Photovoltaic Systems for Facades and Roofs

High Performance and Attractive CIGS Thin-Film Solar Modules for Building Integration
Our Mission

NICE Solar Energy is among the world’s leading suppliers of CIGS solar modules. Our company offers unique levels of expertise in CIGS thin-film module research and facade integration.

We develop high-performance and attractive solar modules based on our innovative CIGS thin-film technology. By doing so, we help to drive the global energy transition. CIGS thin-film technology is based on a razor-thin conductive layer of copper, indium, gallium, and selenium. Experts are convinced of it as the solar technology that currently offers the greatest potential, delivering compelling advantages both over other thin-film technologies and crystalline silicon solar cells.

Where our name comes from
N National Institute of 
I lean and low-carbon 
C Energy

Research, Development, and Production in Germany
Our research, development, and production facility in Schwäbisch Hall, Germany, houses over 160 employees engaged in continuously raising the efficiency levels of our modules, honing the effectiveness of our production processes, and developing new areas of application for our CIGS solar modules. We are continually expanding our location in Schwäbisch Hall.

Over 40 Years of Experience
We can point to over 40 years of experience and research in CIGS technology, longer than any other company in our field. We have a close-knit and long-standing partnership with the Baden-Württemberg Center for Solar Energy and Hydrogen Research (ZSW).

Sustainable Production
One benefit is already in evidence as early as the production stage: the low amounts of material required. While today’s conventional crystalline cells are around 200 μm thick, the CIGS absorber is less than 2 μm thick. This saves material during production and is sustainable and environmentally friendly.
Architectural Highlight – facade integration

CIGS modules are ideally suited for vertical installation, and thus for integration into building facades (building-integrated photovoltaics – BIPV). A facade system of BIPV modules transforms buildings from passive structures into active sources of renewable energy, and enhances their aesthetic appeal.

Maximum Efficiency

CIGS modules offer superior efficiency compared to other thin-film technologies. High-performance modules based on CIGS technology can already match the efficiency of multicrystalline solar modules.

Building Integration Division (BIPV)

The market for building-integrated photovoltaics is growing steadily. This technology offers virtually limitless potential in the construction of new buildings and renovation of existing stock. Our BIPV division is continuously expanding, and we can already point to a long list of photovoltaic facades realized in collaboration with our partners.
Center for Solar Energy and Hydrogen Research Baden-Württemberg (ZSW)
256 m² of PV facade with framed modules
Our photovoltaic facade system with framed modules is a ventilated curtain wall facade that offers a wide array of design possibilities.

The system is optimized for integration into building facades and comprises:

- CIGS modules of NICE Solar Energy with special frame
- Starting profile
- Horizontal profile
- Rubber connecting profile
- Clip profile
- Locking element

Facade supports, vertical profiles, and electrical system technology must be provided by the client. Installation is also performed by the client. The elegant modules in dimensions up to 1206 x 606 mm are in black, with frames, profiles, and locking elements in black anodized aluminum. Custom module sizes and colored or printed modules can be produced on request.
Your benefits

Our photovoltaic facade system with framed modules opens up enormous scope for applications requiring building-integrated photovoltaic systems. It offers attractive benefits:

- Option of simple, rapid turnkey installation on existing facades (e.g. plaster, roughcast or pebbledash, concrete)
- Invisible, concealed module mountings create a sleek, modern appearance
- Elegant, premium facade aesthetic
- Proven construction product
- Multifunctional (power generation, soundproofing, weather protection, cooling effect in summer)
- Horizontal and vertical installation options
- Facade design to client’s specifications
- High energy yield compared to other module technologies
- Sustainable energy generation based on advanced CIGS technology
- Competitively priced standard dimensions (1206 × 606 mm)
- Smaller module dimensions also available
- German manufacturer with warranty conditions under German law
- Photovoltaic energy enhances image of sustainability

Integration of CIGS photovoltaic modules into building facades offers extensive benefits in the construction of new buildings or renovation of existing ones. The solar modules replace conventional facades and protect the facade from weathering in addition to generating electricity. In addition, our photovoltaic facade system with framed modules can be used as an attractive design element.
Simple to install

Ultra-fast installation with minimal scaffolding and installation costs. Modules can be removed individually if required.

1. CIGS photovoltaic module with special frame in black (standard color) (frame in black anodized aluminum)
2. Starting profile (black anodized aluminum)
3. Clip profile (black anodized aluminum)
4. Locking element (black anodized aluminum)
5. Rubber connecting profile (for connecting module)
6. Horizontal profile (black anodized aluminum)

SIMPLE TO MAINTAIN AND REPLACE

Hook tool onto module ➔ Tilt module forward ➔ Remove module ➔ Free access
KIWI Supermarket, Norway
380 m² PV facade area with frameless modules in brilliant and matt finishes
Our facade system with frameless modules is a ventilated curtain wall facade with concealed clasp fasteners. Extensively proven in practice, the patented fastener system is extremely cost-effective and suitable for use with a variety of insulation thicknesses and applications.

The system package optimized for use with NICE solar modules comprises:

- NICE Solar Energy frameless CIGS modules with glued top-hat profile and riveted clasp profile ("backrail")
- Facade profile with matching profile glued to reverse

Facade supports, vertical profiles, fastening elements, and electrical system technology must be provided by the client. Installation is also performed by the client. The stylish black modules are supplied in standard dimensions 600 x 1200 mm. Custom dimensions from 100 x 100 mm to 2400 x 4200 mm are available on request. We can also supply attractive modules in a range of colors and tints.
Your benefits

The frameless facade system of NICE Solar Energy opens up enormous scope for applications requiring building integrated photovoltaic systems. It offers attractive benefits:

- Option of simple, rapid turnkey installation on existing facades (e.g. plaster, concrete)
- Invisible concealed fasteners are the crowning touch of any ventilated curtain wall facade
- Height tolerance compensates for up to 3.5 mm
- Large spans possible with supporting profiles
- Elegant, premium facade aesthetic
- Proven construction product
- Horizontal and vertical installation options
- Facade design to client’s specifications

- Multifunctional (power generation, soundproofing, weather protection, cooling effect in summer)
- High energy yield compared to other module technologies
- Sustainable energy generation based on advanced CIGS technology
- Standard sizes at attractive prices
- German manufacturer providing warranty conditions under German law
- Solar energy enhances image of sustainability
- Structured statics possible

Integration of CIGS photovoltaic modules into building facades offers extensive benefits in the construction of new buildings or renovation of existing ones. The photovoltaic modules replace conventional facades and protect the facade from weathering in addition to generating electricity.
Simple to install

Ultra-fast installation with minimal scaffolding and installation costs.

1. Black CIGS photovoltaic modules (standard color)
2. Top-hat profile glued to module (black anodized aluminum frame)
3. Clasp fastener profile riveted to top-hat profile (black anodized aluminum)
4. Matching facade profile (black anodized aluminum)

FAST, SIMPLE INSTALLATION

Affix matching facade profile to facade ➔ Fix module to clasp ➔ Done

Unframed module with mounting system

Profile graphic
Single-family house, Schwäbisch Hall, Germany
136 m² PV in-roof system
Our photovoltaic in-roof system solution is a patented installation system in which classic roof tiles on sloping roofs are replaced by integrated “solar tiles.” In addition to their high solar power yield and clean, functional appearance, in-roof panels are easy to install.

The system package optimized for use with NICE photovoltaic modules comprises:

- NICE Solar Energy CIGS modules with special frame
- Mounting brackets in stainless spring steel for the profile and glass areas
- Edge sections for joins with side connection plates (left and right)
- Connection plates for left, right, top and corner plates

Electrical system technology must be provided by the client. Installation is also performed by the client. The stylish black modules are supplied in dimensions 632 x 1200 mm. We can also supply attractive modules in a range of colors and tints on request.
Photovoltaic In-Roof System With Frames

Your benefits

NICE Solar Energy in-roof system opens up an enormous scope of applications requiring building integrated photovoltaic systems. It offers attractive benefits:

- Replaces conventional roof covering with clay tiles
- Watertight roofing, comparable to standard clay tiles
- Attractive solution
- Swift and economical installation method
- All cables are weather-protected
- Replaces tiled roof = adds value
- Maintenance-free
- Snow load up to 2400 N/m²
- Structured statics according to Eurocode 1 possible
- Modules can be removed or changed individually
- Barrier-free module edge: snow slides off sooner than with conventionally framed modules (self-cleaning)
- For roofs with slope of 10° to 70° (lower slope angles possible with appropriate roof support)

Integration of CIGS photovoltaic modules into roofs offers extensive benefits in the construction of new buildings or renovation of existing ones. The modules replace conventional roof tiles and protect the roof from weathering in addition to generating electricity.
Simple Installation

Ultra-fast installation with minimal scaffolding and installation costs. If required, modules can be removed or changed individually.

1. **CIGS modules**
   from NICE Solar Energy with special frame

2. **Mounting brackets**
   in stainless spring steel for the profile and glass areas

3. **Edge sections**
   for joints with side connection plates (left and right)

4. **Connection plates**
   for left, right, top

5. **Corner plate**

6. **Rubber seal**

**FAST AND EASY TO INSTALL**
Simple installation on metal brackets

**OPTIMUM WEATHER PROTECTION**
Optimum weather protection – the framed in-roof solar modules interlock and overlap

Diagram – Overlapping modules
Diagram – Interlocking modules
Materials and Colors

Choice of glass panel finish
Matt or brilliant finish

Unlimited color options
Standard colors white, blue, red, green, yellow, orange, red brown and ocher brown with different tints on request.
Dimensions and Scalability

NICE frameless photovoltaic modules are available in virtually any size required.

We produce variable formats by cutting elements to size or combining multiple elements. This enables us to supply infinitely scalable sizes from 100 x 100 mm to 2400 x 4200 mm.

Infinitely scalable

Standard module 600 x 1200 mm
Dimensions and Scalability

STANDARD MODULES

- Standard modules with one junction box
- Available as framed or frameless
- Module size (frameless) 600 x 1200 mm

MODULES IN ADAPTED FORMATS

e.g. 4x element

- Variable formats available by cutting elements to size or combining multiple elements.
  Max. dimensions 2400 x 4200 mm
### Technical Data

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>TEMPERATURE COEFFICIENT</th>
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<tbody>
<tr>
<td>Model</td>
<td>N-G1025E105</td>
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<tr>
<td>Cell type</td>
<td>CIGS</td>
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<tr>
<td>Usage</td>
<td>Outside</td>
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<td></td>
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<tr>
<td>VALUES CORRESPOND TO 1000W/M², AM 1.5 AND 25°C (STC)</td>
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<tr>
<td>Rated power [W]</td>
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<tr>
<td>Rated voltage [V]</td>
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<tr>
<td>Rated current [A]</td>
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<tr>
<td>Open circuit voltage [V]</td>
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<tr>
<td>Short circuit current [A]</td>
<td>I_{SC} 1.41</td>
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<tr>
<td>Open circuit voltage at -10°C [V]</td>
<td>U_L -10°C 112.00</td>
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<tr>
<th>SYSTEM DESIGN CHARACTERISTICS</th>
<th>MECHANICAL CHARACTERISTICS</th>
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<tbody>
<tr>
<td>Maximum system voltage [V]</td>
<td>1000</td>
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<tr>
<td>Reverse current load [A]</td>
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<td>Power tolerance [W]</td>
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<td>Module operating temperature [°C]</td>
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<tr>
<td>Maximum surface load [N/m²]</td>
<td>2400</td>
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### NOCT (NOMINAL OPERATING CELL TEMPERATURE)

- Temperature coefficient open circuit voltage [%/°C] -0.29
- Temperature coefficient rated power [%/°C] -0.36
- Temperature coefficient rated current [%/°C] 0.05

### TEMPERATURE COEFFICIENT

- Temperature coefficient open circuit voltage [%/°C] -0.29
- Temperature coefficient rated power [%/°C] -0.36
- Temperature coefficient rated current [%/°C] 0.05

### MECHANICAL CHARACTERISTICS

- Length [mm] 1200
- Width [mm] 600
- Module height (with junction box, cable etc.) [mm] 26
- Bond height [mm] 7
- Cover glass height [mm] 3.2
- Weight [kg] 12

### MODULE ASSEMBLY

- Cover glass: Heat-strengthened anti-reflecting coated glass
- Framing: without
- Electrical connector: HC4
- Junction box: Hirschmann

*Sample module data sheet. Product-specific parameters depend on module design and module system.*