SOLAR INVESTORS GUIDE

SIG 3/2026

Innovations for mounting

Edition for The smarter E Europe 2026

photo: BayWa r.e. Solar Solutions

pv Europe
solar technology and applications

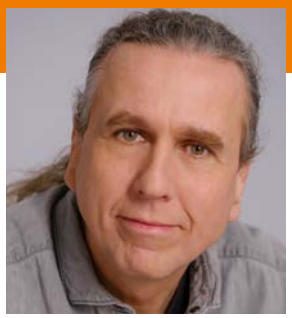


photo: Mildred Klaus

Mounting – saving time and money, raising quality

The solar energy transition is gaining real momentum. International crises and rising prices for fossil and nuclear energy are making solar electricity and battery storage more attractive than ever. Large industrial roofs and available open land are being developed for module arrays, and sealed surfaces such as car parks are increasingly being fitted with solar carports.

The residential segment is also raising the bar. Heritage roofs, for instance, are increasingly being equipped with colour-matched solar elements that blend into the existing architecture. On-site solar is winning out because it makes economic sense and the technology is ready.

None of this happens by itself. Rising energy prices are also driving up the cost of metals such as copper, aluminium and steel, which puts pressure on the manufacturers and suppliers of mounting systems. Their response is to slim down the systems and push for more factory pre-assembly, which is the only way to save time, money and labour on site.

To keep installation as simple as possible, the number of individual parts is being cut. Functions such as cable management, personal protection, lightning protection and water drainage are being built into the systems rather than added on. The result is higher quality and longer-lasting installations – and for a technology that needs to last 25 years, that matters.

I wish you an informative and insightful read.

Heiko Schwarzburger
editor-in-chief
PV Europe & photovoltaik

PREVIEW SIG 4/2026

New trends in large-scale PV

Our next SIG looks at new business models for solar projects paired with large-scale storage, a combination that is driving the energy transition across Europe. Out on **17 July 2026**.

photo: IBC Solar

E-PAPER SOLAR INVESTORS GUIDE

O&M for solar parks

photo: EMC-direct/GEM

As a rule, one to three percent of the total investment should be allocated to operation and maintenance expenses over a 20-year period. Solar parks are therefore considered low-maintenance assets, with O&M costs significantly lower than those of fossil fuel or nuclear power plants.

Maintenance costs are largely driven by the extensive area covered by module fields. A solar park with a capacity of 300 MW and grid connection will require 250 to 300 hectares of land. There are hundreds of thousands of solar modules, kilometres of cabling and millions of small components such as DC connectors, cable ties and clamps.

Cost optimisation therefore focuses on minimising component variety and using durable, long-lasting components. In a solar park, components are exposed to weather and solar radiation for many years. Over time, this exposure affects both plastics and metals.

Operate plants proactively

To operate plants proactively, monitoring and advanced analysis tools are essential. Thermal imaging drones scan module fields to detect faulty modules. Electroluminescence analysis is used to identify damaged cells after a hailstorm. Sample tests on the ground can be employed to examine the backsheet films of solar modules.

These examples illustrate a broader principle. Operation and maintenance requirements must be integrated from the earliest planning and installation phases. Ultimately, long-term asset value is shaped long before the first kilowatt is generated, and the more systematically this is done, the more effectively the investment is safeguarded against avoidable follow-up costs and long-term depreciation.

▶ ***https://www.pveurope.eu/sig-2026-2-om-solar-parks***

SIG 3/2026

photo: Varista

Varista offers a broad portfolio of open-ground substructures, with each new version pared back in complexity.

The open-ground segment finds its range

Solar parks ■ Demand for solar parks shows no sign of letting up. For large arrays, though, the time required and the flexibility of the mounting system both weigh heavily on the choice of sub-structure. A growing number of manufacturers are now offering systems for smaller installations, geared in particular to industrial and agricultural projects. **by Sven Ullrich**

Open-ground PV is in a good place at the moment. "Demand for fixed-tilt substructures in the open-ground segment is holding up at a high level. At the same time, we are seeing a clear rise in cost pressure, which is making itself felt across project developers and the supply chain alike," says Marco Göbel, managing director of MKG Göbel. "The central driver in the further development of mounting systems at the moment is sustained cost reduction, particularly given the move toward ever larger solar modules."

Stability through closed beams

That is the thinking behind the rework of the company's GMS Core mounting system. The new development will be on show at this year's MKG Göbel stand at Intersolar (A6.530). "We have built the system to reduce both material use and installation effort further, without compromising on stability or function," Göbel says. The stability comes from torsionally stiff beams. "That gives us optimal support for the modules while at the same time using less material," he explains.

The closed steel beams that MKG Göbel uses are clearly safer than open profiles for ground-mounted arrays. They resist twisting, hold the loads within the profile, and stabilise the modules at the contact point rather than adding load to them.

The GMS Core suits large and small arrays alike, in either south-facing or east-west configuration. A levelling rocker provides lateral flexibility, so the system can follow the contours of the ground. Integrated height adjustment and a stepless tilt angle add further flexibility.

Screw foundations for smaller arrays

The big solar parks are not the only ones in demand. Smaller arrays are increasingly being built as well, often to make use of brownfield land or lefto-

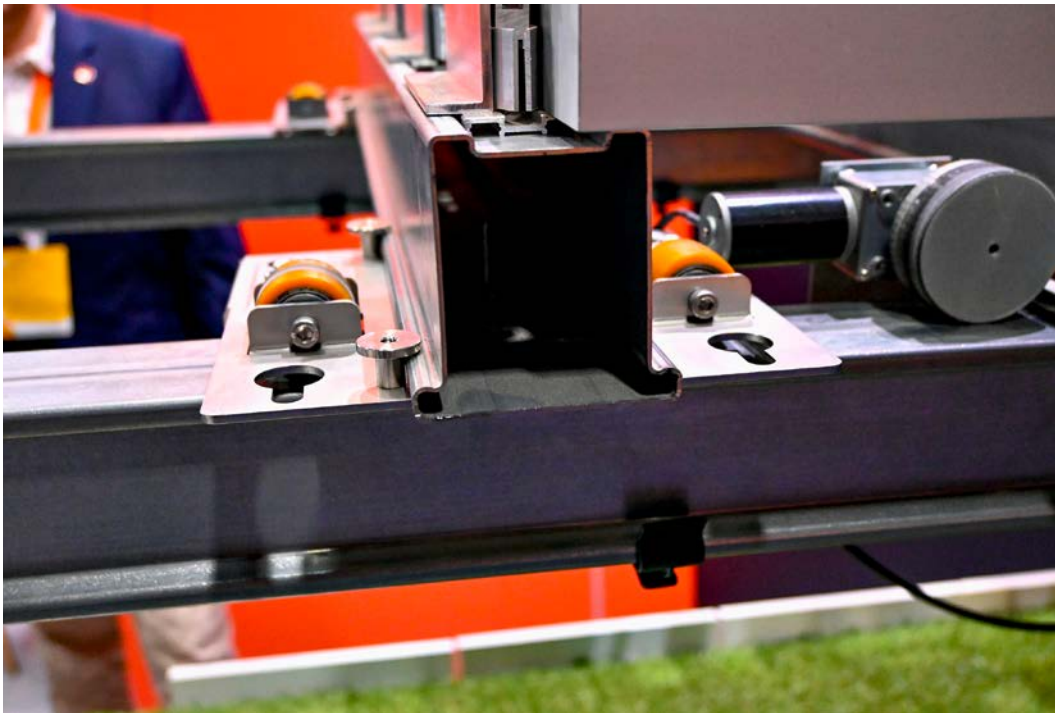


photo: Velka Botička

MKG Göbel uses closed, torsionally stiff profiles to add stability to the array.

ver plots in agriculture and on commercial sites. K2 Systems (A6.190) developed its slim N Rack mounting system explicitly for applications of this kind.

At Intersolar, K2 Systems is presenting its new open-ground system, the Pi Rack. "The focus right now is firmly on making installation easier, faster and more efficient for our customers," says Dieter Hardock, head of product management at K2 Systems. "Three things are central to that: cutting complexity in the portfolio, improving installation speed and handling further, and extending the range of applications, particularly in open-ground and carport projects."

Screwless assembly

With that in mind, the K2 developers chose not to bolt the modules in place but to slide them into dedicated rails. This also makes the system more stable, because the modules sit better, particularly the larger panels now coming through. The cables run directly inside the purlins and rafters, which keeps the cable management clean.

For small, flexible open-ground arrays, Wagner Solar (A5.150) offers the Tric Flex One. The system consists of a post element with the feet already pre-fitted. The installer simply folds the feet out and sets the post into a previously dug pit, then fills the pit back in and compacts the soil. After that, all that remains is to attach the rafters at the top of the post and fix them with the supplied supports. The tilt angle can be set in five-degree steps between 15 and 40 degrees.

At this year's Intersolar, Wagner Solar is presenting a system aimed at larger applications: the Tric Flex P. It is a flexible open-ground system founded on driven posts or concrete flanges. Because it is flexible, it can adapt to a range of module sizes, and because the posts come in two parts, the module tilt can be set between ten and 15 degrees.

photo: Clenergy

Clenergy's new tracker can be controlled by the farmer directly, via an app.

Suited to agri-PV

The eaves height of the modules can also be set steplessly between 50 cm and 2.50 metres. Wagner Solar uses aluminium of European manufacture, which means no pre-drilled hole patterns are needed. The installer simply drills holes at the height required for the mounting, with all other components fixed using self-drilling screws.

Because the lower module edge can be set at considerable height, the system meets the requirements of DIN SPEC 91434 for agri-PV arrays on arable and pasture land. Wagner Solar designed it to use as little material as possible, drawing on wind-load assessments. Quick, straightforward installation was also central to the brief.

Installation time, and with it system cost, was also at the centre of the work at Varista (A6.450) on its open-ground systems. The company achieves this through a high degree of factory pre-assembly and reduced complexity in the components themselves.

Varista has also reworked its logistics and installation processes to make the work on site more efficient. With its system, the company is responding to the same rise in demand that runs through the segment. By its own account, project enquiries are picking up noticeably, particularly for larger arrays. Varista sees clear growth potential in this and a positive market trajectory for the years ahead.

CR-TOOLS

Cable management redefined

With the Alpha PV-Clip, CR-Tools (C4.374B) has put a small but easily overlooked detail of solar installation under the spotlight. How the cables are routed determines the quality and longevity of a photovoltaic array.

The Alpha PV-Clip is the first to combine transverse and longitudinal cable routing on both sides of the module frame in a single component. The installer can fit the clip directly to the module frame, by form fit and entirely without tools. The cables stay in place and no longer sag, which has long been a recurring source of fault in array operation.

The clip can also be slid along the frame as needed, so pre-fitting it at the module further eases the cable run. A carefully worked geometry with an integrated spring mechanism makes the clip compatible with all the common solar modules on the market. That saves time, simplifies the process, and lifts installation quality.

The clip is made in part from recycled plastic. Special additives protect it from extreme UV and weather. The combination of clever engineering, material quality and ecological responsibility is rounded out by social partnerships in the packaging side of the business. CR-Tools will be presenting and launching the PV-Clip at Intersolar together with the mounting-system manufacturer K2 Systems.

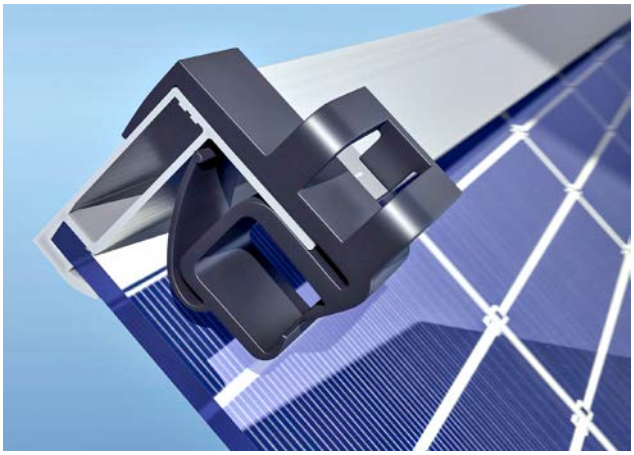


photo: CR-Tools

▶ ***https://crtools.de/en-us/english-2/***

photo: Wagner Solar

Alongside its system for smaller plots, Wagner Solar has also developed a solution for larger plants.

SL Rack (A6.480) is also building on this growing segment. "For open ground, we are showing a new slider system," says Ludwig Schletter, managing director of SL Rack. "It is a slide-in system in which the module is pushed in from below upward. It is very installer-friendly."

Tilting trackers to vertical

SL Rack will also be bringing its still-young tracker system to Munich, designed specifically for agri-PV. The farmer can rotate the module tables right up to the vertical, which leaves the rows between the trackers clear for unimpeded work, much as with vertically mounted modules.

SL Rack also offers a separate solution along similar lines, the Agri Wall. Here the modules are installed between two driven posts, fixed in place with dedicated brackets.

Mounting larger modules vertically

A further development for vertical module mounting is coming from Next2Sun (A4.130). Installers can now also mount G12 modules of up to 760 W. This matters, given that at 2,384 by 1,303 mm these panels are markedly larger than the 560 W modules used until now. The change reduces the installation effort per kilowatt of installed capacity, and with it the necessary investment, by a substantial margin. That makes it well suited to large agri-PV plants in particular.

Clenergy (A6.220) has also reworked its tracker system for use alongside agriculture. It is a single-axis system in which the trackers operate independently of one another, each driven by its own 24 V DC motor. By spreading the mechanical loads across multiple drive points, the manufacturer makes the system more rigid against twisting, and so more stable. Each tracker can take up to 120 modules in two rows, one above the other, and is also compatible with large-format panels.

Farmer controls the tracker directly

Clenergy has built in a wide adjustment range. The tracker can run to a tilt angle of up to 75 degrees and can be tuned to specific shading strategies in the field, depending on the crop and its growth stage. At a tilt of 45 degrees, the tracker leaves a ground clearance of 1.2 metres.

Clenergy extends the usual SCADA control with an option to operate the tracker from a smartphone. The farmer can set the module tilt and adjust it to the needs of the day, choosing from a range of operating modes. Alongside the automatic sun-tracking mode there is an agrivoltaic mode optimised for crop shading, a high-wind mode that protects the steel structure, and a manual mode. There is also a harvest or maintenance mode and an emergency stop mode.

To control the tracker, the farmer pairs the smartphone with it via Bluetooth and accesses the controls from there. Because no internet connection is required, the solution also works in remote rural areas.

Flexible fixed-tilt mounting

T-Werk (A5.370) showed the flexibility of its fixed-tilt Silenos system at last year's Intersolar in Munich. That flexibility comes from the Themis levelling clamp, which lets fitters compensate steplessly for terrain slopes of up to 30 degrees without breaking the module tables.

To set the angle, the fitter secures the base plate of the levelling clamp onto the purlin. The upper face of the plate carries a semicircular recess, into which the matching counterpart sits, a precisely fitted U-tube closed on top, to which the mounting rail attaches. The semi-circular link between purlin and mounting rail lets the installer set the angle of the module table by fixing the mounting rail to the neighbouring purlin in the same way.

Biodiversity in view

This year, T-Werk is presenting a new add-on for the Silenos system with biodiversity in mind. Called Let it bee, the extension pairs efficient electricity generation with active species protection in solar parks. Visitors to the T-Werk stand at Intersolar can see how it works.

- ***https://www.clenergy.com/***
- ***https://k2-systems.com/en/***
- ***https://www.mkg-goebel.de/en/***
- ***https://next2sun.com/en/***
- ***https://www.sl-rack.co.uk/***
- ***https://t-werk.eu/en/***
- ***https://www.varista.de/en***
- ***https://wagner-solar.com/en/***

SCHLETTER GROUP

Tracker systems updated for solar parks

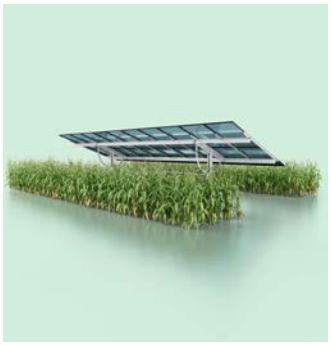


photo: Schletter Group

Schletter Group (A6.180) is putting its updated tracker system for solar parks and agri-PV at the centre of its appearance at this year's Intersolar. The work has focused on cutting installation time, which is becoming ever more important in the open-ground segment. Installation time is a major cost factor. Schletter has responded with new beam constructions and trackers mounted at greater height.

The new rafter system has been deliberately simplified, to the point where, in theory, a single person can fit the modules. The new fixings are also flexible enough to handle a range of module sizes.

- ***https://www.schletter-group.com/***

“Margins are tight, and you fight for every cent”

Ludwig Schletter has been managing director of SL Rack since the company was founded in 2018.

photo: SL Rack

Markets ■ Ludwig Schletter, managing director of SL Rack, on rising order books, tight margins in the open-ground segment, and why the system supplier has to stand behind the installer.

an interview

The German PV market, and with it the market for mounting systems, has come under some pressure in recent months. How do you assess the current situation?

Ludwig Schletter: *We can't complain. Our order intake is higher than last year. You can feel that some competitors are pulling back or are less active than they were. But for us at SL Rack, the situation has not turned negative. We are also seeing a positive trend again in systems for roof installations. It is difficult for us to say exactly whether the demand is coming from the residential or the commercial segment, though. We sell our roof systems exclusively through wholesale. We supply the distributors with rails, clamps and other components. Where those end up being installed is not something we see directly.*

How are things in your other European markets?

The Austrian market is behaving similarly to Germany. Things have quietened down somewhat, but demand is still there. You have to bear in mind that Austria, with nine million inhabitants, accounts for roughly a tenth of the German market. Switzerland is at an even lower level. Italy is developing very positively. The Italians have excellent solar irradiation and huge potential for photovoltaics that they left untapped for a long time. That is changing now.

What do you think is behind that?

In 2013 and 2014, after a phase of excessive subsidies, support was cut to practically zero. In my view, that was entirely the wrong decision. The market is now picking up again, much like demand in south-east Europe. The markets in Hungary, Romania and the neighbouring countries are developing reasonably well, but they are very price-driven. For us as a quality manufacturer with production in Germany, that is not entirely easy, because the other suppliers there have cost advantages. That will change, though, once the first damage from cheap mounting systems starts to show up.

Last year at Intersolar you presented new systems for agriculture. How has demand been?

Demand has unfortunately fallen short of expectations. One reason is that the subsidy rules agreed under the solar package in April 2025 have not yet been approved. I expect that approval will no longer come. We are in contact with the

photo: SL Rack

With the Fast Flat, SL Rack has built a system with a high degree of pre-assembly, so it goes up quickly on site.

energy policy spokespeople of the Bundestag parliamentary groups on this, and they confirm that expectation.

Is that a problem for the economics of these systems?
Not fundamentally. Systems for farmers can work economically even without the solar package. It becomes a challenge in the tenders. These systems may end up around half a cent per kilowatt hour above conventional solar parks in production costs. But everyone is competing on the same terms.

Half a cent per kilowatt hour sounds very little. How is that possible in practice?
I am convinced that we do not need to mount open-ground systems as high as some assume, which keeps the additional cost in check. We should integrate them sensitively into the landscape, perhaps plant a hedge around them, and use the land intensively. If we use the strips along motorways and railway lines in this way, we also avoid competing for agricultural land.

Does agriculture also mean roof installations?
Demand is quieter than at peak times, but it is there. This segment will pick up again as energy prices rise, because it is about self-consumption. And the generational change in farming may well be another opportunity for photovoltaics, because the younger generation is more open to modern energy supply on the farm.

That's similar to the commercial sector, where self-consumption is the business model that matters most going forward. How is that segment performing?
It could be better. Commercial operators are still somewhat cautious about switching to self-supply. Many have recognised that it would pay off, but a large share of business owners remain hesitant about investing. The current economic uncertainty plays a part.

The commercial sector also involves solar carports. What do you offer in this segment?
We carry the full range of substructures and can offer these systems as well. A solar carport is always project business, though, and more complex than an open-ground array. It often involves architecture, the orientation has to be considered, and solar irradiation is sometimes not ideal. Sometimes the area has a basement underneath or there are power lines in the ground. A frequently asked question is how to handle rainwater drainage. These are challenges you do not have on open ground. That said, it is an excellent approach, and I think it is a real shame that only the electricity yield is factored into the economic assessment. A carport also provides protection from sun, rain and snow.

SL Rack is a full-range supplier covering roof, open ground and carport. What advantages do you see over specialised providers?
The segments learn from one another. Structural analysis is needed on the roof and on open ground alike. Aerodynamics and wind assessments are relevant in both areas too, and the expertise in handling modules is the same. There are also synergies in the components themselves. We can use our clamps across all systems. Internally, though, we keep the technical advisory teams separate. We have one team for open ground, which also covers carport projects, and one for roof. But purchasing, inventory management and structural calculations work across segments. We see the same synergies among our customers. Many now build both open-ground and roof systems, and even the wholesalers sell in both directions.

Last year you presented a solution for retrofitting green roofs. How often do you supply projects of that kind?
Not often enough, unfortunately. We have solutions for both retrofit and new build, but demand is muted. Part of the reason is that green roofs still make up a fairly small share of the overall market. According to the German Feder-

al Association for Green Buildings, the figure is around 13 percent. The specialist green-roof suppliers also often have their own solutions for combining green roofs with solar.

What is next for the roof segment?
An important topic is the requirements set by the ZVDH, the German roofing trade association, for mounting solar systems on roofs. Our Delta plate, a roof replacement panel, and the sealing around the roof hook are direct responses to those requirements. We work closely and productively with roofers on this. There are also new roof coverings that we need to respond to. And wind is something that occupies us intensively.

Can you elaborate?
We have carried out wind tunnel tests at one-to-one scale, with original modules at full size. The results have been very revealing, and much closer to reality than the approximations used until now. One finding is that with flat-roof systems you will never get away entirely without ballast. That is what our wind tunnel tests showed. A ballast-free system would only work if you could define the wind, meaning it would only ever come from one direction. But that is not how it works in practice. With full-scale testing, though, we can optimise the ballasting precisely.

What role does software play at your company?
Software is a major topic. We want to support the installer in the planning stage and we feel responsible for the outcome of their work. If an installer uses our software to design the layout and has followed our specifications, we guarantee that the planned system will perform as designed.

What are you working on with the software?
We are working on making it simpler and faster, on optimising the roof survey function and on mapping the structural analysis end to end, including terrain categories. We are also integrating the ordering process so the installer can order the components from the whole-saler directly from within the planning tool. We are also developing an availability display: if a fitter on site realises something is missing, they should be able to see immediately which nearby wholesaler has the product in stock. We are also using AI, for instance for terrain modelling in open-ground planning.

Beyond the software, what support do installers get?
We offer first-installation support, for example. It matters to us that we communicate the product advantages we built into the design. It is not a given that the installer recognises them straight away. Beyond that, we provide planning advice, training on the software, and, crucially, support with complaints. If there is a problem on site, the system supplier has to stand behind the installer and find a good solution together. We also stock all our roof products and ship from the warehouse, so delivery is practically next day. For open ground we work on a project basis, but because we have our own production we can manufacture at short notice.

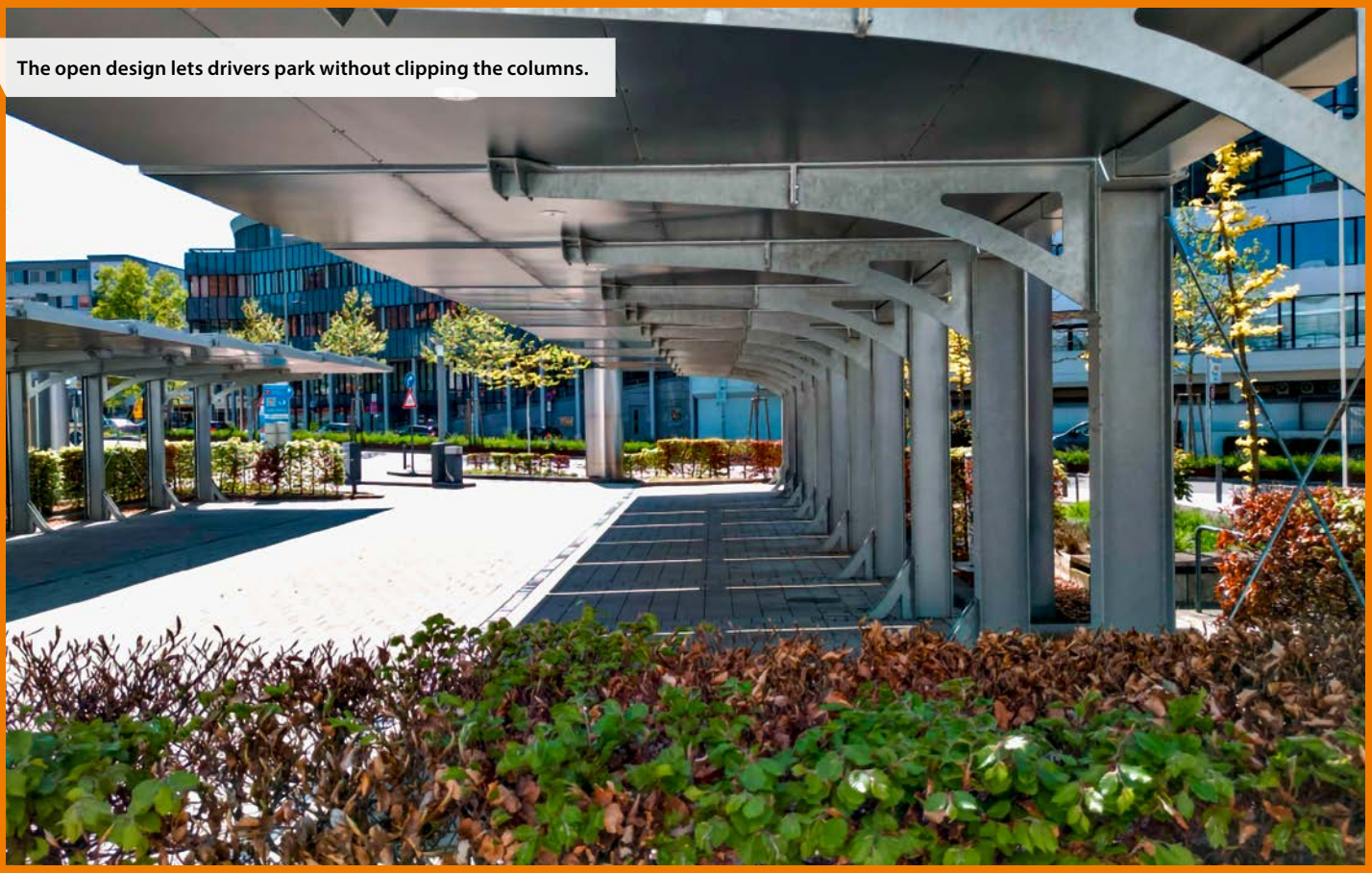
How much can you produce?
We deliver around two gigawatts a year for open ground and another two gigawatts for roof, so roughly four gigawatts in total. Production is well utilised. What goes beyond our own capacity, we buy in. We are not expanding production further at the moment but work with partners in Austria and Bulgaria. Aluminium profiles that we do not produce ourselves come from Turkey and Berlin, among other sources.

Finally, what challenges do you face in the open-ground segment?
Margins are tight, and you fight for every percentage point. In principle that is a good thing, because we want affordable electricity and everyone in the value chain has to make their best contribution. But it means that substructures have to be optimised relentlessly. Then there are the geological requirements, which differ at every site, and the structural verifications.

Interview by Sven Ullrich.
▶ ***https://www.sl-rack.co.uk/***

photo: SL Rack

The portfolio also includes mounting systems for solar carports.



The open design lets drivers park without clipping the columns.

photo: UV Energy

Retrofit solar for working car parks

Carports ■ Slimline systems that need no concrete foundations are well suited to retrofitting existing car parks with solar. They are not only cost-effective, they also allow construction to proceed while the car park stays in use.

by Sven Ullrich

Using car parks for photovoltaic installations is, in many ways, an obvious and multi-beneficial move, and plenty of businesses and other institutions have recognised as much. Supermarkets and shopping centres can offer genuine value to customers who park, and increasingly charge, their EVs comfortably in the shade of the modules overhead. The electricity generated either flows into staff vehicles at commercial sites or supplies shoppers at retail centres. Municipalities stand to gain most in sheer scale, with civic and leisure-centre car parks often large enough to host hundreds of kilowatts each.

Bolted onto the tarmac

Delivering such projects, however, is rarely as straightforward as it looks. Neither commercial operators nor supermarkets can afford to close their car parks for weeks on end while modules are installed overhead. This is where new structural concepts come in, built around rapid retrofit. "We can close off a single row of parking spaces. The rest of the car park stays open while we put up the carport, then we release that row again and move on to the next," explains Steffen Theurer, managing director of UV Energy.

The company has built its carport business specifically around this kind of phased retrofit. Installation requires no major excavation. The structure stands on a steel foot anchored into the existing surface using metallic point foundations. These measure 50 mm in diameter and can run up to two metres deep, with the actual length set by the substrate underneath the car park and the wind and snow loads at the site.

The supports are mounted to the rear of the steel foot and rise high enough to leave three metres of clearance between the ground and the underside of the modules, enough for vans to park beneath the carport. Where required, UV Energy can extend the supports further still, adapting the system for logistics operators that need to fit trucks under the array.

Modules built into the frame

At the top of the supports, horizontal mounting frames carry the modules, which sit directly within the framework. The frames come in a standardised size of 5.30 metres wide by 2.40 metres long. The system can be configured either as a single-pitch roof covering one row of parking, or in a Y-shape straddling two rows back-to-back.

For module integration, UV Energy offers two options. The first uses semi-transparent modules carrying general building approval (allgemeine bauaufsichtliche Zulassung, abZ). These let part of the sunlight pass through, giving a bright, naturally lit space below while still providing shade and shelter from rain. Given the frame dimensions and current module outputs, this version delivers around 2.7 kW of installed capacity per frame.

Using standard modules

The second option reaches 2.8 kW per frame by using standard modules of the kind installed on ground-mounted arrays or rooftops. Because these are not certified as overhead glazing, the installers fit a subroof of trapezoidal sheet metal beneath the modules, which protects the area below should a module ever be damaged.

UV Energy has decided not to use a trapezoidal sheet metal roof with modules mounted on top. The frame-based approach lets the company handle larger modules without difficulty, since each module is supported continuously along all four edges, which makes the structure considerably stronger. The trapezoidal sheet elements can also be removed from underneath, which simplifies module replacement in the event of a defect.

There is a further benefit to this approach. By integrating the modules into the frame structure, the result is a closed surface that does not let water through. Thanks to the slight pitch, water runs to the rear in the case of the single-pitch design, or toward the centre in the case of the Y-configuration, and is channelled away from there. Depending on the location, the modules need cleaning once or twice a year.

UV Energy also dispenses with a second support, which keeps the area beneath the canopy more flexible in use and reduces the risk of drivers clipping a column.

Keeping car parks open

Beyond the slim profile and rapid assembly made possible by the wide module overhang, what matters most is that the system can be erected without interrupting car park operations. “That is extremely important for businesses, and especially for clients such as supermarkets and retailers. If a customer can’t park there, they simply drive to the next supermarket,” Theurer notes.

With UV Energy’s solution, the car park operator barely notices that part of the site is closed off. “We’ve calculated it: closing a car park entirely costs a large supermarket between 15,000 and 18,000 euros in lost revenue, depending on the size of the site,” Theurer says. That figure would come on top of the investment in the solar system itself.

Anchored with screw foundations

A similarly slim retrofit solution has been developed by Pillar Solar. The Ukrainian company’s carports stand on a base that can be anchored either with concrete foundations or with screw foundations driven directly into the ground. “We use a special machine to drive the screw foundations in,” explains Ihor Vasiutiak, technical director at Pillar Solar. “Beforehand, we only have to cut out a section of asphalt or remove a few paving stones. Once the system is up, we fill the surface back in.”

The screw foundations come in a range of lengths. “The required length is determined by a soil survey, which we always carry out in advance,” says Vasiutiak. This also secures the structural integrity of the system.

Three variants in the portfolio

Pillar Solar offers several versions of its solar carport. The slimmest is the Model W, in which the module surface rests on four V-shaped supports. The

advantage is that the system is inexpensive and quick to install, though the four supports do bring some risk of drivers clipping them when parking.

That risk is avoided with the Taurus model. It also stands on four supports, but these are arranged in pairs along one side of the carport, leaving the parking entry unobstructed. A diagonal brace between the supports and the module rails stabilises the wide cantilever, and a continuous transverse purlin runs between the support segments, allowing for generous spans.

A more visually refined variant is the Blade model. Here the module surface rests on a wide double-T support. It is a true single-post system, structurally optimised and notably stable despite its light appearance. The modules likewise sit on a wide-cantilevered double-T beam.

Configurations and roof options

Pillar Solar offers its systems in three configurations. The L-type fits a single row of parking. The Y-system spans two rows back to back, with the module surfaces inclined toward each other in the middle. A larger solar lean-to roof likewise covers two parking rows arranged in sequence.

For module installation, Pillar Solar provides two options. As a rule, the carports are clad with trapezoidal sheet metal roofs onto which the modules are fitted using a standard mounting system. "The second option uses channels into which the modules are inserted to form the roof skin," Vasiutiak explains. "For this we use modules with a special approval as overhead glazing."

No heavy machinery required

Retrofitting car parks with low-impact systems of this kind also streamlines the entire project workflow. Soil surveys and building permits are generally still required, but these are mandatory for projects of this kind in any case.

The actual installation, however, moves much faster. The elaborate planning of concrete or other foundations is no longer needed. "We don't need to bring excavators or other heavy machinery to the car park to put the system up," Theurer points out. "With conventional solar canopies for car parks, the process from planning to project completion takes 27 to 47 weeks. We get the entire planning process done in five minutes."

Modular and standardised systems

The system is standardised and modular in its expandability, which also allows the company to apply for the building permit under an accelerated procedure, since the application itself is always the same.

As a result, the car park operator typically receives the building permit within four to eight weeks, rather than the twelve to fifteen weeks usual for a conventional project. UV Energy also runs a planning tool on its website that allows operators to lay out the system in rough terms.

This further accelerates the overall planning process, since the rough layout draws on the address details of the car park, which already define the relevant snow and wind loads, while an AI calculates the structural design alongside.

The AI also calculates the capacity that fits the available area and the energy the system is likely to produce. This gives the car park operator all the key figures needed to plan and approve the budget, which speeds the project up further.

In this way, UV Energy can also handle the logistical planning while the operator waits for the building permit. With the system already designed, the planners at UV Energy know how many segments are needed and can prepare loading and transport in advance. They also know how many segments fit on a single truck. Within two to four weeks, UV Energy is ready to build.

Build-ready within two weeks

The trucks then deliver the carports to the site. "When the truck arrives at the car park, it is unloaded with a forklift. That is the only machine we need, including for the assembly itself," Theurer explains. "The truck brings a team of five fitters with it. Depending on the substrate and the conditions, this team puts up 20 parking bays in three to five days. That is how we generate the speed of project delivery."

UV Energy provides not only the full planning package, including the grid connection request and the building survey, but also financing for the project. "We've developed a straightforward onsite PPA model. The electricity supply contract runs for ten years, and within that period the entire system has paid for itself," Theurer explains.

For a car park operator using the solar electricity on site, this is attractive. They save the full grid charges on the electricity, which account for around a third of the electricity price.

They also have stable electricity costs over a ten-year period. To deliver this, UV Energy works with a banking partner or finances the system through a project company.

▶ ***https://en.pillar.ua/***

▶ ***https://uv.energy/***

GOODWE

Modular carport – aesthetics on the car park

Goodwe has developed a flexible, modular carport. It is a complete solution: Goodwe supplies the substructure together with the bifacial Polaris modules, all on a single pallet. The modules come with a dedicated frame designed for seamless integration into the substructure.

The module frames interlock so that they fully seal the surface from below while at the same time channelling rainwater and meltwater away. The modules are also laid in an over-lapping arrangement from front to back. This combination of dedicated frame and shingle-style installation lets water run unimpeded toward the rear of the carport, where it flows into a gutter for controlled drainage.

The installer can also vary the height of the carport according to customer requirements. The four columns consist of two segments that slide into one another. Each segment has several drilled holes through which the installer can set the height, after which the bolted joint is concealed with a cover plate. This makes the carport suitable not only for private cars but also for commercial use, where vans need to park beneath the structure.

photo: Velka Botička

The adjustable supports allow the rear height to be set between two and 2.5 metres, and the front between three and 3.5 metres. This makes the system suitable even for high-roofed vans. The three-metre spacing between the columns is sufficient for parking larger vehicles. With these dimensions, six Polaris modules fit into the structure, giving a capacity of just over 4.8 kW per segment.

▶ ***https://en.goodwe.com/polaris-series***

Installers need systems they can put up by feel – green roofs included.

photos: Wagner Solar

Less hardware, faster builds

Flat roofs ■ At the Intersolar, the manufacturers of mounting systems are set to show off their new and updated solutions for large commercial roofs. Once again, the focus will be on new market segments and quick, intuitive installation.

by Sven Ullrich

A great deal has shifted in the world of flat-roof mounting systems in recent years. New segments have come and gone, and much of the work now lies in the details, as well as making life easier for the installers up on the rooftops. In the commercial and industrial roof-top segment, the makers of substructures are once again sensing a pick-up in demand.

Part of what is driving this is the current high cost of energy. Commercial operators and industrial sites are responding to the uncertainty in energy markets by generating their own solar electricity and selling the surplus. The result is a segment that is moving in the opposite direction to the residential rooftop market.

Responding to new module sizes

Within the commercial sector, however, customer price sensitivity continues to put suppliers of mounting systems under pressure. Speed and simple systems that can keep pace with the changing demands of the module market are what suppliers now have to deliver. Ernst Schweizer AG (A5.540), for instance, will be presenting an update to its MSP flat-roof system at this year's Intersolar in Munich. "The aim is to enable efficient installation of systems even on roofs that are difficult to populate," says Victor Stenz, product manager for solar systems at Ernst Schweizer AG. "Simple, fast and safe are the points we have in our sights."

Among other things, the company has responded to the changing module sizes introduced over the past few years. To help installers to fit them, Ernst Schweizer has lengthened the module supports. "That brings us back to fitting standard modules at a ten-degree tilt," says Stenz.

Cable management improved

Ernst Schweizer has also reworked its cable management. The installer now has three options. Alongside the established cable tie, there is a new cable holder clip that fits quickly onto the support foot, and a connecting rail clip that allows cable trays from any manufacturer to be bolted onto the mounting system. "We've also given some thought to the optimiser and developed a clamp holder for it," Stenz adds. The clamp clicks onto the support foot, and the installer slots the optimiser into place.

There is also a new ballast fixing that mounts between two adjacent supports. "It secures the ballast stones against shifting in both the longitudinal and transverse directions," explains the Ernst Schweizer product manager. "We were after a solution our partners would find straightforward to handle. At core, we put in what they asked for, and leave out what they didn't."

All components deburred

Speed of assembly is also the theme at SL Rack (A6.490). The company has continued refining its established Fast Flat system for flat roofs. "The installers have taken to it well, because it goes up quickly and the logistics make sense: 100 kilowatts fit on a single Euro pallet," says Ludwig Schletter, managing director of SL Rack. "That cuts down on the storage space needed."

For gravel roofs, SL Rack has developed dedicated feet that lift the system clear of the gravel layer and channel the load into the substructure. The company has also reworked its connection to the roof skin, via stock screws or similar fixings, to handle higher wind loads. "Our philosophy is generally to get by with as few parts as possible," says Schletter. "We've also reached a high degree of preassembly. And every part is deburred, so installers can grip them without injuring themselves." This is not always taken for granted, and it directly affects how fast and how safely the fitters can work.

Ballast-free installation

A whole-system installation approach is also at the centre of OBO Bettermann's stand (A6.470). The company addresses not only the mounting system itself but also cable management and lightning and fire protection. That holds across all the segments OBO Bettermann serves: pitched roofs, industrial and commercial roofs, and the open ground.

At Intersolar, OBO Bettermann is presenting the new ballast-free Magic PV Flat Glue mounting system, alongside an extension of the ballasted flat-roof system Magic PV Flat Basic. The ballast-free solution consists of a universal base foot fixed to the roof surface, to which the solar array is attached.

For slightly pitched roofs

This means generators can also be installed on slightly pitched roofs: the Magic PV Flat Glue can be used on bitumen membranes up to five degrees and on plastic membranes up to eight degrees. The array is installed parallel to the roof. With the Magic systems, OBO Bettermann is aiming for an installation that is, as far as possible, free of screws and tools across all components.

photo: Ernst Schweizer

Ernst Schweizer has fitted its MSP system with a longer support.

photo: T-Werk

T-Werk is bringing a new green-roof mounting system to Intersolar.

photo: Wagner Solar

Wagner Solar has built proper maintenance access into its green-roof system.

"That keeps the systems simple and also brings down installation time," says Nils Palzhoff, product manager at OBO Bettermann. "And that is generally the decisive cost factor, given the persistent skills shortage."

Pre-assembly does the work

Roof-parallel mounting is also the new offering on the Renusol stand (A6.411). It is a reworking of the Cologne manufacturer's established FS Pro. "What sets it apart is that it comes pre-assembled," explains Marko Balen, head of business development at Renusol. "The supports are already integrated into the base rail and simply fold up into position."

The protective mat is also pre-fitted to the base rail. This minimises the work required on site and helps to keep the build moving. The pre-assembly approach also makes quality issues less likely on site.

Renusol is extending the same logic to its roof-parallel mounting variant, which will be released as the FS Pro 0. It addresses a particular niche, namely arrays on slightly pitched roofs that go beyond the conventional flat-roof slope of up to five degrees. "These are projects we'd had enquiries about from time to time," Balen reports. "To serve that segment as well, we've adapted the established FS Pro accordingly."

A hybrid of ballasting and fixed attachement

For such projects, Renusol works with a hybrid of ballasting and fixed roof attachment to secure structural stability. The company allows a roof fixing to be bolted directly onto the mounting system. "We work with various manufacturers of these roof connections," says Balen. "What's distinctive is that we have proprietary design software, which lets us incorporate the holding values from different manufacturers and produce a verification for the system as a whole, fixings included. Customers want a complete package. They don't want to have to think about which fixings will work with the system."

For dual-pitched roofs, an alternative FS Pro 0 setup connects across the ridge. The downslope forces of the two array sections cancel each other out, allowing a purely ballasted installation.

Adequate room for maintenance

Roof attachment will also be on display at the Novotegra stand (A4.179), though the manufacturer's main focus is on the green-roof system, including its planning capabilities. One concern there is making sure there is enough access for maintenance via service walk-ways, which are essential for working smoothly on the roof.

Planners had repeatedly asked for a wider service walkway between the module pairs of the green-roof system, and Novotegra has now built that into its Solar-Planit planning software. Row spacing of up to 4,200 mm can now be selected, producing a service walkway of around 600 mm.

Module supports lengthened

By the time of the Munich show, the south-facing variant of the green-roof system will also be plannable in Solar-Planit. Customers will then be able to set up and modify the design themselves, again with variable row spacing, allowing them to plan more flexibly and turn around quotes more quickly.

The green roof is also a centrepiece on the T-Werk stand (A5.370). The Triton Flora is built for extensively and semi-intensively planted flat roofs. It is based on the Triton mounting system in use since 2016. Longer module supports raise the gap between the underside of the module and the green-roof substrate to 30 cm.

Fewer components

The greater clearance allows for healthy plant growth, while the 80 cm row spacing between module rows leaves room for the planting to be tended without difficulty. As with the established Triton, the Flora variant is installed without tools or chips, using plug-bolt connections and without penetrating the roof, with project-specific ballasting.

Wagner Solar (A5.150) has also been refining the green-roof system it presented at Intersolar last year. The Tric F Green is a ballast-optimised green-roof system weighted with the green-roof substrate itself.

Near-total freedom

The installer has near-total freedom in setting the orientation of the array and the modules. The system can be built in either south-facing or east-west configuration, and the modules can be mounted either portrait or landscape. A flexible build can also accommodate gradients and unevenness in the roof.

Wagner Solar has positioned the maintenance walkways at the high points of the array. This brings more rainwater to the green roof and makes its upkeep easier.

Mounting under high snow loads

The system now gets by with fewer components. Wagner Solar has cut the number of supports by 50 percent, and many parts now arrive pre-assembled at the factory, which makes for a more efficient build. The system can also be erected at varying module tilt angles, and a flexible height adjustment lets the gap between substrate and module underside be set anywhere between 30 and 45 cm.

Commercial roofs are among the focal points of the Wagner Solar stand, following the company's recent additions to its pitched-roof portfolio. The established Tric F Duo now comes in a version 2.0, which allows clamping on the long side of the module for higher snow loads. Large-format modules can now only be clamped on the long side, a development that Wagner Solar covers with the version 2.0 of the Tric F Duo.

Demand from industry rises

Here too, fast, error-free and secure assembly is the priority. Wagner Solar achieves this through a high degree of pre-fabrication. The new system also lets surge water through and spreads the load across a wider area of the roof.

The commercial segment, alongside open-ground installations, is currently central for Wagner Solar. The company is feeling the rise in demand brought on by the current crises. For commercial and industrial customers, generating their own electricity from renewables has rarely been as attractive as it is now. It offers a route to independent, secure and affordable supply.

- ▶ *https://www.ernstschweizer.ch/en/*
- ▶ *https://www.novotegra.com/en/*
- ▶ *https://www.obo.global/*
- ▶ *https://www.renusol.com/en/*
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- ▶ *https://wagner-solar.com/en/*

PREMIUM MOUNTING TECHNOLOGIES (PMT)

Evo Green for green roofs certified

The German Institute for Building Technology has granted general building approval for the Evo Green mounting system by PMT, recognising it as a complete system. As a result, planners and installation companies no longer need to provide additional project-specific documentation. For larger construction projects and public tenders, systems with general approval are often a requirement.

PMT Evo Green is based on the Evo system and has been specifically developed for green roof applications. It is available in various system heights and can be adapted to different ballast requirements and vegetation heights of the roof greening.

A flexible cable management system protects cables and modules during maintenance work or vegetation cutting. The design follows a modular kit principle. The mounting system is suitable for all commercially available framed solar modules and can be integrated efficiently and safely thanks to its sophisticated system architecture.

It is ideal for green flat roofs with the high demands on functionality and flexibility. Sophisticated click connections, pre-assembled components and flexible module row spacing enable rapid and low-coordination implementation. High-quality system components, integrated cable routing, and optimized load distribution ensure a high degree of safety and stability.

▶ *https://pmt.solutions/en*

Installers are picking up more pitched-roof work again, and the new solutions on show at Intersolar should help with the load.

photo: Dominic Nahr/Swissolar

Metal tiles replace the angle grinder

Pitched roofs ■ Stricter mounting rules are pushing manufacturers toward metal replacement tiles. New solutions for trapezoidal sheet and other coverings will also be on show at Intersolar.

by Sven Ullrich

Homeowners are currently holding back on solar installations. The residential segment is slower than it was, and forecasts suggest it will not reach the levels of a few years ago. The mounting-system suppliers in this market are feeling the effect.

There are, however, signs of a slight recovery. "After a cold winter, we are seeing demand improve as spring arrives in March and April, even though it is still below last year's level," says Willem Haag, managing director of K2 Systems. "This is also reflected in the official installation figures: rooftop additions in Germany in the first months of the year are likewise still below the previous year. Against the backdrop of the war in Iran, though, there are now clear signs that demand for photovoltaics is picking up across all segments," Haag adds.

More airflow behind the modules

Regardless of this slight recovery, the manufacturer has been working on its systems for pitched-roof installation and will be presenting the updates at this year's Intersolar in Munich (stands A6.190 and 280). The developments for pitched and slightly inclined roofs relate primarily to trapezoidal sheet. Here the Renningen-based company has developed the Multi Rail High.

This is a variant of the Multi Rail short-rail system, laid parallel to the corrugations, that creates more distance between the solar module and the roof skin. The two side flanges of the U-shaped rail have been extended. With this K2 Railup, the installer gets better rear ventilation behind the modules, which improves output thanks to cooler operating conditions. It also creates space for additional components such as power optimisers mounted underneath the modules.

Form-fitting installation

The K2 Railup is available for both trapezoidal and corrugated sheet roofs. For corrugated sheet, the base of the short rail is rounded so that it fits snugly against the profile. This also ensures that the rail's EPDM layer properly seals the screw holes.

K2 Systems has also worked on the mounting options for its insert-rail variant. Until now, these rails were mounted on trapezoidal sheet using the Multi Rail. The installer can now also combine them with the simpler Basic Clips, small holders made of glass-fibre reinforced plastic that screw directly onto the high corrugation of the trapezoidal sheet. The insert rails slide into them. Because they are floating-mounted, thermal expansion is not an issue.

Angle grinders are off limits

Mounting-system manufacturers also have to respond to changing requirements. On pitched roofs, the issue is less about module size, as it is on flat roofs, and more about the rules set by the ZVDH, the German roofing trade association. On pitched roofs with a slope of less than 60 degrees, tiles and roof stones may no longer be cut with an angle grinder.

That makes conventional roof hooks obsolete. A growing number of manufacturers are now developing metal replacement tiles with an integrated roof hook. Varista (A6.450) is presenting one such solution at Intersolar. The VSZ metal replacement tile saves the installer considerable work because the tile no longer needs to be cut. According to the manufacturer, this speeds up installation by around 30 percent.

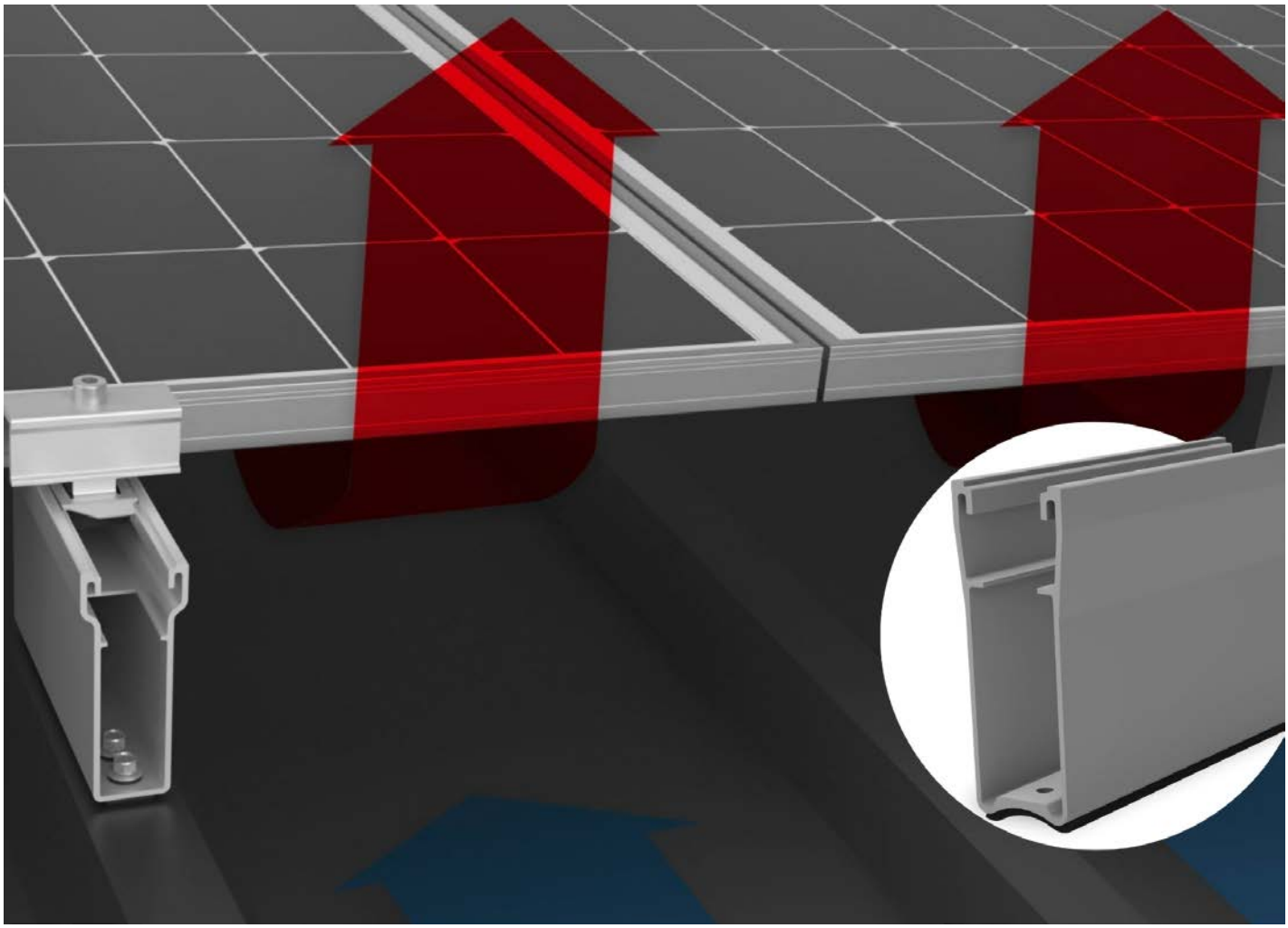

photo: K2 Systems

The Multi Rail High from K2 Systems opens up more space behind the modules.

Flexible on the batten

The Varista VSZ can be mounted flexibly on the battens and is compatible with a wide range of roof tiles, fitting precisely into the covering. It is made of corrosion-free aluminium and comes in three standard colours: plain, black and terracotta. If builders need other colours, Varista can produce it in any RAL colour. The design also gives the replacement tile high stability, allowing it to be used even in the highest snow-load zone 3.

Schletter (A6.180) also has a metal replacement tile in its portfolio, the Alu Tile. To cover as wide a range of roof tiles as possible, the manufacturer supplies the replacement tile without an integrated roof hook. The hook comes separately, and the installer screws it to the replacement tile on site. It can be combined with any of the metal roof tiles.

More planning options

Novotegra (A4.179) has focused primarily on the planning and structural calculations for site-supplied fixings such as the various metal replacement tiles. Specifically, this concerns the Lehmann tiles with integrated roof hooks that Novotegra has had in its portfolio for some time.

Until now, it was not possible to generate an overall structural analysis, and with it an installation plan, for the combination of these fixings and the C-rail that Novotegra uses as standard. In future, installers will be able to plan these fixings in Solar-Planit. Planning is possible both for the Topfix system on tile roofs with Lehmann tiles and for solar brackets from other tile manufacturers. In the latter case, the tensile, compressive and shear load capacities of the fixings need to be known. Installers can now also plan arrays on standing-seam metal roofing with clamps from the standing-seam manufacturer, combined with the Novotegra system.

Roof-integrated systems updated

New products for roof-integrated installation will also be on show. Megasol (A1.340) will be presenting its new low-glare modules in various colours, including one designed for slate roofs. Heliup (C4.550F), a French manufacturer of lightweight modules, is coming to the Intersolar at the Munich fair ground, too.

Established systems will also be on display, among them the Solrif from Ernst Schweizer (A5.540). The Hedingen-based manufacturer will be bringing its latest developments to Munich, including the flexible Vario flashing.

This replaces the range of connection flashings that the installer previously had to keep in stock to finish the array at the ridge. Ernst Schweizer also has the Vario gauge in its portfolio, an installation aid that speeds up the setting of roof hooks for the Solrif modules.

- ***https://ernstschweizer.com/en/***
- ***https://k2-systems.com/en/***
- ***https://www.novotegra.com/en/***
- ***https://www.schletter-group.com/***
- ***https://www.varista.de/en***

photo: Varista

Varista has developed a metal replacement tile with an integrated roof hook, compatible with a wide range of roof tiles.

Plenty of colour: the new solutions from roof-integrated system makers are designed first and foremost with heritage protection in mind.

photo: Věka Botička

The colour question on heritage roofs

Roof-integrated mounting ■ On historic roofs, the wrong colour can stop a solar project before it starts. A growing number of manufacturers now offer tinted and low-glare modules in shades designed to match the surrounding tiles.

by Sven Ullrich

PV and heritage protection may not have been natural partners, but the relationship has shifted decisively in recent years. Since German law defined photovoltaics as being of overriding public interest, heritage officers can no longer reject solar applications outright. Instead, they have to work with builders and planners to find ways of integrating PV into the building envelope.

The aesthetics of the protected building naturally remain central, but suitable solutions have been available for some time. At this year's Dach+Holz trade fair in Cologne, Wevolt, the photovoltaic subsidiary of building materials supplier Wienerberger, presented a new development: a tile-red version of the X-Tile roof-integrated solar element. "It has gone down well with visitors to the fair," says Markus Schorer, head of PV AC installation at Wevolt. "It was a development we pushed forward in response to demand from the market."

High output despite the colour effect

Until now, these elements were only available in black. With the red tile, the company is explicitly expanding its portfolio with heritage protection in mind. The solar roof elements blend visually into the surrounding tile roof despite a slight colour variation, while still delivering high output.

The tile-red element has the same dimensions as its black counterpart. At its cover width, it replaces five Actua 10 roof tiles or 5.5 Plano 11 roof tiles from Wienerberger. It is also lighter: the solar element weighs just 13.8 kg, compared with a good 22 kg for the tiles it replaces.

Roof tile range expanded

Alongside the X-Tile solar roof elements, Wevolt also has the X-Frame roof-integrated system in its portfolio. This is based on a tray substructure into which the micro inverters and framed solar modules are mounted. The

tray fixes directly onto the roof battens, placing the array on the same plane as the roof tiles so that it sits more naturally in the roof.

The X-Frame trays are laid with lateral and longitudinal overlap and finished with flashing, forming the water-bearing layer, which makes it possible to use standard framed modules. With the X-Roof, Wevolt is planning to add a fully roof-integrated system in which the modules themselves form the water-bearing layer.

Nelskamp has had tile-red solar roof elements in its portfolio for some time. At Dach+Holz this year, the company presented two further additions. "We now have ten different tile profiles that are compatible with our solar roof elements," says Frank Engelmann, head of training at Nelskamp. The portfolio is close to complete: Nelskamp has 14 tile profiles in total.

New to the range is a PV tile module for the Nibra flat roof tile. "Developing a solar element compatible with these flat roof tiles was not straightforward," Engelmann explains. "The elements have to match the typical profile, with a flat, straight trough and a curved cover roll."

Matched to the tiles

Nelskamp has incorporated this tile profile into the matching PV tile module, which is laid over the Nibra tiles. The frame of the solar element includes a recess that follows the curve of the cover roll. The connection at the top was also a challenge, because the flat roof tile has a foot rib that engages with the head interlock of the tile below.

Since it is not possible to add a head interlock to the cover glass of the solar module, Nelskamp now also supplies flat roof tiles with the foot rib removed at the factory. This saves the roofer from grinding it off on site, which is not only dusty but can also cause tile breakage.

The Nelskamp F10 Pro flat roof tile also has a different cover width from the previously compatible tiles, so Nelskamp had to adjust the width of the laminate for this element to fit into the tile roof without gaps.

That was not necessary for the new solar element compatible with the Finkenberger tile. Nelskamp's roof tiles almost all share the same cover length and cover width, so the developers only had to adapt the existing Planum PV element. The Finkenberger tile has a distinctive profile of its own, with two deep corrugations and a rounded raised corrugation between them.

Roof tile does not rest on the solar element

The solar element sits on the raised corrugation, with the gap between module and deep corrugation sealed with an EPDM packing piece to keep the roof watertight. For the connection at the top, Nelskamp supplies adapted tiles in the foot area so that the overlapping tile does not rest on the solar element. "There is one further detail at the moment: the Finkenberger tile has a raised side interlock, whereas the plain tile the module was originally developed for has a low side interlock," Engelmann explains.

For now, roofers have to double up the batten by eight millimetres at the edge of the modules to bring the interlock height of the modules up to that of the tile. "We already have a solution for this, which we are now bringing to market, so the roofer will no longer need to fit the spacer batten," Engelmann says.

Two different widths

Nelskamp offers both new roof elements in different widths. The company already has its Planung elements in lengths of 150 and 90 mm, so both lengths are also available for the Finkenberger tile. Because the flat roof tiles have a different cover width, Nelskamp offers the solar elements in widths of 150 and 75 mm.

Roofit Solar has also presented new solutions with heritage protection in mind. The company specialises in building-integrated solar modules in which solar glass is laminated onto standing-seam metal roofing, using a technology developed jointly with the Tallinn University of Technology. The module doubles as a solid roof covering that can be laid just as easily as a con-

photo: Veika Botička

Nelskamp has widened its range of solar roof tiles.

SOLAR FABRIK

Photovoltaics on a listed monastery

The installation company Tellus Systemtechnik has completed a 99 kW photovoltaic system on the Lamspringe monastery in the Leineberg region. Across roughly 400 square metres, 220 Mono S4 Halfcut modules of the Solar Fabrik Trend Full Black type are installed, each rated at 450 W. All the electricity is fed into the grid. The system achieves a specific annual yield of around 1,060 kWh per kW.

The Benedictine monastery is a listed building, which placed particular demands on the installation. To integrate the modules into the historic architecture as harmoniously as possible, they were mounted in a single continuous rectangular area without stepping.

The modules were sampled in advance and combined with a fully black anodised substructure. The earthworks for the cable routing were carried out under archaeological supervision to protect any potential historical finds. "The project shows how photovoltaics can work in the surroundings of listed buildings," says Christian Laibacher, managing director of Solar Fabrik.

▶ *https://solar-fabrik.de/en/*

photo: Solar Fabrik

ventional standing-seam metal roof. At Dach+Holz, Roofit Solar showed its BIPV modules in a range of colours.

Alongside the standard black solar modules (RAL 9005), builders can now choose iron grey, terracotta or pale green. This makes solar possible not only on heritage-listed buildings but also in old town centres with predominantly red roofscapes, in settings that call for a copper-like appearance with green patina, or in areas where grey roofs are required.

Reflection ruled out

The company developed these options in response to market demand, as Anneli Vernik, head of marketing at Roofit, reports. "We saw a gap in the market that photovoltaics had not yet filled," she says. "We first tried to find out which colours were most in demand."

The result was these three colours. Roofit Solar can also offer custom colour solutions. "Since these involve additional lead time and cost, they are mainly of interest for larger projects," she says.

Non-reflectice modules

Roofit Solar also presented a second new product at Dach+Holz in Cologne: a non-reflective module, now available in an anthracite matt finish. "This can be installed without any issues in residential areas where glare from solar systems has been a recurring problem," Vernik says. "It can even be used in sensitive locations such as around airports." Roofit Solar's black systems have also received the Red Dot Design Award, underlining the combination of function and visual quality.

Megasol also showed low-reflection modules at the fair, fitted with granite grey or tile-red module glass. With the Mega Slate, roofers can not only combine photovoltaics with red tile roofs but also use them on slate roofs. The low glare makes them suited to residential areas and locations near airports, and the finish gives them a slightly warmer appearance.

All sizes can be combined

The modules come in three sizes, all of which can be combined. They share a height of 465 mm but differ in width: the widest measures 1,081 mm, the narrowest 357 mm, with a 719 mm module in between. This allows better use of the available roof area.

Megasol now has four module sizes in its Level Up system, which can also be combined with the Mega Slate. Installers can wire them in any combination, since all modules use the same cell technology. The installer only needs to make sure the total stays within the MPP range of the inverter. Megasol offers an online design tool for this.

The planner selects the right roof using Google Maps, then refines the roof area to match the actual dimensions. The software handles the layout automatically, including string plans, installation plans and parts lists. The installer can then order the materials online.

▶ *https://megasol.ch/en/*

▶ *https://nelskamp.de/en/*

▶ *https://www.wevolt.energy/*

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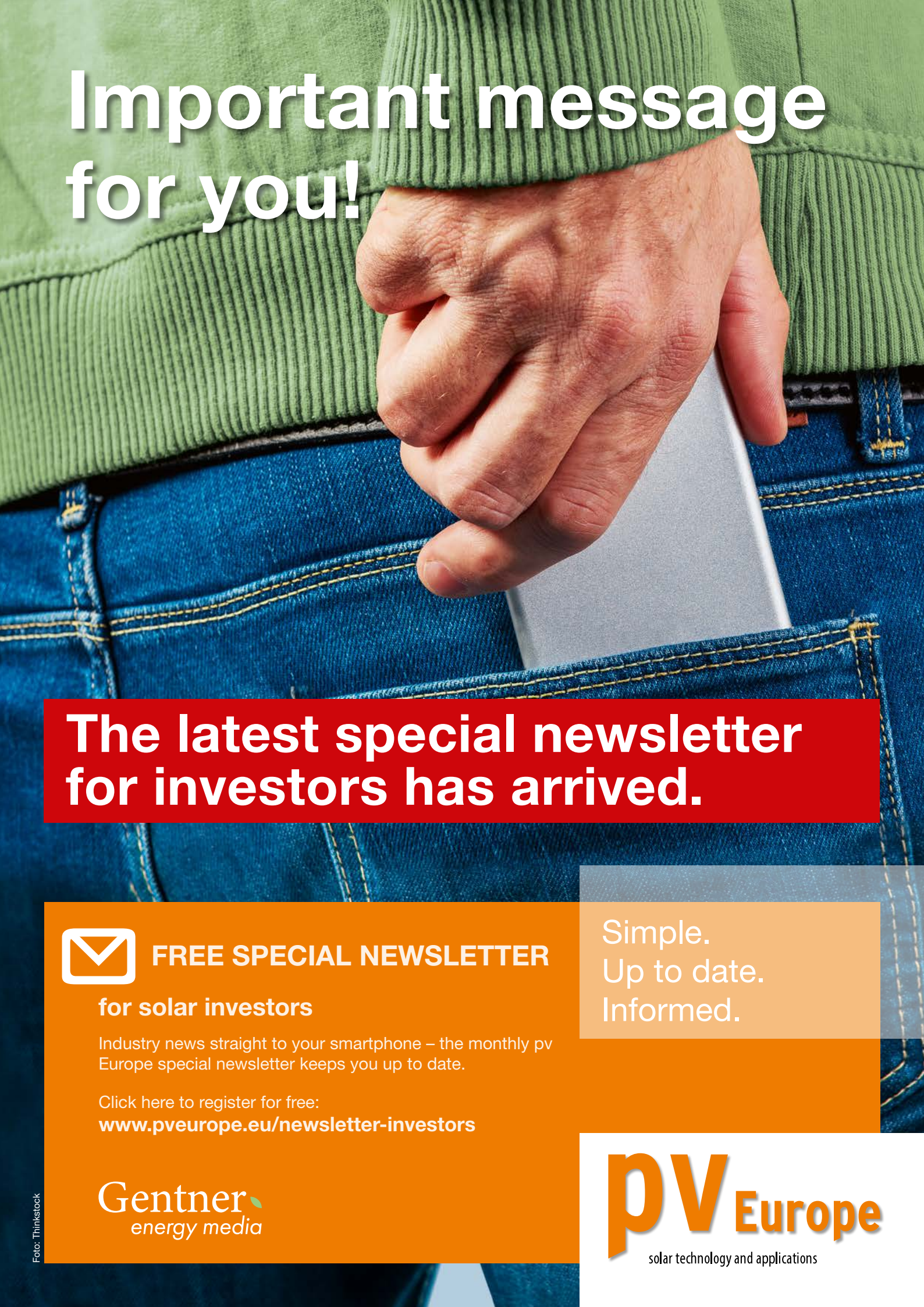
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