



Photo: Solaire France

These dark, square photovoltaic roof tiles called Sunstyle – built by Solaire France, a module manufacturer from southern France – are installed without a frame and with the tip pointing down.

## Different system concepts

**Roof-integrated systems:** On slanted roofs, solar panels can replace conventional roof tiles and shingles. Manufacturers of insulation systems and module makers both offer systems for the roof-integration of photovoltaics. A number of new systems simultaneously perform multiple building functions.

This market overview on the next few pages covers roof-integration systems based on two different principles. On the one hand, modules can be installed flush with the roof membrane; in such cases, a watertight layer of metal or plastic is installed beneath. On the other, the solar array not only replaces roof tiles, but also performs the functions of the roof membrane. French feed-in tariffs make a distinction in these two approaches, with the functionally integrated systems receiving a higher tariff. A number of non-French manufacturers have responded with special products for the French market. Likewise, feed-in tariffs for roof-integrated systems are 20 percent greater than for arrays installed on rooftops in Switzerland. In both cases, the array has to per-

form two functions for the building: generate electricity and protect the building from precipitation, thereby making other building components redundant.

The systems in the market overview differ in another respect: while some integrate standard framed modules in the roof membrane, others have modules specially made for this purpose. Generally, standard modules are not designed to provide a watertight roof cover, so a lot of additional material is needed. Frameless laminates which overlap like shingles and laminates with special frames that perform multiple functions (such as installation supports and rainwater conduits) are therefore becoming increasingly popular. These systems are also generally thinner and look better.

Module manufacturers have also come up with a number of new developments for roof integration. Solon has further developed its roof-integrated panel with a plastic frame. At 250 watts-peak, the new Solon Blue 250/05 is larger than its predecessor. With a thickness of only 27 millimeters, the panel and its installation strut generally only take up as much space as roof tiles. Furthermore, the array now has a metal frame with ventilation slits on all sides.

Solarwatt has come up with its own frame design that completely does without installation equipment. The Easy-In panels are attached to the roof battens as overlapping shingles. The system is currently being revised, and the manufacturer says they will go on sale again in

2011. Schott's new, flatter Indax 255 is also directly screwed into the battens.

Fath has also looked into new, smart ways to use module frames. Its S2plus system glues them on to the back of the laminate. As a result, the array's surface is completely made of glass and cleans itself easily. The panels are inserted like shingles in horizontally installed metal rails. The Solesia photovoltaic roof tile, made by southern German tile manufacturer, Creaton is as wide as six roof tiles and fits exactly into a number of Creaton's matrices for roof tiles. The slender, frameless laminate is clamped onto a tapered sheet of aluminum and can be seamlessly inserted in roof tiling.

Solrif, which has been sold by Swiss metalwork firm Ernst Schweizer for more than 10 years, is the leader in the market overview. With 300 megawatts of installed capacity, Ernst Schweizer has far and away installed the most photovoltaic modules in attractive, integrated slanted-roof systems. In Solrif, the modules have a slender aluminum frame on three sides. The frames of the adjacent modules interlock so that rainwater safely flows down a channel. The lower edge is frameless so that the laminates can clean themselves more effectively. Panels are directly installed on roof battens.

A lot of module manufacturers use frames to create their own roof-integrated panels. For instance, the Solrif frame is used in Sunways' SM 215L-IN roof-integrated panel. British module manufacturer Solarcentury and Norway's REC also now offer panels with Solrif frames. REC's Peak Energy Integrated is the size of a standard panel and installed horizontally as a watertight roof membrane. Solarcentury's M187 is a bit smaller at 1.62 by 0.82 meters. Its nearly black monocrystalline cells and black frame combine to provide a uniform appearance. Gehrlicher's Gehrtec Intra can not only be combined with thin film panels from First Solar, but also with crystalline laminates. The manufacturer says the system makes do with a small number of components and does not require tools for module installation.

The Pass'Inn from China's Nengli allows standard framed panels to be directly installed on roof battens. The horizontally inserted panels rest on a steel rail that also serves to channel off rainwater. The space between the panels is closed off with rubber seals. Nengli sells

its roof-integrated systems in Europe and also entered the southern Chinese market in 2010. In its roof-integrated system called Intevo, Austrian panel manufacturer Ertex uses thin panes of hardened glass only two millimeters thick. The firm can thus make glass-glass panels with the weight of standard panels; furthermore, the modules are very thin, with a frame height of 25 millimeters.

### Large and small formats

Atlantis Energy, a US specialist supplier of small solar tiles, now also offers larger formats. Its TallSlate and TallSlate Grandee can be installed more quickly than the smaller Sunslates and are also less expensive. On the other hand, the Sunslates can be more easily adapted to the structure of existing roof shingles and better compensate for unevenness in the roof. All of the systems that Atlantis offers benefit from the combination of photovoltaics and solar thermal. Tubes draw off a lot of the heat from the panels, thereby making them more efficient. Atlantis sells its roof-integrated panels in the US and Europe. The firm is currently developing small solar tiles especially designed for the southern European market.

Solaire France, a module manufacturer from southern France, has an unusual way of approaching solar roof integration. Its dark, square photovoltaic roof tiles called Sunstyle are installed without a frame and with the tip pointing down. The tips of the 87 by 87 centimeter modules overlap, creating a pattern of diamonds resembling shale. The panels are screwed into the substructure at two points. They constitute a watertight roof membrane with lip seals. Solaire France also offers triangular border elements to finish off the roof cover. They are available in opaque and transparent versions. Likewise, glass elements can be integrated in solar roofs as skylights.

Four new systems have watertight channels below the modules: Solarworld's Sundeck; Renusol's Intersole XL, which is especially designed for large roofs; Phoenix's TectoSmart, which is installed on a watertight wooden shell; and the sheet metal clamp system from Chinese metalworking firm Powerway. Powerway's system uses trapezoidal roof clamps for frameless modules. When a building's entire roof is covered, the array is quite attractive. The trapezoidal metal sheets ensure water tightness. ♦ Anja Riedel

Mounting systems for solar technology



# NEW!

- For roofs with low ballast potential
- High degree of efficiency due to East-West-Orientation
- With the new K2 LevelRail
- Slight, two-sided 10° elevation
- High flexibility - for all types of modules
- Reduced assembly time due to pre-mounted components
- Extremely cost efficient



**K2 SYSTEMS**  
**EAST-WEST**  
**LOW BALLAST**  
**ELEVATION**  
**SYSTEM**

K2 Systems GmbH  
Riedwiesenstr. 13 – 17  
71229 Leonberg  
Germany  
Phone  
+49 (0)7152 3560-0  
Fax  
+49 (0)7152 3560-179  
info@k2-systems.de  
www.k2-systems.de