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

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European Award Building-Integrated Solar Technology 2008

"Jury report"

Aim of the competition

The use of solar energy in and on buildings has become a key aspect within energy efficient construction – for individual homes, industrial and administrative buildings, as well as residential schemes. Solar power systems should be self-evident components in both innovative building skins and refurbishments to improve energy efficiency.

The challenge is to find suitable ways to implement these technical innovations in design terms. Both solar thermal energy and photovoltaic systems open up a diverse range of possible applications and offer high quality products.

By integrating solar power systems in the roofs and/or facades of buildings in an architecturally and technically sophisticated manner, architects can increase the awareness of both developers and the public about the possibilities for combining buildings with solar power technology and thus help renewable energies become more widespread.

To increase acceptance and to foster awareness of this topic, the Bavarian Association for the Promotion of Solar Energy (SeV) has organised the competition 'Building-Integrated Solar Technology 2008'. The SeV hopes that the award will encourage the planning and designing of excellent building-integrated solar power systems, and thus showcase exemplary solutions in qualitatively sophisticated architecture.

Of the 40 projects that were entered, 38 projects from 8 countries were assessed by the jury (two projects did not meet the requirements in terms of their completion dates).

In addition to the overall architectural quality, the jury assessed the degree to which solar technology was deployed to inform the design. Here they appraised not only new approaches taken in terms of the building concept (including the type of building and use) and the solar technology (within the overall building services system), but also the extent to which the building acts as a "signal" for society as a whole. The submitted projects, which varied considerably in terms of their architectural quality, were based on diverse underlying requirements regarding the building function, location aspects and technological standards, ranging from relatively simple single family homes to highly complex institutional buildings.

In the first round, all the projects were closely examined by each member of the jury before being discussed together.

With a whole series of entries (Project 06, Project 12, Project 14, Project 16, Project 19, Project 25, Project 29, Project 30, Project 32 and Project 33), the jury identified individually interesting aspects that merited honorary mentions. The jury then discussed in detail the projects that were considered to have award-winning potential and, following a further vote, narrowed down the

choice to a final shortlist (Project 08, Project 15, Project 18, Project 34 and Project 37). The jury considered that all these projects were of a considerably high architectural standard.

Following another vote, the five remaining projects were then narrowed down even further, leaving Project 08, Project 18 and Project 34 in contention for the first prize. These projects offer an excellent response to the requirements of the competition brief. Following further assessment of the projects and a detailed discussion, the following order was determined:

First prize:
"European Award for Building-integrated Solar Technology2008"
(EUR 15,000)
• Project 18: **Marché International Support Office** (2007)
Marché Restaurants Schweiz AG, CH-8310 Kemptthal
Architect: Beat Kämpfen, Büro für Architektur, CH-8094 Zürich

The "Marché International Support Office" is said to be the first office building in Switzerland that actually achieves a "zero energy balance". In conjunction with a clear architectural concept and a compact structure, the architects have succeeded in delivering an exemplary solution for an office building that generates all the energy required for its operation itself. The materials used for the supporting structure and building skin combine, in a self-evident manner, standard timber construction methods, innovative PCM technology and photovoltaics.

The entire surface of the monopitch roof is designed as an electricity generator and supplies 100% of the power required. The architects have succeeded in designing the roof and verges so that they are not just unobtrusive in appearance but are also meticulously and elegantly detailed. The layered execution of the glass-glass thin-film modules, which are relatively small in size and are anthracite-coloured, has created an aesthetically pleasing roof surface that is exemplary in its elegance and establishes a benchmark.

Recognition award (EUR 10,000)
• Project 08: **opusHouse**
Architect: opus Architekten BDA, Darmstadt

The conversion and redevelopment of existing buildings, both in the rural and urban realm, will become an increasingly important task for architects in future. Here the integration of solar technology presents a particular challenge, especially when the conservation of both individual historic buildings and building ensembles has to be taken into account. With "opusHouse", the new roof has succeeded in visually incorporating solar thermal energy and photovoltaics along the building's street frontage in an exemplary manner, whereby no new approaches have been sought in conceptual terms. Rather, the implementation convinces through its extremely sensitive handling appropriate to the task. The collectors and PV modules are coloured to blend in with the neighbouring

roof surfaces while remaining visually legible as an additional functional layer integrated within the roof design. The different structural and thermal requirements of solar thermal and photovoltaics are successfully resolved in the detailing of the eaves and ridge.

In design and energy terms, the jury were critical of the transparent structure used for the infill site.

Commendations

• Project 34: **Sino-Italian Ecological and Energy Efficient Building** (2006) Tsinghua University, Beijing/China
Architect: Mario Cucinella Architects, Bologna

With the SIEEB Building for Tsinghua University – a powerful, prominent building with an architecturally unusual and novel composition – the cantilevered PV louvres projecting outwards on each storey are an important feature informing the design. The institute building's U-shaped floor plan is oriented in a north-south direction. The design incorporates a diverse range of overlapping uses and references to traditional Chinese symbolism, and expresses the different functional layers within the building skin both in structural and design terms. Particularly for countries like the People's Republic of China, such buildings play a significant role in encouraging a new approach to the use of technology and energy in architecture.

The project provides an excellent example of a building that makes both an architectural and technical contribution to sustainable building.

• Project 15: **Solar home built to passive home standard/"Plus-Energy" concept'**
TU Darmstadt, FB Architektur, FG Entwerfen und Energieeffizientes Bauen

For the experimental building, which was designed by a group of Darmstadt students under Professor Hegger and realised as a prototype, the solar technology systems integrated into the roof and facade make an important contribution to achieving "energy autonomy". The multifunctional combination of timber, as a sustainable construction material, with photovoltaics is particularly successful in the facades. The amorphous silicon modules are convincingly integrated within the timber louvres both design-wise and structurally. This enables both shadow-free tracking as well as adjustable semi-transparency in the facade.

In terms of typology, however, this raises the question as to which climate region the site-independent building is ultimately designed for, since the choice of material and zoning strictly speaking contradict one another.

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DETAIL

• Project 37: **Solar Building XXI** (2006)
Instituto Nacional de Engenheria, Tecnologia e Inovação – INETI, Lisboa/Portugal
Architect: Pedro Cabrito & Isabel Diniz

With this building for the 'National Institute for Engineering, Technology and Innovation', direct and indirect systems for utilising solar energy are used as a matter of course. The active technology, above all the PV modules in the facade, is carefully and unobtrusively integrated, whereby familiar design approaches have been adopted. The structural design using mullion and transom curtain walling achieves an attractive and elegantly proportioned solution.

Citations

• Project 06: „Zero Emission" Production – Production and Advisory Centre (2008), **Corona Solar GmbH,** 66636 Tholey-Theley
Architect: Peter Heinz, Tholey

The use of storey-high solar collectors in the facade of an existing industrial building with narrow, vertically placed elements illustrates the potential of solar thermal energy not just through its multiple applications (thermal insulation and generation) but also as a design feature. Collectors with such dimensions provide considerable scope for individual solutions, particularly in facades. Such examples have a widespread impact, particularly on everyday architecture.

• Project 12: „Plus energy home in Pfarrkirchen" (2007)
Architect: **Architekturbüro Alfons Lengdobler, Pfarrkirchen**

With this plus energy home, the solar thermal system is integrated within the facade in a particularly convincing manner. The storey-high flat-plate collectors are used in two system widths. In conjunction with the wall surfaces and apertures, these are harmoniously integrated within the facade both structurally and design-wise. In addition, the overall energy technology concept also impresses.

• Project 14: „Energetic modernisation of a single familiy home" (2007)
Architect: **Hinrich Reyelts, Karlsruhe**
• Project 30: „Students Hall of Residence Marktstraße" (2006),
Akademisches Förderungswerk, Bochum
Architect: Ulrich Krampe + Peter Reiter Architekten BDA, Bochum

Projects 14 and 30 provide examples of refurbishments to improve energy efficiency. In contrast to new-build projects, the integration of solar technology is hampered through a diverse range of additional parameters. The single family home and the multi-storey students' hall of residence nevertheless manage to successfully integrate collectors and photovoltaic panels within the facades (and roof) as part of their advanced building system concepts, even if the architectural possibilities were not fully exploited.

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• Project 16: „ENERGYbase – Office Building of the Future" (2008)
WWFF Business and Service Center GmbH, Wien
Architect: POS architekten DI Ursula Schneider, Wien

The facade features a special "folded surface". This is aimed at achieving maximum daylight yields and passive solar gain, with excellent shading in summer. As well as optimising the tilt angles for the installation of the solar technology elements, this design feature also articulates the building's outward appearance.

• Project 19: „Plus energy home/solar powered housing estate 'Am Schlierhaus'" (2006), Freiburg
Architect: **Rolf Disch Solararchitektur, Freiburg**

The roof surfaces are completely utilised as energy roofs. A harmonious choice of photovoltaic modules has been achieved in terms of both their arrangement and dimensions. At the scale of an urban district, the extensive use of active solar technology sets a striking example that creates a visual impact from a distance.

• Project 25: „PV film Hightex Office" (2007), 83253 Rimsting
SolarNext AG, Rimsting

This project is concerned with the development of a construction component. Using ETFE film, the project developers have succeeded in integrating flexible PV cells within the upper layer of an existing double-layered, pneumatic cushion structure. This opens up new and more wide-ranging possibilities for using photovoltaics.

• Project 32: "Ferdinand-Braun-Institut für Höchstfrequenztechnik" (2007)
12489 Berlin
Architect: **msp Gesellschaft für Bauplanung mbH,** Dresden

As part of the refurbishment of the external facades, the southwest elevation has been designed as a gently curved "wall screen". In addition to optimising the radiation yields, the curve also enhances the architecture by creating a striking eye-catcher.

• Projeect 29: „Telecom Tower" (2008) National Telecom Corporation, Khartoum/ Sudan
Ertex Solar GmbH, A-3300 Amstetten

With a 2,000 m^2 surface area, the "multifunctional photovoltaic facade" scheme is the world's first building project to utilise amorphous silicon thin-film technology on such a large scale. The jury would also like to praise its contribution as a multiplier for solar technology in an African country.

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• Project 33: „SCHOTT Iberica" (2005), Sant Adria de Besos (Barcelona)
Architect: **Torsten Masseck (Centre de Investigació Solar – CISOL), Sant Cugat del Vallès**

The construction of new buildings in existing districts poses a particular challenge in terms of establishing a dialogue with the existing building stock. With the design for the coloured and semi-transparent PV facade, the graduation of the individual panels takes equal account of the given climatic and architectural conditions as well as the shading caused by the neighbouring house.

Prize jury meeting
Date: 21.11.2008
Venue: Hotel SOFITEL Munich Bayerpost, Bayerstraße 12, 80335 München
Start: 9.00 am
End: 3.30 pm

Attendees (in alphabetical order):
Prof. Dr.-Ing. Gerd Becker (Member of the Board, SeV)
Prof. M. Sc. Dipl.-Ing. Ingrid Burgstaller (Architect, University of Applied Sciences, Nuremberg)
Prof. (em.) Dr.-Ing. e.h. Klaus Daniels (Engineer, Munich)
Prof. (em.) Dr. (Univ. Rom) Dr. h.c. Thomas Herzog (Architect, Munich; Chairman)
Prof. Dr.-Ing. Roland Krippner (Architect, Member SeV)
Dr.-Ing. Bruno Schiebelsberger (Chairman of the Board, SeV)
Dipl.-Ing. Christian Schittich (Chief Editor DETAIL)
Prof. Dr. Volker Wittwer (Fraunhofer-Institut für Solare Energiesysteme, Freiburg)

29 November 2008

Jury report Prof. Dr.-Ing. Roland Krippner