ARCHITECTURE AWARD BUILDING-INTEGRATED SOLAR TECHNOLOGY 2022

Solarenergieförderverein Bayern e. V.
Bavarian Association for the Promotion of Solar Energy

Solarenergieförderverein Bayern e. V.

Office
Friedrich-List-Str. 88
81377 München
GERMANY

T 0 89 / 27 81 34 - 28
F 0 89 / 27 81 34 - 30

info@sev-bayern.de
www.sev-bayern.de

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DETAIL

SWISSOLAR
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Association suisse des professionnels de l'énergie solaire
Associazione svizzera dei professionisti dell'energia solare
Swiss Solar Energy Professionals Association

Architecture Award Building-Integrated Solar Technology[2022]

Competition results

About the Competition
The international competition was held for the 9th time in 2022.

Due to the intensifying climate crisis and far-reaching geopolitical events, the expansion of renewable energies has gained further traction worldwide in 2022, which is also reflected in numerous legislative decisions, for example at the European level, but also in many countries. In Germany, for example, several federal states have introduced a mandatory requirement to install solar power systems and there are also efforts to give climate protection priority over historic preservation concerns in order to accelerate the expansion of PV systems. This gives the submissions to the **Architecture Award Building-Integrated Solar Technology[2022]**, and especially its award-winning projects, additional significance.

This year's competition attracted 121 entries, 12 of which came from universities. Since the first competition in 2000, a total of 783 entries have been submitted to the nine competitions. This is an extremely pleasing result given the prize's aim of not only encouraging outstanding contributions to planning and designing building-integrated solar power systems, but also highlighting exemplary solutions in sophisticated architecture.

With the 2008 competition, solar thermal systems were included in addition to photovoltaics (PV). In the current submissions, however, it can be seen that solar thermal energy hardly plays a role in these projects any more. Whilst the proportion of schemes with PV systems has risen continuously from 57.9 per cent (2008) to 92.7 per cent (2022), projects combining both types of systems have reduced by three quarters to 6.4 per cent, and in the current competition only one project with a pure roof collector system was represented.

Participants from 46 countries have taken part since the competition was expanded to include not only German but also international entries. With one submission each from Monaco, Uganda and the United Arab

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Emirates, three more countries joined in 2022. Projects from German-speaking countries nevertheless dominate the current competition, accounting for two-thirds of the total. 34.7 per cent of the schemes come from Germany, 25.6 per cent from Switzerland and 6.6 per cent from Austria. The remaining third come from the other 16 countries, with 13 submissions from the Netherlands alone, which is a considerable proportion compared with the previous competitions and reflects the greatly expanded activities in this field of work in those countries. With 5 projects each from Belgium and Sweden, 3 submissions from France and 2 projects each from Italy and Norway, it is largely other countries from northern and western Europe that round off the field of participants.

The **Architecture Award Building-Integrated Solar Technology** has also always been successful in attracting architectural firms to participate in the competition. With almost 58 per cent, they form the largest group of entrants. Those entering include numerous renowned architectural practices, which confirms the quality and relevance of the competition. Twenty-eight per cent of the projects were submitted by the solar industry and 11 per cent by universities.

The distribution of the entries in terms of typology shows that almost 40 per cent are residential schemes, 56 per cent are apartment buildings and 44 per cent are single-family homes. The other projects can be divided between administrative/office buildings (17.4 per cent), special buildings (hotels, cultural and sports buildings, churches, etc. – 15.6 per cent), educational buildings (11.9 per cent), industrial/commercial buildings (9.2 per cent) and some infrastructure projects (6.4 per cent). The schemes therefore provide solutions covering different contexts, urban and rural environments, as well as a wide range of building types.

A key challenge for achieving the climate goals is the energy-efficient modernisation or refurbishment of the existing building stock. Here, 20 per cent of the projects submitted involve the retrofitting of old buildings, an increase of one third compared with 2020. It is noticeable that this proportion now makes up around one third of the submissions for apartment buildings. The entries show a wide variety of solutions that now need to be incorporated into building practice on a much larger scale.

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In terms of the types of installations, just under half of all the schemes that have been entered for the **Architecture Award Building-Integrated Solar Technology**[2022] use purely roof-based systems. A further 37 per cent are also combined with systems integrated in the façade. Only 13 per cent have exclusively photovoltaic façades, often in administrative/office buildings.

More than 60 per cent of the roof systems are on flat-pitched and steep roofs, with almost 84 per cent using in-roof solutions – across entire or partial areas. The roof systems feature a wide range of different module sizes, ranging from large- and medium-size PV modules to small-scale solar shingles and tiles. In this context, some projects show a range of colour tones that expands the customisation options for solar power systems on existing roofs. Just over 10 per cent use photovoltaics in canopies, ranging from carports to PV roof gardens. A good 28 per cent of the systems on flat roofs have mostly been realised in combination with solar façades.

This distribution is somewhat different with residential buildings. While roof systems dominate in almost three quarters of the projects for single-family homes, the rest are combinations that reach almost 60 per cent in the case of apartment buildings. Especially with this building type, the Swiss projects (more than 40 per cent) show the ambition of developers and architects with a broad spectrum of solutions. Pure façade solutions are found exclusively in the non-residential schemes. In terms of the type of construction generally used, almost 90 per cent of them are realised with rainscreen cladding.

About the evaluation

Under the chairmanship of Professor Lydia Haack, the jury began by reviewing the entries for the **Architecture Award Building-Integrated Solar Technology**[2022]. The aim was to identify projects for different building types, each with a representative use of solar technology and an exemplary energy concept among the field of participants. After a detailed discussion in the first round, 59 projects remained in the competition. Following a detailed and critical discussion of the remaining projects with regard to the evaluation criteria, they narrowed down the entries in two further rounds until a "shortlist" was achieved in the 4th round, which still included 22 projects.

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In a competition that showed an overall high level of quality with numerous exemplary solutions reflecting the standards that building-integrated solar technology projects nowadays achieve, including in everyday architecture, the "shortlist" represented an outstanding field of participants.

In thorough discussions that evaluated and weighed the various approaches taken, especially with regard to architectural aspects and the degree of innovation, the projects for the respective award categories were then determined. The jury is unanimous in its positive assessment that even with very different building tasks, and in different environments, these projects show that photovoltaic modules and solar thermal collectors can be successfully integrated at a qualitatively high level with equal ambition in terms of design and technology. The good news: It can be done!

The following ranking was determined for the remaining 11 schemes. The winner and the awards were chosen unanimously.

The entries for the student prize were then reviewed and evaluated. Twelve universities participated. Of these, nine teams took part with their prototype experimental buildings in the Solar Decathlon Europe 2021/2022; six colleges and universities from Germany and one each from Bangkok, Eindhoven and Gothenburg. The jury was also delighted with the quality of the entries in this competition, which included 11 design-build projects and one bachelor thesis. A "shortlist" of four schemes was determined following a detailed discussion.

In appreciation of the overall concept and the innovative design of the photovoltaics, the prize for student work was awarded unanimously. Three schemes on the "shortlist" were awarded honorary mentions (non-monetary prizes).

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Photos: Megasol

Architecture Award Building-Integrated Solar Technology[2022]
(15,000 euros)

Project:	**Amt für Umwelt und Energie, Basel**
Architect:	jessenvollenweider architektur, Basel
Entrant:	**Megasol Energie AG, Deitingen**

The new building for the Amt für Umwelt und Energie (Office for Environment and Energy) in Basel was completed in 2021 not far from the market square with its historic town hall. Right from the beginning, the client's goal was to realise a "flagship project for sustainable construction" and a multiplier for other building schemes.

The slender and rectangular eight-storey building fits snugly between existing neighbouring buildings as a freestanding structure that responds in height to the surrounding context. The two upper storeys are set back to prevent overshadowing.

The energy concept for the building, which is constructed using a hybrid timber-concrete frame structure, is based on providing district heating and natural night-time cooling with thermal component activation as well as mechanical hygiene ventilation with closed-cavity windows. Combined with the photovoltaics integrated in the façade and the utilisation of grey water, this has enabled the building to meet the requirements of the MINERGIE-A-ECO label.

The façade is characterised by a clearly defined grid with large-format window openings and narrow vertical ventilation sashes, which are also designed as corner windows in the southwest. More than two thirds of the opaque surfaces are designed as PV façades.

The façade concept ultimately realised underwent multiple design iterations. An approach using visible "amber-coloured" polycrystalline photovoltaic cells was initially pursued. Not yet satisfied with the result as an "urban solar dress", the architectural practice further developed the concept by using 3D fused glass as the front panel. After experimenting with different textures, they decided on a structure with a square grid and circular depressions in the surface. In order to accentuate the slightly translucent effect, especially when viewed from a distance, a PVB film with metallic reflected dots was additionally inserted between the fused glass and the PV cells. These dots are arranged in the surface in three different degrees of density, graded between 5, 7.2 and 9 per cent, which rise from the first floor, initially each time over two storeys, to the seventh floor.

Photo: Megasol

The result fascinates with its innovative reinterpretation of a glass/photovoltaic façade, in which historical architectural references are also recognisable. The chosen texture with its "deliberate unevenness" is reminiscent of Pierre Chareau's façade with glass blocks at the Maison de Verre (1931) in Paris.

PV modules with an output of 167 kW are installed across a 1,141 m^2 area using concealed fixings. This enables the building's annual electricity requirement (approx. 45,000 kWh) to be covered, with surplus electricity fed into the grid.

In teamwork with specialist designers and manufacturers, the architects have succeeded in creating an extraordinary solution with this façade. In conjunction with a coherent building concept, their aesthetic and technical ambition has enabled the photovoltaics to present a completely new expression of solar technology – especially in close-up view – that also succeeds in integrating the building into the urban context.

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Photos: Nextensa

Award
Architecture Award Building-Integrated Solar Technology[2022]
(2,000 euros)

Project:	**Gare Maritime, Brussels**
Architect:	Neutelings Riedijk Architects, Rotterdam
Entrant:	**Nextensa, Brussels**

The Gare Maritime, an imposing building with three larger and four smaller halls that was once Europe's largest freight station following its completion in 1908, has been transformed into a multi-purpose complex. A marketplace with eating areas has been created in the central part, while the outer areas house uses such as offices, retail and commerce.

Following its refurbishment and conversion, this valuable structural testimony to the industrial revolution in Belgium has also been extended to create a solar power plant. PV modules are arranged across almost the entire surface of the southeast- and northwest-facing gable roofs that cover the three large, elongated halls. A slightly matt surface prevents stronger reflections. In agreement with the local authorities, it was decided not to cover the roofs of the outer, lower halls with PV modules, as these would have been visible from the surrounding urban realm. 3.3 MW was still able to be installed across a 16,464 m^2 area.
In addition, semi-transparent modules were installed in the glazed gable façades in the southwest. 204 modules with generously spaced cells were used, which, in addition to the installed PV power of 38.8 kW across 331 m^2, also provide solar shading and daylight utilisation, as well as enabling an effective indoor-outdoor relationship. A rare example of how modern solar technology can be used with confidence even in a historic façade.

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Photos: Nadia Vontobel Architekten

Award
Architecture Award Building-Integrated Solar Technology[2022]
(2,000 euros)

Project: **Winter energy-plus house Sol'CH, Poschiavo**
Entrant: **Nadia Vontobel Architekten, Zürich**

The new building's two-storey structure, which replaces an existing building, is based on a longitudinal, narrow floor plan that slightly slants inwards towards the east. The steeply pitched gable roof is asymmetrical in shape with a significantly larger surface area facing south. For the building, which is also designed as an energy-plus house in winter, the north sides of the façade and roof are also designed as solar-active surfaces. The energy concept includes an air-to-water heat pump, a 3,000-litre storage tank and electric mobility with bi-directional charging.
The importance of the façade as a surface for providing energy is also shown by the installed PV output of 65.6 kW, which is distributed over 284 m^2 in the façade and 187 m^2 in the roof. The PV system, which consists of 435 modules in 45 different sizes, generated a total of 44,972 kWh in the first year.
The careful and precise detailing on the roof and opening edges is also reflected in the joints for the façade and roof modules. Starting with the standard modules in the roof, a coherent grid was developed in which the openings and building incisions are precisely coordinated. Highly efficient PV modules with an anti-reflective coating are used on the roof, while satinised and coloured front glasses in the PV façade "with their anthracite and brown tones" round off the harmonious overall impression.
A residential building in a village setting that provides both a compelling architectural response and coherent energy concept, and which is exemplary for the suburban area in terms of the building's structure design and handling of the solar envelope.

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Award
Architecture Award Building-Integrated Solar Technology[2022]
(2,000 euros)

Photos: Lund+Slaatto arkitekter

Project: **Portalen, Drammen**
Entrant: **Lund+Slaatto arkitekter, Oslo**

The Portalen office building in Drammen, Norway, has been designed as a new office extension whose upper storeys span across an existing building and smaller pavilion, thus impressively reformulating the entrance situation. The seven-storey building's façade is defined by narrow and vertically oriented opaque elements that protrude clearly from the plane of the façade. The precisely articulated concept is complemented by floor-to-ceiling glazing and narrow spandrel panels concealing the ceiling structure. Recessing the uppermost storey to form an open space gives the structure a certain lightness despite its mass, which is provided with an additional rhythm by the alternately offset façade panelling. In these elements, the cladding with integrated PV modules is designed as a rainscreen structure with concealed joints. 434 modules (in 29 different formats) covering 305 m^2 and with an installed capacity of 87.65 kW are installed in the façade. In addition, a standard 338 m^2 rooftop system generates a predicted yield of around 100,000 kWh.

The façade surfaces are kept in a reddish colour palette in various gradations. This is continued in the treatment of the front glass for the crystalline PV modules, which excellently complements the metallic and glass surfaces of the building through various reflections. A fine texture also appears on the surface when lit by the sun. The result impresses through the integration of the photovoltaics as part of an elegant façade concept.

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Award
Architecture Award Building-Integrated Solar Technology[2022]
(2,000 euros)

Project: **Coop headquarters, Basel**
Entrant: **Burckhardt+Partner, Basel**

With a lot of the existing building stock in need of energy efficient refurbishment, especially office buildings from the 1960s and 70s are suitable for the integration of solar technology due to their often clear construction and gridded façades. This was implemented in exemplary fashion in the renovation of this high-rise building (1978, Gass+Boos Architekten).

The 14-storey building is characterised by an elegant façade that is slightly slanted to the edges, large-scale glazing and narrow parapet strips, chamfered corners with a 45-degree window axis, and the external supporting structure made of reinforced concrete. As part of the renovation, the metal parapet panels were replaced with PV modules. Monocrystalline modules are used on all sides, whose front glass is coloured "slightly black" by an internal ceramic print. This creates slight matting on the surface, where the cells are hardly noticeable, and to a very homogeneous overall impression. 158 kW were installed across a 1,628 m² area and will generate a predicted energy yield of 70,000 kWh/a.

Photos: Mark Niedermann

The renovated façade impresses with its precise detailing; offsetting the PV strips from the slightly protruding glazing creates a nuanced rhythm and offers a compelling technical and design solution.

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Photos: Emmanuel Museruka

Award
Architecture Award Building-Integrated Solar Technology[2022]
(2,000 euros)

Project:	**Children's Surgical Hospital, Entebbe**
Architects:	Renzo Piano Building Workshop, Genoa, with
Entrant:	**studio TAMassociati, Venice**

The medical centre, built for the Emergency non-government organisation that provides free surgical treatment for children from all over Africa, is slightly oriented to the southwest and consists of two parallel, elongated buildings that are connected by a square building to the east. The single-storey buildings, which vary in depth, have monolithic walls constructed using rammed earth techniques. To prevent heat gain, a gently sloping butterfly roof with wide overhangs is suspended a clear distance above the building structure. The elegant steel structure functions as a multifunctional roof for providing both weather protection and energy generation. Arranged across a 3,301 m^2 area, 2,352 thin-film modules with an installed PV capacity of 276.36 kW generated about 245,000 kWh of electricity during the first 12 months.

The Children's Surgical Hospital in Entebbe provides an excellent example of climate-friendly construction, utilising local materials in combination with renewable energy sources. The roof is designed as a fifth façade. Matched to the structural grid, well-proportioned PV surfaces are arranged with a clear structure. The conceptual approach utilising a "simple" construction method combined with an extremely sensible solution for large-scale energy roofs not only provides an exemplary solution for the African continent, but can also be transferred as a model to other climate regions and construction tasks.

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Photo: Frank Hanswijk

Photo: Ossip Duivenbode

Photo: Wienerberger

Honorary mention
Architecture Award Building-Integrated Solar Technology[2022]
(non-monetary prize)

Project:	**PTT Binnenrotte, Rotterdam**
Entrant:	**Orange Architects, Rotterdam**

The former administration building for the Dutch telecommunications company PTT, which dates from 1951, consists of a mighty four-storey concrete-framed building with a brickwork façade. Orange Architects revitalised the building by converting it into studio apartments with a restaurant on the ground floor.

An almost full-surface PV system with an expected energy yield of 56,000 kWh was integrated into the southern gable roof. The rather small-format modules with a homogeneous appearance in a dark matt colour are used as roof cladding. To adapt to structural irregularities, the glass shingles were specially cut to size at the lateral roof edges. The eaves-side incisions are precise and colour-coordinated with the joint grid.

The result shows how photovoltaics as a modern energy technology can, when well-designed, also provide a compelling solution for conversions and extensions in the urban realm. The anthracite-coloured modules provide a restrained accent that harmonises with and complements the exposed brickwork.

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Photo: iart

Photo: Laurits Jensen

Photo: iart

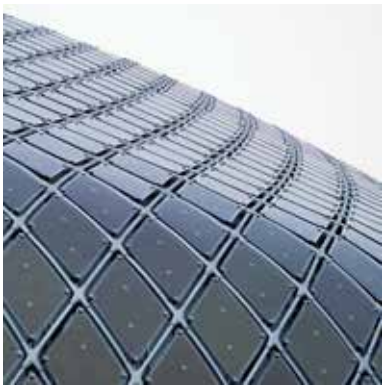

Photo: iart

Photo: iart

Honorary mention
Architecture Award Building-Integrated Solar Technology[2022]
(non-monetary prize)

Project:	**Novartis Pavillon, Basel**
Architects:	AMDL CIRCLE and Michele De Lucchi, Milan
Entrant:	**ASCA, Nantes**

AMDL CIRCLE and Michele De Lucchi chose an innovative approach for the Novartis Pavillon in Basel. The exhibition, meeting and event centre on the Novartis Campus has been designed with a circular floor plan and symmetrically bevelled roof. Above the glazed ground floor zone as far as the roof's apex, the façade and roof surface is wrapped in a net-like structure in which semi-transparent, diamond-shaped polycarbonate panels with organic photovoltaics (OPV) are held in place with point fixings.

A zero-energy media façade was realised in collaboration with iart – Studio for Media Architectures. 10,680 modules in 10 different sizes are mounted across a 1,333 m² area; the installed PV power is 36 kW. All modules, which are each attached via four brackets to a lightweight steel substructure, are equipped with four LEDs, two facing outwards and two facing inwards onto the building's metallic shell. The surface therefore functions both during the day and night as a multi-layered media screen that draws its energy from the OPV.

A rather delicately detailed concept whose underlying technology promises greater freedom in terms of the conceptual design and colour scheme.

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Photos: furoris A art

Honorary mention
Architecture Award Building-Integrated Solar Technology[2022]
(non-monetary prize)

Project:	**Terra.Hub, Ursprung**
Entrant:	**furoris X art Architekten, Chemnitz**

The new community and cultural centre on the outskirts of the village of Ursprung in Saxony is designed as a single-storey shed clad with vertical wooden slats. The southern side of the gable roof, which has wide fascias along the verges and eaves, slants downwards at a strikingly oblique angle.

Here 39 standard modules are mounted in three rows on a trapezoidal sheet metal covering; the additions to the roof edge are made with 21 custom-made PV modules. The installed PV power of 12.87 kW is used to operate a hydrogen plant; battery storage and electromobility complement the ambitious energy concept.

Terra.Hub is conceived as both a "culture barn" and energy centre. The roof surface, which is fully covered with PV modules, has no penetrations and thus provides a striking solar installation, exemplary for rural areas and a natural part of regional building culture.

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Photo: Daniel Baggenstos Fotografie

Photo: Alexander Gempeler Architekturfotografie

Photo: Daniel Baggenstos Fotografie

Honorary mention
Architecture Award Building-Integrated Solar Technology[2022]
(non-monetary prize)

Project: **Manuel elementary school, Bern**
Entrant: **dadarchitekten, Bern**

Manuel elementary school, which consists of a campus-style complex of pavilions and buildings built between 1945 and 1960, is listed as worthy of protection in the City of Bern's building inventory. As part of its overall renovation and extension by dadarchitekten, the roof surfaces of the four existing and two new buildings were almost entirely designed as energy roofs.

Covering an area of more than 1,300 m^2, 3,148 modules generating 610 kW of PV power have been installed on the new roofs, which are partly oriented to the southeast/northwest or southwest/northeast. With a total energy yield of approx. 580,000 kWh/a, this enables two and a half times the school campus's own electricity requirement to be produced.

Penetrations were largely avoided. The edges of the verge, ridge and eaves were made of sheet metal matching the same colour as the anthracite-coloured modules, and the skylights were precisely fitted into the module grid. Despite the different roof pitches and building depths, this has enabled the photovoltaics to become the connecting element harmonising the building ensemble. The result shows in an exemplary manner that careful design work can also meet listed building requirements with assuredness.

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Photos: GWG Tübingen

Honorary mention
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(non-monetary prize)

Project:	**Renovation + extension to residence building, Tübingen**
Entrants:	**GWG Tübingen/Stadtwerke Tübingen/Orth Architektur, Tübingen**

The renovation and extension of an apartment block from the 1920s in Tübingen represents a successful transformation of existing tiled roofs into (partial) energy roofs.

With this building, which provides a "distinctive feature in the urban landscape", Orth Architektur used straight solar roof tiles with a red surface, which they installed in the area free of shading above the dormers on the south side of the new roof structures.

8.32 kW of PV power have been installed across an 80 m^2 area. The small-format PV modules (437 × 257 mm) are hardly distinguishable from the conventional roof tiles, and thus enable a harmonious overall appearance. An approach that coherently expands the possibilities for integrating solar power systems into historical roof landscapes, especially in the case of listed buildings and residential complexes.

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Student Award
Architecture Award Building-Integrated Solar Technology[2022]
(2,000 EUR)

Project: **Team coLLab, Solar Decathlon Europe 2021/2022**
Entrant: **Hochschule für Technik Stuttgart**

At Solar Decathlon Europe 2021/2022, the student teams were given the challenge of developing concepts for adding additional storeys to existing buildings in various urban districts and with realising a functional section as a one- or two-storey Housing Demonstration Unit (HDU).

The coLLab team from Stuttgart University of Applied Sciences chose a concept with an open-air area spanning several storeys, which they developed for a location on their own campus in Stuttgart. As a space-creating and design-defining element for both generating energy and solar shading, the students chose diamond-shaped OPV modules that are arranged in a filigree cable net on three sides of the building and above the "loggia". While the Novartis Pavilion in Basel uses modules with largely identical dimensions, the dimensions of the flat modules in the coLLab building are determined parametrically and, depending on the building's aspect and the expanse of the openings, are also used in different sizes and densities to achieve a good overall performance.

This produces a varied OPV cladding that, in both daylight and artificial light, creates an effective, multi-layered façade concept in combination with the timber structure and the climbing plants.

Photos: Nicolai Rapp

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Photo: Stefan Huth

Photo: Frank Hülsmeier

Photo: Timo Schmidt

Student Award – Honorary mention Architecture Award Building-Integrated Solar Technology[2022]

(non-monetary prize)

Project: **SOLAR.shell-Transfer, Bad Rappenau**
Entrant: **Hochschule für Technik, Wirtschaft und Kultur Leipzig**

The concept behind the SOLAR.shell façade, which Leipzig University of Applied Sciences has been developing since 2016, is aimed at achieving a three-dimensional PV façade that can be tailored to the respective location using a parametric design process. In addition, the yield per square metre of PV area can be increased by "up to 55 per cent" compared with vertically arranged modules. The carrier material consists of folded metal tiles made of aluminium composite panels.

In the façade that has now been realised in Bad Rappenau, the small-scale, landscape-format PV modules are used in different ways. In the southern façade, these modules (212 × 1380 mm) are installed in a series of tilted narrow strips, interrupted by the window openings. In the west, the loggia is framed by an area with modules (212 × 820 mm) that are both inclined at an angle and obliquely positioned.

A novel approach with rather small-format glass-film modules, which enables a variety of rainscreen cladding designs thanks to the homogeneous surfaces.

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Photo: SDE 21-22

Photo: Zooey Braun

Photo: SDE 21-22

Photo: KIT

Student Award – Honorary mention Architecture Award Building-Integrated Solar Technology[2022] (non-monetary prize)

Project: **Team RoofKIT, Solar Decathlon Europe 2021/2022**
Entrant: **Karlsruhe Institute of Technology (KIT)**

The RoofKIT team from the Karlsruhe Institute of Technology planned a rooftop extension to Café Ada in the Mirker district in Wuppertal. The PV system is arranged here on a gently sloping sawtooth roof surface in three equal-sized arrays, each with six portrait-format standard modules. In addition these will also be expanded to form "photovoltaic-thermal hybrid modules", in which a heat exchanger will be installed on the back. Mounted flush with the roof edges above the water-carrying layer, the reddish-brown glass surface blends in with the colour of the copper roof.

As part of an ambitious overall concept that also addresses aspects such as recycling-oriented design, the handling of the PV roof also shows the coherent integration of standard modules in an urban context.

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Photos: HS Düsseldorf

Student Award – Honorary mention Architecture Award Building-Integrated Solar Technology[2022]

(non-monetary prize)

Project:	**Team MIMO, Solar Decathlon Europe 2021/2022**
Entrant:	**Hochschule Düsseldorf**

The MIMO (Minimal Impact – Maximum Output) team from Düsseldorf University of Applied Sciences also designed a rooftop extension to Café Ada in Wuppertal, which is located near the Solar Decathlon competition site. The photovoltaics are used as part of the adaptive climate envelope, which forms a thermal buffer space. A unique feature is that the PV system is installed solely in the glazed surfaces, both in the skylight strips in the roof and in the horizontal louvres used in the façade.

The arrangement of the monocrystalline cells varies with different cell densities. Although based on changing the joint size and omitting individual cells, the module design is "parametrically" tuned for energy yield, daylight utilisation and solar shading.

The photovoltaics in the "intelligent façade" can also be perceived in the interior and complement the atmospheric ambience with timber, cork and brick surfaces.

ARCHITECTURE AWARD BUILDING-INTEGRATED SOLAR TECHNOLOGY 2022

Solarenergieförderverein Bayern e. V.
Bavarian Association for the Promotion of Solar Energy

Shortlist

Photo: Daniel Baggenstos Fotografie

Schutz und Rettung, Zürich
Entrant:
3S Swiss Solar Solutions AG, Gwatt

Photo: David Matthiessen

Freie Waldorfschule, Stuttgart
Entrant:
Behnisch Architekten, Stuttgart
SunStyle, Bolligen

Photo: Juri Junkov

Photovoltaic-Carport, Rheinfelden
Entrant:
Energiedienst, Rheinfelden

Photo: Charles Bouchaib

Le Hangar Habité, Chantepie
Entrant:
Haddock Architecture, Paris

Photo: Thomas Telley, St. Antoni

Railway station BLS, Reichenbach
Entrant:
Kocher Minder Architekten, Steffisburg

Mahali Hub, Cape Town
Entrant:
Team Mahali Design Collective, Cape Town

Photo: Zuerrer

Tiny Houses, Schwyz
Entrant:
Marty Architektur, Schwyz

Elementary school, Bad Radkersburg
Entrant:
Stadtgemeinde Bad Radkersburg
Piber Architektur, Bad Radkersburg

Abattoirs d'Anderlecht, Brussels
Entrant:
Skysun, Brussels

Solar roof tiles

Entrant:
SolteQ Europe, Oberlangen

TERRA – the sustainability pavilion Expo Dubai 2020
Entrant:
SUNOVATION Produktion, Elsenfeld

Photo: Anders Fredriksen

House of Choice, Solna
Entrant:
White Arkitekter, Stockholm

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Jury session
Date: 14.10.2022
Location: Maritim Hotel München
Start: 10.00 Uhr
End: 17.00 Uhr

Jury (in alphabetical oder):

- Prof. Dr.-Ing. **Gerd Becker**
  (Member of the board, SeV)
- Prof. AA Dipl. **Lydia Haack**, architect and urban planner BDA
  (President, Bavarian Chamber of Architects)
  Head of the jury
- Prof. Dr.-Ing. Gerhard **Hausladen**
  (Ingenieurbüro Hausladen)
- Prof. Dr.-Ing., Architekt BDA **Roland Krippner**
  (Technische Hochschule Nürnberg)
  Secretary of the meeting
- Dr.-Ing. **Bruno Schiebelsberger**
  (Head of the booard, SeV)
- Dipl.-Ing. **Jakob Schoof**
  (Deputy Editor-in-Chief, DETAIL)
- Julian **Weyer,** Partner, Arkitekt maa,
  C.F. Møller Architects
- Prof. Sophie **Wolfrum**
  (Janson + Wolfrum Architektur + Stadt)

Organization
Fabian **Flade** M. A.
(Solarenergieförderverein Bayern e. V.)

ARCHITECTURE AWARD BUILDING-INTEGRATED SOLAR TECHNOLOGY 2022

Solarenergieförderverein Bayern e. V.
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Submitted projects (in order od the location)

- Aalen (DE), Schubart-Gymnasium
  Liebel/Architekten BDA, Aalen
- Allschwil (CH), MFH Heuwinkel
  Graphis Bau- + Wohngenossenschaft, Bern
- Amsterdam (NL), Diamond Exchange, Capital C
  ZJA, Amsterdam in collaboration with
  HEYLIGERS architects
- Amsterdam (NL), Nautic Coordination Center
  wrk architecten, Amsterdam
- Amsterdam (NL), Rhythm House
  Julius Taminiau Architects, Amsterdam
- Amsterdam (NL), Student Experience Minervahaven
  VURB Architects, Amsterdam
- Aschersleben (DE), Nearly energy self-sufficient MFH
  Aschersleben Gebäude- und Wohnungsgesellschaft
- Bad Kreuznach (DE), Mobil- und Infopunkt
  slb_architekten und ingenieure
  StadtLandBahn Hachenberg & Roll, Boppard
- Bad Radkersburg (AT), Elementary school
  Stadtgemeinde Bad Radkersburg
- Bad Rappenau (DE), SOLAR.shell-Transfer
  ai:L Architektur-Institut Leipzig
  an der Hochschule für Technik, Wirtschaft und Kultur
- Basel (CH), Solar façade Amt für Umwelt und Energie
  Megasol Energie, Deitingen
- Basel (CH), Renovation Coop headquarter
  Burckhardt+Partner, Basel
- Basel (CH), Solar media façade Novartis Pavillon
  ASCA, Nantes
- Berlin (DE), Laboratory building
  DGI Bauwerk, Berlin
  Helmholtz-Zentrum Berlin für Materialien und Energie
- Bern (CH), Manuel elementary school
  dadarchitekten, Bern
- Bobingen (DE), Update for a house from the 80s
  Architekturbüro Rainer Drasch, Neusäss
- Borkum (DE), Offshore
  Delugan Meissl Associated Architects, Wien
  Neue Energielösungen GmbH, Bremen
- Borlänge (SE), Villazero
  Fiskarhedenvillan
  Mondo arkitekter Dalarna, Falun
  Structor Byggteknik
- Bozen (IT), Sports facility
  SSV Bozen – Dept. Fistball
  Architekt Michael Scherer, Bozen
- Brienz (CH), Renovation SFH
  archiX, Brienz
- Brussels (BE), Abattoirs d'Anderlecht
  Skysun, Brussels
- Brussels (BE), Bota Solar
  Sunsoak-Design, Brussels
- Brussels (BE), Canal Hill
  Corbisier Architectes, Brussels
- Brussels (BE), Gare Maritime
  Nextensa, Brussels
- Büsserach (CH), Campus Aqua
  Jeker Architekten, Basel
- Buochs (CH), Timber meets solar
  Tamara & David Meyer-Petermann, Buochs
- Chantepié (FR), Living Warehouse
  Haddock Architecture, Paris
- Coburg (DE), Circular Tiny House CTH*1
  Hochschule Coburg
- Culembourg (NL), Centraal Boekhuis
  Grenzebach Envelon, Asbach-Bäumenheim
- Davos (CH), HORIZON solar folding roof
  dhp technology, Zizers
- Deutsch-Wagram (AT), Kindergarden
  Juri Troy Architects, Wien
- Ditzingen, Trumpf
  DAS Energy, Wiener Neustadt
- Dossenheim (DE), Julius-Kühn-Institut
  hotz + architekten, Freiburg
- Drammen (NO), Portalen
  Lund+Slaatto Arkitekter, Oslo
- Dubai (AE), Monaco Pavillon
  Expo Dubai 2020
  OOS, Zürich
- Dubai (AE), TERRA – The Sustainability Pavillion
  Dubai Expo 2020
  SUNOVATION Produktion, Elsenfeld
- Eindhoven (NL), ripple
  Solar Decathlon Europe 2021/22
  VIRTUe (student team)
  Eindhoven University of Technology
- Entebbe (UG), Children's Surgical Hospital
  studio TAMassociati, Venedig
- Erkheim (DE), Team coLLab
  Solar Decathlon Europe 2021/22
  Hochschule für Technik Stuttgart
  Baufritz, Erkheim
- Ermatingen (CH), Mesmerhaus
  dransfeldarchitekten, Ermatingen
- Feldbach (CH), KREIS-Haus
  Verein Synergy Village, Feldbach
- Freiburg (DE), MFH Belchenstraße 12-34
  Polarstern Erzeugungs GmbH, München
- Gignac (FR), Lycée Simone Veil
  Region Occitanie Pyrénées-Méditerranée
  HELLIN-SEBBAG Architectes, Paris
- Göteborg (SE), C-Hive
  Solar Decathlon Europe 2021/22
  Chalmers University of Technology, Göteborg
- Hägglingen (CH), SFH Oldani-Wermelinger
  Architektur & Bauplanung Matthias Oldani,
  Hägglingen
- Haßfurt (DE), Office building BaurConsult
  BaurConsult Architekten Ingenieure, Haßfurt
- Heudebouville (FR), École Les Coteaux Fleuris
  HEMAA Architectes, Paris

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- Hoofddorp (NL), Solar design façade Pharos building
  Solarix, Amsterdam
- Cape Town (ZA), Mahali HUB
  Team Mahali Design Collective, Cape Town
- Karlsfeld (DE), PV EnergyCarport
  GridParity, Karlsfeld
- Karlsruhe (DE), RoofKIT
  Solar Decathlon Europe 2021/22
  Karlsruher Institut für Technologie
- Kassel (DE), Fraunhofer IEE
  HHS Planer + Architekten, Kassel
- Kleinaign (DE), SFH
  SunRoof Germany, München
- Kleinlützel (CH), SFH Meier
  g3 Architektur, Laufen
- Krakau (PL), Waste incineration plant
  DAS Energy, Wiener Neustadt
- Kronach (DE), MFH KC 37 + KC39
  Lauer+Lebok Architekten, Lichtenfels
- Leonberg (DE), Passive house
  eecon Ingenieurbüro, Leonberg
- Lichterfeld (DE), autartec®
  Fraunhofer IVI, Dresden
- Lübben (DE), Energy self-sufficient MFH
  Lübbener Wohnungsbaugesellschaft
- Madrid (ES), Entrepatios Las Carolinas
  sAtt Arquitectura, Madrid
- Milan (IT), PV glass integration Gioia 22
  Onyx Solar Energy, Ávila
- Marburg (DE), Solar radiology
  Architekt Dipl.-Ing. (TU) Hagen Plaehn, Hannover
- Mechelen (BE), "Het Predikheren"
  DAS Energy, Wiener Neustadt
  Kalzip, Koblenz
- Menzenschwand (DE), FRIHA
  AMUNT Nagel Theissen Architekten und Designer, Stuttgart
- Middelburg (NL), Solar design façade City Theatre
  Solarix, Amsterdam
- Mühldorf (DE), Berufliches Schulzentrum
  Landratsamt Mühldorf
  ARGE Schmuck-Anglhuber, Kraiburg
- München (DE), San Riemo
  Kooperative Großstadt e. G., München
  ARGE SUMMACUMFEMMER Büro Juliane Greb
  Isarwatt e. G., München
- Solar Roofscapes in Munich Urban Context
  Maximilian Sepp, Philipp Unger
  Technische Universität München
- Münnerstadt (DE), Berufsbildungszentrum
  Benkert Schäfer Architekten, München
- Münsingen (CH), St. Johannes
  Katholische Kirchgemeinde Münsingen
- Münsingen (CH), Sóley
  Pensionskasse der Bernischen Kraftwerke
  SKS Architekten, Bern
- Neuzeug (AT), Office building my-PV
  my-PV, Neuzeug
- Niederwangen (CH), Schul- und Sportanlage Ried
  Büning-Pfaue Kartmann Architekten, Basel
- Niederwinkling (DE), Sonnenhaus Autark
  Dasch und Wörtz Architekten, Straubing
- Nienburg (DE), Solar roof
  Ennogie Deutschland, Magdeburg
- Nürnberg (DE), Energie- und Umweltstation
  Mario Bodem Architecte DPLG
  ING+ARCH, Nürnberg
- Nußdorf (AT), Auenwerkstatt
  Architekt Dipl.-Ing. Peter Horner, Salzburg
- Oberlangen (DE), SolteQ Europe
  Solar roof tiles
- Paulinenaue (DE), LELF
  ZRS Architekten Ingenieure, Berlin
- Perth (AU), Solar Glass Greenhouse
  ClearVue Technologies, Perth
- Pfäffikon (CH), MFH
  Setz Architektur, Rupperswil
- Poschiavo (CH), Sol'CH
  Nadia Vontobel Architekten, Zürich
- Raalte (NL), Row housing Dingshof
  Viridian Solar, Cambridge
- Reichenau (DE), Solar façade rmsolar
  SOLARWATT, Dresden
- Reichenbach (CH), Railway station BLS
  Kocher Minder Architekten, Steffisburg
- Rheinfelden (BE), PV Carport
  Energiedienst, Rheinfelden
- Rotterdam (NL), PTT Binnenrotte
  orange architects, Rotterdam
- Schwyz (CH), Tiny Houses
  marty architektur, Schwyz
- Seoul (KR), Hanwha HQ Building
  UNStudio, Amsterdam
- Sion (CH), MFH SAKURA
  Kämpfen Zinke + Partner, Zürich
- Sittard (NL), Solar façades Dempsey Residence
  ZigZagSolar, Eindhoven
- Skellefteå (SE), Sara Kulturhus
  AVANCIS, Torgau
- Solna (SE), House of Choice
  White arkitekter, Stockholm
- Stavanger (NO), BIPV Façade Norwegian Petroleum Direktorate
  Multiconsult, Stavanger
- Stuttgart (DE), Freie Waldorfschule
  Behnisch Architekten, Stuttgart
  SunStyle, Bolligen
- Tamins (CH), Rhiienergie
  Ertex Solar, Amstetten
- Texel (NL), Holiday Home
  orange architects, Rotterdam
- Tübingen (DE), Westspitze
  a + r Architekten, Stuttgart
- Tübingen (DE), Renovation MFH
  GWG Tübingen
  Stadtwerke Tübingen
  Architekturbüro Orth, Tübingen

- Urdorf (CH), Bauen 2050
  Solaxess, Marin-Epagnier
- Ursprung (DE), terra.hub
  furoris X art GmbH Architekten, Chemnitz
- Västerås (SE), Climate positive houses
  ETC Bygg, Stockholm
  ETC Sol, Stockholm
  Arkitekt Hans Eek, Västerås
- Vilsbiburg (DE), PV canopy
  Lisa Dräxlmaier GmbH, Vilsbiburg
  Delta ImmoTec, Geisenhausen
- Waalwijk (NL), Willems Logistic
  BIPV.world, Waalwijk
- Wängi (CH), MBR Solar
  Grenzebach Envelon, Asbach-Bäumenheim
- Wallisellen (CH), K3 Handwerkcity
  K3 Immobilien
  Atlantis Umweltberatung, Siedlungsplanung und Architektur, Wallisellen
- Wien (AT), BIKES & RAILS
  Architekturbüro Reinberg, Wien
- Wien (AT), Donauzentrum
  Ertex Solar, Amstetten
- Wien (AT), Thurngasse
  DAS Energy, Wiener Neustadt
- Wien (AT), IKEA
  querkraft architekten, Wien
- Wien (AT), SMART BLOCK Geblergasse
  zeininger architekten, Wien
- Winnipeg (CA), Manitou a bi Bii daziigae
  Red River College Polytechnic
  Diamond Schmitt Architects, Toronto
  Number TEN Architectural Group
- Winterthur (CH), Fehlmann-Areal II
  Bob Gysin Partner Architekten, Zürich
- Wuppertal (DE), level up
  Solar Decathlon Europe 2021/22
  Technische Hochschule Rosenheim
- Wuppertal (DE), LOCAL+
  Solar Decathlon Europe 2021/22
  Fachhochschule Aachen
- Wuppertal (DE), MIMO
  Solar Decathlon Europe 2021/22
  Hochschule Düsseldorf
- Wuppertal (DE), X4S
  Solar Decathlon Europe 2021/22
  Hochschule Biberach
- Zürich (CH), EWZ – Schutz und Rettung
  3S Swiss Solar Solutions, Gwatt
- Zürich (CH), MFH Martastrasse
  Vera Gloor AG, Zürich
- Zürich (CH), Renovation Heilig Geist
  Kämpfen Zinke + Partner, Zürich