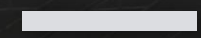




Soltec

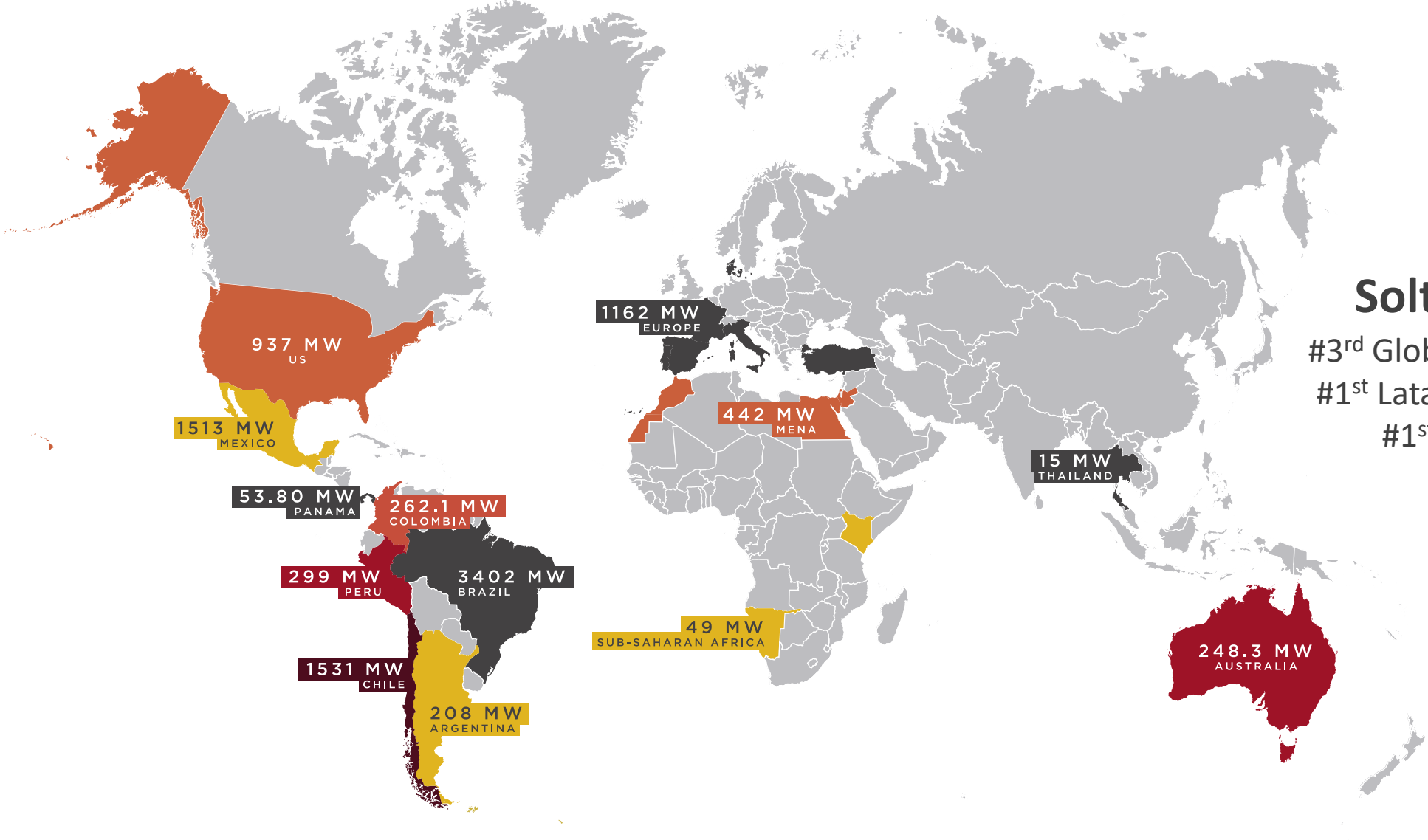


**Making Tracks,
Building Trust**

**Striving for lowest
LCOE with the new 2P
linked tracker design**

Miguel Pozuelo, Key Account Manager Soltec
Eduardo de San Nicolás, CSO and Corp. Dev Soltec

Soltec at a Glance



11 GW

Soltec's track record

- #3rd Global Solar Tracker Supplier
- #1st Latam Solar Tracker Supplier
- #1st Bifacial Tracker Supplier

+16 years of experience
+1600 people

'La Silla' PV Solar (2015, Chile)

- 5 years since the first commercial Bifacial Tracker: La Silla Plant, BG = 13.3%
- Soltec produced the first solar tracker specifically designed for bifacial modules installed in a utility scale solar plant



Soltec releases SF7 Bifacial Tracker (2017)

Up to
+2.1%

Bifacial gain
compared to trackers
In 1P

Up to
15.7%*

Bifacial gain
under high albedo



From both
sides now

SF7 Bi-facial collects light both on the front and on the rear side as it captures sunlight reflected from the surface under the solar tracker. On the right conditions, yield will be increased up to 25%

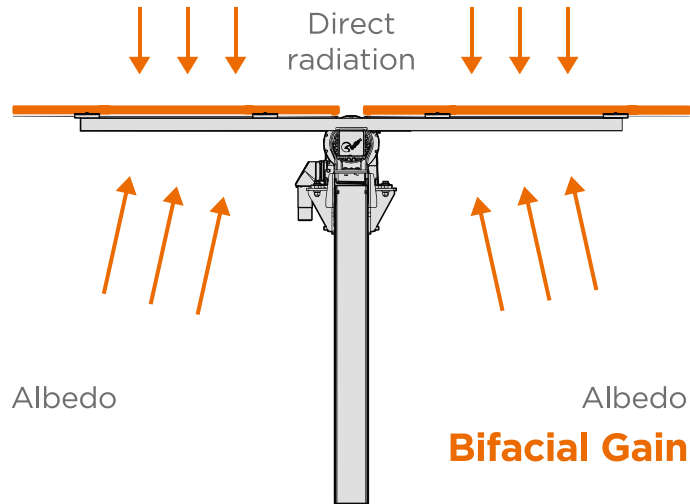
*Measurements taken at BiTEC. Actual results could be greater





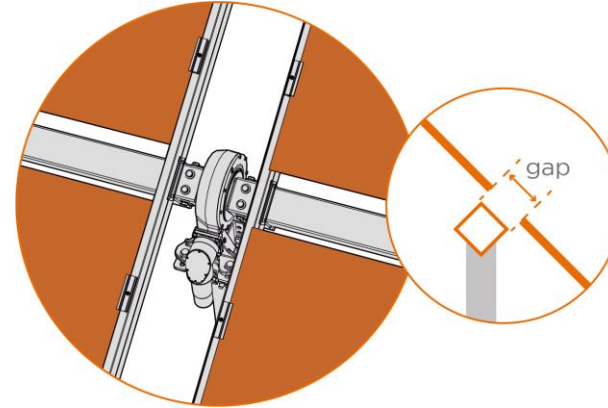
From both sides now

The SF7 standard configuration enables cost-effective installation, operation, and innovation



No Shading

2P module mounting:
no backside shading from torque tube.

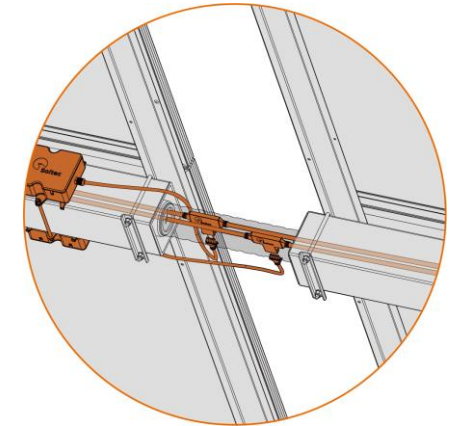


15 cm gap (6 inches) between modules and torque-tube

No hanging wires

Manages DC cable through torque-tube with no shading interference over the back-side of the panels.

83% Total wire savings
75% Installation labor savings



Bifacial Tracker Evaluation Center –BiTEC (July 2018 -2020)

Bifacial testing in Livermore (CA), founded in 2018

- 2 FULL YEARS of BiTEC performance data
- Bifacial Gain of 15.7% for SF7 Bifacial with albedo 55% and 7.3% under seasonal albedo
- Bifacial Gain for 2P SF7 Bifacial is 2.1% higher than 1P tracker → 1,6\$ million benefit for a 100 MW plant – 25 years

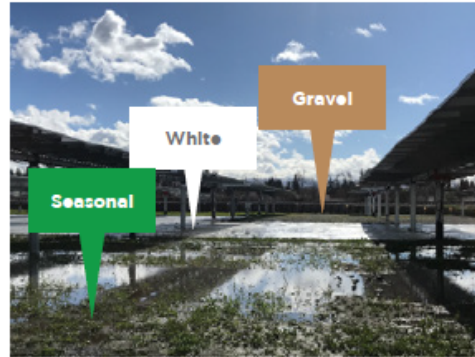


Figure 3. Trackers under different albedo conditions at BiTEC. Dirt test

In Blue: Modules used for measurements
 In Red: Aisle Pitch in meters:
 2P - 12.0, 10.0 and 8.7 meters equivalent to a GCR of 0.33, 0.40 and 0.46 respectively
 In White, Brown and Green: White, Gravel and Seasonal albedos respectively

Albedo	Ground Coverage Ratio		
	0.46	0.40	0.33
White	49-65%	2P/1P	
Gravel	24-36%	2P	2P
Seasonal	16-23%	2P/1P	

Table 1. Scenarios analyzed at BiTEC. Source: Soltec

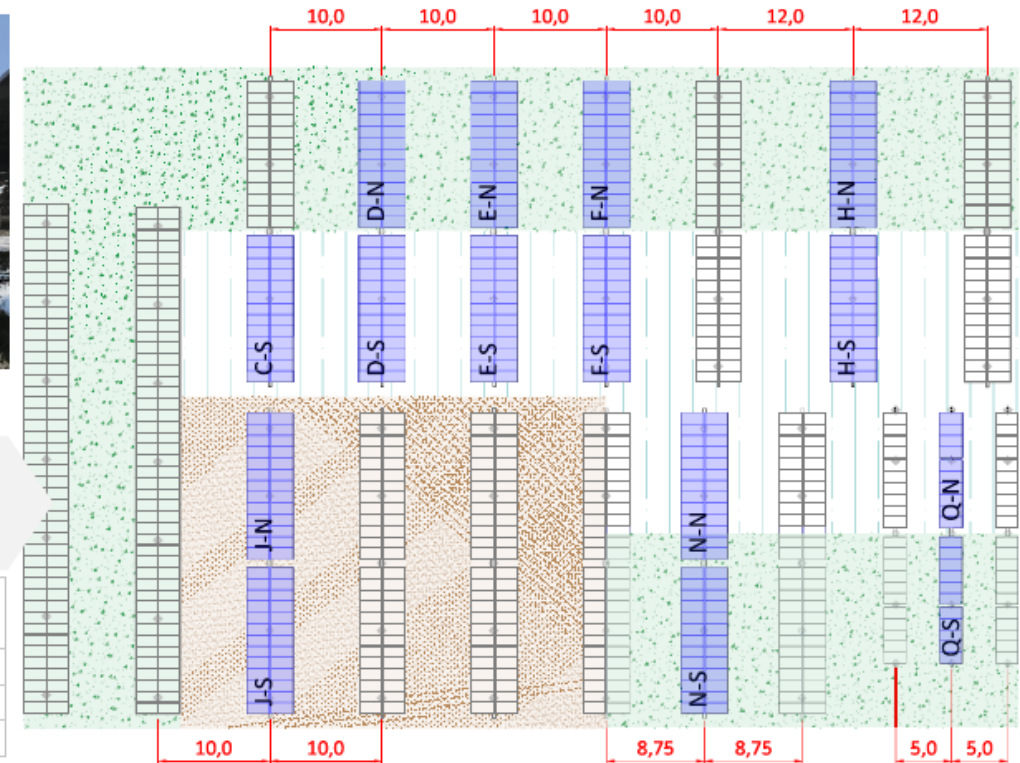


Figure 4. Layout BiTEC. Source: Soltec

Expertise in Bifacial Trackers' Design (2017 – 2020)

4+ GW SF7 Bifacial in projects worldwide

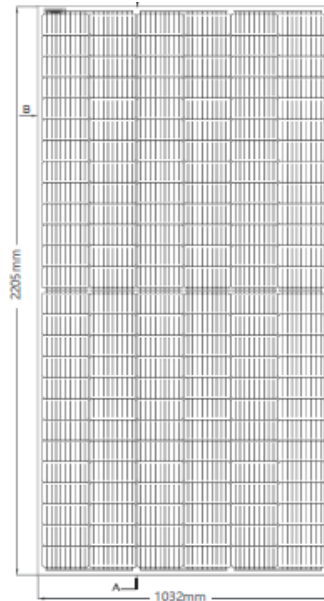
Sao Gonçalo I-Brazil (475 MW), Potrero (296MW), Cluster MG-Brazil (118MW), Tlaxcala Mag II-Mexico (219,6 MW), and many others.



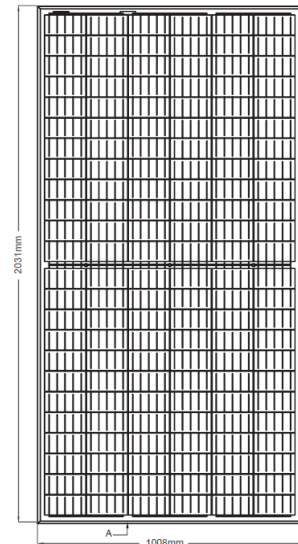
What is changing at the PV market?

If SF7 Bifacial tracker works: Why launching a new tracker?

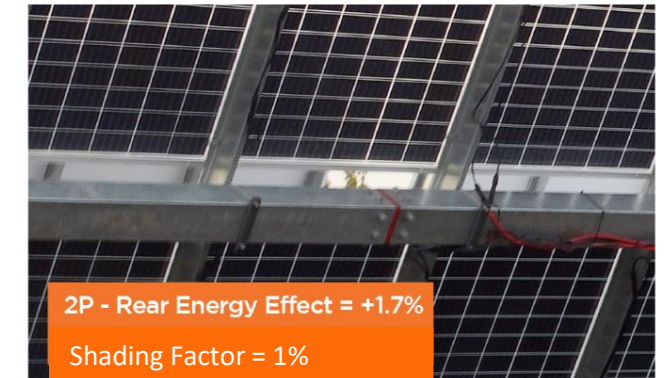
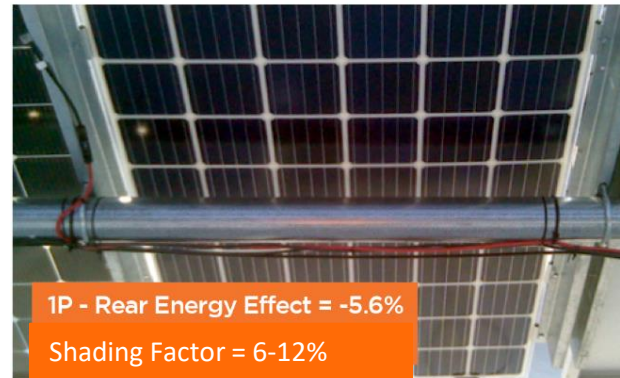
- Panels are getting bigger and so structure is becoming more expensive (both 1P and 2P)
- Unexperienced and ultra-conservative simulations from advisors and EPC contractors end up minimizing 2P bifacial yield boost and lead the focus on the upfront cost



Tiger
2205x1032 mm



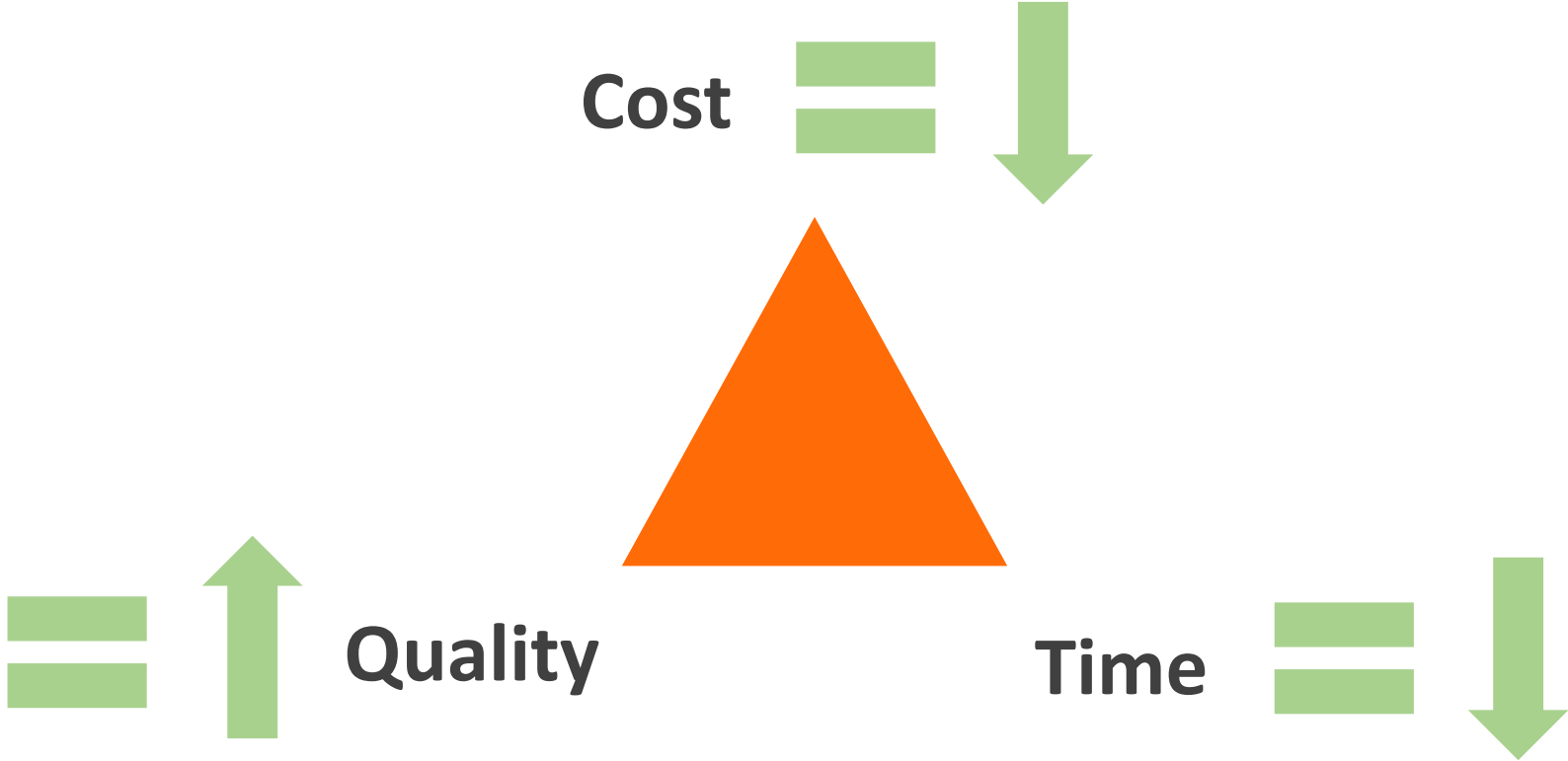
Swan
2031x1008 mm



1P vs. 2P

Which is the challenge?

Designing and offering a tracker that improves price while maintaining competitive advantages in quality and service



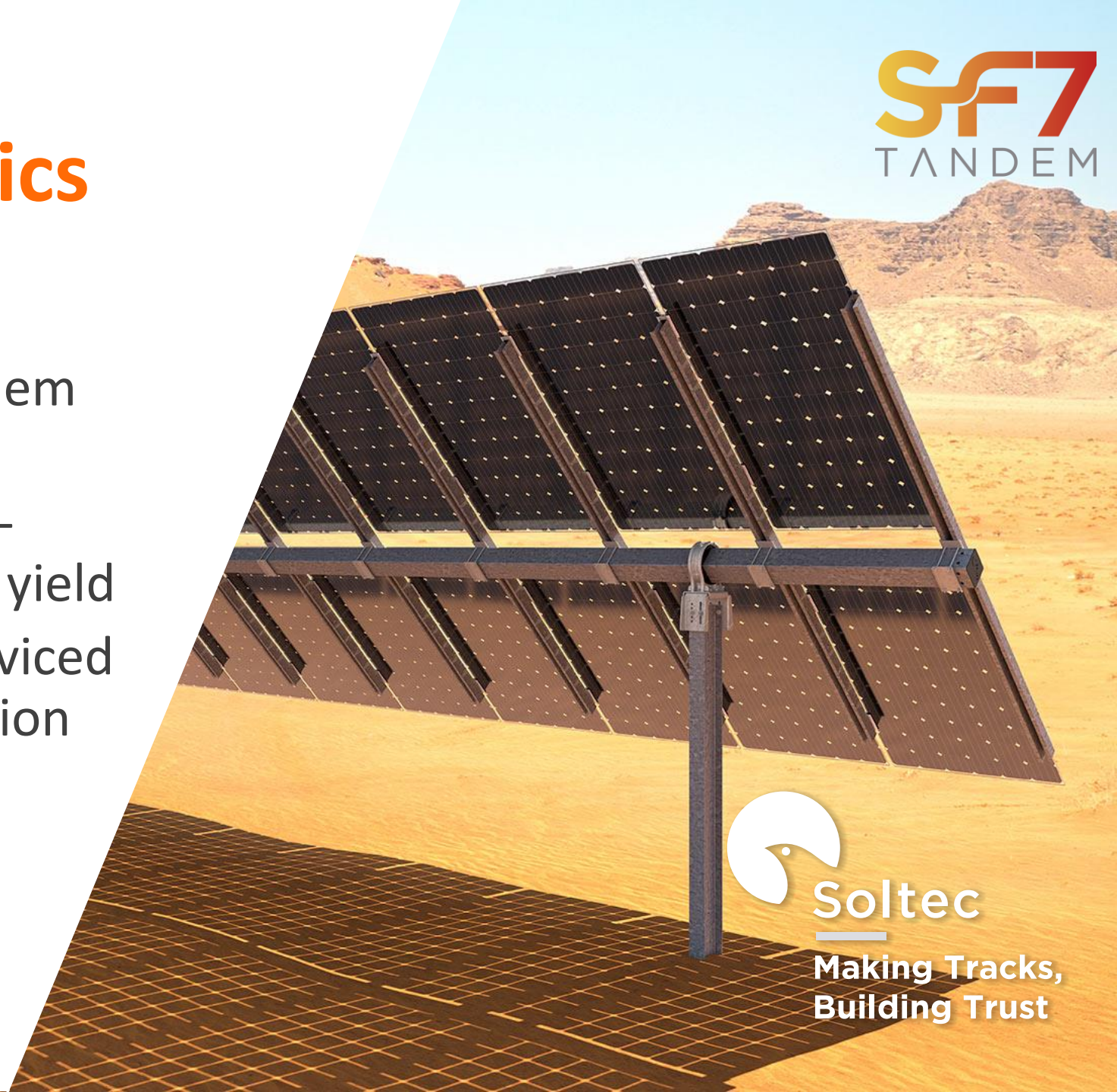


SF7 TANDEM

Squared efficiency: The first 2P linked Tracker

3 main characteristics

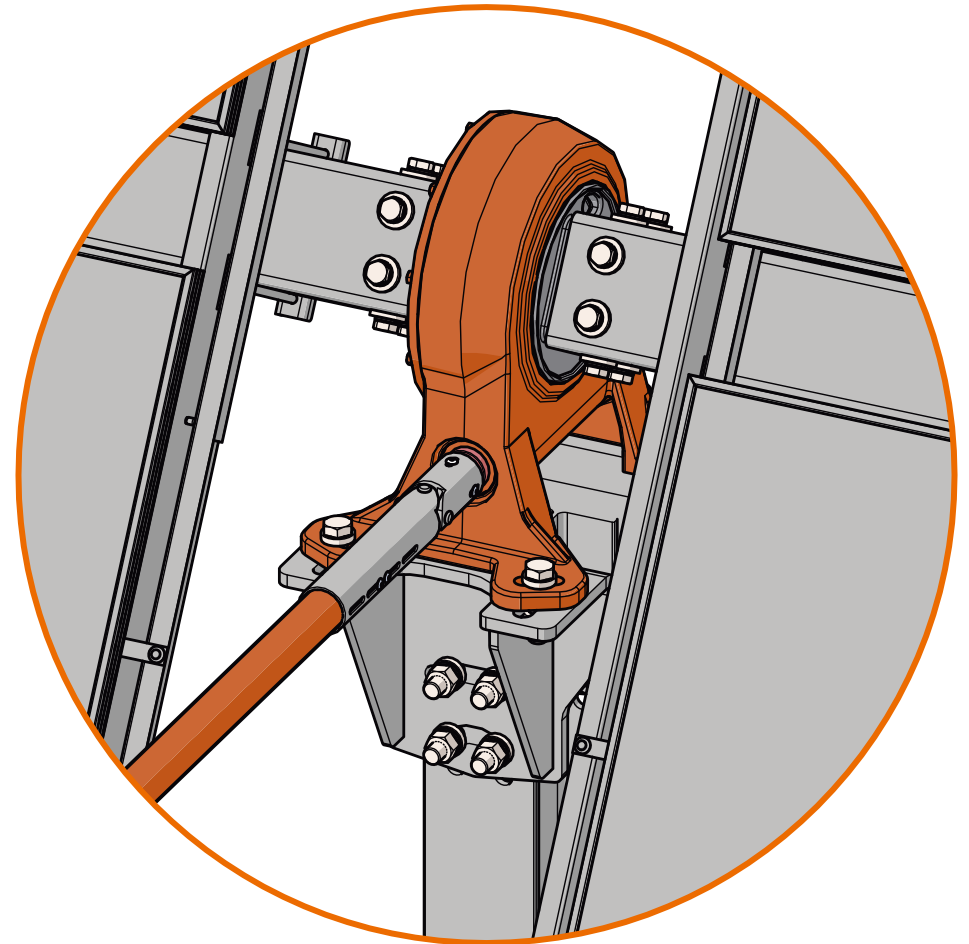
- **Cost-Effectiveness:** SF7 Tandem reduces Capex and Opex
- **Quality:** SF7 Tandem is wind-designed and boosts bifacial yield
- **Service:** SF7 Tandem full-serviced solution to optimize installation and O&M works



Tracker CAPEX

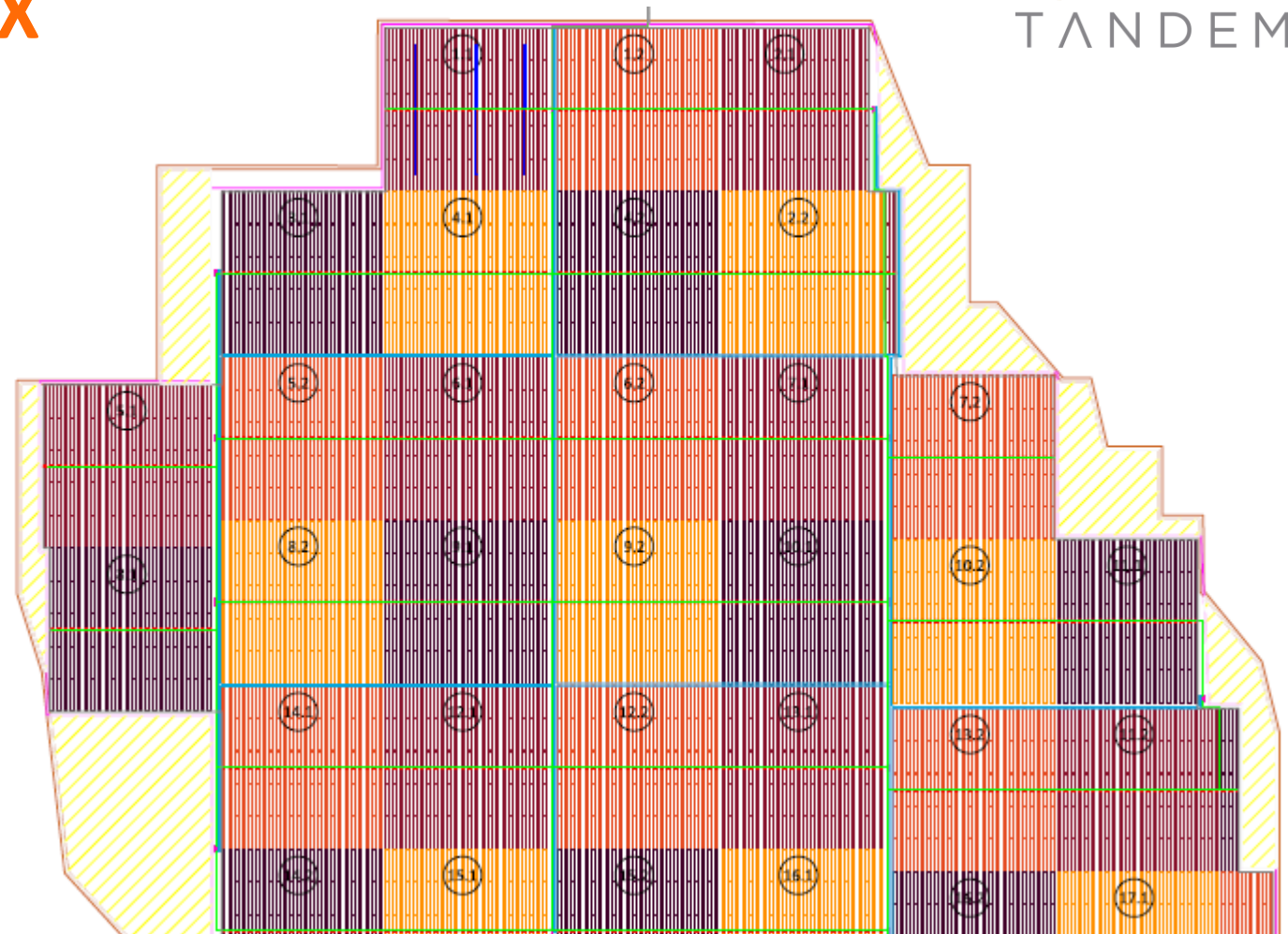
Fewer parts, simpler tracker:
Higher Efficiency

- **CAPEX: Optimized simplicity**
 - ✓ Higher MW installation rate
 - ✓ Easier and faster installation, similarly to the SF7
 - ✓ Lower material cost, installation and reduced BOP costs
 - ✓ Fewer parts: **50% fewer motors** and **50% fewer Tracker Controllers** than the conventional SF7
 - ✓ Fewer components: **46% fewer piles**, **60% fewer screw connections**, **20% fewer parts-count** than other 1P dual-row competitors



BoP related to tracker CAPEX

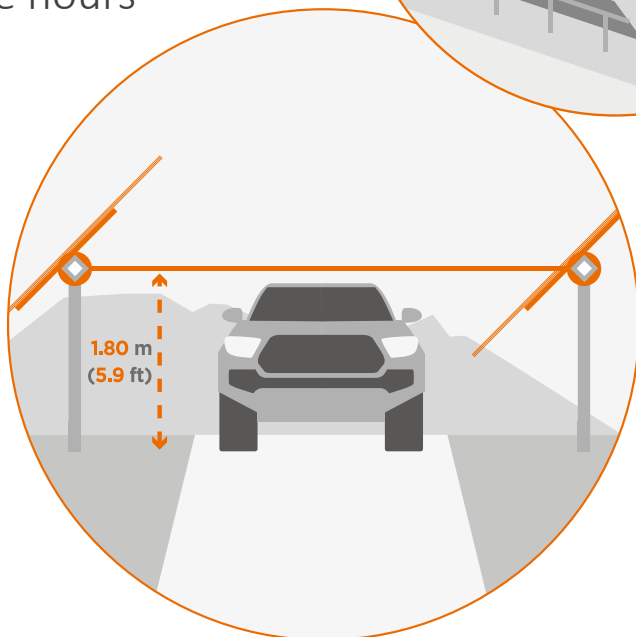
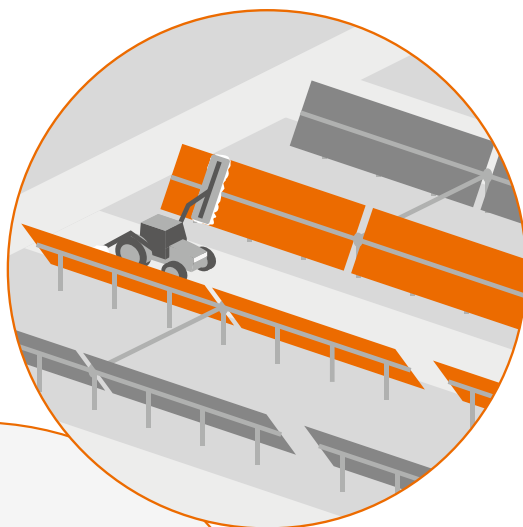
- **CAPEX:** Optimized simplicity.
 - ✓ Less predrilling
 - ✓ Less pile-ramming
 - ✓ StringRunner allows for in-tube cable management and low voltage trenching minimization
 - ✓ Higher adaption to terrain
 - ✓ Reduction of civil works



Cost-effectiveness: OPEX

Face-2-Face

Face-2-Face positioning helps washing vehicles cover twice the array-area per vehicle pass, thus proportionately reducing the hours-per-MW washing rate



Accessible Maintenance

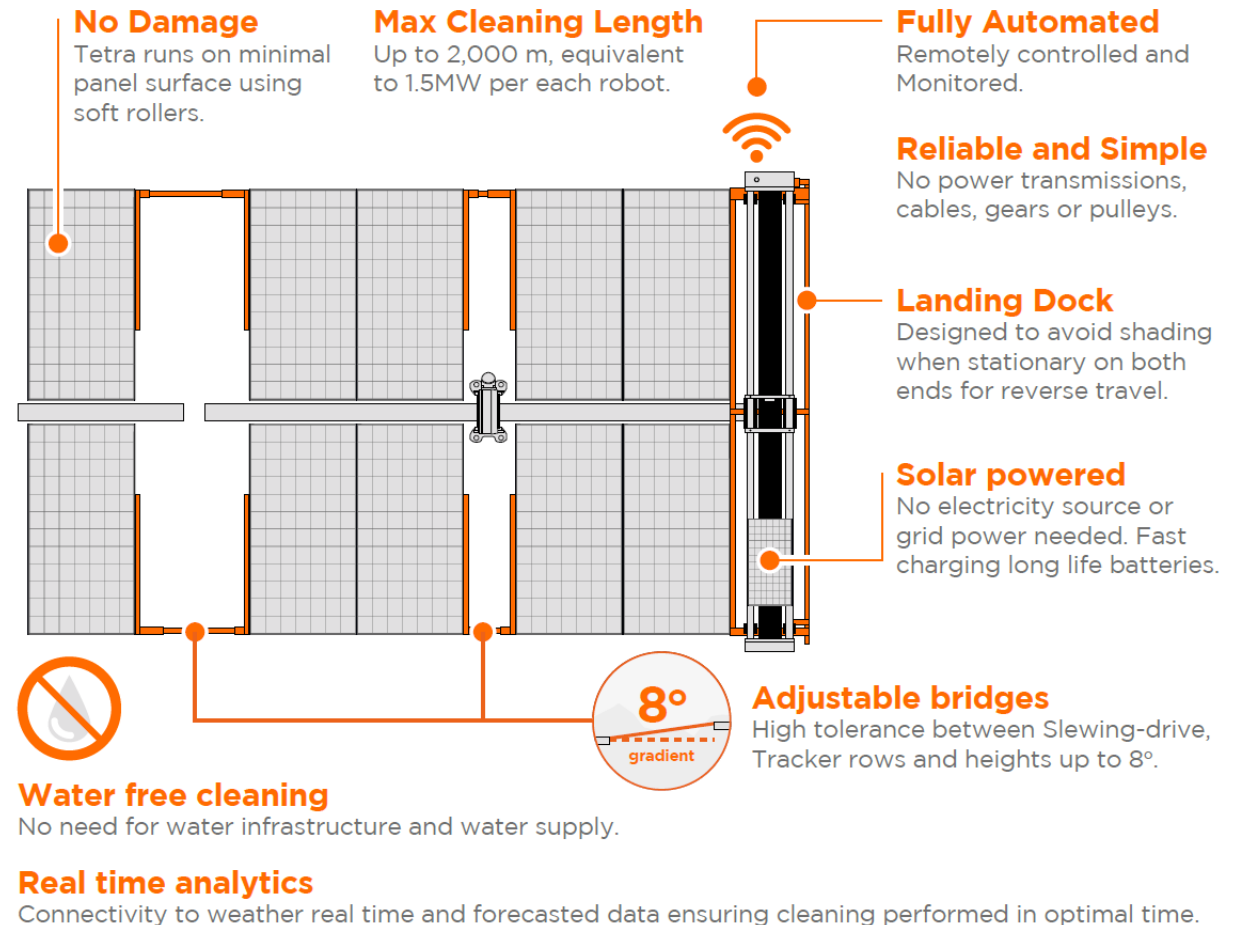
Cardan shaft conveniently located at **1.8 m (5.9 feet)** eases O&M and ensures system functionality under any weather or terrain circumstances

Cost-effectiveness: OPEX

Allows for easy integration of robot cleaning solutions

Key focus from tracker perspective:

- Allowing for **wide tolerances** of design
- **Minimising cost** of integration elements: dock stations, bridges and reverse stations
- Ensuring reliable communication and safe cleaning to **reduce OPEX**
- **Minimising the number of robots per MWp** by:
 - Avoiding gaps or interferences that robots could not undertake
 - Optimising layout to maximise number of trackers cleaned by a single robot



Cost: Comparison SF7 2P Tandem vs 1P Dual Row



TRACKER

Component	SF7 Tandem 2x 2P45	Dual Row 2x 1P60	
N trackers	2	3	
N tables	4	6	
N strings	12	12	
N piles	28	57	+103%
N torque-tubes	16	45	+180%
N torque-tube joints	8	36	+350%
N Slewing Drives	4	3	-25%
N Motors	2	3	-33%
N Tracker-Controllers	2	3	-33%
N Dampers	0	12	-

BoP RELATED TO TRACKER

100MWp BoP related to tracker Comparison

	Dual Row 1x60	SF7 Tandem2x45	Difference	Unitary cost	Unit	Savings
Solar cable (km)	726	365	-361	0,5	USD/m	- 180.353,78 USD
SB-Conv.Unit cable (km)	134,7	77,8	-57	2,7	USD/m	- 153.561,60 USD
RS485 cable (km)	0	0	0,0	1,5	USD/m	- USD
Aisles (m)	3.927	4.815	888	75	USD/m	66.600,00 USD
Solar area (ha)	176	171	-6	2.000	USD/ha	- 11.555,56 USD
DC trenches (km)	15,6	12,7	-3	20	USD/m	- 56.311,11 USD
AC trenches (km)	3,7	4,8	1,2	20	USD/m	23.391,11 USD
Pile-ramming	38.889	19.444	-19.444	10	USD/pt	- 194.444,44 USD
Predrilling 50%	19.444	9.722	-9.722	15	USD/pt	- 145.833,33 USD

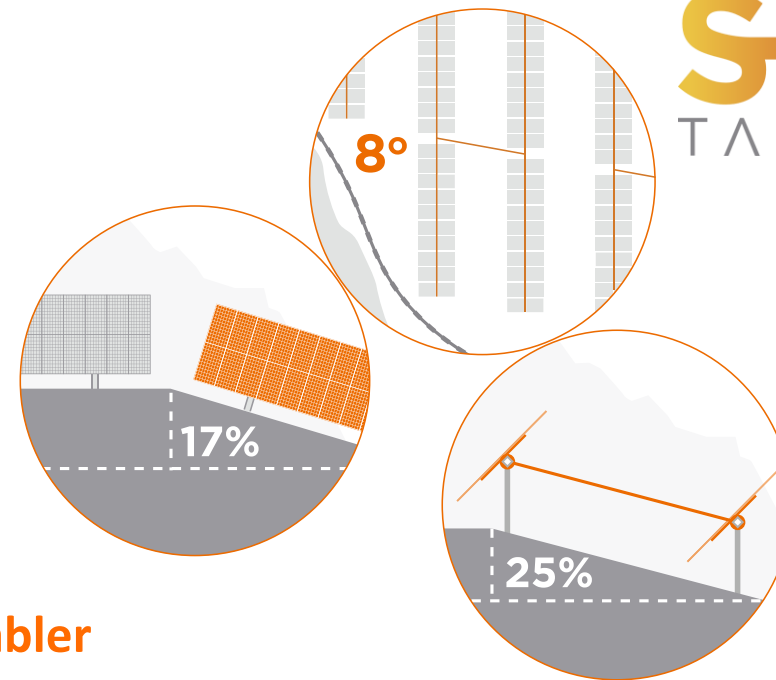
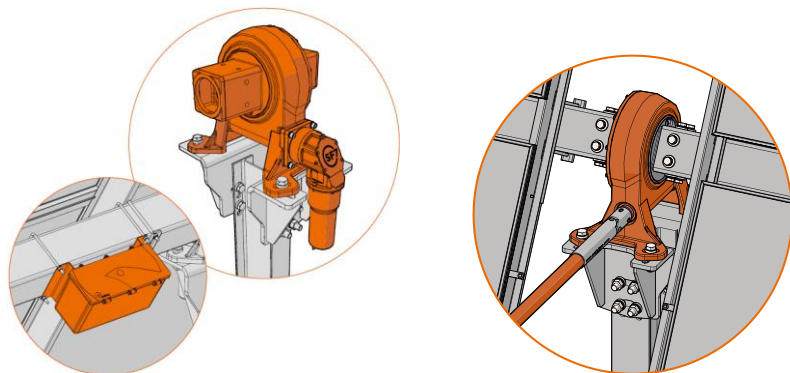
Total Savings SF7 Tandem 2x45 vs Dual Row 1x90

- 652.068,71 USD -0,0065 USD/Wp

Quality: SF7 Tandem

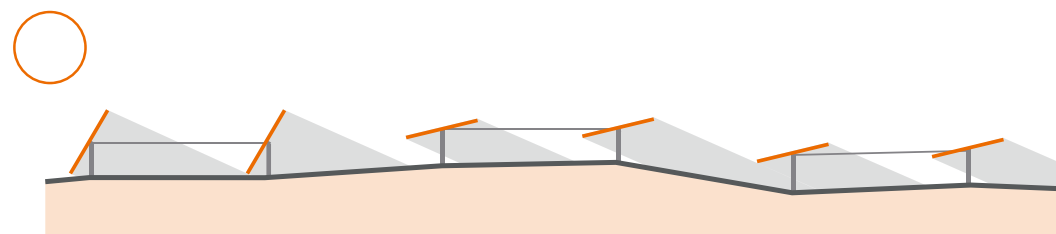
Same robustness and reliability, wider tolerances

- ✓ Self-stow at high tilt angle
- ✓ SPD: Surge Protection Device
- ✓ TMS: Tracker Monitoring System
- ✓ Engineered with the innovative **Dy-Wind** design
- ✓ 2 drives double torque-blocking capacity for a more safe and robust structure



Land Enabler

- ✓ Adaptability to slopes and boundaries
- ✓ Wide construction tolerances



TeamTrack® Backtracking enabled

Quality: Dy-WIND system



Dy-WIND

Dynamic Wind Analysis in Tracker Array Design

Dy-Wind is the innovative wind load analysis method the structural dimensioning of Soltec PV trackers is based on

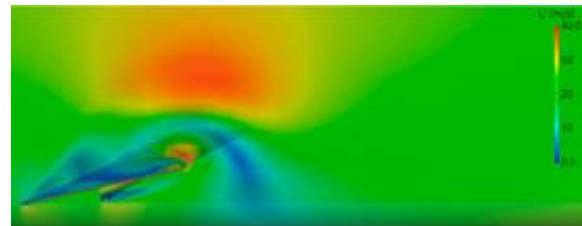
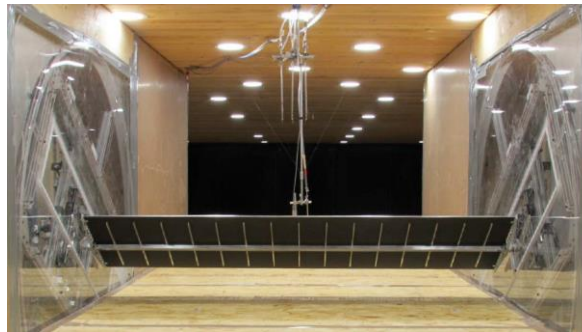
Wind tunnel (rigid models)



2013/2014

Static + Dynamic modelling

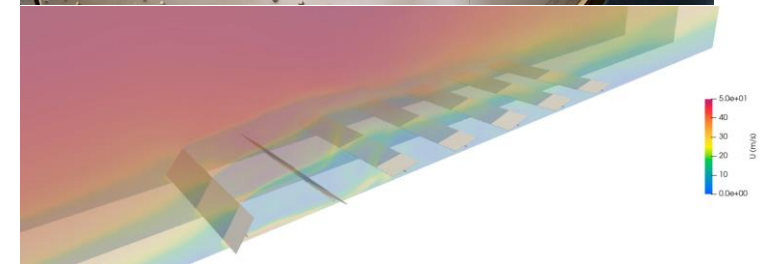
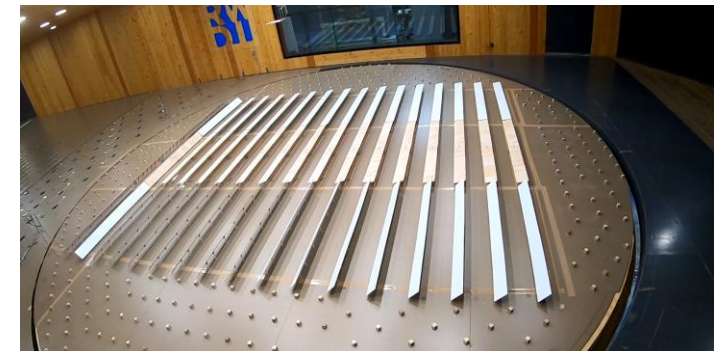
Wind tunnel (sectional models)



2017/2019

Instability + Aeroelastic modelling

Aerolastic wind tunnel (flexible models)

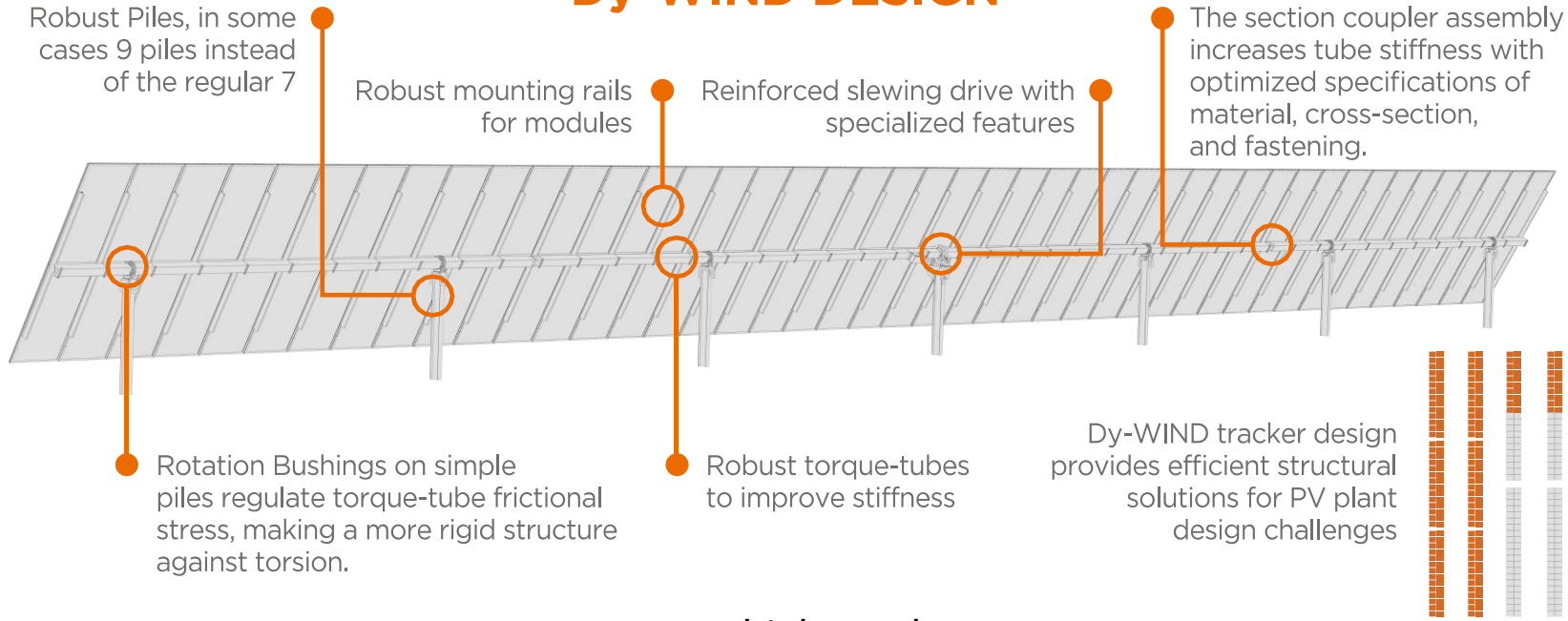


2019/2020

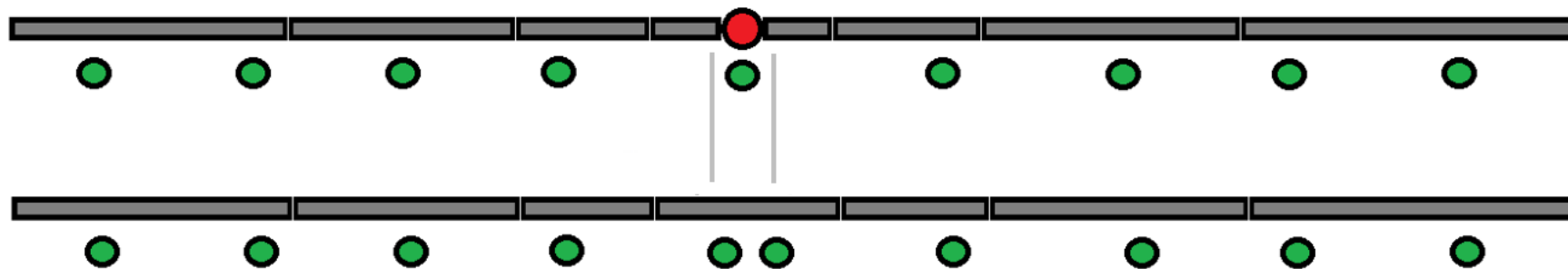
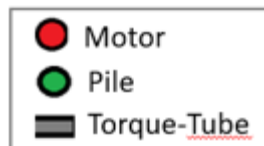
Aeroelastic + Full PV Plant CFD calibration

Quality: Comparison SF7 2P Tandem vs 1P Dual Row

Dy-WIND DESIGN



More parts vs higher robustness



Timer & Service: Overview

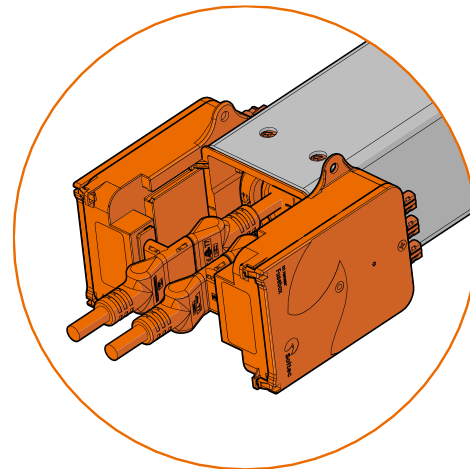
SOLTEC SERVICES

Construction Plan, Onsite Advisory,
Solmate...



SOLTEC SOLUTIONS

DC-Harness, String Runner,
TeamTrack...



SOLHUB

Quick delivery times & experienced
installation provided by Soltec



Soltec has installed 5.6+ GW of its trackers in projects around the globe

Summarizing

- **Cost-Effectiveness:** SF7 Tandem reduces Capex and Opex
- **Quality:** SF7 Tandem is wind-designed and boosts bifacial yield
- **Service:** SF7 Tandem full-serviced solution to optimize installation and O&M works



Any questions?

eduardo.nicolas@soltec.com

miguel.pozuelo@soltec.com

HEADQUARTERS

Gabriel Campillo s/n
Pol. Ind. La Serreta
30500 Molina de Segura
Murcia, Spain
+34 968 603 153
+34 968 603 246
info@soltec.com

UNITED STATES

5800 Las Positas Rd
Livermore, CA 94551
+1 510 440 9200
usa@soltec.com

MADRID

Núñez de Balboa 33
28001 Madrid, Spain
+34 91 449 72 03
emea@soltec.com

SCANDINAVIA

Walgerholm 7
3500 Værløse, Denmark
+45 20 43 01 50
scandinavia@soltec.com

EGYPT

egypt@soltec.com

ITALY

italia@soltec.com

MEXICO

Jaime Balmes 11, Plaza Polanco
Torre B, Piso 6, Oficina B2
Colonia Los Morales
Delegación Miguel Hidalgo
Ciudad de México 11510
+52 1 55 5557 3144
mexico@soltec.com

BRAZIL

Dr. Barreto 483
Loteamento Jardim Aeroporto
Quadra 01, Lote 09
Bairro Pitangueiras
Lauro de Freitas-BA
CEP 42701-310
+55 071 3026 4900
brasil@soltec.com

CHILE

Rosario Norte 615, Oficina 1503
Las Condes, Santiago 7561211
+56 2 2573 8559
chile@soltec.com

PERU

República de Panamá 3576
Oficina 1101
San Isidro, Lima
+51 1422 7279
peru@soltec.com

ARGENTINA

Calle Buenos Aires 105, 2do.
Entre piso. Oficina A
Salta, Provincia de Salta
+54 911 48891476
argentina@soltec.com

INDIA

303, 3rd Floor, Tower 1
DLF Corporate Park
DLF Phase-3, Gurugram
Haryana 122002
+91 124 4568202
india@soltec.com

CHINA

Room 2002
1313 Nong Jiangchang Rd
Jing'an, Shanghai 200072
+86 21 66285799
china@soltec.com

AUSTRALIA

Level 33 Australia Square,
264 George Street
NSW, 2000
Sydney, Australia
+61 (2) 9275 8888
australia@soltec.com

ISRAEL

israel@soltec.com

