



# Reshaping Solar Energy

  
Modular Arc System by **goldbecksolar**



# Modular Arc System

## Solar system of the future

### Product and Function Description

MarcS Modular Arc System is an innovative system for the construction of solar power plants. It can be used as a hybrid solution that links agriculture with photovoltaics in a completely new way. MarcS results from 20 years of experience in building high-quality solar power plants.

The system consists of solar modules arranged in rows that are built in the shape of an arc, unlike conventional solar systems. A structurally advantageous arrangement. It merges the modules to the substructure in a solid static element spanning 9 meters. A rail system supports the modular arcs that can be moved flexibly over large areas. The modules are oriented to the east and west with different inclinations and achieve kWh yields of classic single-use photovoltaic systems. The entire area below the modules can be used for different purposes.

This innovation requires little material, is cost effective, flexible and helps to multiply the use of land and the economic benefits. A sustainable combined solution. The PV system of the future.

### Key Data

Static Shape	Arc
Orientation	East-West
Usage	multiple use / solar, agriculture, livestock or other
Support column distance	up to 9 meters or one support column every 20 m² depending on the size of the modules
Surface efficiency	> 2 MWp / ha
Surface coverage	flexible up to 100%
Height span	2.50 to 3.50 m
Energy production	up to 1.9 million kWh / ha / year in the Netherlands



# Advantages of MarcS

- 1. Multifunctional:** it is possible to use it as a single PV system, as a hybrid solution as Agri-PV or even a triple system solution Agri-PV+ livestock farming.
- 2. Economical:** due to efficient use of materials, improved use of space and maximum energy generation.
- 3. Self-supporting:** MarcS does not require any supports under the arcs. The load-bearing support columns required are one row of support columns every 9 meters or one support column per 20 m<sup>2</sup> depending on the size of the modules.
- 4. Sliding:** the possibility of moving the system installed on rails allows MarcS a flexible and individual use.
- 5. Quick:** system installation quick and flexible thanks to full or partial automation at a single assembly point.
- 6. Efficient:** very high surface efficiency of over 2 MWp/ha characterises MarcS. It is more efficient than other existing products.

- 7. Modular:** expandable with additional functions like:
  - Water balance system: including water collection, storage and selective release to plants and animals.
  - LED lighting: a controllable light source for plants and animals, a filter calculation system, lighting of storage rooms or for other purposes.
  - Automated helper systems: like harvesting robots or robots for autonomous pesticide-free weed removal, which are the self-propelled applied to the track system.
  - Greenhouse: with side walls, the MarcS can be flexibly converted into a greenhouse, for the winter period.
  - Extension for livestock.
  - Extension for storage room.
  - Weather control: extension of the movement control by weather-based automation.

„MarcS will improve the way we build solar plants in the future, building them faster, easier, more economical, multiplying land use and allowing a better use of resources! “

## Economic Benefits:

- **Cost effective:** the arc shape requires very low material cost and can be used as a single, double or triple purpose system, multiplying the economic benefits.
- **Individual:** the design allows the site to be managed flexibly and individually even with recurring period changes.
- **Space-saving:** due to the self-supporting structure, a large area under the PV system is free and usable for other purposes.
- **Ground preserving:** during construction, the modules are pre-assembled and moved via the rail system from a single point without affecting the soil during the whole process.

## A unique technological Innovation!

- ✓ The main technological innovation is the integration of the solar modules as part of the substructure creating a solid unit: the arc, statically stable and cost effective in its construction.
- ✓ Second, the sliding nature of the module arc opens the system to different possibilities in its use improving also its installation.
- ✓ Third, MarcS uses the modular and ground surface more efficiently than other conventional options.

**A new solution that is beyond comparison to any existing PV system.**



# MarcS and Agri-PV

Climate change with extreme weather conditions, regulatory requirements and the decreasing availability of large areas of land are bringing into focus a dual use of agricultural land. The Agri-PV solution generates electricity using a renewable energy source, the sun, without taking the required land away from use for food production. Among the main advantages of the combined use of MarcS modules with agriculture are:

## Safety for crops and animals

The modules also provide protection for animals and crops during extreme weather conditions such as hail, drought or heavy rain, heat waves and excessive sunlight.

## Earlier/delayed harvest

Attractive seasonal prices can be achieved due to better controllability of temperature and light and thus harvest cycles.

## Harvest and breeding optimization

With the combination of photovoltaics and agriculture, quality can be optimized. Plants and animals thrive better because they are less exposed to damage from water evaporation or birds of prey.

## Increasing module efficiency through plants

The plants help to reduce the temperature of the panels thus optimizing efficiency. The influence of wind and dust is reduced.

## Improved economics

The sale of electricity is incremental to the crop income.

MarcS system was developed with farmers and is well suited to the needs of agriculture. It foresees the use of robots for further development stages.



## Safety

The arc shape gives the system excellent static stability. The pressure is distributed to the load-bearing support columns, increasing the compressive strength. No disturbing supporting pillars and beams are necessary under the arcs, which significantly increases safety during use and maintenance and reduces the risk of accidents.

In the early development stage, we're testing heavily on snow and wind loads and conduct electroluminescence measurements in a specially constructed test frame.

## Contact us

MarcS will be available exclusively through GOLDBECK SOLAR.

## GOLDBECK SOLAR GmbH

Goldbeckstrasse 7  
69493 Hirschberg  
T + 49 6201 7103 300  
[marcs@goldbecksolar.com](mailto:marcs@goldbecksolar.com)





## Our active Markets



**Latin America**  
Chile  
Mexico

### Europe

Germany  
Great Britain  
Ireland  
Netherlands  
Poland

### Asia

Kazakhstan

## Contacts

### Germany

GOLDBECK SOLAR GmbH  
Goldbeckstrasse 7  
69493 Hirschberg  
Germany  
Tel. + 49 6201 7103 300  
Fax. + 49 6201 7103 399  
info@goldbecksolar.com

### Netherlands

GOLDBECK SOLAR Nederland B.V.  
Roggeweg 30N  
6534 AJ Nijmegen  
Netherlands  
Tel. +31 85 222 1489  
Tel. + 49 6201 7103 300  
info@goldbecksolar.com

### Chile

GOLDBECK SOLAR  
Av. Santa Maria de Chamisero 14700 – 36  
CP 9340000 Santiago de Chile  
Chile  
Tel. + 56 9 7785 2668  
claudio.alemany@goldbecksolar.com

### Mexico

GOLDBECK SOLAR Mexico S.A. de C.V.  
Av. Santa Fe No. 170 Piso 6-1-04  
Col. Lomas de Santa Fe  
01219 Ciudad de Mexico  
Mexico  
Tel. + 52 55 9172 8690  
info-mexico@goldbecksolar.com

