



# INNOVATIVE PHOTOVOLTAIC PROJECTS



**INFORMATION**



## Heiko Hildebrandt

Graduate Engineer and Managing Partner

"A visionary idea at first, the energy revolution has meanwhile become very specific and it is no longer a question if it can be realized. Today we are not just working on the mere number of kilowatt hours anymore, but we are developing useful and cost efficient components for an entirely sustainable energy supply."

## Nicolai Zwosta

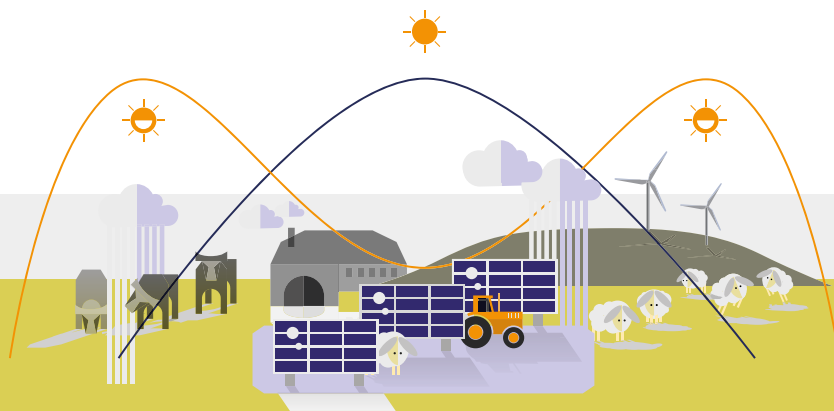
Graduate Geographer and Managing Partner

"We combine solar energy with landscape conservation and agriculture. This is absolutely necessary as we are still far from reaching generation quantities which can really catch up with the climate change. Just think of electromobility as an example."



# CONTENT

About Next2Sun	2
Our concept	3
Agriculture and livestock farming	4
Agricultural uses	6
Nature, environment and sustainability	8
Innovative Solar Project in Eppelborn Dirmingen	10
Founding Partners	12





# ABOUT NEXT2SUN

The **Next2Sun** GmbH was founded in 2015 in order to introduce a new type of photovoltaic plant system which, unlike conventional photovoltaic systems, reaches its generation peaks in the mornings and evenings.

The challenges of the energy revolution are most likely to be solved by companies willing to question existing solutions while searching for innovations. Together, the parent companies Ökostrom Saar GmbH and Solverde Bürgerkraftwerke Energiegenossenschaft eG have brought the development of a new photovoltaic plant type to a marketable stage. Both companies have been successfully developing projects in the field of renewable energies. Next2Sun combines the know-how of both companies. In 2017, our start-up company won the PV Magazine "Top Innovation" Award for developing a new photovoltaic system. However, Next2Sun's work is not limited to the development and optimization

of plant technology, but also includes developing suitable project sites for the implementation of our own photovoltaic type.

Our team operates from locations in Berlin, Freiburg and Merzig and we have several years of experience as plant operators and project developers. Prior to building Europe's biggest bifacial photovoltaic plant, we spent several years collecting data from prototype plants. Being long standing actors in the field of energy revolution as well as experienced project developers, we are excited about the abundance of possibilities and the almost global applicability of this new concept.

# OUR CONCEPT

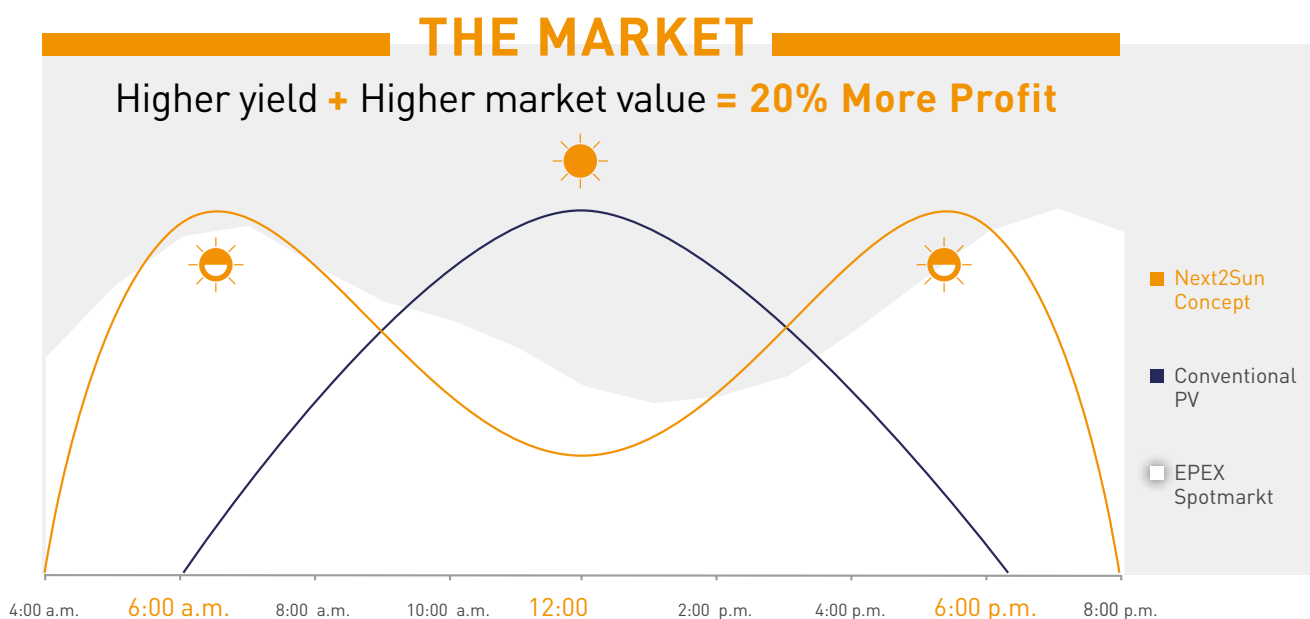
It is Next2Sun GmbH's goal to add a new component for the generation of electricity from solar radiation to the energy revolution. The main idea behind our plant concept is the vertical installation of specific solar panels which are able to utilize light from both sides ("bifacial" modules).



The two sides of the modules are facing East and West, leading to a peak in energy generation during mid-morning and in the evening. With the growing expansion of renewable energies, the differences between times of high and low feed-in from wind and solar energy are further increasing. This already shows almost daily in the morning and evening hours where consumption is high but the feed-in from solar plants is low: during those hours the electricity prices are highest and thereby indicate a shortage. Conversely, the phases of very low or even negative prices at noon are continuing to increase, indicating an oversupply. Our Next2Sun concept is the ideal solution to this problem!

Next2Sun plants are feeding energy to the grid when other photovoltaic plants are producing on a low level. This relieves the electricity grids, especially those in lower voltage levels. Next2Sun plants can feed into the system even where the grids are already running near capacity due to conventional wind and photovoltaic plants.

Our photovoltaic system benefits directly from the market situation: due to the electricity prices typically being lower at noon and higher in the morning and evening hours, our plants reach higher average revenues. In practice, we currently achieve 5 to 10% higher market profits compared to conventional photovoltaic plants. Not only in the course of electricity generation, but also concerning the height of the specific yields, Next2Sun plants are steps ahead of the classical South-facing plants: depending on the type of module used, 5 to 15% higher electricity yields per kW can be achieved.





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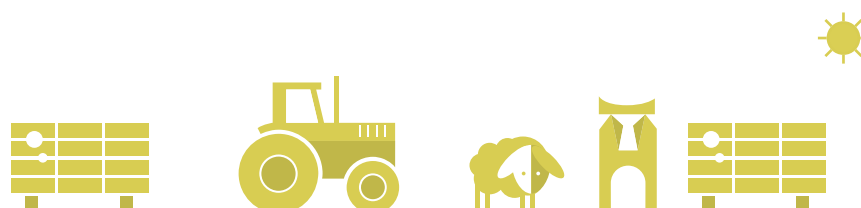
# AGRICULTURE AND LIVESTOCK FARMING

The area of a **Next2Sun** solar park can be used for agriculture nearly to the full extent

The land as a factor of production is preserved, as no soil will be sealed and only 1 % of the area will be overbuilt. Neither the water nor the solar radiation budget will be changed considerably: the solar plant requires only about 10-15 % of the total insolation, leaving sufficient sunlight for photosynthesis.

Furthermore, no external compensation areas are necessary for a **Next2Sun** plant as the plant area itself can be designed ecologically valuable. This further reduces „excessive land consumption“.

The space of at least 10 meters between the rows enables the use of conventional agricultural machinery, securing efficient work management. With the usual working widths, about 90 % of the solar park area can be used for agricultural purposes. Depending on the requirements of the use, the distances between the rows can be individually broadened up to 20 meters. Pasture farming is also possible by technically protecting the plant accordingly.





Primarily the plant area is suitable  
for all types of grassland utilization:

- Meadows used for hay or silage
- Pasture farming (cattle, sheep, etc.)
- Biomass and material use
- Arable land is also possible but far more difficult to implement

Depending on the type of use, the machinery used for farming as well as the photovoltaic plant itself will be technically adjusted to enable optimal use of the area. (Examples: protection against stone chipping or cable damage in pasture farming)

Another potential application of the **Next2Sun** concept, which in fact is very interesting, is the self-production of operational electricity demand. The production profile of our plants is especially suitable for the operation of dairy farms, as it enables very high self-consumption quotes. A large part of the operational electricity demand can be met by self-production without losing areas near to the farm for other usage.

We have developed a special variation especially for the use in agriculture where the bifacial solar modules can be used as enclosures like pasture fences or privacy screens, for example. It is a fence that pays for itself!



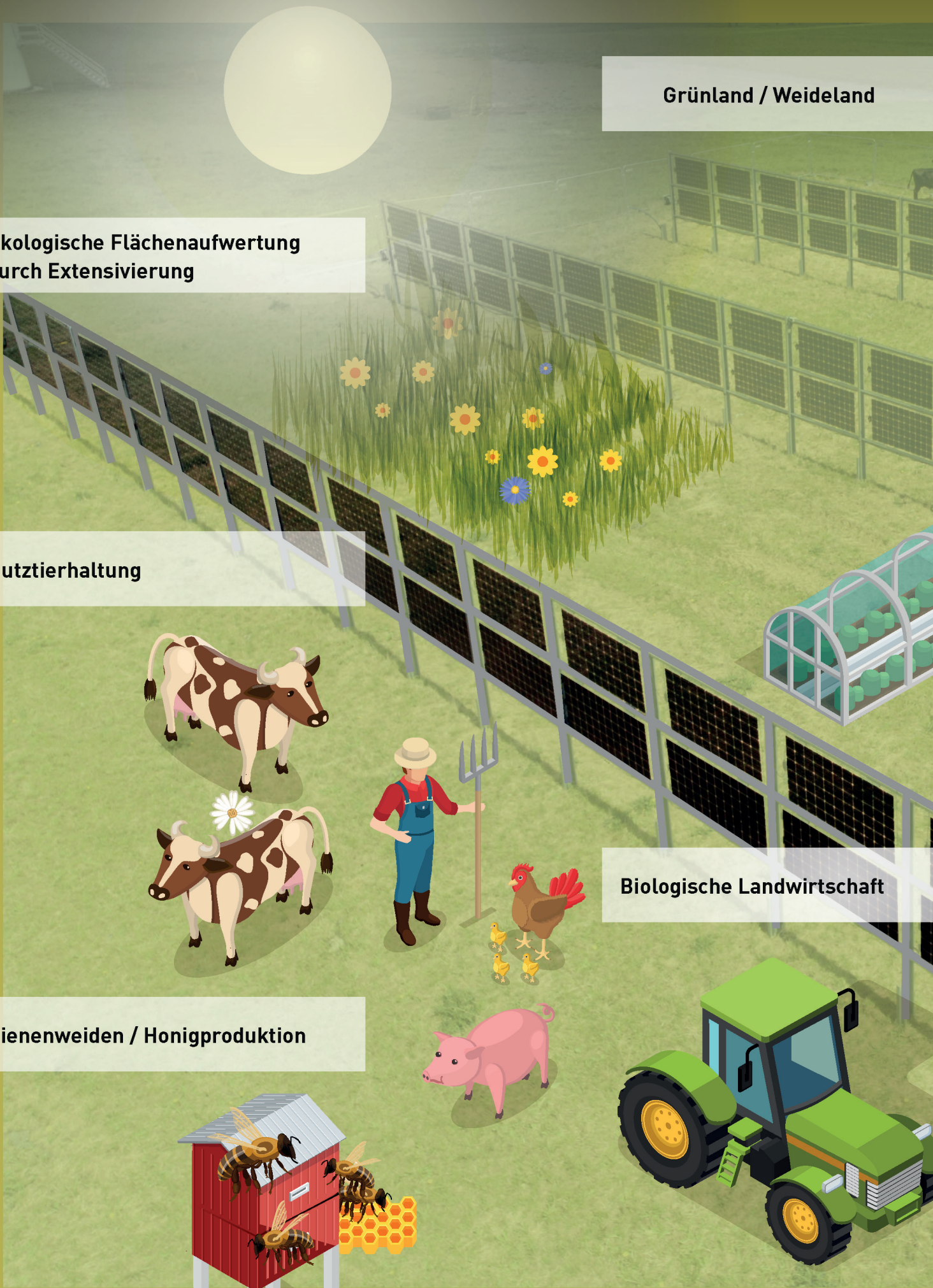
Grünland / Weideland

Ökologische Flächenaufwertung  
durch Extensivierung

Nutztierhaltung

Biologische Landwirtschaft

Bienenweiden / Honigproduktion

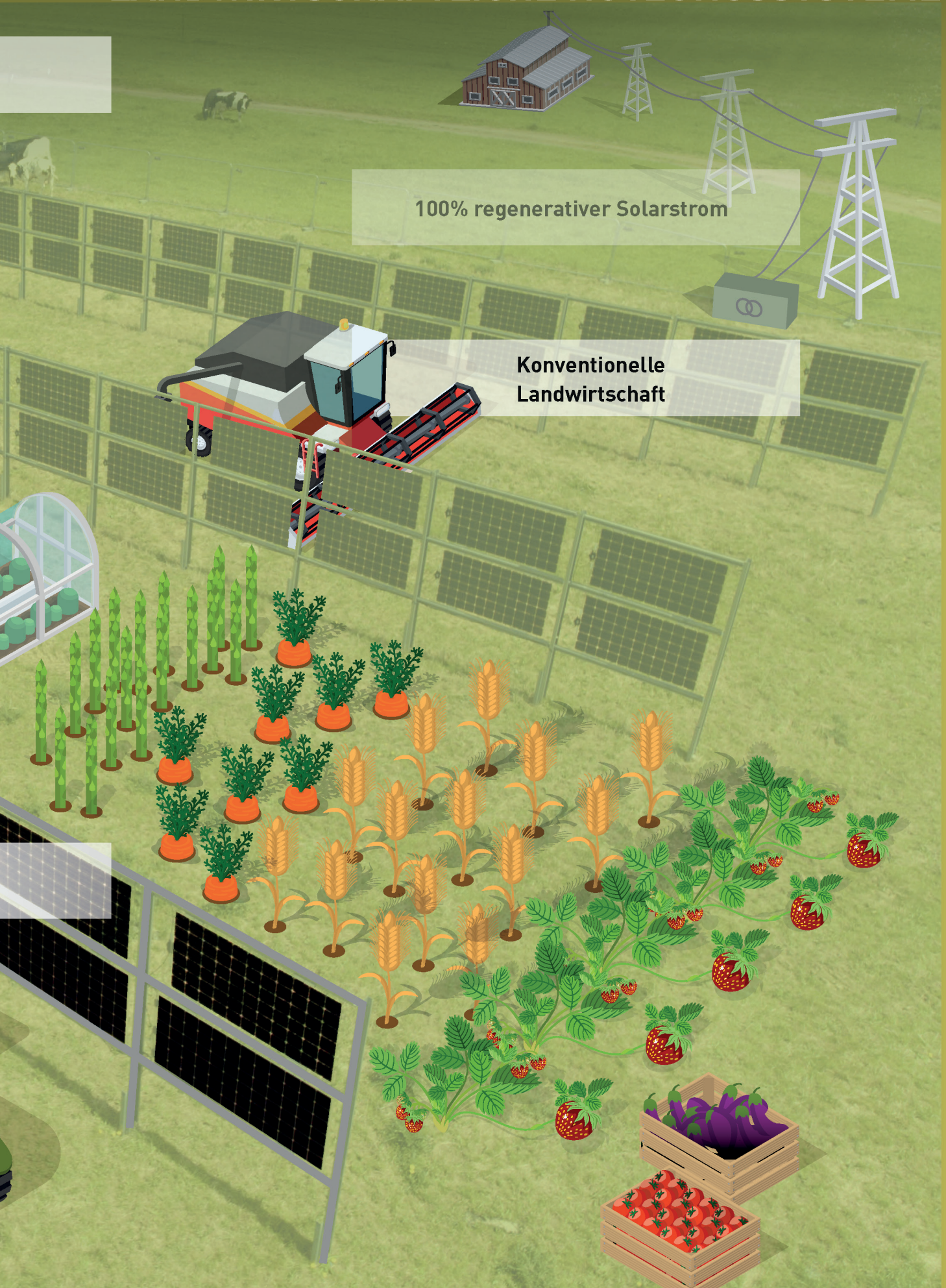




# LANDWIRTSCHAFTLICHE NUTZUNGSSYSTEME

100% regenerativer Solarstrom

Konventionelle  
Landwirtschaft



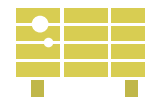
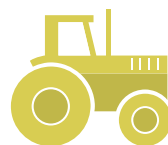


# NATURE, ENVIRONMENT AND SUSTAINABILITY

The vertical installation of the modules barely affects the value of the ground surface:

- Insignificant level of overbuilding: less than 1 % of the ground surface, no sealing, no foundation
- Almost unchanged water supply: no change in the distribution of rainfall
- Only minor changes in the insolation: just about 10–15 % of the annual solar radiation is being used by the photovoltaic plant

This results in very low influence on the vegetation growth.





In the area below the module rows there are strip-type structures with many design possibilities. Habitats, which have become very rare in today's monotone agricultural landscape can be created:

- Grass and flower strips, e.g. for insects and butterflies
- Deadwood areas
- Piles of stones

Apart from strip-type structures, extensive habitat structures like e.g. wild flower meadows can be created on either the whole plant area or parts of it, as well. Our plant concept allows us to individually meet the particular project and location requirements.



While the optical long-distance effects are comparable to conventional photovoltaic plants, the appearance at close range is less technically characterized as there are no module back panels with visible junction boxes and cables.

Furthermore, dazzle effects outside of the solar plant are almost impossible as any reflections of the vertical construction due to physics can only go to the ground.

The low overbuilding is a huge advantage especially for birds, as seen from the bird's-eye view the ground surface remains almost completely open.





# INNOVATIVE SOLAR PROJECT IN

In Dirmingen, a district of Eppelborn, a special kind of solar farm has been constructed: worldwide it is the first plant of this size where solar modules are not flatly tilted facing South but vertically positioned facing East and West.

The solar farm Dirmingen produces around 2.0 megawatt, enough electricity for 700 households on an area of about 7 hectares. Symbolically, it was put into operation on 22 September 2018 during the "Das Saarland voller Energie" (the Saarland full of energy) action week of the Ministry of Economy, Labor, Energy and Transport. Contractee and operator of the solar farm is the Ökostrom Saar Wind GmbH, a 100% subsidiary of the Ökostrom Saar GmbH from Merzig in Saarland.

The solar farm Dirmingen is a lighthouse project for the energy revolution. The new plant design manages the stretch between agricultural use and electricity production from solar energy and thereby offers a solution for the growing land-use conflict.

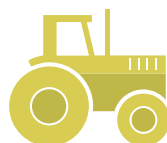




# EPPELBORN-DIRMINGEN

## Facts

- Location: Eppelborn Dirmingen in Saarland
- Size: 7 hectares with about 5,700 bifacial solar modules
- Energy output: 2 MWp (supply for 700 households)
- Annual energy output: 2,150 MWh/year
- Alignment: vertically aligned facing East-West
- Put into operation: 2018
- Operator: Ökostrom Saar Wind GmbH
- Europe's first bifacial, free-standing photovoltaic plant in this magnitude



# FOUNDING PARTNERS

The **Next2Sun** team has committed itself to finding solutions today for foreseeable problems the energy revolution will bring in the future. We see the fascinating possibility to establish an unconventional concept as a new component in the renewable energy mix of the future. Please do not hesitate to contact us via phone or email with any questions you might have.



**Heiko Hildebrandt**  
Graduate Engineer  
Managing Partner



**Nicolai Zwosta**  
Graduate Geographer  
Managing Partner



**Markus Probst**  
B. Sc. Geographer  
Acquisition  
Project Development



**Thomas Brill**  
Graduate Economist  
Finance  
Corporate  
Development



**Daniel Kögler**  
M. Sc. Renewable  
Energy Systems  
Acquisition  
Site Management



**Robert Baldy**  
M. Sc. Renewable  
Energies  
Plant Operation  
Research  
and Development



**Sascha  
Krause-Tünker**  
Graduate Merchant  
Finance and  
Consulting



## LEGAL NOTICE

**Publisher of this brochure:**

Next2Sun GmbH  
Trierer Str. 22  
66663 Merzig (Germany)

**Represented by its managing directors:**

Graduate Engineer Heiko Hildebrandt, Graduate Geographer Nicolai Zwosta  
**Tel.:** +49 (0) 6861 - 829120 · **Email:** info@next2sun.de  
**Website:** [www.next2sun.de](http://www.next2sun.de)



#### Büro Berlin

Burgsdorfstraße 8  
13353 Berlin  
Tel.: +49 (0) 30 - 28640317

#### Büro Merzig

Trierer Str. 22  
66663 Merzig  
Tel.: +49 (0) 6861 - 829120

#### Büro Freiburg i. Br.

Am Rotschachen 10a  
79110 Freiburg i. Br.  
Tel.: +49 (0) 761 - 45893167

Email: [info@next2sun.de](mailto:info@next2sun.de) - Website: [www.next2sun.de](http://www.next2sun.de)