Applications for Bifacials Modules

SMA LS & BS Solution

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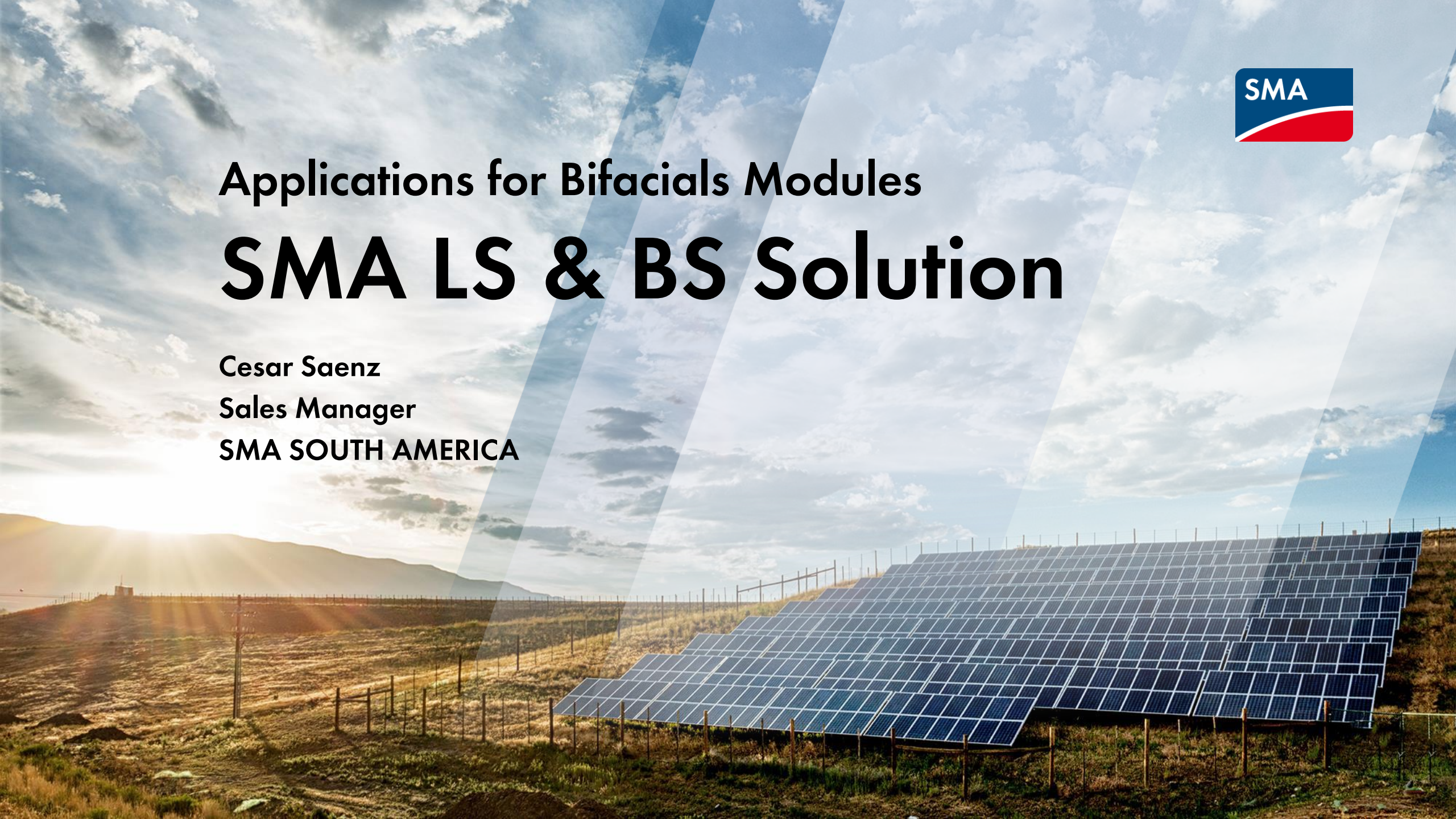

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AGENDA

1 **Why SMA?**
Milestone

2 **Bi-facial Panels – Inverter Selection**
What needs to be checked at the inverter side

3 **182 mm Solar Panels Compatibility**
Specification deep dive

4 **Solution from SMA**
Sunny Central UP, SHP PEAK3, STP CORE2

SMA Worldwide

#1 European PV inverter manufacturer brand
German Engineering and Design.

> 100 GW of installed SMA inverter power
in more than 190 countries worldwide

> 3,000 SMA employees
in 18 countries, more than 650 sales and service teams

1. Preliminary figures

A pioneer in PV and storage system technology for 39 years...

1987
SMA develops the first transistor inverter for photovoltaics.

1999
First transformer-less string inverter

2002
First Central inverter.

2009
The world's largest carbon-neutral inverter factory begins operations.

2015
For the first time, the Sunny Home Manager integrates household appliances into the energy management system via EEBUS.

2017
Sunny Tripower CORE1 is the first free-standing string inverter.

2019
Sunny Central UP delivers 50% more power than its predecessor and integrates large storage systems.

2020
SMA 360° is the most comprehensive installer App on the market.

1981
SMA Founded

001
Sunny Island delivers an autonomous electricity supply to off-grid areas.

2008
SMA achieves the year's largest IPO.

2011
Sunny Tripower is the first inverter to achieve 99% efficiency.

2016
Sunny Boy Storage is the first AC-coupled system to integrate high-voltage batteries.

2018
With ennexOS, SMA establishes the first IoT platform for cross-sector energy management.

2020
110kw inverter, Up to 12 MPPT

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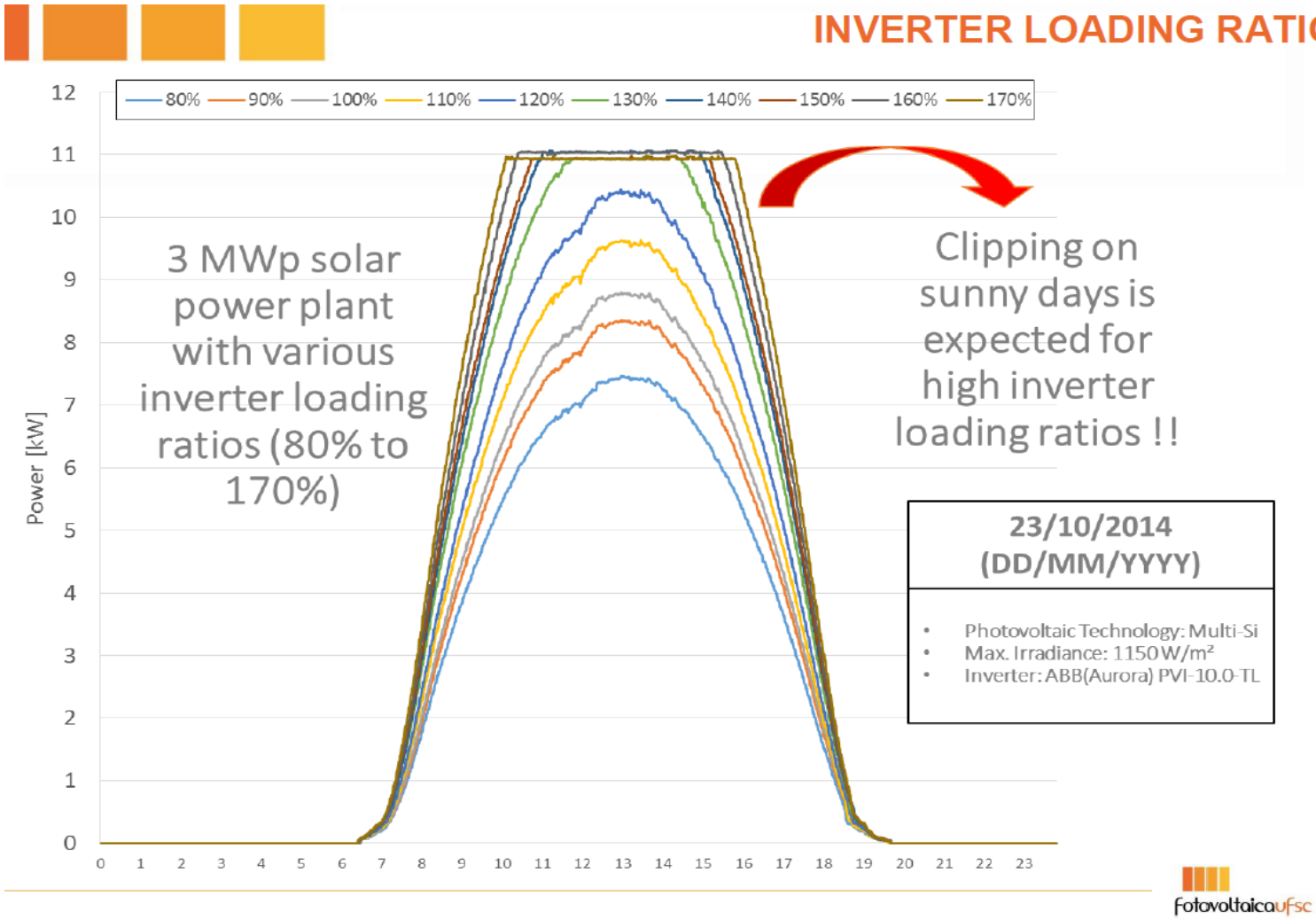
Bi-facial Solar Panels

Bifacial solar panels have their backs covered with either a transparent sheet or a have a double glass panel. This makes reflection possible, hence, there is energy production from both sides, increasing the total power output.

Surface Type	Reflection Rate	Back side Gain
Water	10~20%	4~7%
Grass	15~25%	7~10%
Concrete	25~35%	8~12%
Sand	35~45%	10~15%
Snow	40~70%	15~22%
Reflecting Coating Roof	80~90%	23~25%
Newly accumulated snow	80~95%	25~30%

* sourced from the TUV RH report.

Bi-facial Solar Panels – DC/AC Sizing Ratio



- A Case Study in 2016 by Solar Energy Research Laboratory at Universidade Federal de Santa Catarina – Brazil
- In order to achieve the optimal LCOE, PV inverter should be able to maintain its reliability under **high DC/AC ratio.**

*Source - http://www2.pv.unsw.edu.au/videos/Lucas-Nascimento-5May2016/seminar.php by Lucas Nascimento

Bi-facial Solar Panels – Inverter Selection

The additional output of bi-facial solar panel will increase the DC power at the inverter input. For inverter manufacturer this will be specified at the Input (DC) section – Max. PV array power.

For SMA inverters, this DC/AC ratio can go up to **150%** to ensure it can cover the max. gain from the bi-facial panels.

Technical Data	Sunny Highpower 100-20	Sunny Highpower 150-20
Input (DC)		
Max. PV array power	150000 Wp	225000 Wp
Max. input voltage	1000 V	1500 V
MPP voltage range / rated input voltage	590 V to 1000 V / 590 V	880 V to 1450 V / 880 V
Max. input current / max. short-circuit current	180 A / 325 A	180 A / 325 A
Number of independent MPP trackers	1	1
Number of inputs	1 or 2 (optional) for external PV array junction boxes	

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182mm Solar Panels Compatibility – Higher rated Power, voltage and current

Ultra-high-power modules come with lower LCOE and BOS costs, aiming to deliver high power performance and long-term reliability.

Higher maximum power, current and voltage - need to be compatible with inverters

Electrical Characteristics

Module Type	SRP-525-BMA-BG		SRP-530-BMA-BG		SRP-535-BMA-BG		SRP-540-BMA-BG	
STC	Front	Back	Front	Back	Front	Back	Front	Back
Maximum Power -P_{mp} (W)	525	391	530	395	535	399	540	403
Open Circuit Voltage -V_{oc} (V)	49.41	49.38	49.51	49.48	49.64	49.61	49.77	49.74
Short Circuit Current -I_{sc} (A)	13.43	10.01	13.54	10.07	13.63	10.14	13.72	10.21
Maximum Power Voltage -V_{mp} (V)	41.60	41.57	41.76	41.73	41.91	41.88	42.03	42.01
Maximum Power Current -I_{mp} (A)	12.63	9.41	12.70	9.47	12.77	9.53	12.85	9.60
Module Efficiency STC-η_m (%)	20.2		20.4		20.6		20.8	
Power Tolerance （W）	(0，+4.99)							
Pmax Temperature Coefficient	-0.36 %/°C							
Voc Temperature Coefficient	-0.28 %/°C							
Isc Temperature Coefficient	+0.05 %/°C							

* sourced from Seraphim Solar System Co., Ltd

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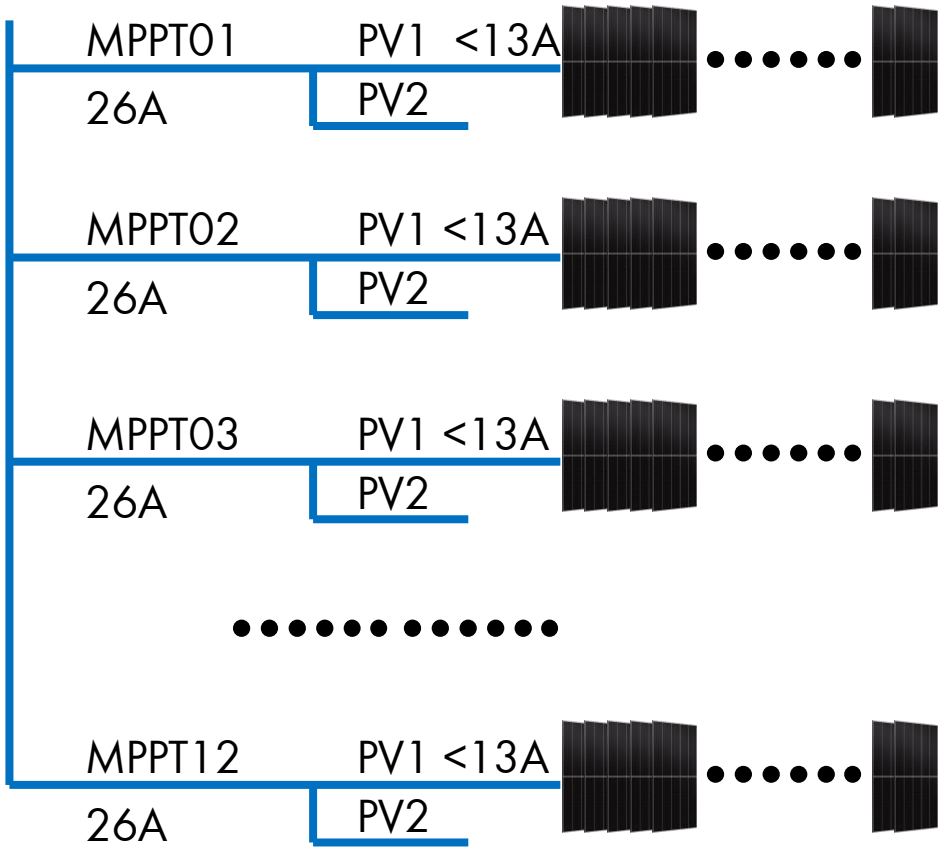
STP CORE2, SHP PEAK3, SUNNY CENTRAL

Commercial

SMA Core2 with 12 MPPT is also compatible for 182mm-210mm PV module

182mm PV module

CORE2 (110 kW)



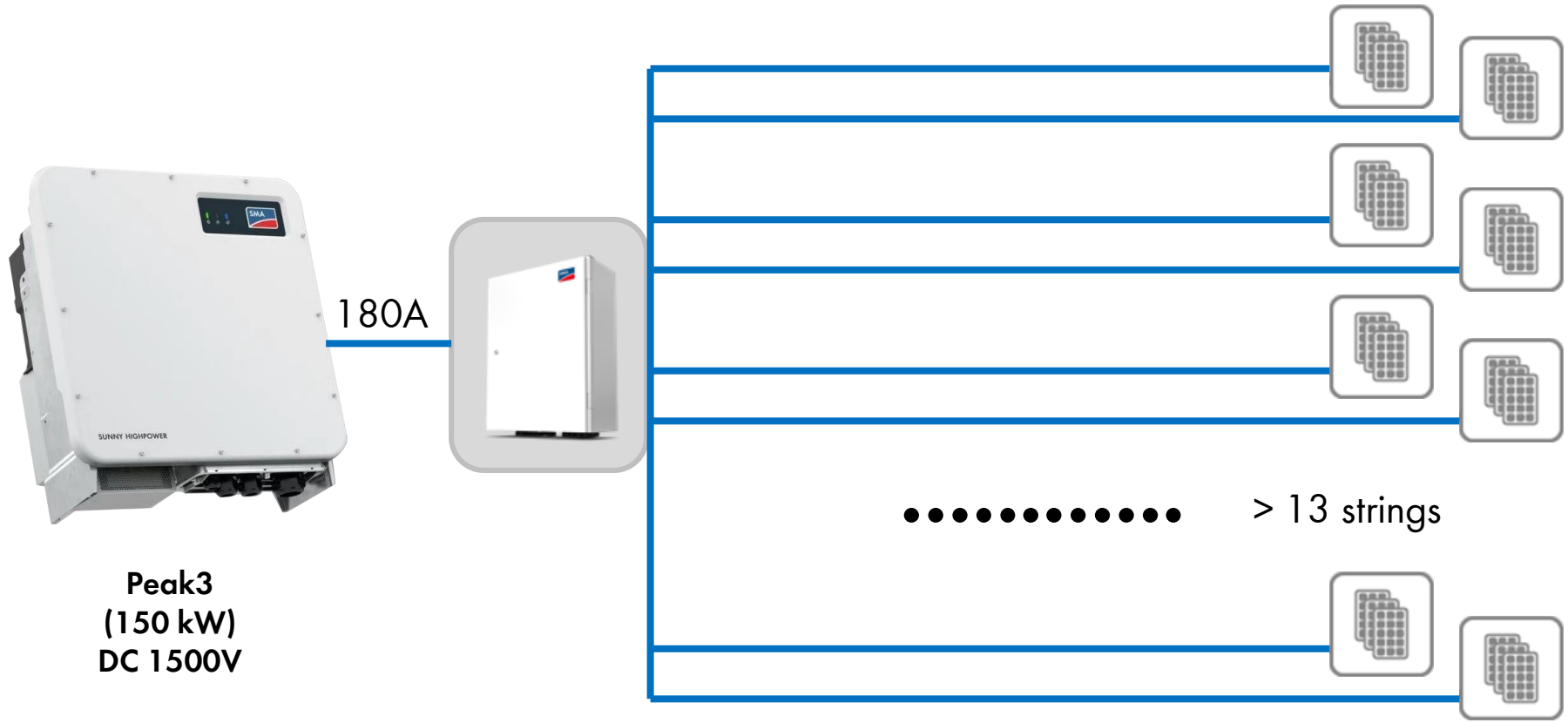
Module Type	SRP-525-BMA-HV	SRP-530-BMA-HV	SRP-535-BMA-HV	SRP-540-BMA-HV
	STC	STC	STC	STC
Maximum Power at STC (Pmp)	525	530	535	540
Open Circuit Voltage (Voc)	49.41	49.51	49.64	49.77
Short Circuit Current (Isc)	13.43	13.54	13.63	13.72
Maximum Power Voltage (Vmp)	41.60	41.76	41.91	42.03
Maximum Power Current (Imp)	12.63	12.70	12.77	12.85
Module Efficiency at STC(ηm)	20.2	20.4	20.6	20.8
Power Tolerance	(0,+4.99W)			
Maximum System Voltage	1500V DC			
Maximum Series Fuse Rating	20A			

STC: Irradiance 1000 W/m² module temperature 25°C AM=1.5

* sourced from Seraphim Solar System Co., Ltd

182mm Solar Panels Compatibility –
High compatibility with wide adaptability for SMA inverters

The Sunny High Power PEAK3 String Inverter with 1 MPPT can easily manage the total combined current with 182mm - 210mm solar panels



LARGE SCALE & PROJECT SOLUTIONS

PV / Storage Inverters 2,500 – 3,000kW

- SC 2500-EV - 3000-EV
- SCS 2200 - 2900-EV

PV / Storage Inverters 4,000 – 4,600kW

- SC UP 4000 - 4600
- SCS UP 3000 - 3950

True Turnkey solutions 2,500 – 6000kW

MVPS 20 ft.

MVPS 40 ft.

- Tailored power conversion systems as **true turnkey container solution** (MVPS)

System components

- Power Plant Manager

Service

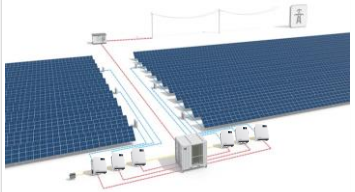
- Warranty support
- EW support
- Engineering Service

- **SMA offers solutions for the entire value chain from DC to the MV grid worldwide.**

Commercial & Large Commercial Solution

A product for all commercial project sizes.

Application



15 kW

STP TL-30

50 kW

STP CORE1

100 kW

500 kW

STP CORE2

STP CORE2

SHP PEAK3

500-MW

SHP PEAK3

SUNNY CENTRAL


Thank you!