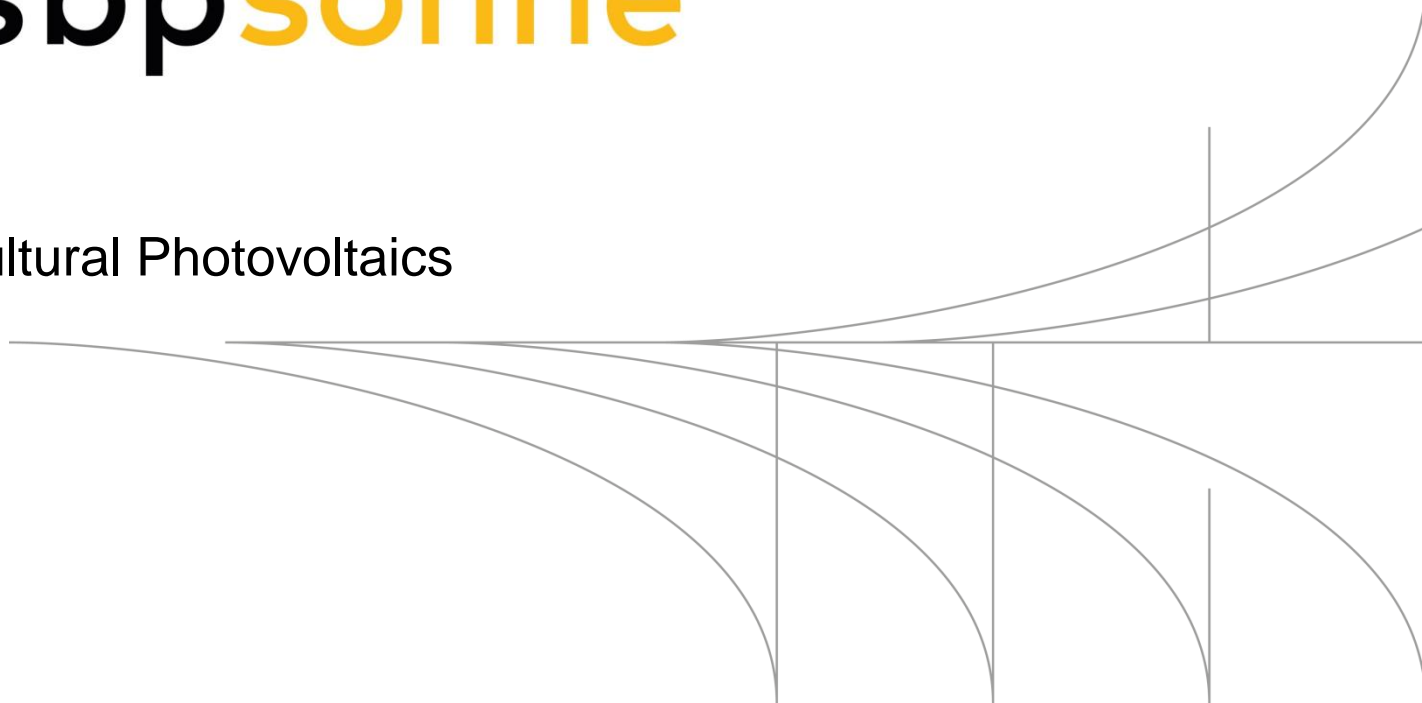




**sbp**sonne

APV – Agricultural Photovoltaics



## Company Profile

sbp sonne is a schlaich bergemann partner company.

Since the founding of our office in 1980 by Jörg Schlaich and Rudolf Bergemann, our aim has been to design and develop innovative structures and systems. Our projects range from long-span, lightweight roofs, multifaceted bridges, slender towers and innovative buildings, to pioneering solar power plants.

For more than three decades, schlaich bergemann partner has been consulting and developing technologies in the renewable energy sector. In 2009, this focus finally resulted in an independent company – sbp sonne.

Today, sbp sonne is arguably one of the most experienced solar engineering offices globally, leading specialized and cutting-edge technology development projects in six continents.



Alf Oschatz  
Managing Director



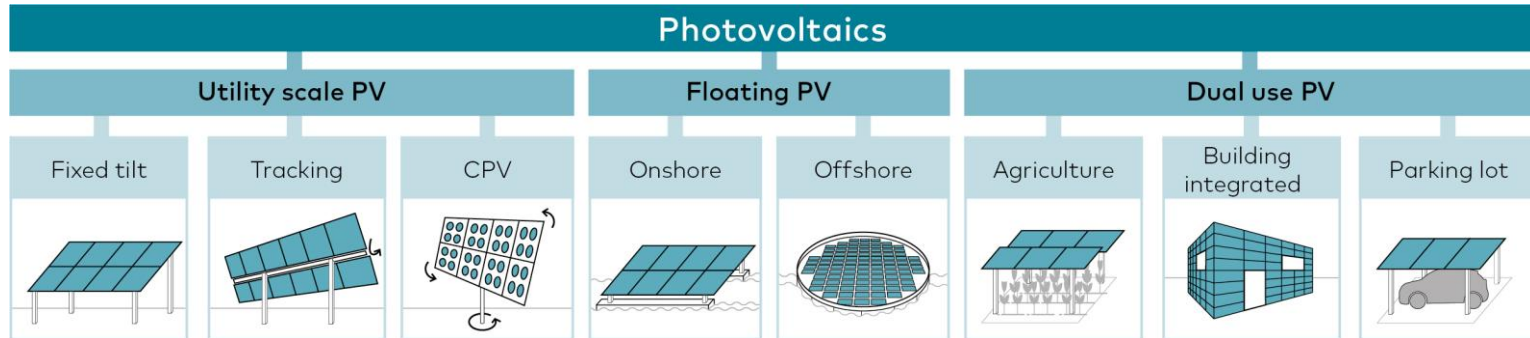
Christian Weinmann  
APV Specialist

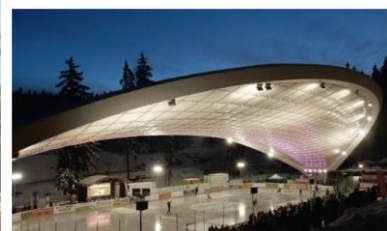
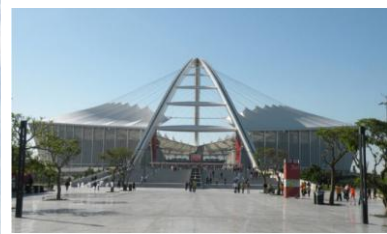
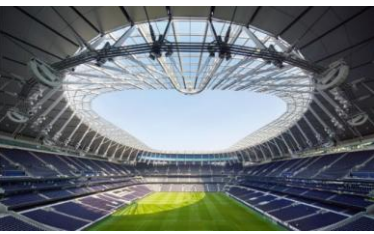
## Scope of Work of sbp sonne gmbh

Solar power plays an immensely important role in the future energy supply. For this reason, sbp sonne is dedicated to developing new technologies for the use of solar radiation – ranging from large utility scale power plants to decentralized power production.

Our key technologies include:

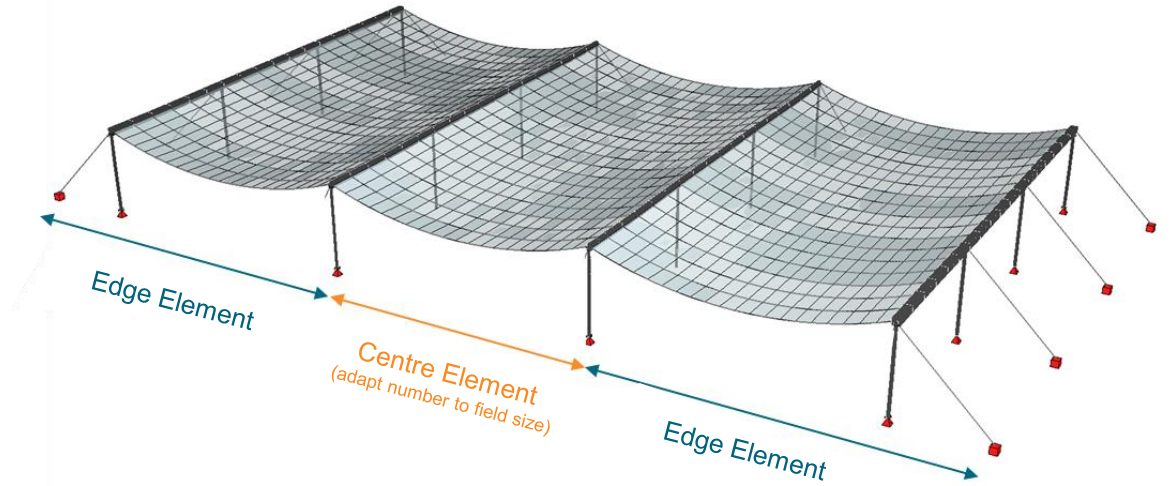
- Single axis photovoltaic trackers
- Fixed-tilt photovoltaic structures
- Floating photovoltaic systems (FPV)
- Agricultural photovoltaic systems (APV)
- Parking lot photovoltaic systems (PPV)
- Building integrated photovoltaic systems (BIPV)
- Concentrating photovoltaic systems (CPV)
- Parabolic trough collectors
- Heliostats and technologies related to solar power towers
- Climate covers
- Dish Stirling systems
- Solar updraft towers



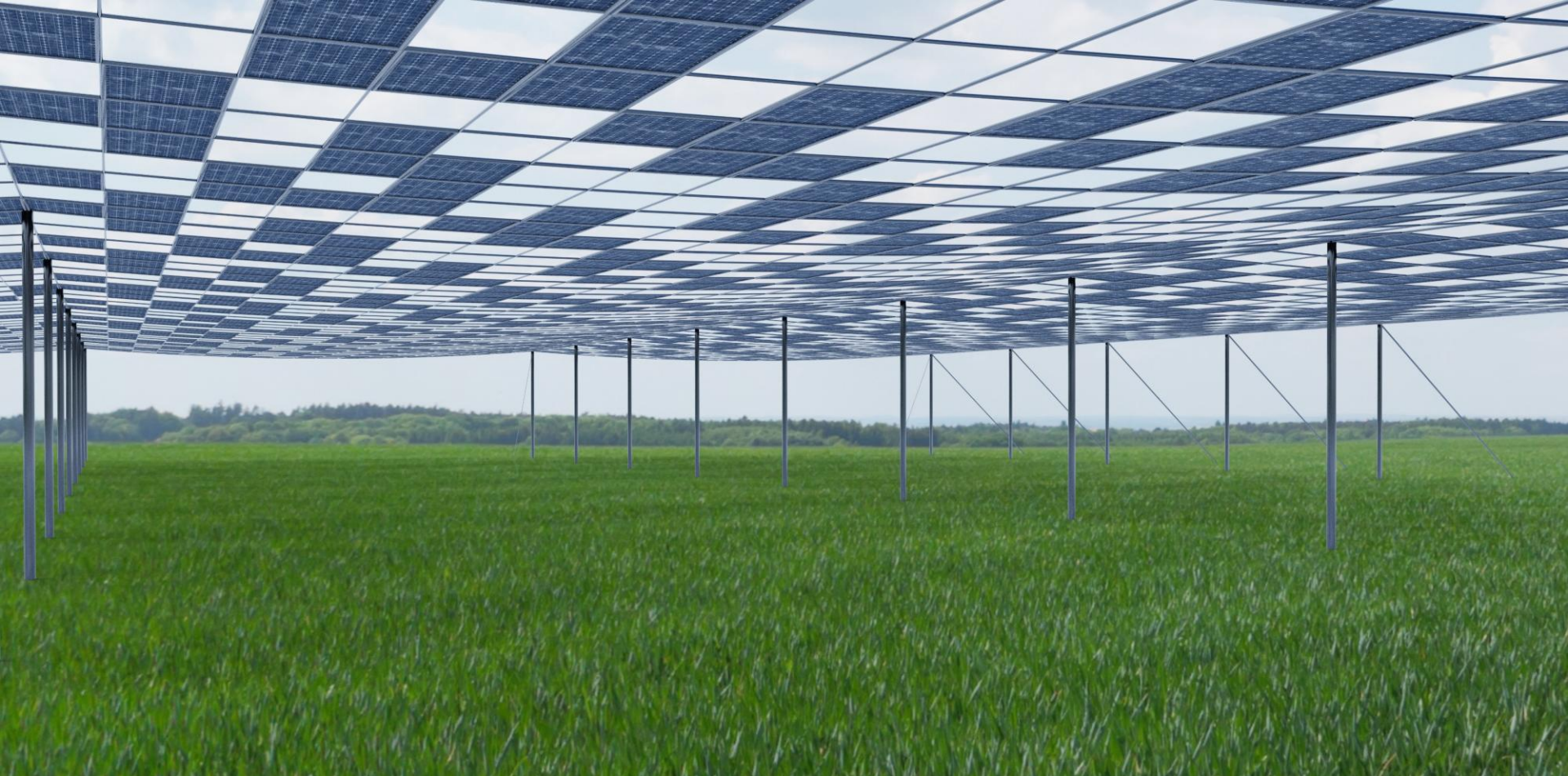


## What characterises the Agri-PV from sbp sonne?

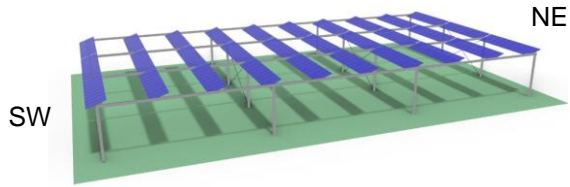
- System for large spans
- Lightweight construction system
- Suitable for large areas
- Customisable to the farmer's requirements
  - Passage width
  - Height
  - Type of PV module installation



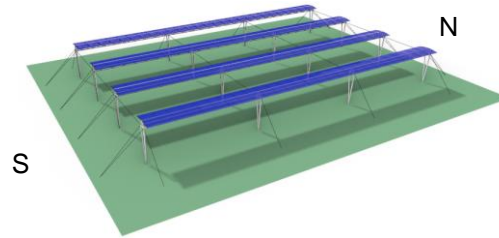
Schematic illustration (stitch shown exaggerated)



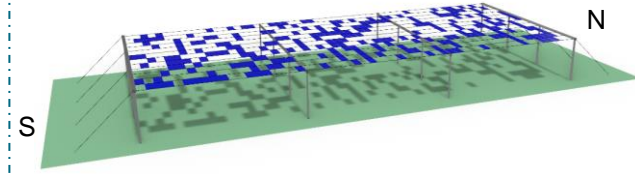
## Conventional steel structure



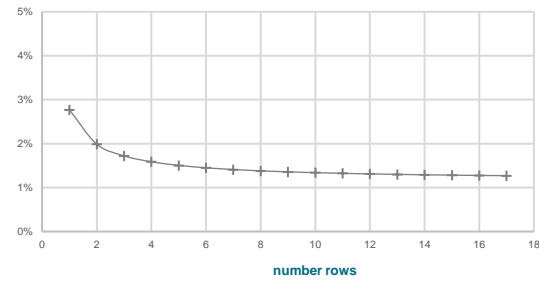
## Light-weight truss structure



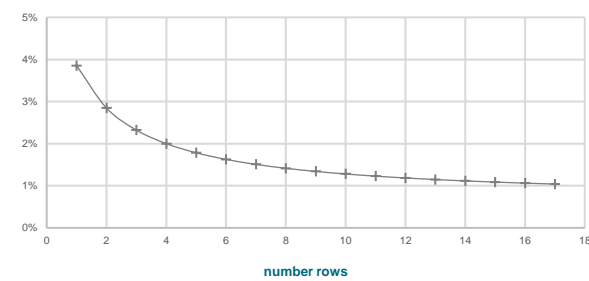
## sbp tension structure



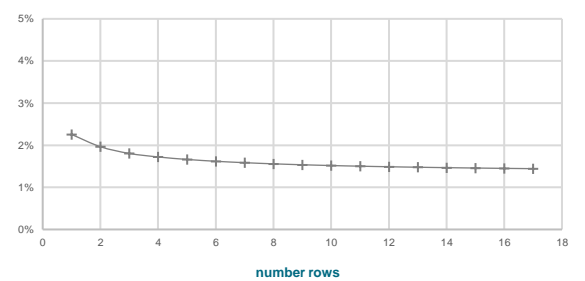
### land loss



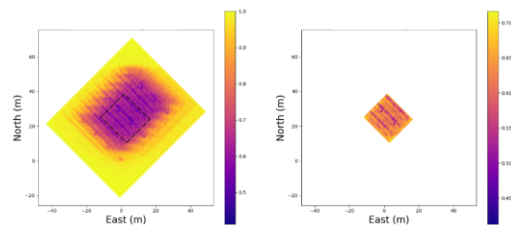
### land loss



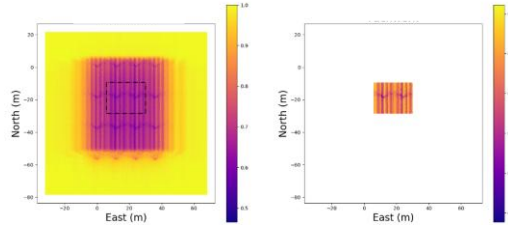
### land loss



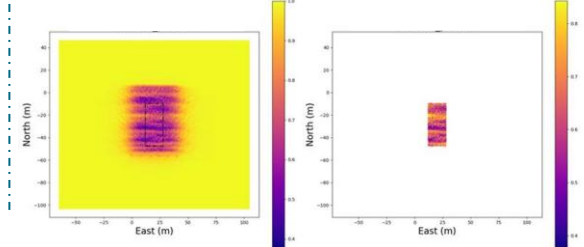
### average shading: 37.9%



### average shading: 32.8%



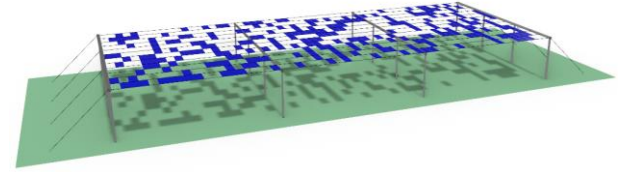
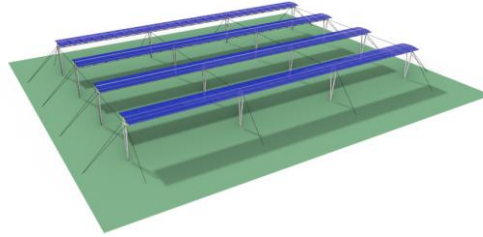
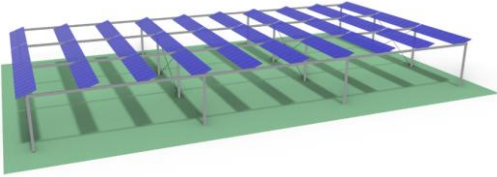
### average shading: 36.4%



## Conventional steel structure

## Light-weight truss structure

## sbp tension structure



Installation

Installation

Installation



Flexibility

Flexibility

Flexibility



Cost potential due to scalability

Cost potential due to scalability

Cost potential due to scalability



Recycling potential

Recycling potential

Recycling potential



Environmental impact

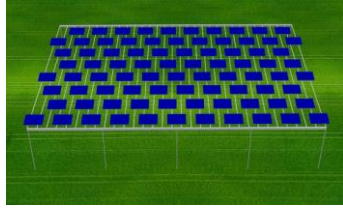
Environmental impact

Environmental impact

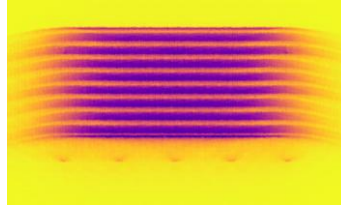
- Chessboard pattern  
PV orientation  
south

➔ 6-7 % higher efficiency

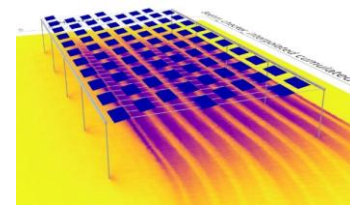
PV Layout



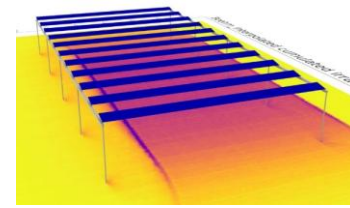
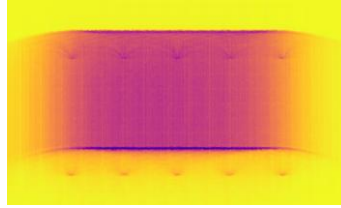
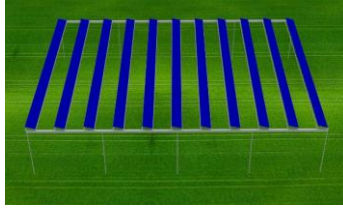
Homogeneity



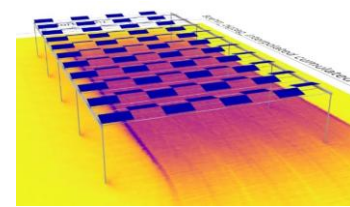
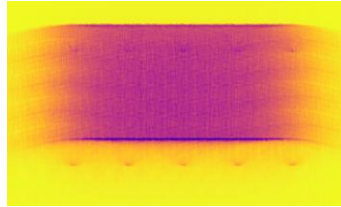
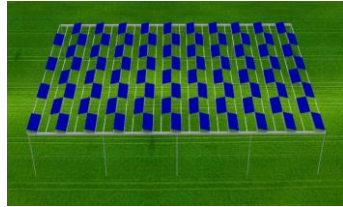
Result



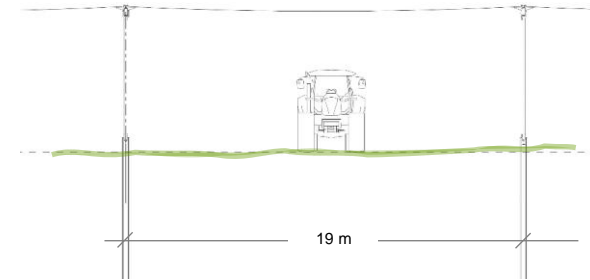
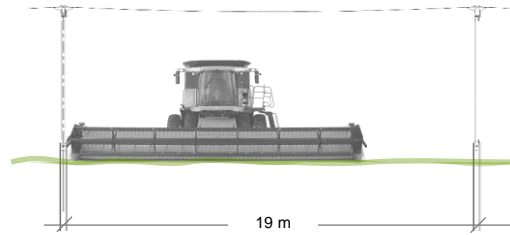
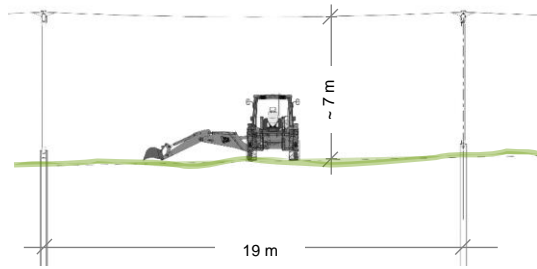
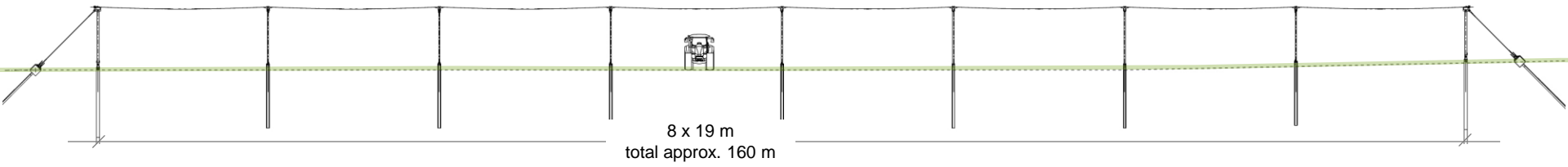
- Conventional row  
PV orientation  
east

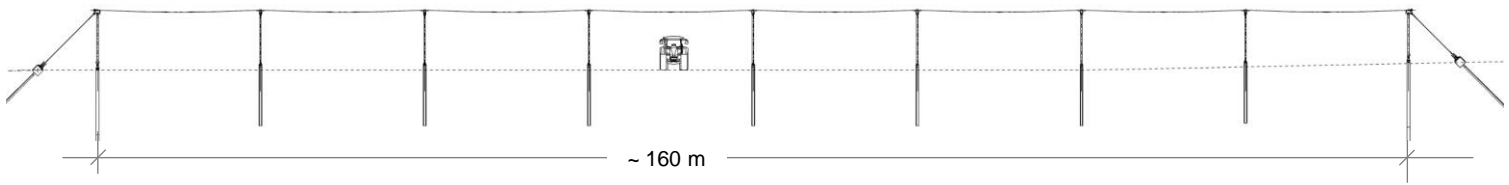
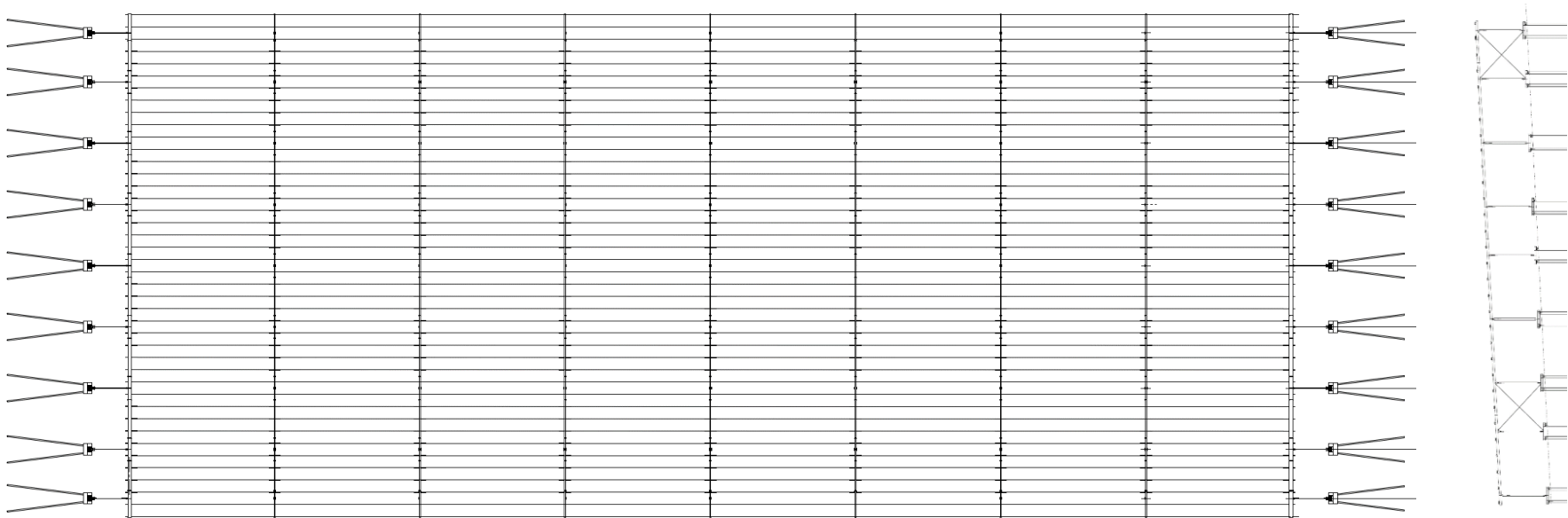


- Chessboard pattern  
PV orientation  
east/west

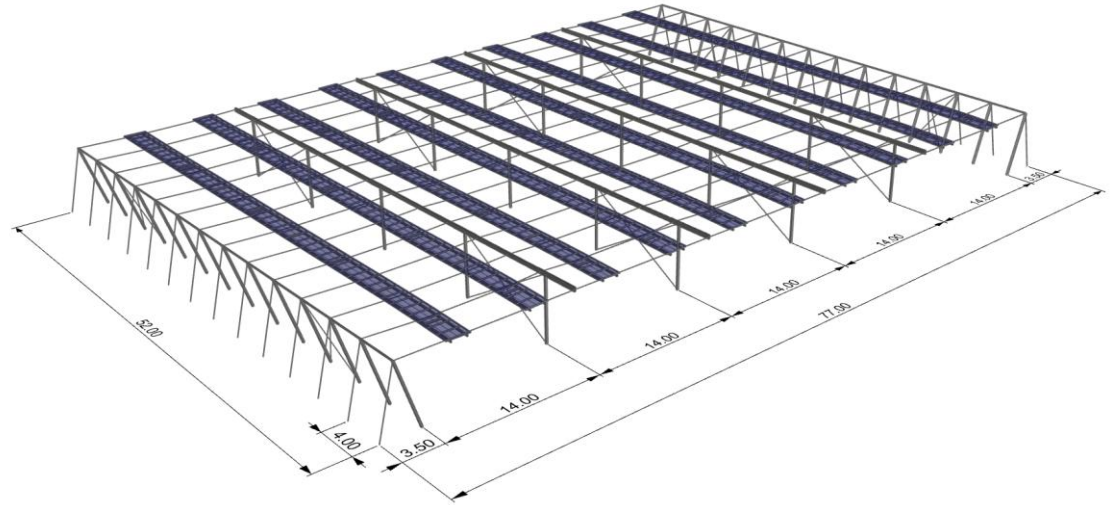








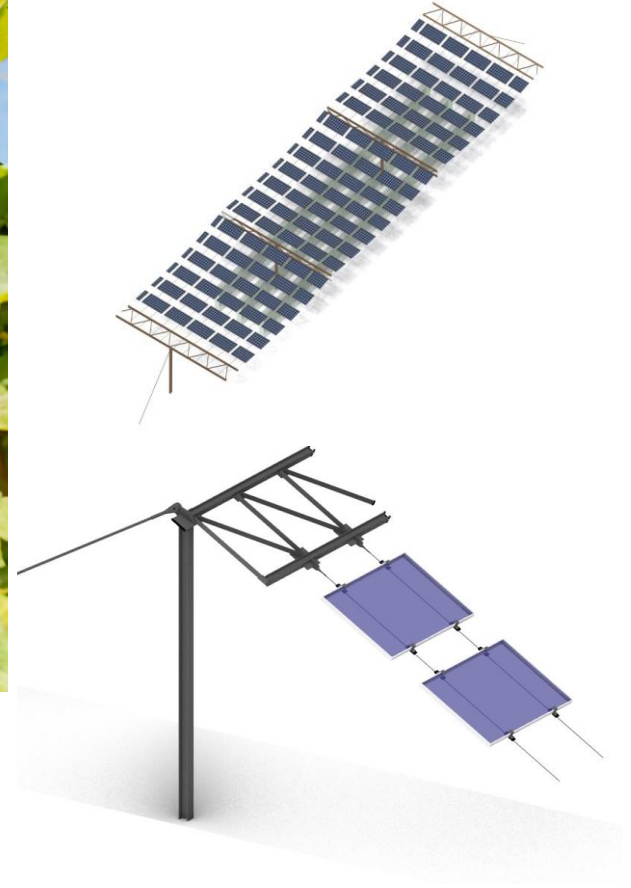
- Power: 204,75 kWp
- Specific yield: 949 kWh/kWp
- Yearly yield: 194,4 MWh
- 30% shading on the ground
- 455 Wp glas-glas pv-modules



## Lightweight Agri-PV for Viticulture

- Lightweight construction system
- Foldable-Flexible-PV
- Ideal for shading young vines
- Other crops outside of viticulture also possible
- Mobile
- Customisable control depending on different weather and sensor data
- Integration of irrigation control possible
- System can be relocated, e.g. after 3 years
- Simple relocatable foundation
- No foundations necessary
- Simple planning permission/ partially permit-free
- Use of the generated electricity as a decentralised, self-sufficient charging option

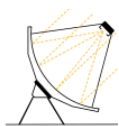




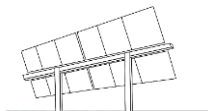
# sbp

schleich  
bergemann partner

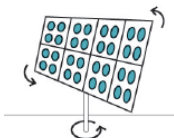
sbp is  
founded



designs and  
put the first  
Dish Stirling  
systems into  
operation



first PV tracker  
development  
project

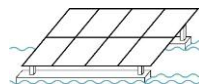


first commercial CPV  
technology  
developed

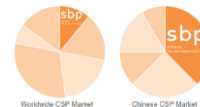
## sbpray

schleich  
bergemann partner

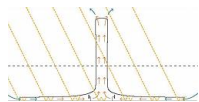
sbpRAY raytracing  
software wins the CSP  
Today CSO engineering  
performance award



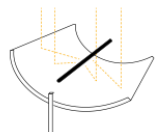
first FPV concept  
developed



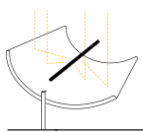
sbp-licensed  
technology is  
implemented in  
**13 % of the global  
CSP market and  
45 % of the CSP  
market in China**



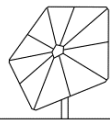
Solar  
Updraft  
tower



develop the  
EuroTrough  
collector



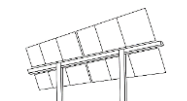
develop the  
UltimateTrough  
collector



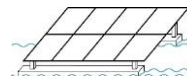
develop the  
award winning  
Stello heliostat



Stello heliostat is  
implemented in  
50MWe Hami CRS



sbp consultation tasks  
exceed **10 GWe worth  
of commercial PV  
projects**



first **bifacial**  
floating PV  
prototype  
in Hungary

1980

1982

1986

2000

2009

2010

2012

2014

2016

2017

2017

2019

2020

2021

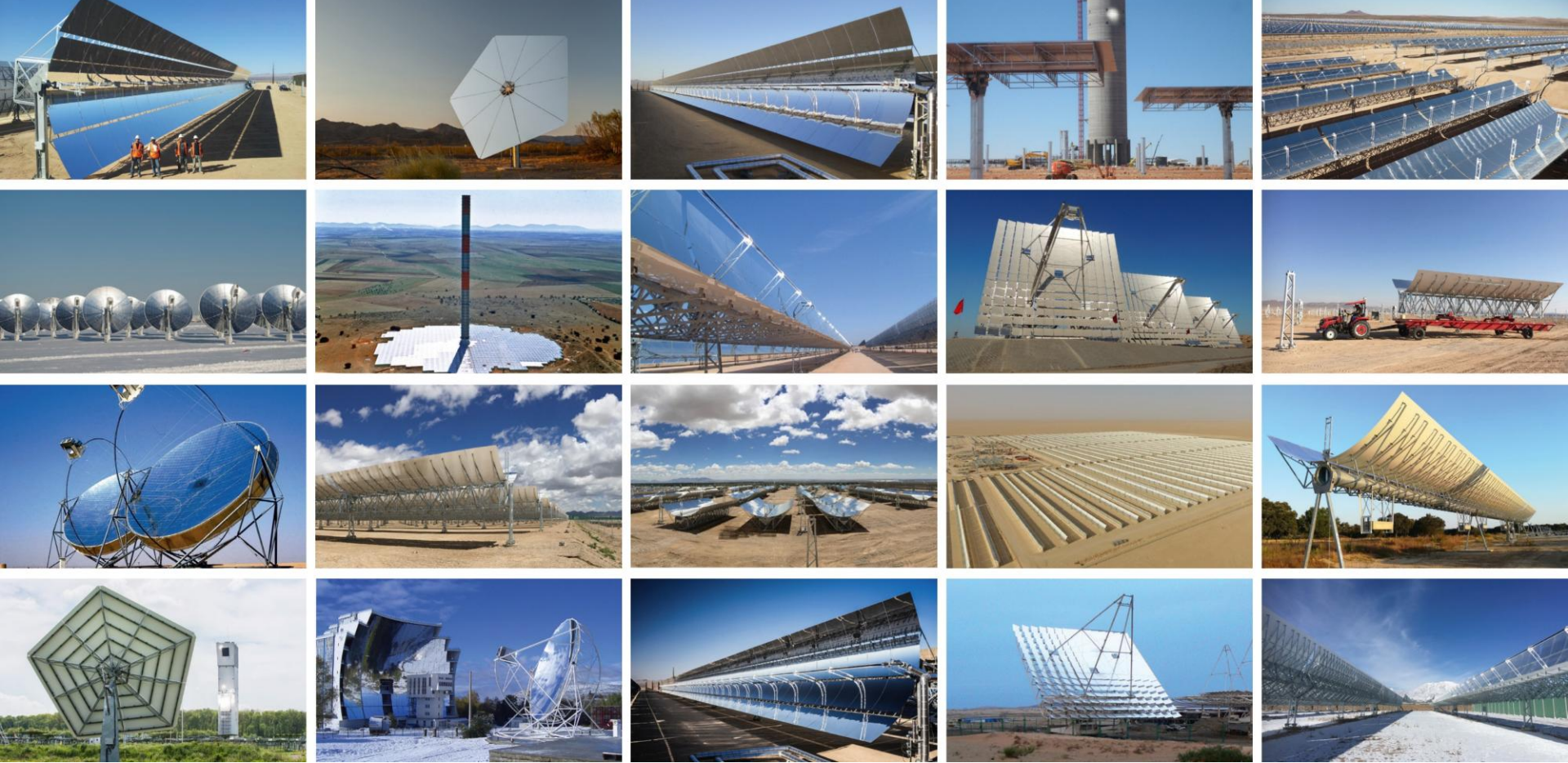
## sbpsonne


Key achievements



sbpsonne

Photovoltaics



An aerial photograph showing a dark-colored car parked on a paved area. The car is positioned between two rows of solar panels. The solar panels are arranged in a grid pattern, with white metal frames and dark blue photovoltaic cells. The car's shadow is cast onto the pavement. The overall scene is brightly lit, suggesting a sunny day.

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sbpsonne