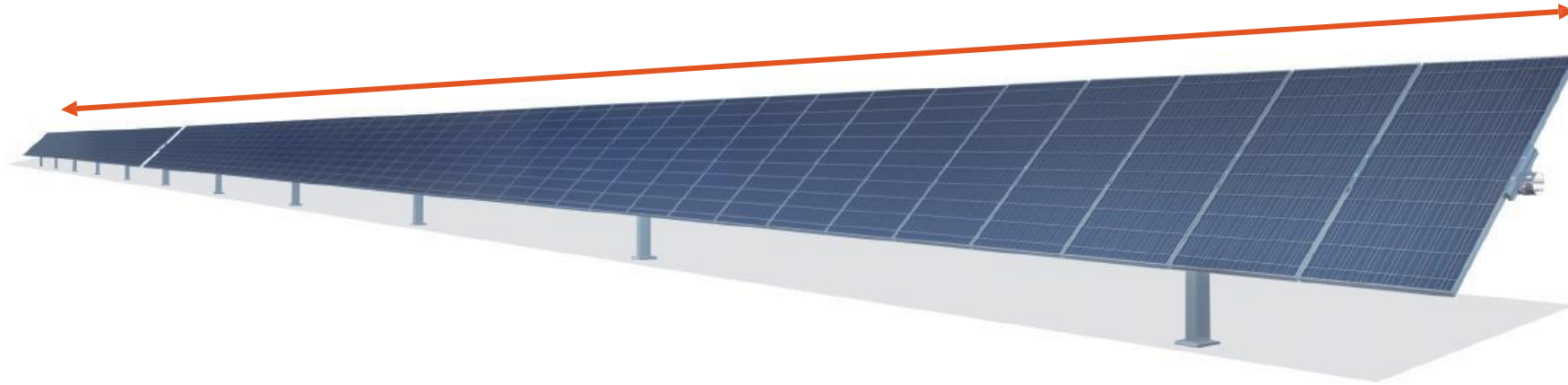
500W+Module Tracker Length more than 100m, critical wind speed reduced a lot

1P tracker single drive system encounters big structural safety challenges



# Large Module Impact On Tracker Design-Tracker Length

## Large module challenges to 1P tracker



### Possible solutions (from worst to best cost-wise):

1. Lower # of strings per tracker
2. Reduce the optimum number of panels/string
3. Increase stiffness locally – end TT tubes become thicker
4. Use SkySmart2, which needs no design compromise

# 4. SKYSMART-2 INTRODUCTION & COMPATIBILITY



# II SKYLINE & SKYSMART

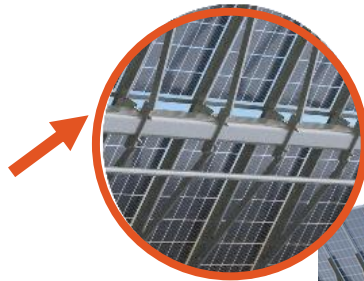
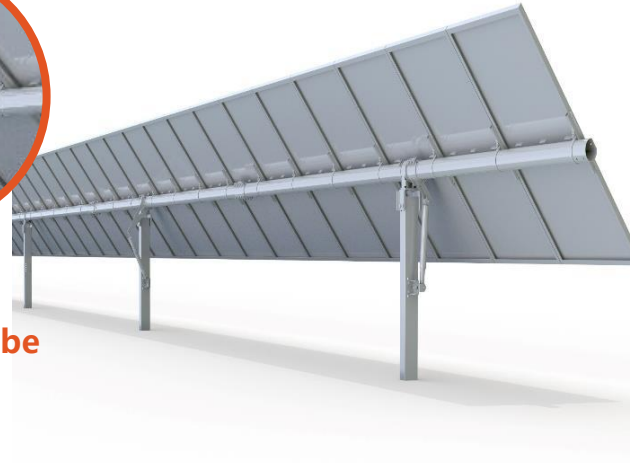
**SKYLINE**  
1 in Portrait



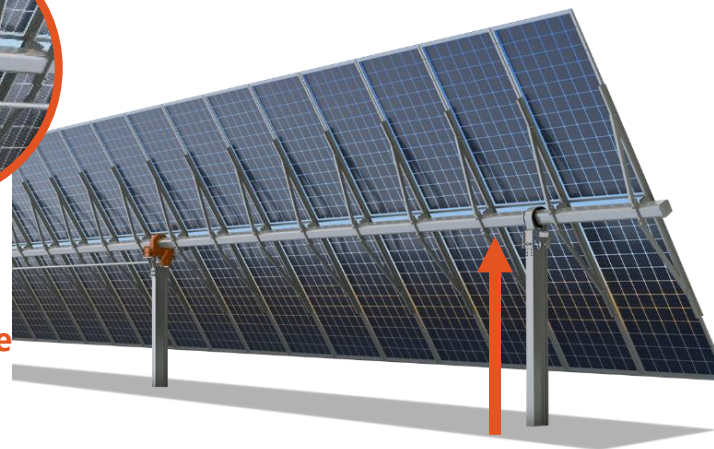
**SKYSMART**  
2 in Portrait



**D-shape  
Torque Tube**



**Square  
Torque Tube**



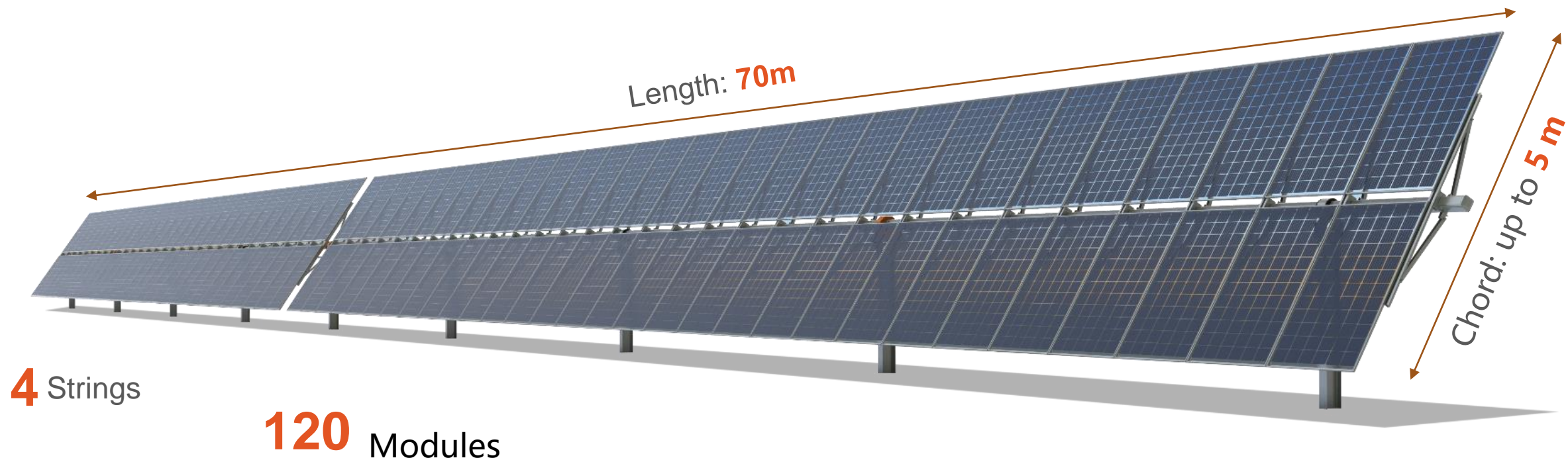
- Stability at **High Wind** Speeds
- **Lower Costs**
- **More Reflected** Energy
- **Less Shading**
- Lower Temperature



**Independent Row 2P Tracker**  
3x more stable, 1P pricing, Solution Friendly



# SKYSMART 2 = COMBINING BEST FEATURES

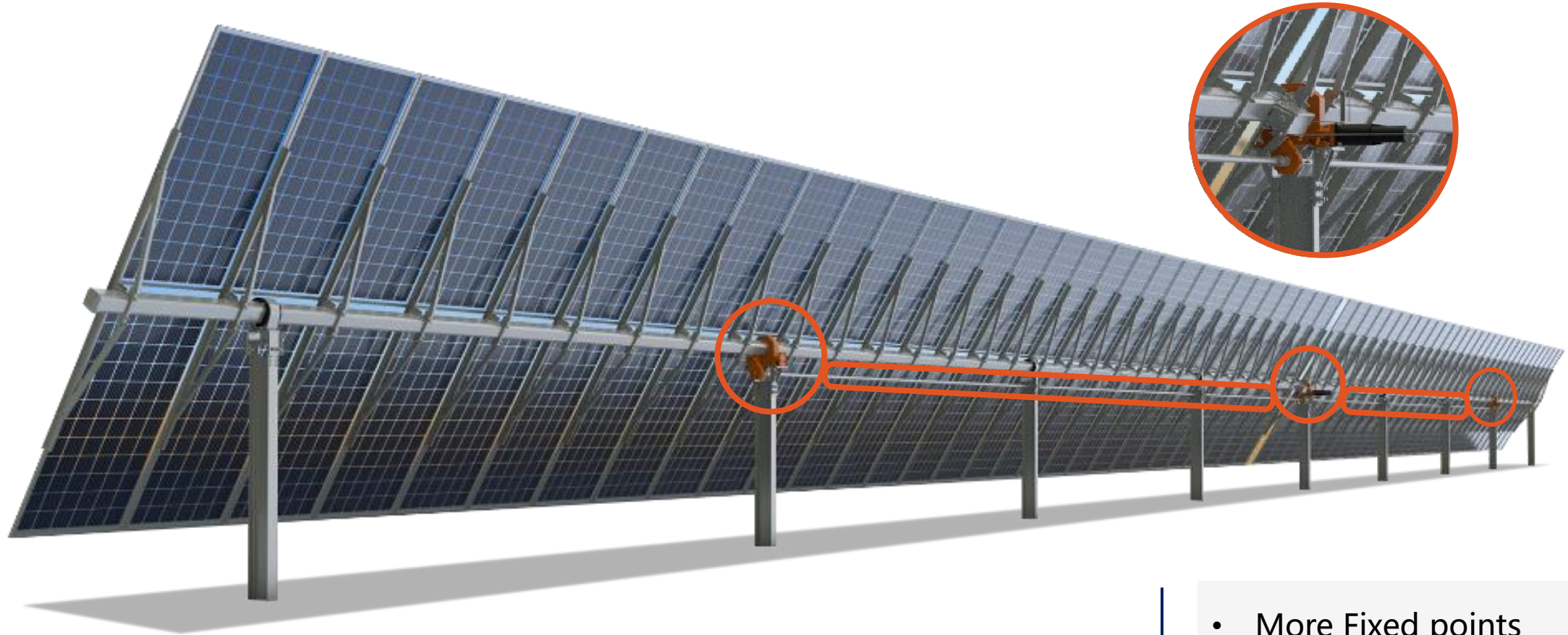


**50-65 KWp\***

\*420 - 550W Modules

- **Best Fit fo Bifacial Modules**
- Higher for better reflection
- Lower shadow ratio

# SKYSMART 2 = COMBINING BEST FEATURES



- More Fixed points
- **200% more stability in at higher wind speeds + Larger PV Module Sizes**
- AI Controller



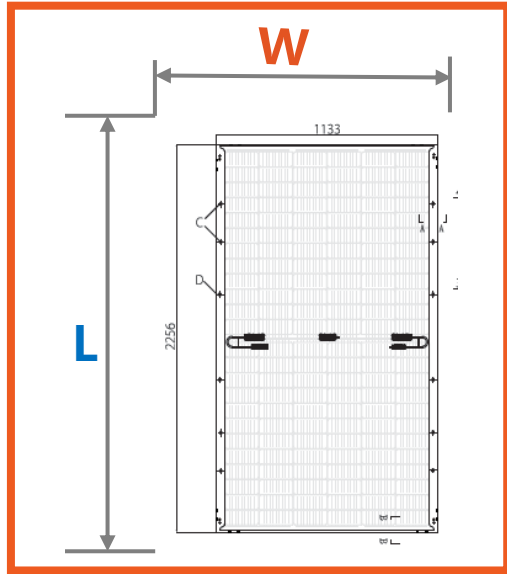
## SKYSMART2

2 in Portrait

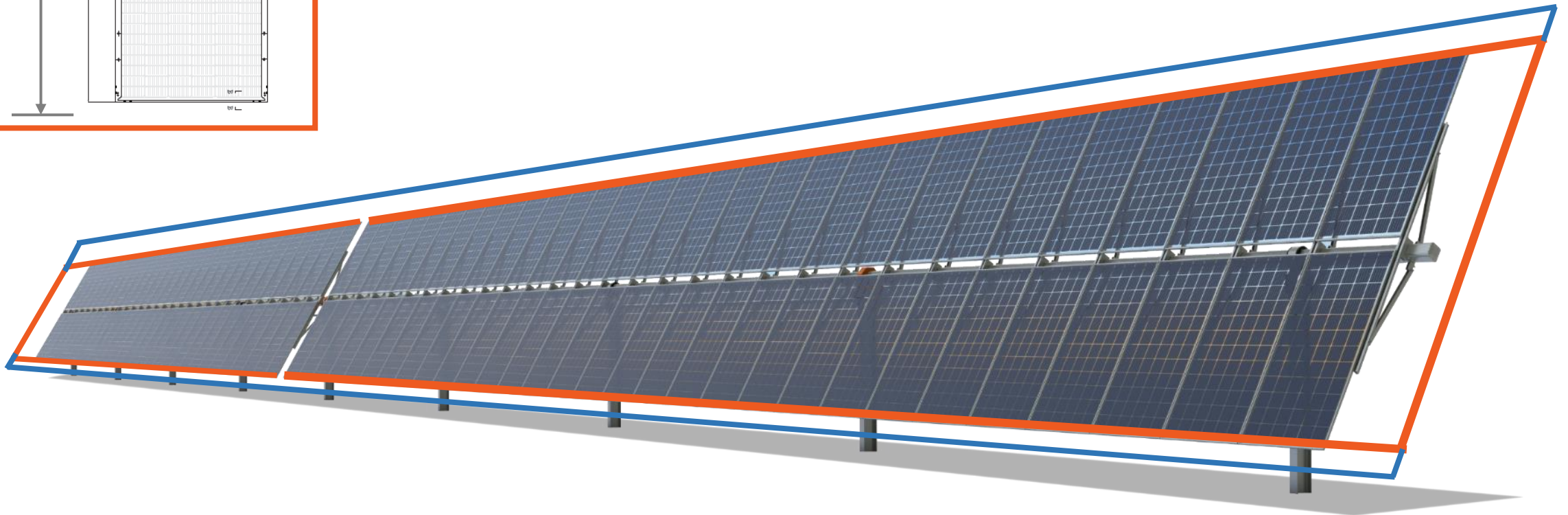


- Compatible from 4m to 5m *chord* total tracker width.
- (Modules from 1.95 a 2.5m length) *Option to 2.7m.*

# I MECHANICAL IMPACT

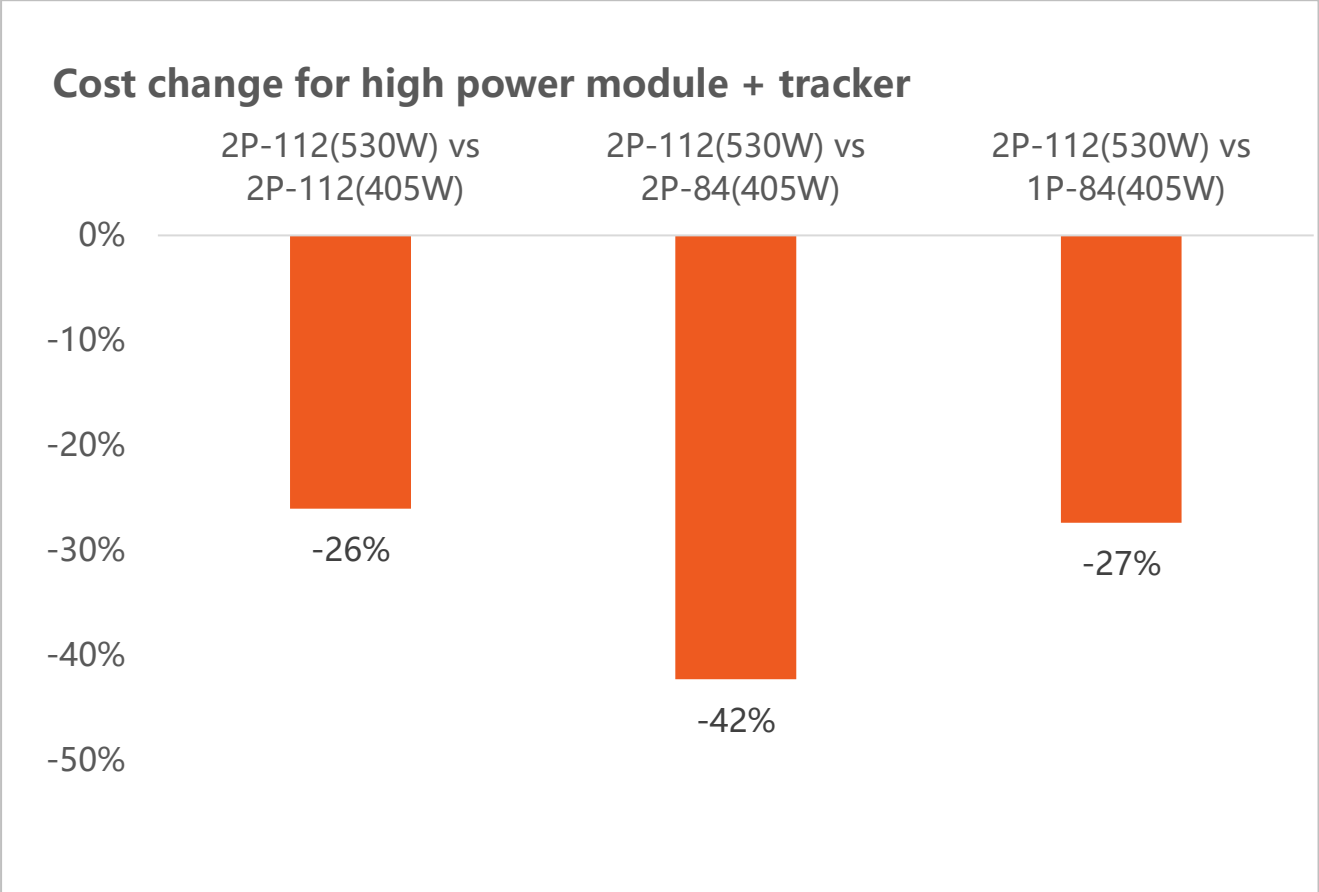


- **Lowers critical wind speed**
- **It violates WTT limitations and constraints**
  - coefficients no longer accurate



According to the actual number of strings, the cost changes of high-power modules + tracker:

	General PERC module	High Power module
Power	405W	530W
Number of Cells	144	144
Open Circuit Voltage	49V	49.5V
Temperature coefficient of Voc	-0.29%/°C	-0.29%/°C
Power	84 or 112 (0°C)	84 or 112 (0°C)





## SKYSMART 2

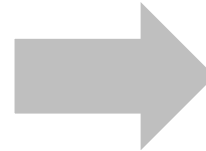
2 in Portrait

**HAS 1 MORE STRING (4 total)**

**HIGH POWER MODULE**

**FEWER MODULES**

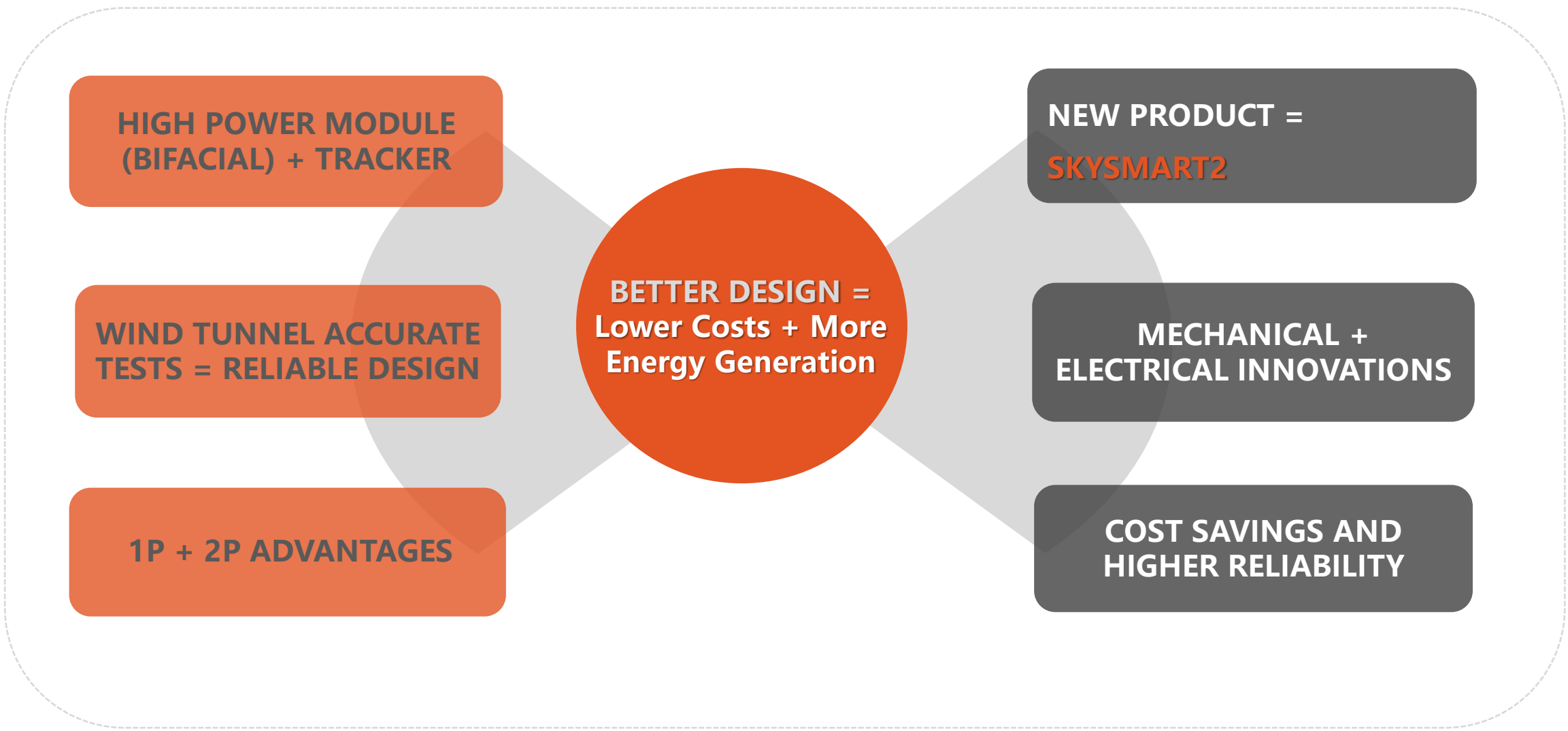
**INCREASED PITCH**



- Module Installation Efficiency On The Tracker By 30%
- Tracker Capacity Increase 62.5%
- More Space
- Higher Yield

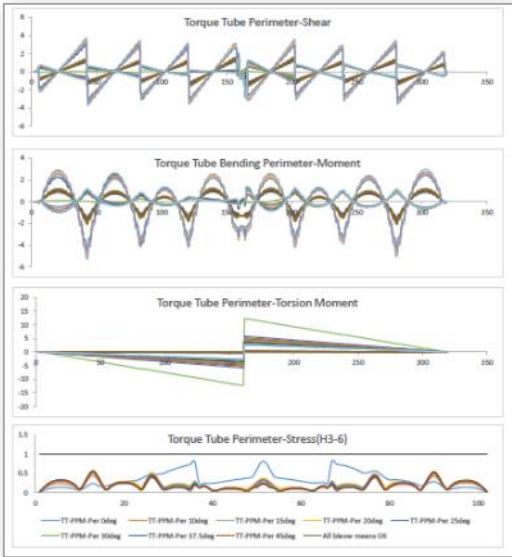
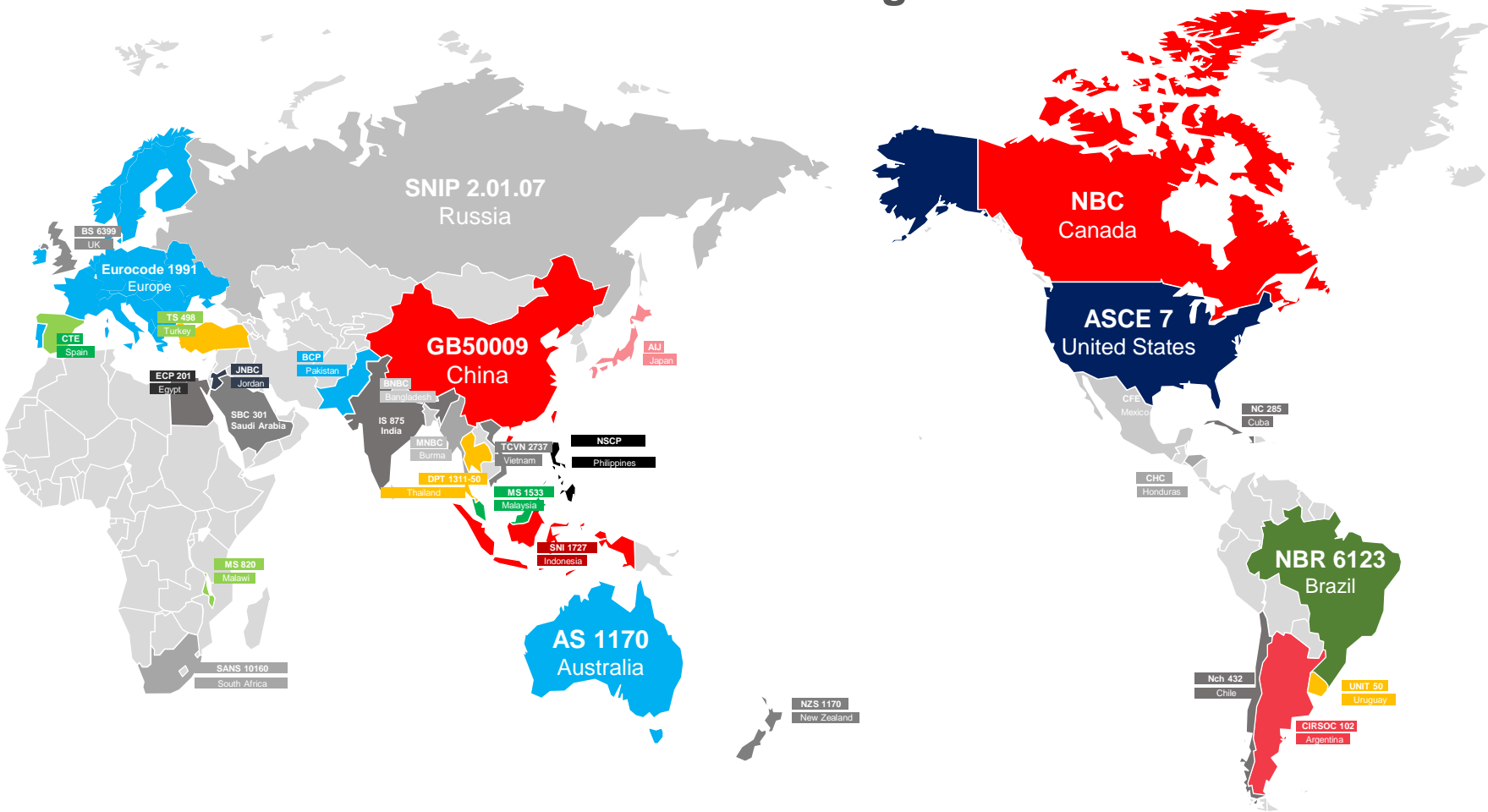
**LOWER COSTS**  
**MORE ENERGY GENERATION**  
**BETTER DESIGN**







## 30+ Countries Building Code



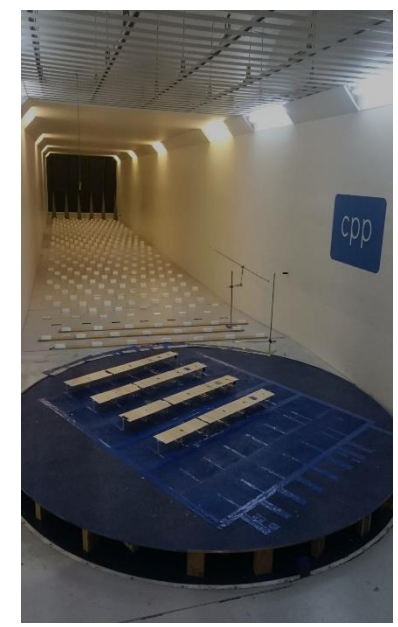
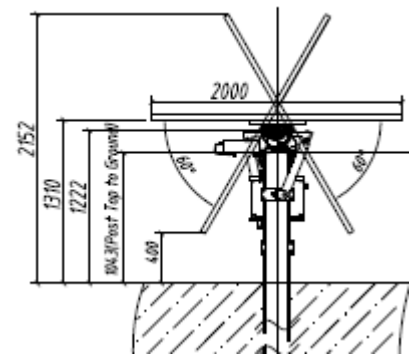
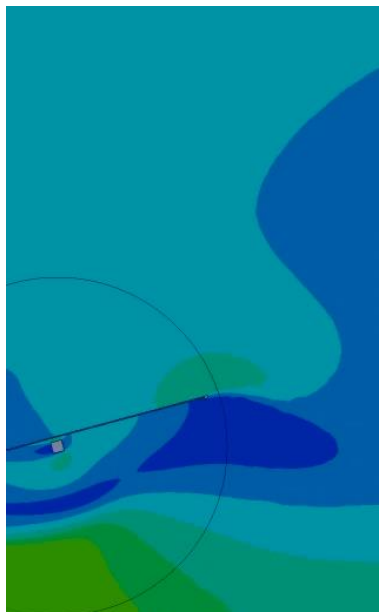
- Local Code

- Wind
- Snow
- Seismic

- Weight  
(Module and  
Structure)

- Shape  
Coefficients
- DAFs

- India: IS875-2015
- Saudi Arabia: SBC 301
- Chile: Nch 432
- Brazil: NBR 6123
- USA: ASCE 7-05/10/16
- Australia: AS 1170
- New Zealand: NZS 1170
- Argentina: CRSOC 102
- Malaysia: MS 1553
- Philippine: NSCP 2010
- Vietnam: TCVN 2737
- Mexico: CFE Design Manual
- Europe: Eurocode 1991
- Japan: JIS C 8955/AIJ



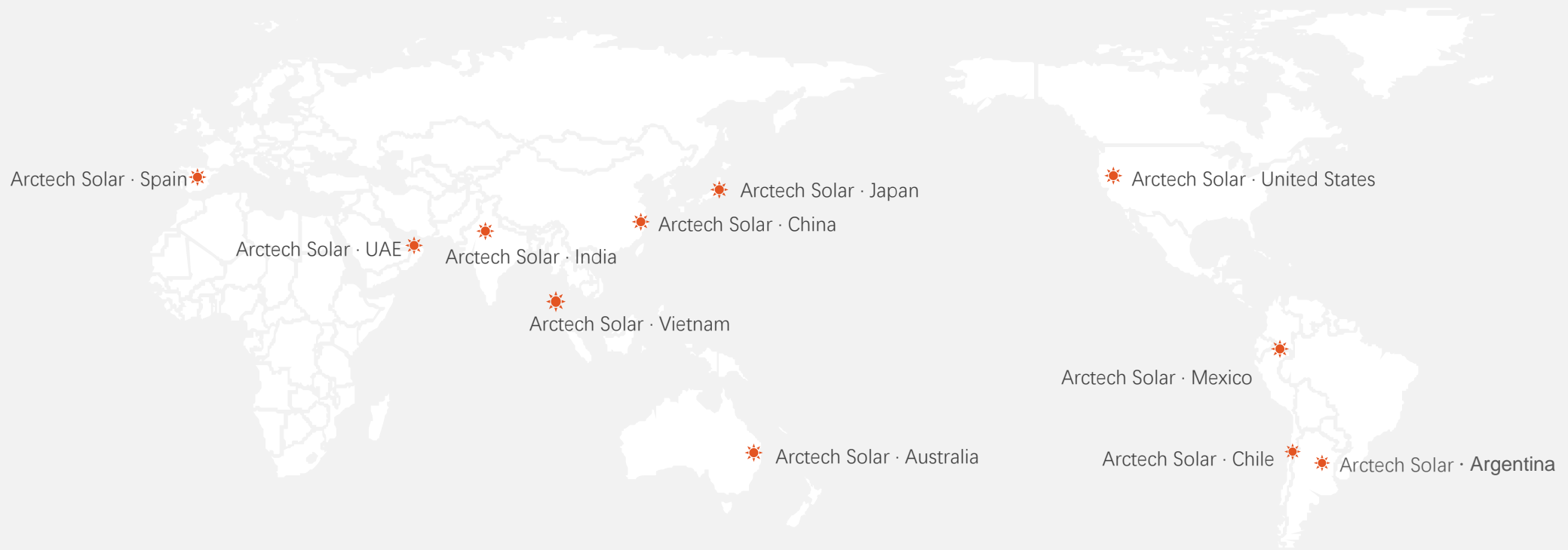
LOCAL CODE

SITE LOADS

DEAD LOAD

TRACKER





**Olvia Malagón Pfeiffer**

Technical Sales Manager - LATAM

[olvia.malagon@arctechsolar.com](mailto:olvia.malagon@arctechsolar.com)

**Gracias | Thank You | 谢谢**

Contact us: [sales@arctechsolar.com](mailto:sales@arctechsolar.com)

