



The beneficial combination of
green roof and photovoltaics

SYSTEM SOLUTION SOLAR GREEN ROOF

The beneficial combination of green roof and photovoltaics

OPTIGRÜN®
ROOF GREENING

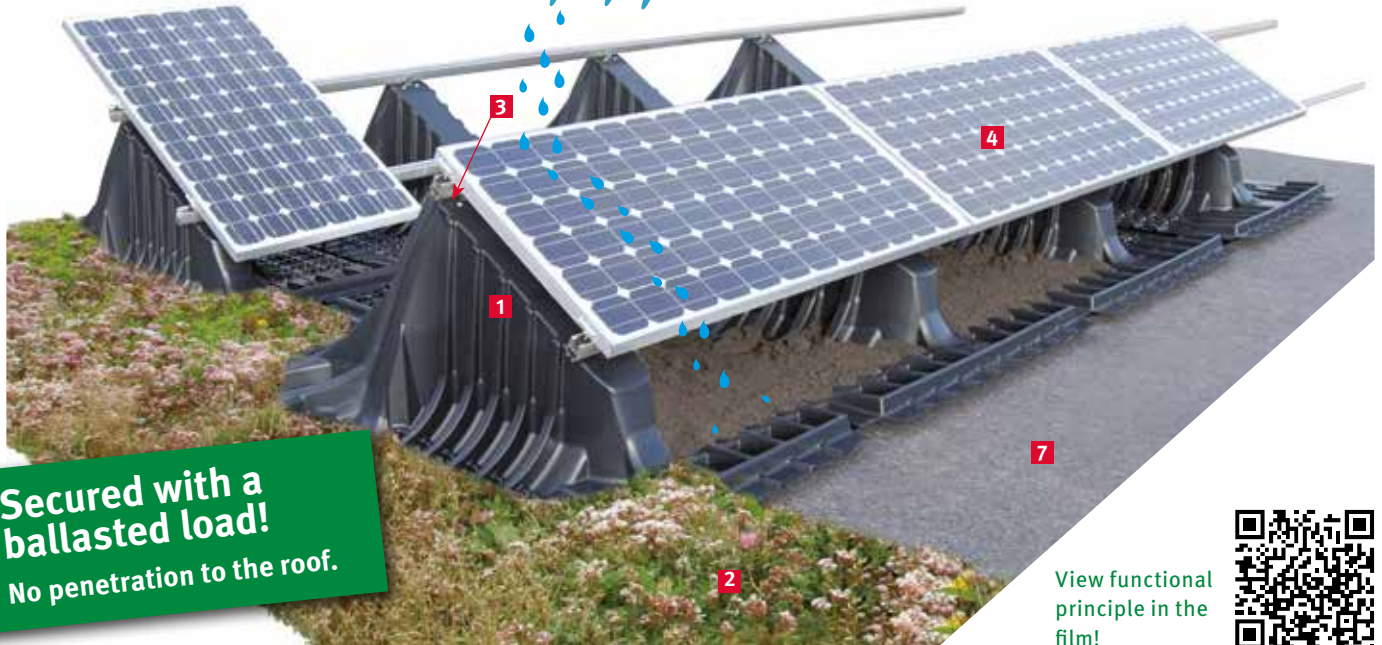
Optigrün system solution Solar Green Roof. Functional principle

1. Functional principle: Secured with a ballasted load

The Optigrün system solution Solar Green Roof is a system secured with a ballasted load that fixes the Solarbase support frames for the photovoltaics modules in place securely with the load of the green roof structure.



The vegetation also runs under the modules, so that as large a proportion of the roof area as possible can be greened and the greatest possible cooling effect achieved. Here in the example Solar Green Roof 30. Labelling see 4.2.



2. Benefits of system solution Solar Green Roof

- As the solar supports are fixed in place by the ballasted load of the green roof build-up the waterproofing system or the fabric of the building below needs to be penetrated. Additional and costly waterproof detailing is not required.
- Due to narrow spacing of the module rows, high yields are possible even in the smallest of spaces.
- The Solarbase support frames as a multifunctional structural component: Fastener for the photovoltaics modules, drainage and water reservoir for the green roof.
- Simple and quick installation.
- The Solarbase support frames are light and yet manufactured to high strength standards and to provide resilience to wind pressures without additional bracing being required.
- Excess water is stored within the green roof build-up. This ensures a water supply to the vegetation, a high level of water retention and thus good cooling of the surrounding area through evaporation.
- Vegetation continues under the photovoltaic panels so that as large an area of the roof as possible can be greened. This will help to fulfil any local planning requirements in this regard.
- The recycled plastic used in manufacture of the Solarbase units is UV and temperature resistant.



3. Combination of photovoltaics and green roofs has many benefits for investors and the environment

› Yield increase for the photovoltaics system

The cooling effect caused by evaporation from the green roof increases the efficiency of the photovoltaics system compared to a non-green roof area which can warm significantly.

› Green roofs protect the waterproofing and extends its working life

This allows the solar system to be operated for a longer time. No waterproofing refurbishment is usually needed before the end of the service life of the photovoltaic system. The green roof also protects the waterproofing from necessary foot traffic for maintenance of the solar system itself.

› Systems secured with a ballasted load don't require any fastening points and are affordable to install

The supports for the photovoltaic panels are held in place by the surface weight of the green roof build-up and do not require any additional penetrative fixings through the waterproofing and roof structure. They are economical and quick to install.

› Fire protection due to the green roof

A properly maintained green roof can prevent possible fire spread across a roof area.

› Rainwater retention

Extensive green roofs retain 50 – 70 % of the annual precipitation thereby reducing pressure on the local surface water drainage system.

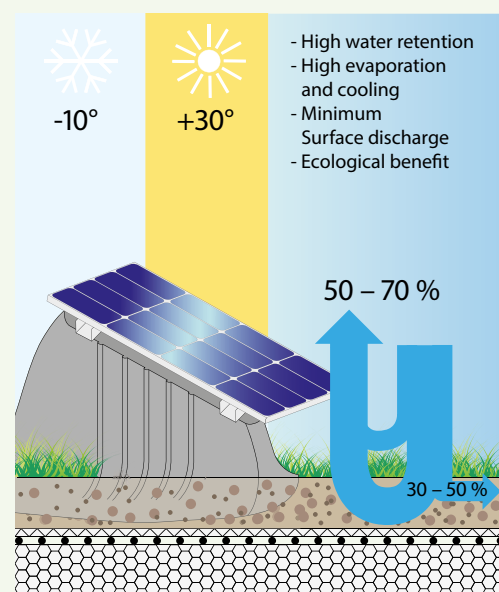
› Stability against wind loading

Wind load reports and wind tunnel development testing offer security when calculating the required ballasted load for the project.

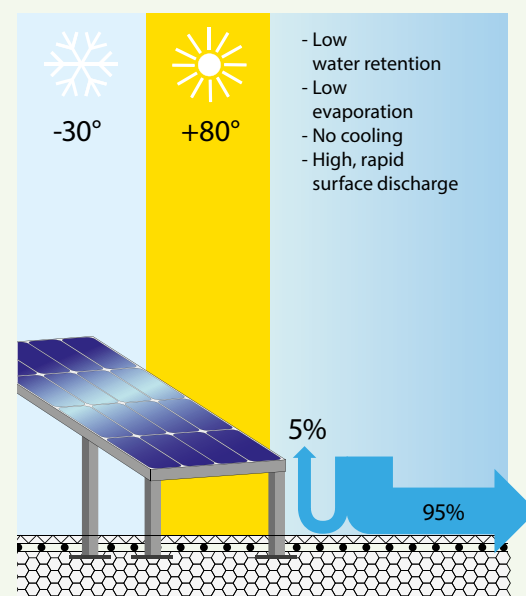
› Fulfilment of environmental requirements

The requirements of nature protection and biodiversity are fulfilled alongside a sustainable construction method.

Combination of photovoltaics with green roof. Solar green roof system secured with a ballasted load.



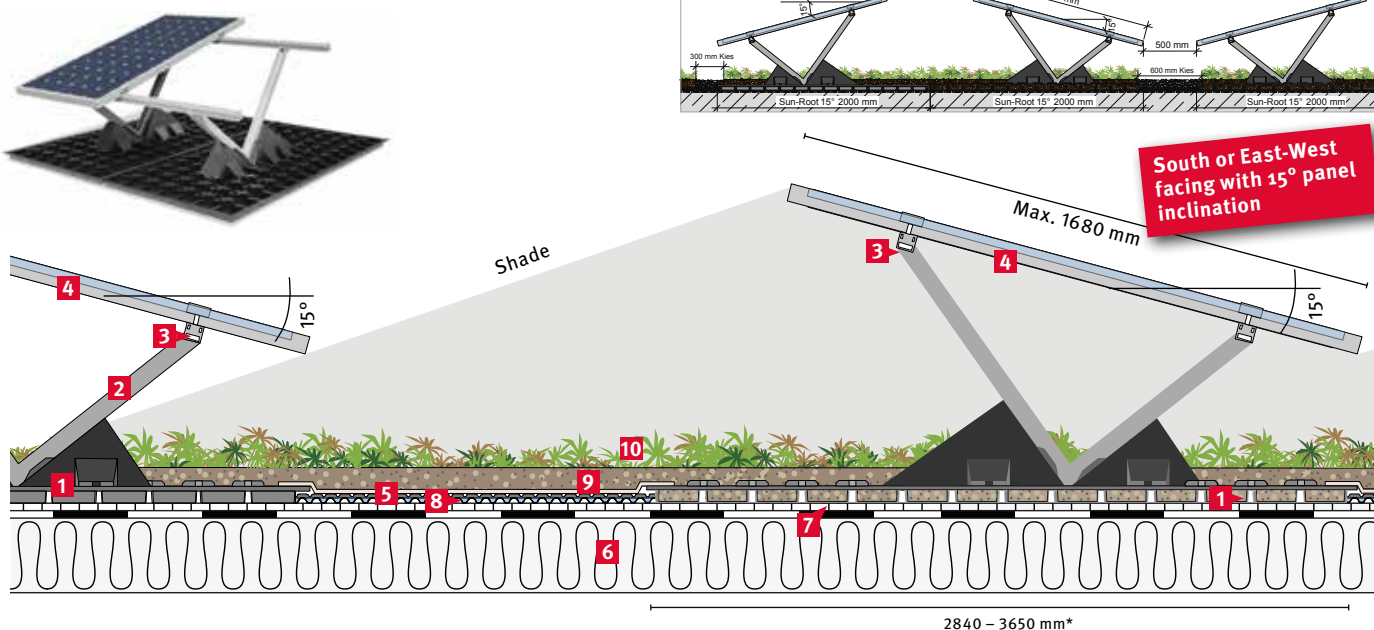
Photovoltaics system anchored into the roof structure, without green roof.



❄ Minimum temperature on the waterproofing
☀ Maximum temperature on the waterproofing

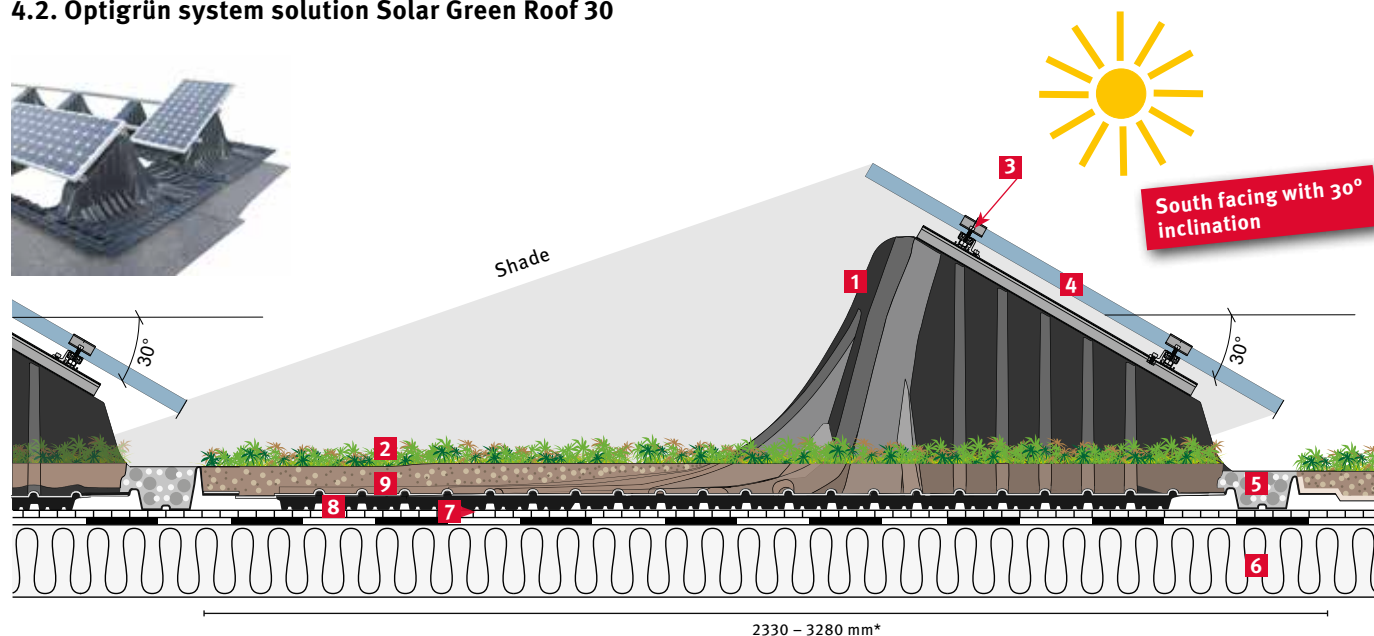
4. Solar Green Roof with ballasted system build-up

4.1. Optigrün system solution Solar Green Roof 15



- | | | |
|----------------------------------|--|---|
| 1 Optigrün Solarbase 15 | 5 Economy Roof Solution 1 | 7 Optigrün Protection and Storage Fleece RMS 500 |
| 2 Support angle | 6 Suitable substructure, Waterproofing (root-proof in accordance with EN 13948) | 8 Optigrün Drainage Board FKD 25 |
| 3 Module support profiles | | 9 Optigrün Extensive Substrate M** |
| 4 Photovoltaics module | | 10 Vegetation |

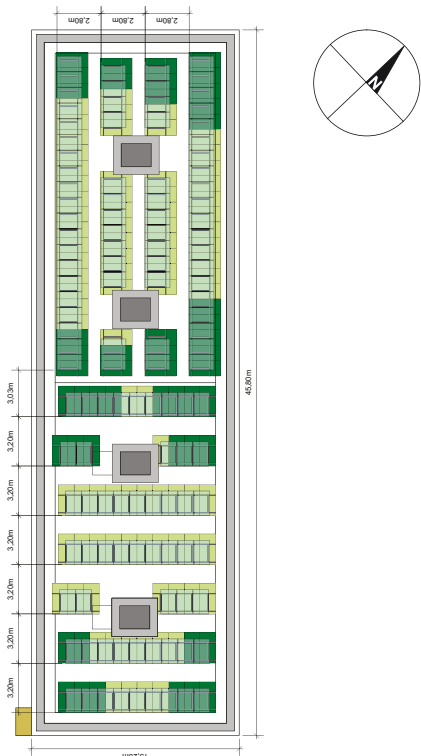
4.2. Optigrün system solution Solar Green Roof 30



- | | |
|-----------------------------------|--|
| 1 Optigrün Solarbase 30 | 6 Suitable substructure, waterproofing (root proof in accordance with EN 13948) |
| 2 Vegetation | 7 Optigrün Protection and Storage Fleece RMS 500 |
| 3 Module support | 8 Optigrün Drainage Board FKD 25 |
| 4 Photovoltaics module | 9 Optigrün Extensive Substrate M** |
| 5 Pebble strips (optional) | |

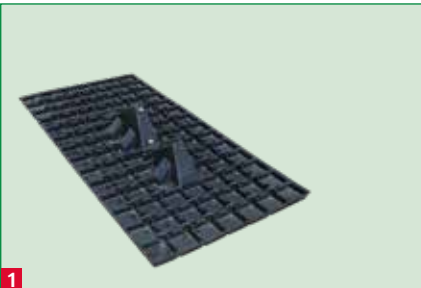
5. Assembly in accordance with installation plan – fast and affordable

Example of an installation plan. Here in the example Solar Green Roof 15

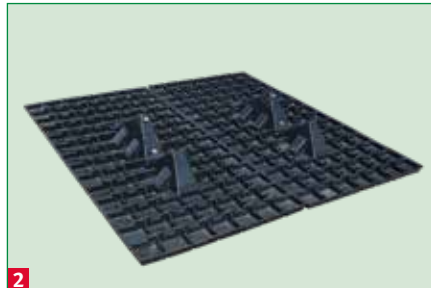


Implemented practical example

Depending on the desired yield, building height, location, wind zone and the planning specification, the technical engineers at Optigrün will be happy to create an installation recommendation and written specification document



1 The Optigrün Solarbase support frame is orientated in accordance with the installation plan from Optigrün international AG.



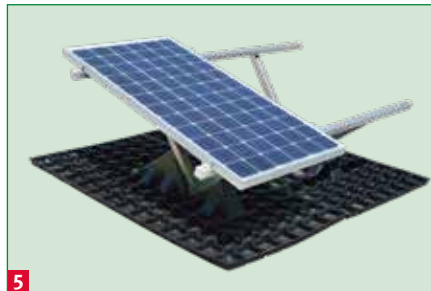
2 The other Solarbase support frames are placed and oriented in accordance with the installation plan.



3 The support angles are screwed into the base plate.



4 The module support rails are placed onto the support angles and connected to each other.



5 The substrate is then fitted as a ballasted load and the modules are fixed in place by the solar installer using clamps.



6 The vegetation is then applied and the subsequent final care undertaken.

6. Multifunctional roof use. Solar Retention green roof

There are many good reasons to combine photovoltaics, green roofs and water storage on the roof with a solution such as the Optigrün Solar Retention green roof. A large rainwater storage reservoir is created here under the Solar Green Roof 15 with the Optigrün Retention Roof Flow Control solution and the water retention box that is part of the system.

- Thanks to the evaporation and cooling process, the green roof improves the performance of the photovoltaic panels and contributes to a more rapid return on the investment for the property.
- Solar green roofs contribute to improving the energy balance for buildings (thermal shielding and thermal insulation, they reduce energy consumption and CO₂ emissions, minimise noise and bind dust and harmful substances.
- The green roof and retention roof save rainfall, minimise drainage peaks and relieve pressure on the local drainage system.
- The more water that is available, the more diverse the vegetation can be.
- The greening also protects the waterproofing so that a service life of at least 20 – 25 years can be achieved without intermediate repair or refurbishment work.

7. Important information for planning and installation

The combination of photovoltaics and green roof requires the collaboration of all trades involved (roofing contractor, green roof/landscaping contractor, solar installer) even at the planning stage. The waterproofing should be suitable for use in this situation and be root resistant in accordance with EN13948. The Optigrün Partner company would normally be responsible for installation of the solar green roof including the photovoltaic supports. The panels would normally be fitted by the solar installer, including all electrical work in accordance with current regulations.

It is important that planting does not shade the photovoltaic panels so. Where required, pebble strips should be installed in front of the panels or the substrate height reduced locally. Depending on the desired yield, building height, location, wind zone and the planning specification, the technical engineers at Optigrün will be happy to create an installation recommendation and written specification document.



OPTIGRÜN®
ROOF GREENING

GERMANY

Optigrün international AG
Am Birkenstock 15 – 19
72505 Krauchenwies-Göggingen
Phone +49 7576 772-0
Fax +49 7576 772-299
E-mail info@optigruen.de

UNITED KINGDOM

Optigrün Limited
Albany Chambers
26 Bridge Road East
Welwyn Garden City (Herts), AL7 1 HL
Phone +44 203 589 9400
Fax +44 207 117 1664
E-mail info@optigreen.co.uk

Follow us on facebook and twitter:



www.optigreen.co.uk/facebook



www.optigreen.co.uk/twitter