

SOLAR CARPORTS & SUSTAINABLE MOBILITY

with ultra-fast charging solutions and batteries



October 2016



1. Components & Joint Venture Partners



2. Carport alternatives from CIRCUTOR

Energy production according to different types and locations

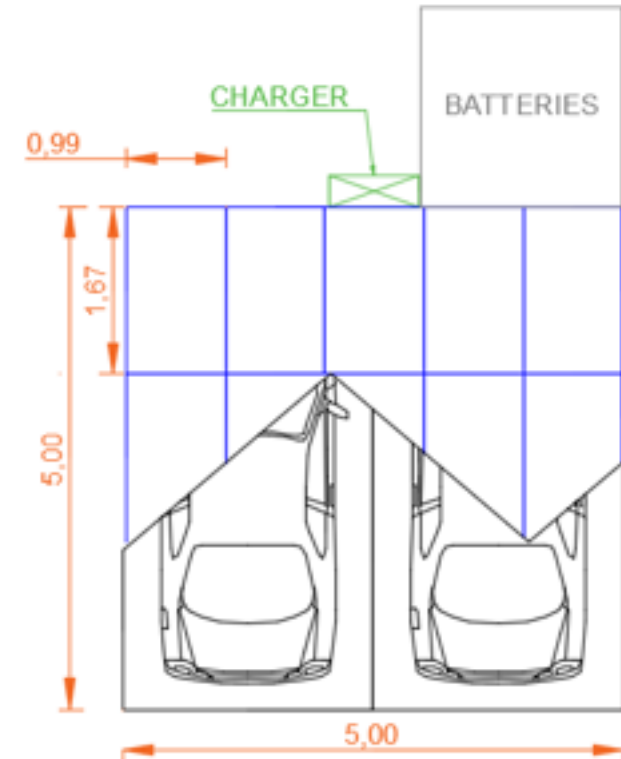
| Solar Carports -CIRCUTOR | | | | | Location: Bolzano (Italy) | | Location: ZÜRICH (Switzerland) | | Location: STUTTGART (Germany) | |
|--------------------------|--------|------------|------------|--------------|---------------------------|----------|--------------------------------|----------|-------------------------------|----------|
| Car parks | Type | Peak power | N° modules | Type modules | Generation kWh | kWh/ kWp | Generation kWh | kWh/ kWp | Generation kWh | kWh/ kWp |
| 2 (A) | single | 4,2 kWp | 15 | REC 280 Wp | 5.310 | 1.264 | 4.212 | 1.003 | 4.236 | 1.008 |
| 4 (B) | single | 8,4 kWp | 30 | REC 280 Wp | 10.675 | 1.271 | 8.485 | 1.010 | 8.525 | 1.015 |
| 8 (C) | single | 16,8 kWp | 60 | REC 280 Wp | 21.410 | 1.275 | 17.036 | 1.014 | 17.111 | 1.019 |
| 8 (D) | double | 16,8 kWp | 60 | REC 280 Wp | 21.410 | 1.275 | 17.036 | 1.014 | 17.111 | 1.019 |
| 16 (E) | double | 33,6 kWp | 120 | REC 280 Wp | 44.830 | 1.275 | 34.072 | 1.014 | 34.222 | 1.019 |
| 24 (F) | double | 50,4 kWp | 180 | REC 280 Wp | 64.242 | 1.275 | 51.108 | 1.014 | 51.333 | 1.019 |

- ❖ Number of cars is just a guide, based on 2.5m per car.
- ❖ 8 degrees inclination.

3. Charging points & battery alternatives

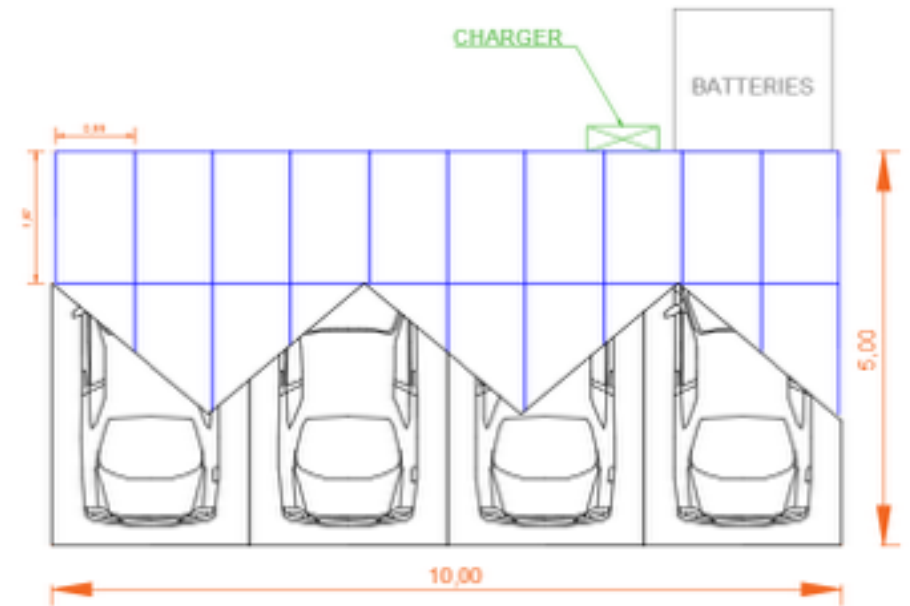
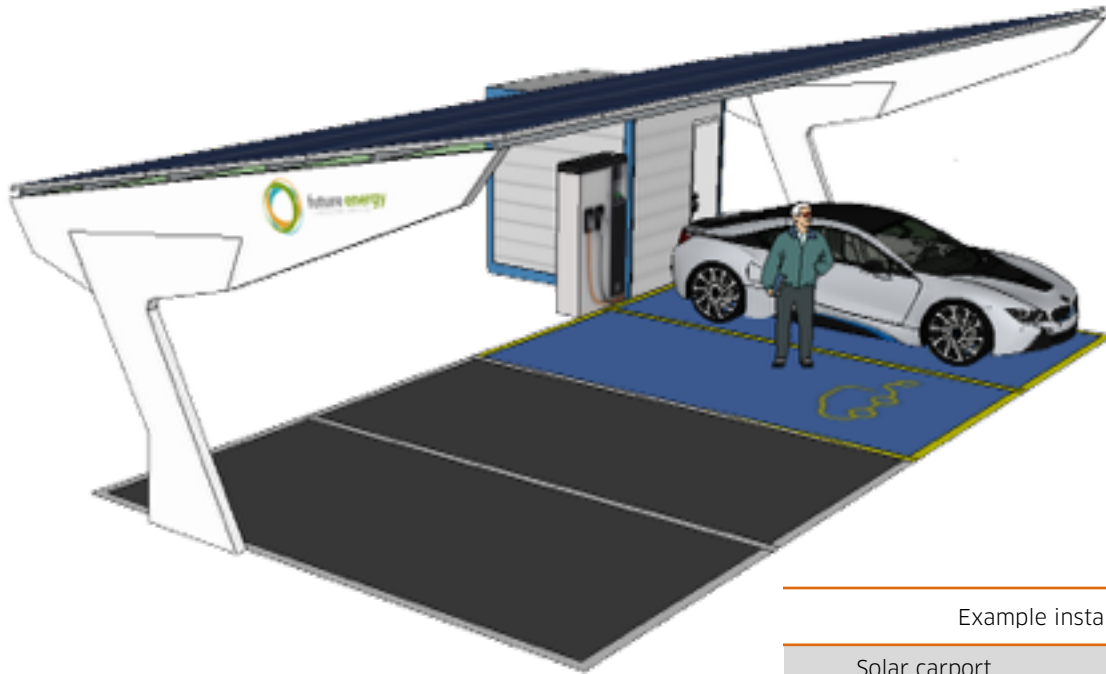
| Solar Carports - CIRCUTOR | | | Batteries Hoppecke OPZS 2000 | | Charging point | | |
|---------------------------|--------|------|---------------------------------|----------|----------------|-----------------------|--------------------|
| Car parks | Type | kWp | Nº units | Power kW | Nº of charger | Nº of charging points | Type CIRCUTOR |
| 2 (A) | single | 4,2 | 37 | 44 kW | 1 | 2 | Raption Slim 22 kW |
| 4 (B) | single | 8,4 | 37 | 44 kW | 1 | 2 | Raption Slim 22 kW |
| 8 (C) | single | 16,8 | 37 | 44 kW | 1 | 2 | Raption Slim 22 kW |
| 8 (D) | single | 16,8 | 74 | 88 kW | 2 | 4 | Raption Slim 22 kW |
| 16 (E) | double | 33,6 | 74 | 88 kW | 2 | 4 | Raption Slim 22 kW |
| 24 (F) | double | 50,4 | 74 | 88 kW | 2 | 4 | Raption Slim 22 kW |

4. Carport type A single, Circutor



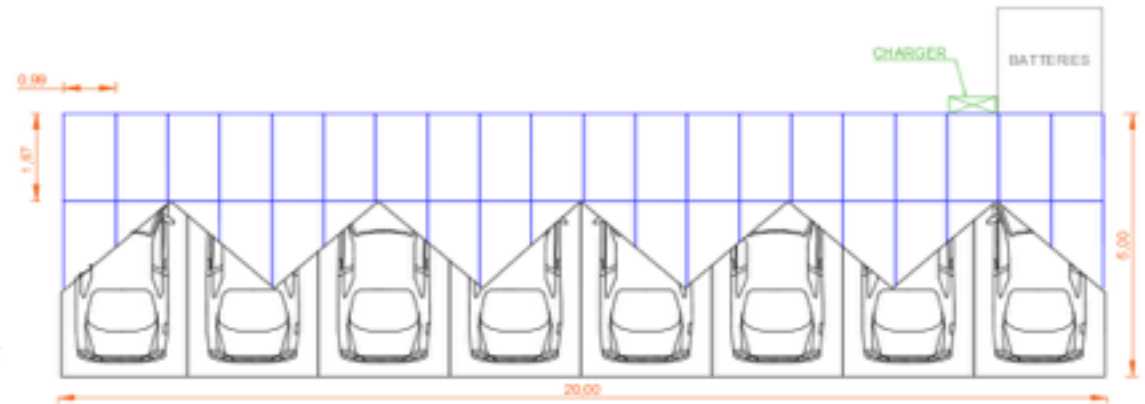
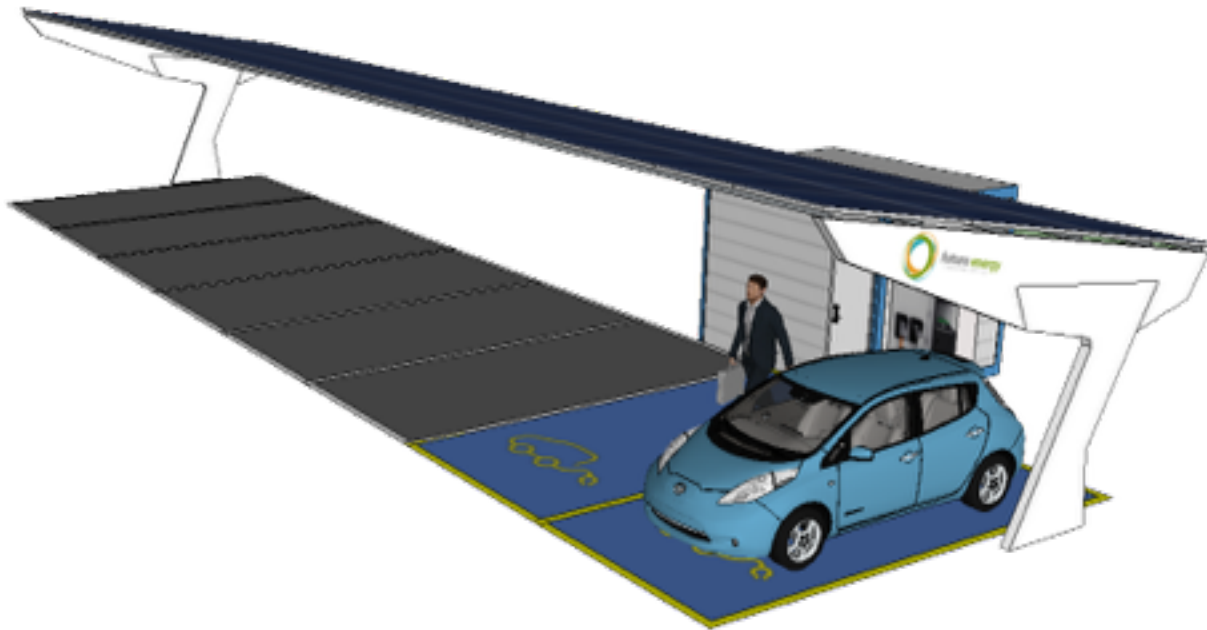
| Example installation | |
|-------------------------|--------------------|
| Solar carport | 2 car parks |
| Peak Power | 4,2 kWp |
| Charging point | Raption Slim 22 kW |
| Batteries Hoppecke OPZS | 44 kW |

5. Carport type B single, Circutor



| Example installation | |
|-------------------------|--------------------|
| Solar carport | 4 car parks |
| Peak Power | 8,4 kWp |
| Charging point | Raption Slim 22 kW |
| Batteries Hoppecke OPZS | 44 kW |

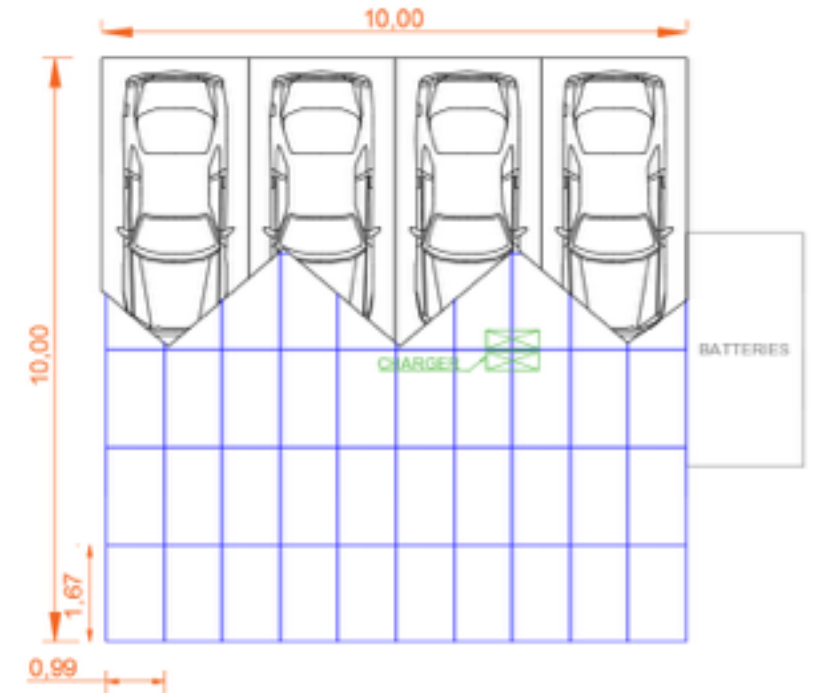
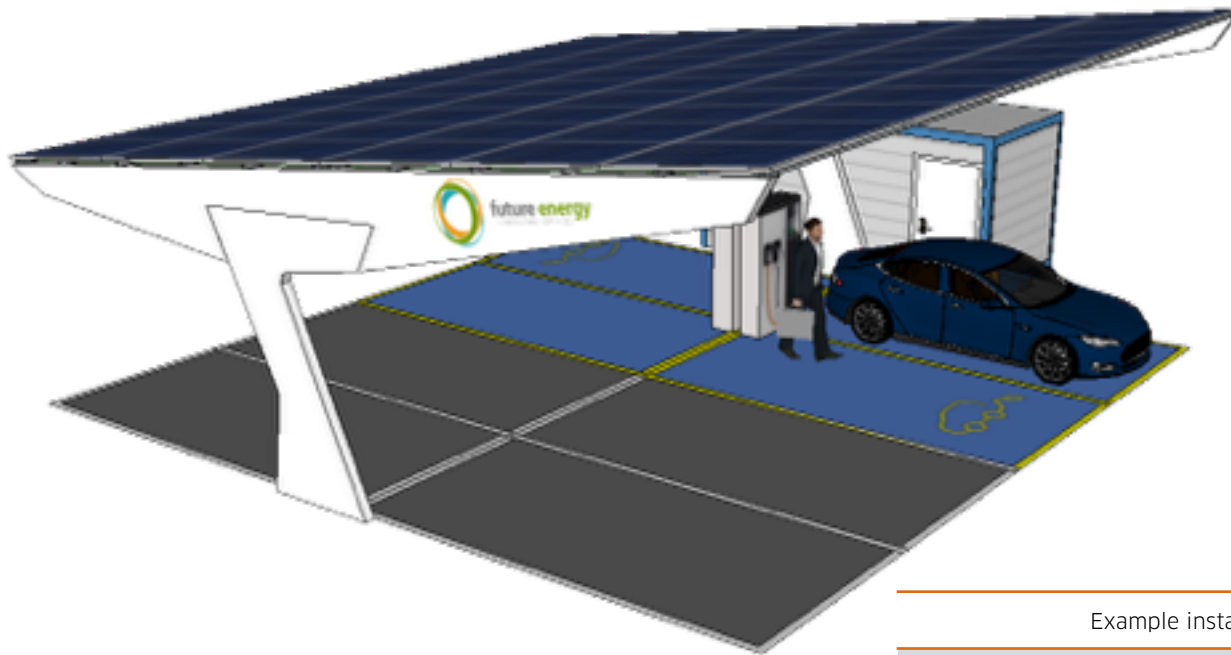
6. Carport type C single, Circutor



Example installation

| | |
|-----------------------|--------------------|
| Solar carport | 8 car parks |
| Peak Power | 16,8 kWp |
| Charging point | Raption Slim 22 kW |
| Battery Hoppecke OPZS | 44 kW |

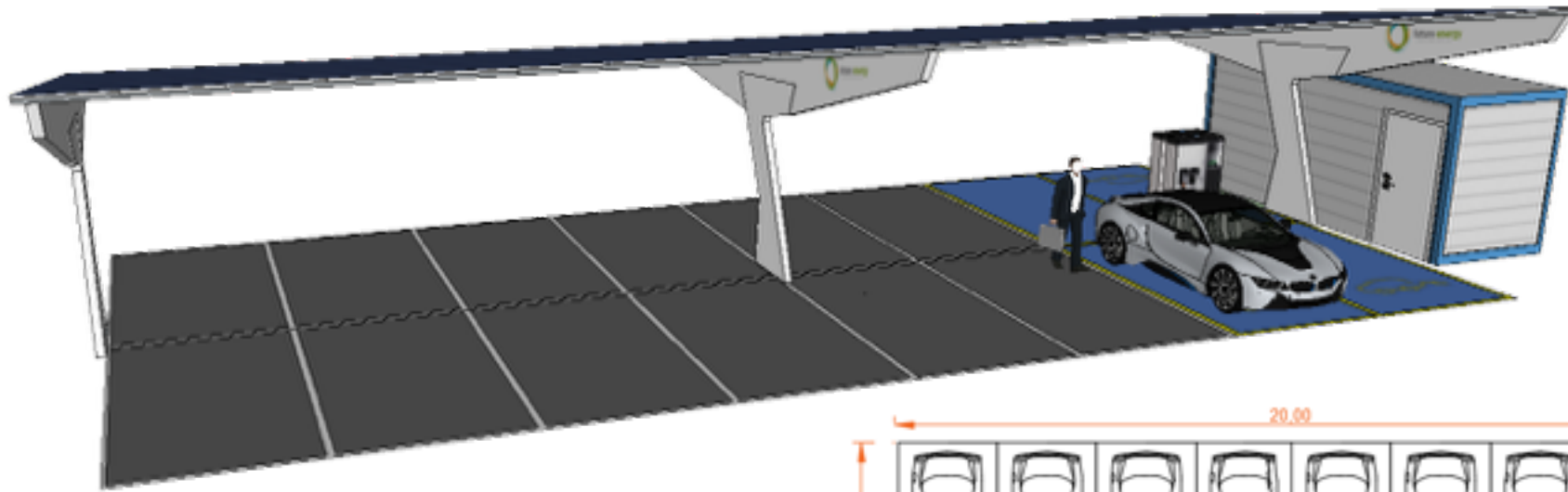
7. Carport typ D double, Circutor



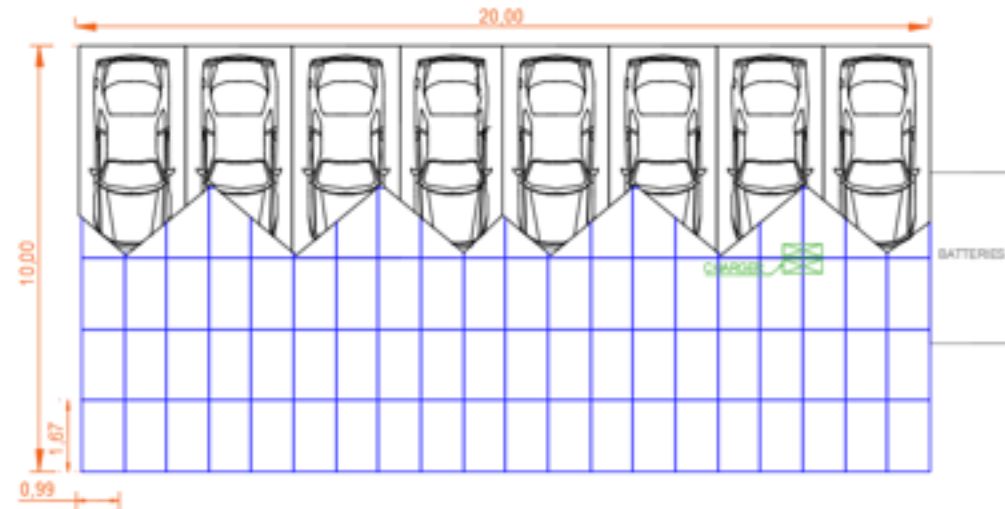
Example installation

| | |
|-------------------------|--------------------|
| Solar carports | 8 car parks |
| Peak Power | 16,8 kWp |
| Charging point | Raption Slim 22 kW |
| Batteries Hoppecke OPZS | 88 kW |

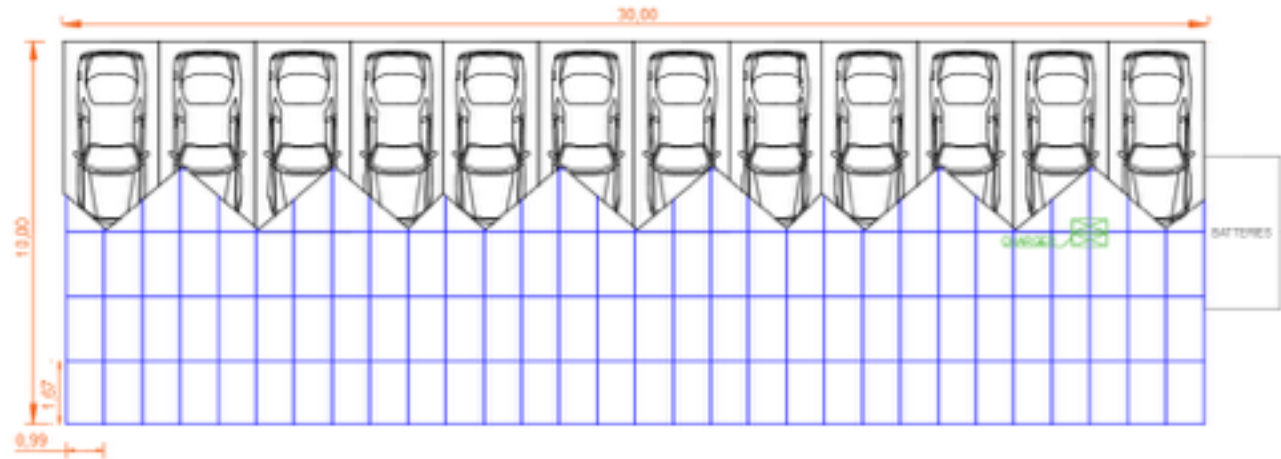
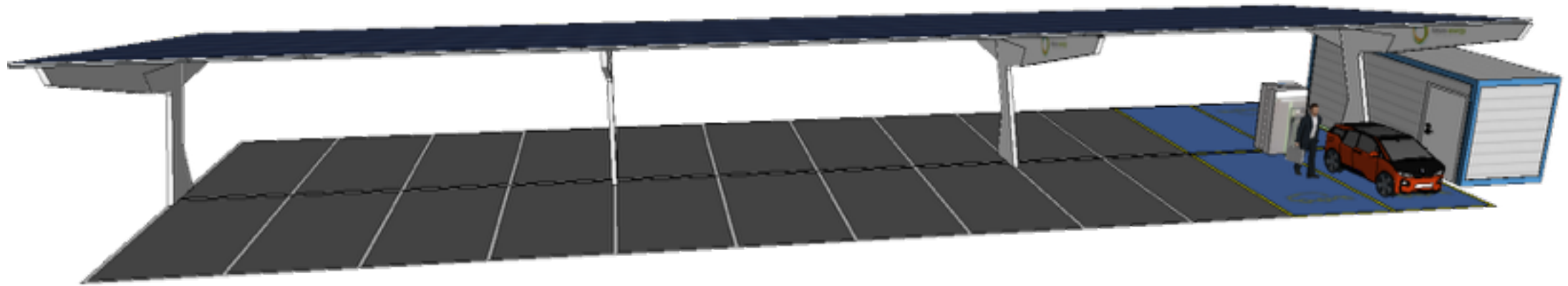
8. Carport type E double, Circutor



| Example installation | |
|-------------------------|--------------------|
| Solar carport | 16 car parks |
| Peak power | 33,6 kWp |
| Charging point | Raption Slim 22 kW |
| Batteries Hoppecke OPZS | 88 kW |



9. Carport type F double, Circutor



Example installation

| | |
|-------------------------|--------------------|
| Solar carport | 24 car parks |
| Peak power | 50,4 kWp |
| Charging point | Raption Slim 22 kW |
| Batteries Hoppecke OPZS | 88 kW |

10. Carport alternatives BLUETOP

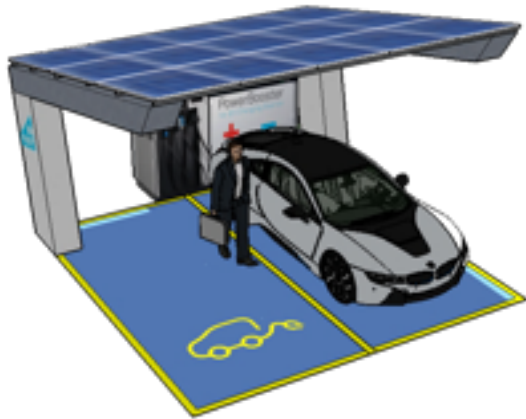
Energy production according to different types and locations

| Solar Carports -BLUETOP | | | | | Location: Bolzano (Italy) | | Location: ZÜRICH (Switzerland) | | Location: STUTTGART (Germany) | |
|-------------------------|----------|------------|------------|--------------|---------------------------|----------|--------------------------------|----------|-------------------------------|----------|
| Car parks | Type | Peak power | N° modules | Type modules | Generation kWh | kWh/ kWp | Generation kWh | kWh/ kWp | Generation kWh | kWh/ kWp |
| 2 | smart | 4,2 kWp | 15 | REC 280 Wp | 5.427 | 1.292 | 4.259 | 1.014 | 4.280 | 1.019 |
| 4 | standard | 8,4 kWp | 30 | REC 280 Wp | 10.908 | 1.299 | 8.580 | 1.021 | 8.621 | 1.026 |
| 8 | premium | 16,8 kWp | 60 | REC 280 Wp | 21.880 | 1.302 | 17.228 | 1.025 | 17.302 | 1.030 |

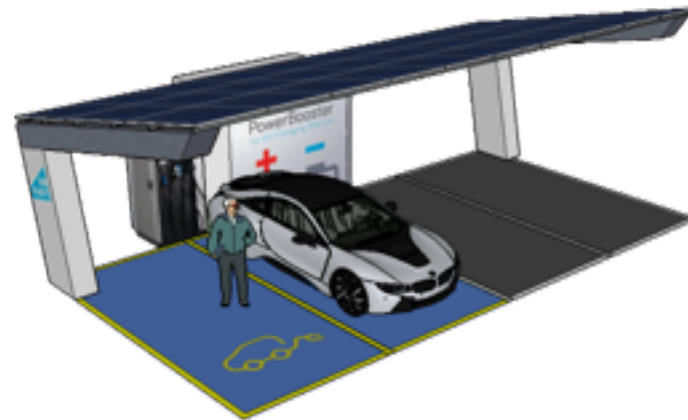
- ❖ Number of cars is just a guide, based on 2.5m per car.
- ❖ 10 degrees inclination.

11. Charging points & battery alternatives

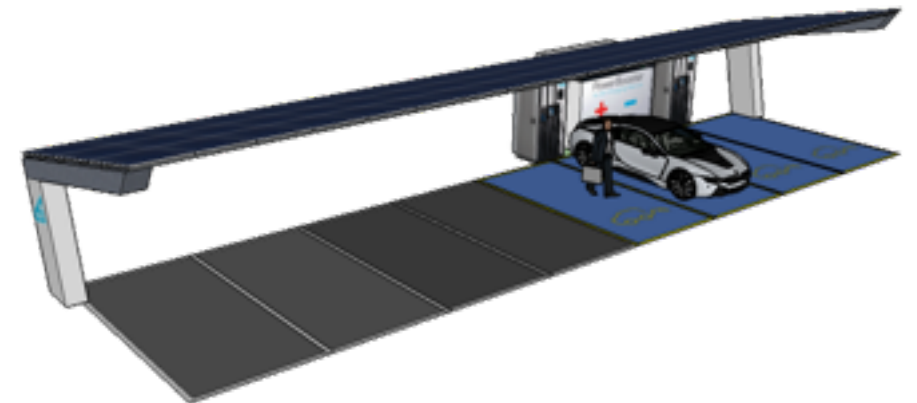
| Solar Carports - BLUETOP | | | Batteries ADS TEC Power booster | | Charging point | | |
|--------------------------|----------|------|------------------------------------|--------------------------|----------------|-----------------------|------------------------------------|
| Car parks | Type | kWp | Nº units | Nominal battery capacity | Nº of charger | Nº of charging points | Type Evttec |
| 2 | smart 1 | 4,2 | 1 | 240 kW | 1 | 2 | 150 kW DC + 60 kW AC output |
| 4 | smart 2 | 8,4 | 1 | 240 kW | 1 | 2 | 150 kW DC + 60 kW AC output |
| 8 | standard | 16,8 | 2 | 1 x 240 + 1 x 120 kWh | 2 | 4 | 2x 150 kW DC + 2 x 60 kW AC output |



2 Charging points

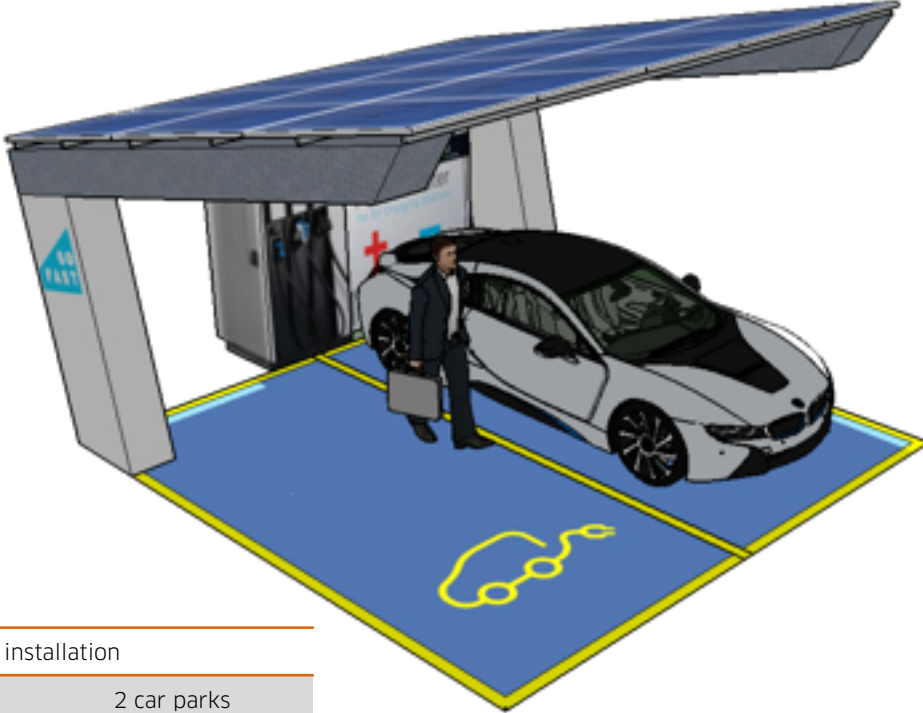
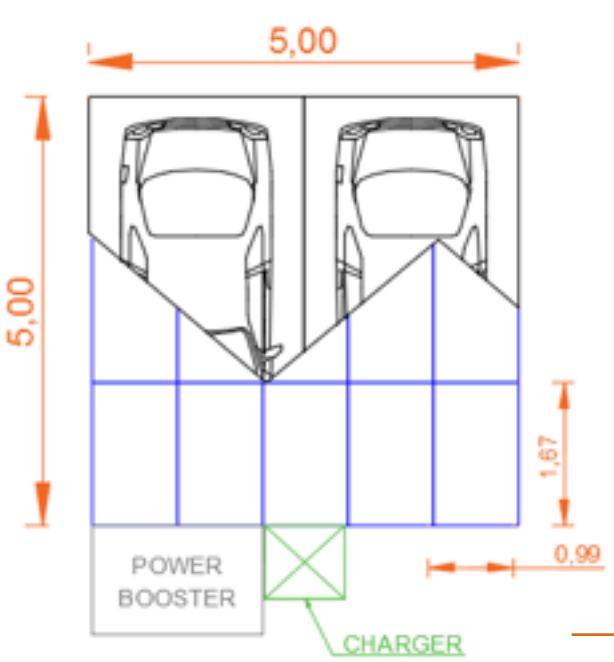


2 Charging points



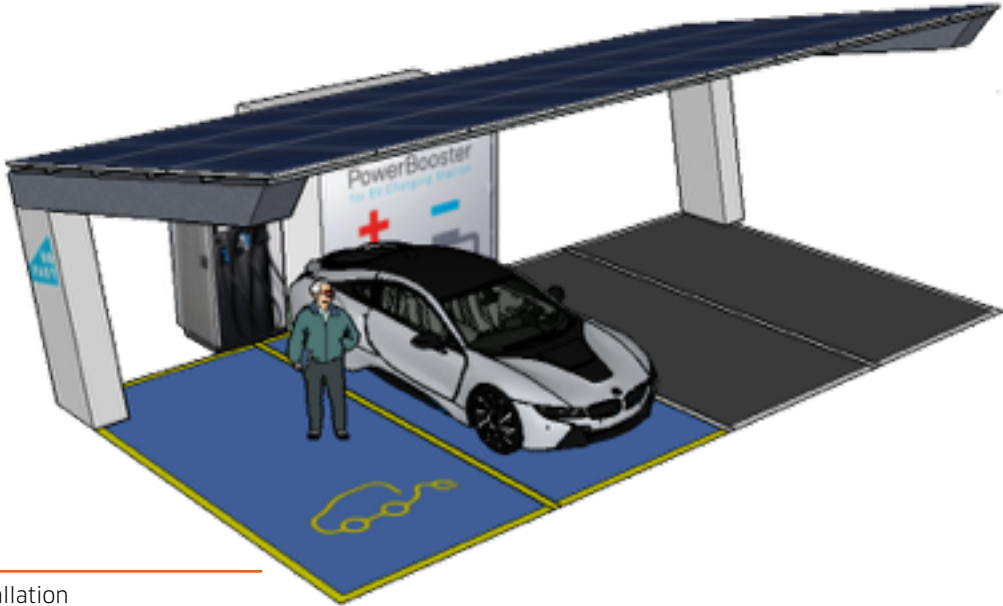
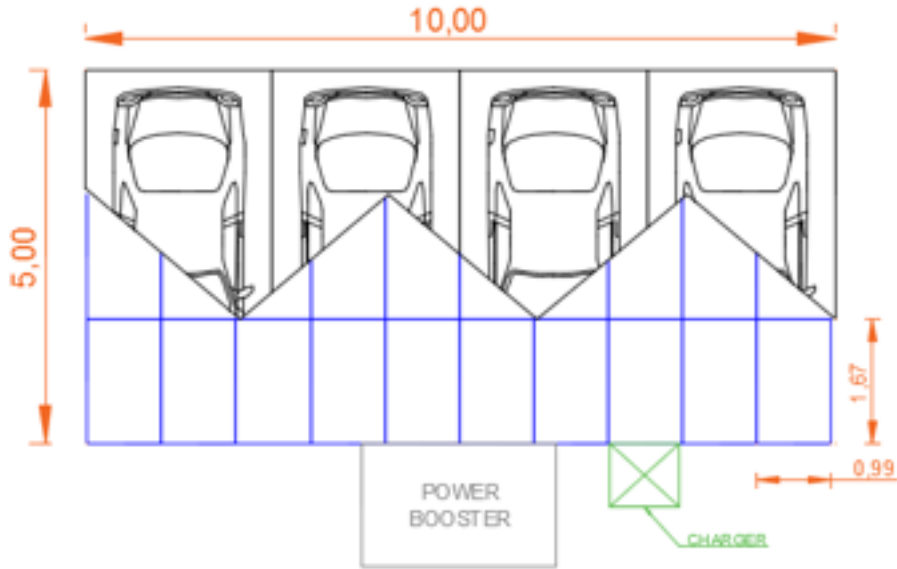
4 Charging points

12. Carport type Smart 1, Bluetop



| Example installation | |
|-------------------------|---------------|
| Solar carport Bluetop | 2 car parks |
| Peak Power | 4,2 kWp |
| Charging point | Evitec 150 kW |
| Batteries Power booster | 240 kW |

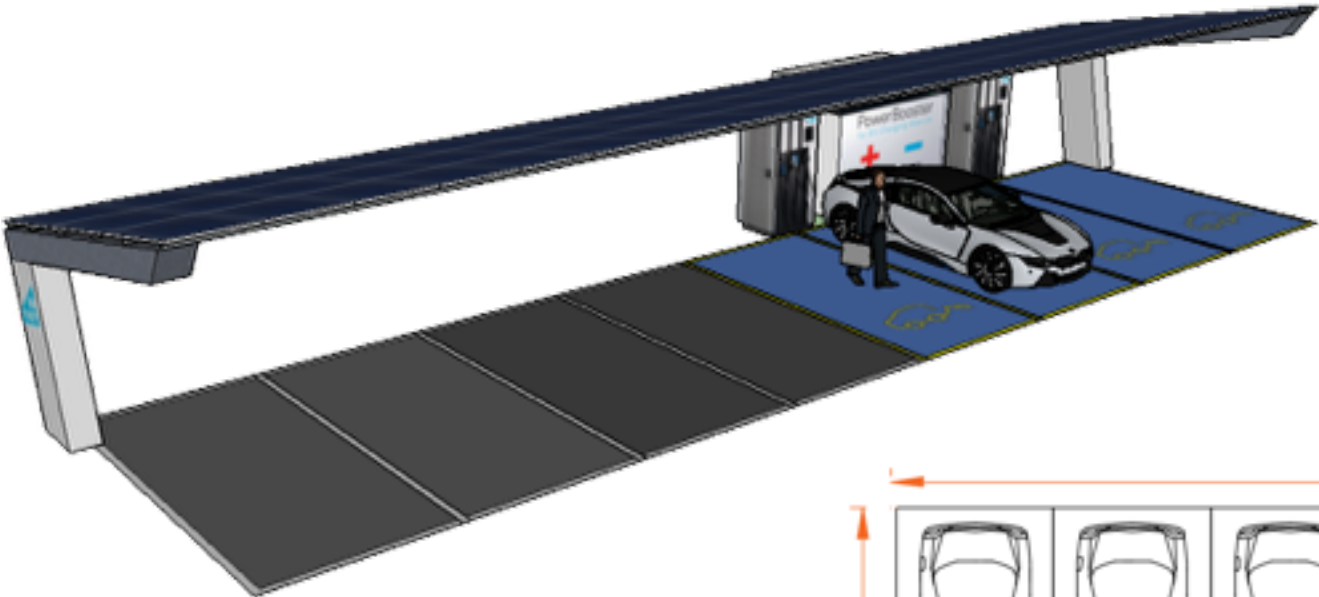
13. Carport type Smart 2, Bluetop



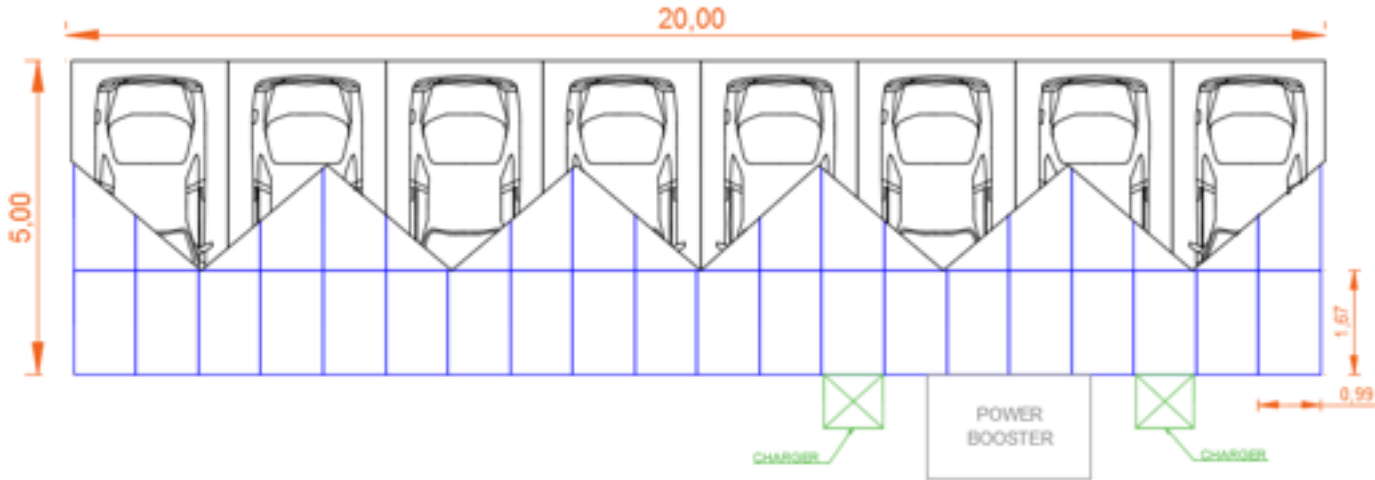
Example installation

| | |
|-------------------------|---------------|
| Solar carport Bluetop | 4 car parks |
| Peak Power | 8,4 kWp |
| Charging point | Evitec 150 kW |
| Batteries Power booster | 240 kW |

14. Carport type Standard, Bluetop



| Example installation | |
|-------------------------|-----------------------|
| Solar carport Bluetop | 8 car parks |
| Peak Power | 16,8 kWp |
| Charging point | 2 units Evitec 150 kW |
| Batteries Power booster | 240 kW + 120 kW |



15. Solar Carport Circutor

PVing PARKS is a solution that combines a photovoltaic solar canopy with regulation of the injection of power into the grid and a charging system for electric vehicles. This solution enables the production of energy during daylight hours to cover part of the electricity consumption of an installation and the charging of electric vehicles.

PVing PARKS solutions can cover a parking area from 2 to 6 spaces with their double connection for charging electric vehicles. Special configurations are also possible for car parks that provide a turnkey solution.

This system offers the following advantages:

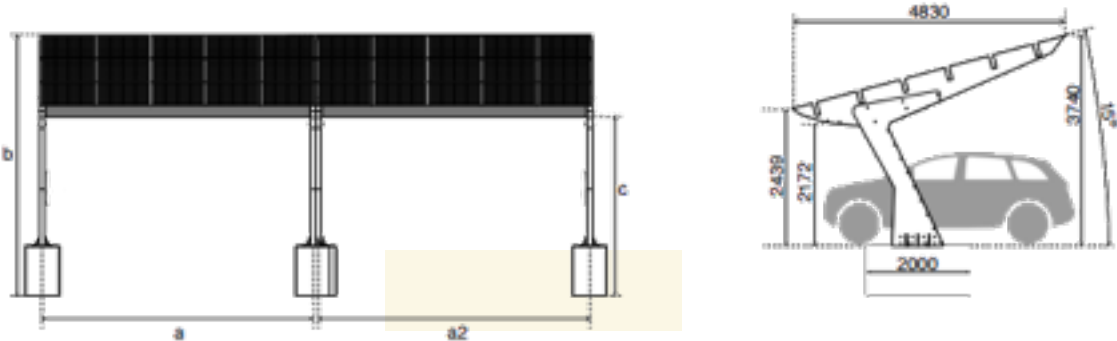
- Reduction in energy consumed from the electrical network
- Coverage for outdoor car parks
- Reduction of CO2 emissions into the atmosphere

CIRCUTOR can also develop larger custom solutions, overseeing the engineering and installation of the entire system.

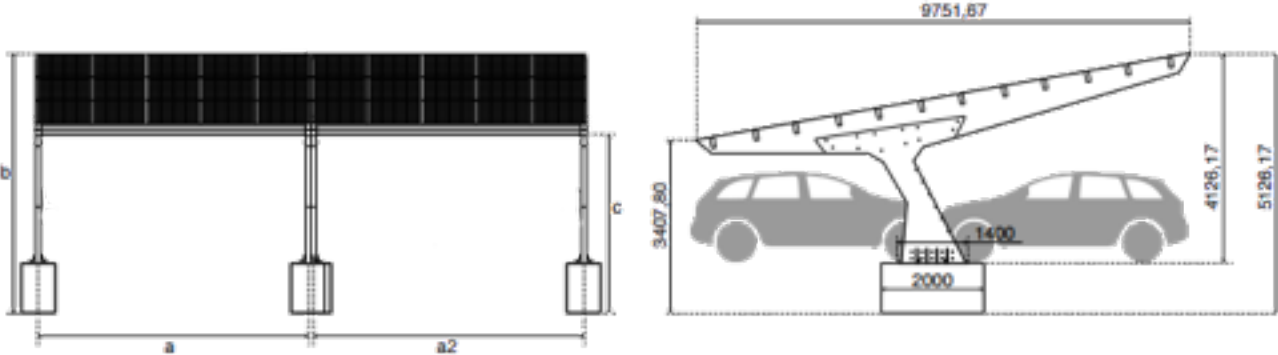


16. Solar carport - Types Circutor

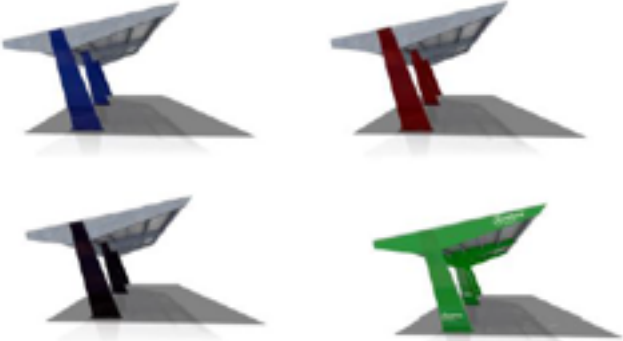
Type MP2 - SINGLE



Type MP4 - DOUBLE



DIFFERENT COLOURS



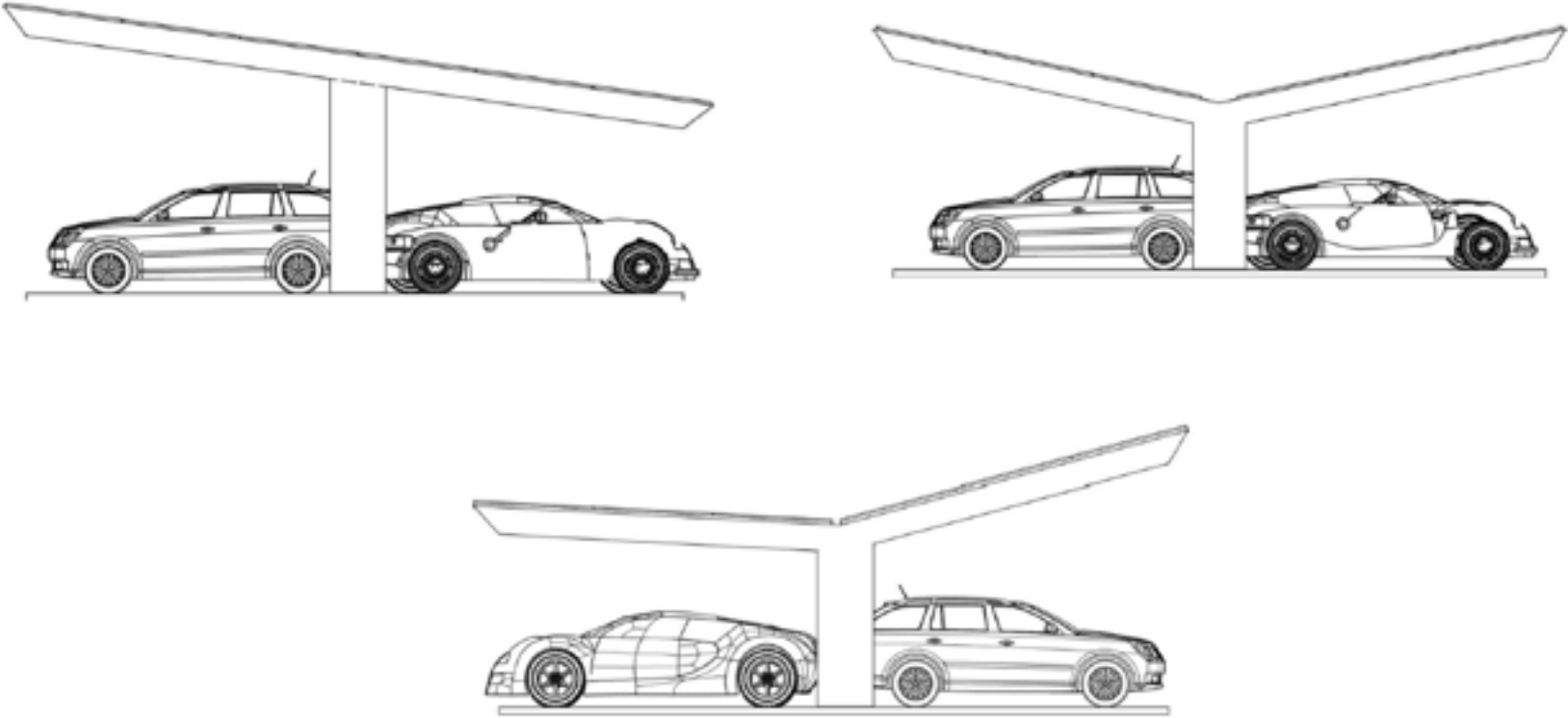
17. Solar Carport Bluetop

- Long span up to 15 meters - provides uninterrupted access.
- Hidden foundation - no concrete bollards required
- Kits for double glass or standard PV modules
- Hidden inverter - an elegant, safe and accessible solution
- Hidden drainage - downpipes are incorporated into support columns.



18. Some alternatives of carports Bluetop

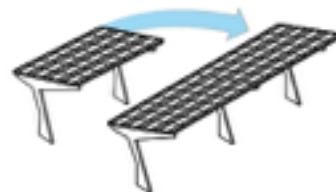
DOUBLE STRUCTURE



19. Installed carport examples

Advantages

- Shelters for vehicles.
- Generation of photovoltaic energy.
- Electric vehicle charging.
- Reduction of energy costs.
- Reduction of CO² emissions associated with generating energy.
- Monitoring and supervision of the electricity consumption of the installation and the PV generation.



20. Ultra-fast charger - Types



RVE - QPC 50 kW
(15-30 min)



RAPTION SLIM 22 kW
(30-60 min)



FASTO 50 kW
(15-30 min)



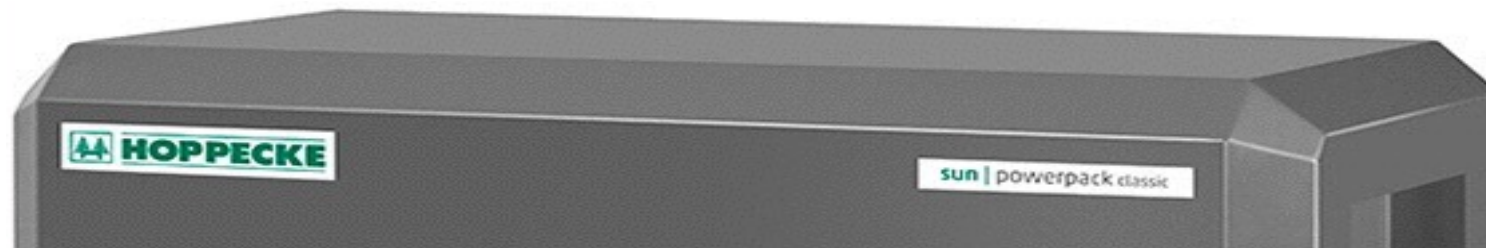
EVTEC 150 kW
(10 min)

21. Hoppecke batteries



Your benefits:

- Highest cycle stability during PSoC¹ operation – due to tubular plate design with efficient charge current acceptance
- Maximum energy efficiency by optimised electrolyte recirculation
sun | air prepared as standard
- Maximum compatibility – dimensions according to DIN 40736-1
- Higher short-circuit safety even during the installation – based on HOPPECKE system connectors

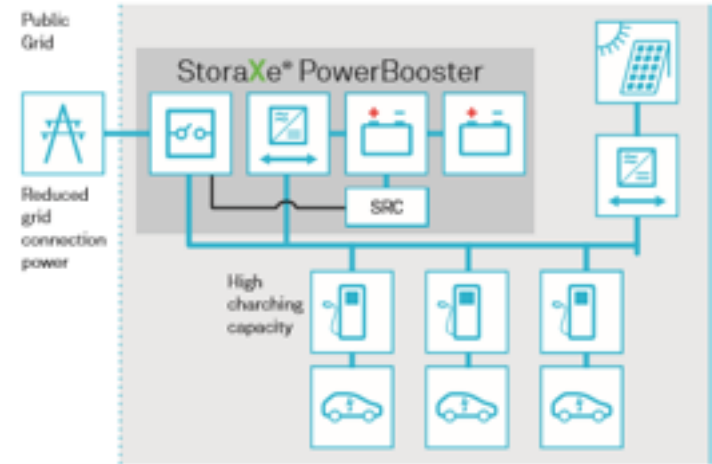


¹ Partial State of Charge

22. ADS TEC batteries (Power Booster)

Compact outdoor battery system in distribution networks

- Outdoor installation directly at the location of use
- Compact design with high performance
- Versatile application types and IT integration



Providing power for EV-Fast-Charger-Stations
Example for the connection of the PowerBooster in a charging infrastructure

- Compact construction
- Direct AC connection to distribution networks at 400 V level
- Recharging with reduced grid connection power
- Suitable for vehicle quick charging station with high charging power

23. REC TwinPeak modules

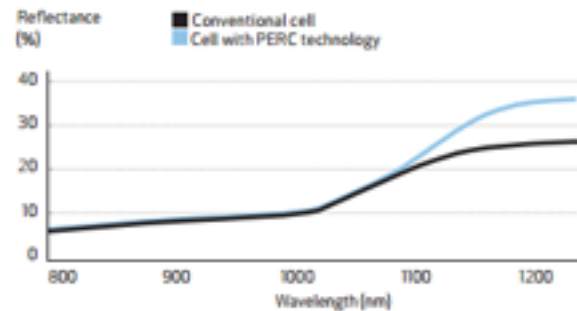
REC TwinPeak Series solar panels feature an innovative design with high panel efficiency and power output, enabling customers to get the most out of the space used for the installation.

Combined with industry-leading product quality and the reliability of a strong and established European brand, REC TwinPeak panels are ideal for residential and commercial rooftops worldwide.

They offer a combined warranty of 25 years. Coverage includes both product and performance, and provides protection and peace of mind for your investment.

- Half cut cells**
Laser cut polysilicon cells reduce internal resistance for higher power output, higher efficiency and increased reliability.
- Passivated Emitter Rear Cell**
New generation of cell technology captures more wavelengths of light through mirror-like architecture for higher efficiency.
- Split junction box**
The three parts enable the innovative new cell layout for a higher energy yield, while reducing heat & increasing reliability.
- Four bus bars**
A shorter distance for electrons to travel vastly improves the current flow, reducing resistance in the cell & increasing efficiency.

Figure 4: PERC technology improves the internal reflection of light at long wavelengths.



- 17.0% EFFICIENCY**
- 10 YEAR PRODUCT WARRANTY**
- 25 YEAR LINEAR POWER OUTPUT WARRANTY**

24. Solar carports

“Our initiatives helps to create a world how we all would like it to be.”

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