

**EU PVSEC and
IPVEA present the
"PV Production Forum 2012"**

The European Photovoltaic Solar Energy Conference and Exhibition (EU PVSEC) and the International Photovoltaic Equipment Association (IPVEA) present the PV Production Forum 2012 during the 27th EU PVSEC in Frankfurt. Jointly organized by IPVEA and EU PVSEC, the third edition of the PV Production Forum provides an international platform for photovoltaic manufacturing technologies. (WIP)

Continued on page 3

**PV equipment suppliers are
concerned about EU ProSun's
anti-dumping action**

The manufacturers of components, machinery and equipment for photovoltaics in Germany see anti-dumping proceedings submitted to the European Commission by EU ProSun at the end of July with great concern. Instead of calling for protectionist measures, the industry should rather concentrate on its strengths and pave the way towards competitiveness of photovoltaics in Germany. The PV supplier industry has to focus on its technology leadership on international markets even more intense than in the past. (VDMA)

Continued on page 5

**Parallel events com-
plementing the EU PVSEC
conference program**

The 27th European Photovoltaic Solar Energy Conference and Exhibition (27th EU PVSEC), taking place from 24 to 28 September 2012 in Frankfurt, Germany, presents the comprehensive program of Parallel Events. (WIP)

Continued on page 7

**"Europe-Asia PV Forum"
on the EU PVSEC 2012**

The 27th European Photovoltaic Solar Energy Conference and Exhibition presents "The Europe-Asia PV Forum" on Monday (24.9.). The event takes place on the first Conference day from 14:30 to 18:00 and addresses key questions for the global PV solar sector. Two Introductory Presentations will be followed by a moderated round table discussion focusing on topics of strategic relevance for PV industry leaders, representatives from politics, finance and research. (WIP)

Continued on page 10

27th EU PVSEC

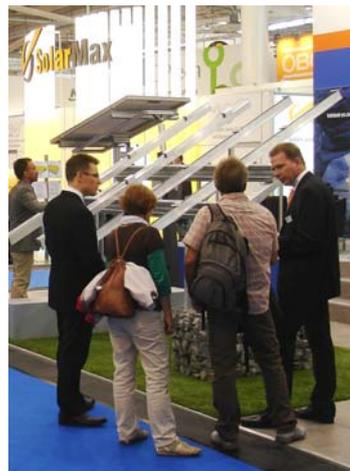
1,600 Presentations covering the entire scope of Photovoltaic technologies, markets and applications

The detailed Conference Program of the 27th European Photovoltaic Solar Energy Conference and Exhibition (27th EU PVSEC), taking place from 24 to 28 September 2012 in Frankfurt, Germany, has been published online. The international Scientific Committee, made up of more than 200 leading experts from the global PV community, reviewed and scored the record number of 1,843 abstracts, applying for presentation, to compose the program of the world's leading Photovoltaic Solar Energy Conference. Under the guidance of Conference General Chairman Dr. Stefan Nowak, Chairman of IEA PVPS, International Energy Agency, Photovoltaic Power Systems Program, and coordinated by the Technical Program Chairman Dr. Arnulf Jäger-Waldau, European Commission, DG Joint Research Centre, the Conference Program was finalized, featuring 86 Conference Sessions with 333 Keynote, Plenary, Oral and more than 1,300 Visual Presentations.



**86 conference sessions
covering the entire scope of photovoltaic
technologies markets and applications**

Dr. Stefan Nowak states: "The European and the world photovoltaic community will meet, discuss and debate about the most recent scientific progresses, technological successes, industrial developments, cost reductions, financial and policy issues, and market deployment results."



The Conference Program of the 27th EU PVSEC covers the entire scope of the PV solar sector and is structured along the following main topics:

- Material Studies, New Concepts and Ultra-High Efficiency
- Wafer-Based Silicon Solar Cells and Materials Technology
- Thin Film Solar Cells
- Components for PV Systems
- PV Systems
- PV – a Major Electricity Source

Dr. Arnulf Jäger-Waldau: "The Program offers overviews of the latest research findings, industrial progress and political landscape through Keynote and Plenary Presentations, and it provides specialised thematic sessions as well, where details are presented in a more focused and technical manner."

Dr. Nowak concludes: "The unique feature of this conference is the fact that it represents a "melting pot" where all the "hot" subjects around photovoltaic technology are being addressed."

This comprehensive Conference Program is complemented by a number of additional Parallel Events that offer a deep insight into specific topics and include the most recent scientific, technology, market and business trends. Detailed information on EU PVSEC Parallel Events will be published shortly. (WIP)

Advertisements

TRIC

**Das Montagesystem
für Solaranlagen**



Wagner & Co
SOLARTECHNIK



**FRANKEN
SOLAR**

**Hall 3.0
Booth H11a**





www.staubli.com/robotik

This is the largest number of abstracts ever

An all-time record number of 1,843 research and industry contributions from 74 countries have been submitted for presentation at the 27th European Photovoltaic Solar Energy Conference and Exhibition (27th EU PVSEC).

This is the largest number of abstracts ever received for a PV solar conference worldwide; it exceeds the number of abstracts submitted for the previous EU PVSEC and even for the joint 25th EU PVSEC and 5th World Conference on Photovoltaic Energy Conversion in 2010. (WIP)

Continued on page 5

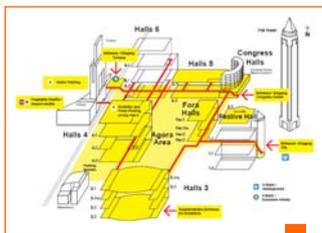
Global alliance of solar energy research institutes

Three leading solar research institutes: the U.S. Department of Energy's National Renewable Energy Laboratory, NREL (USA), Fraunhofer Institute for Solar Energy Systems ISE (Germany) and the National Institute of Advanced Industrial Science and Technology AIST (Japan) signed a Memorandum of Understanding to form the Global Alliance of Solar Energy Research Institutes GA-SERI. (ISE)

Continued on page 18

Advertisement

**EU PVSEC 2012
Floor plan**



**24. - 28.
September 2012
Fair ground
Frankfurt/Main**

Source: Messe Frankfurt

Parallel events complementing the EU PVSEC conference program

The 27th European Photovoltaic Solar Energy Conference and Exhibition (27th EU PVSEC), taking place



from 24 to 28 Sep. 2012 in Frankfurt, Germany, presents the comprehensive program of Parallel Events. These events complement the EU PVSEC Conference Program to offer a deep insight into specific topics along the most recent technology, market and business trends. In addition to the PV Industry Exhibition and to the leading international scientific and technology Conference Program with more than 1,600 presentations, the EU PVSEC Parallel Events address to global decision makers from industry, research, finance and politics.

The Parallel Events of the 27th EU PVSEC are realised with renowned international organisations such as EPIA – European Photovoltaic Industry Association, IEA – International Energy Agency, IPVEA – International Photovoltaic Equipment Association, EU PVTP – European Photovoltaic Technology Platform.

PV's growth will require a paradigm shift in the way electricity is produced, sold, transported and distributed. The high penetration of Photovoltaics into the electricity grid raises challenges and presents opportunities. How should the PV industry address them? And what will be the major implications of changes in the electricity markets? These and further questions are addressed by the 9th European PV Industry Summit. (WIP)

Continued on page 7

EPIA Industry Area

Network with key players of the PV industry, financial and research communities

The EPIA Industry Area at the 27th EU PVSEC will enable all visitors and exhibitors to discover our latest publications, follow our daily program of activities and benefit from special networking facilities during the whole week.

Activities on the EPIA Industry Area include:

- **Alliance for Rural Electrification workshop**
Tuesday 25 September 2012, 16:00 – 18:00
- **Investors Day**
Wednesday 26 September 2012, 10:00 – 18:00
- **Solar Europe Industry Initiative workshop**
Thursday 27 September 2012, 9:00 – 13:00 (upon invitation only)

(EPIA)

More Information under:

www.epia.org/events/photovoltaic-conferences-events-sponsorship/epia-industry-area.html

Advanced SOLIVIA solar inverters and enhanced accessories

Delta Energy Systems (Germany) GmbH exhibits the new transformerless SOLIVIA solar inverter models at the 27th EU PVSEC. The SOLIVIA 3.0, 5.0, 10 and 30 EU TL inverters have an output power ranging between 3 and 30 KW and complement the range of advanced transformerless inverters - for all installation sizes and requirements.

The new models achieve peak efficiencies of up to 98.1% and are based on a proven technology. In 2011, the SOLIVIA 20 EU G3 TL model was tested by the independent Photon Laboratory – with the result "very good". All models convince due to the compact design, ease of use and easy installation. The SOLIVIA 3.0 and 5.0 EU TL models are especially easy to install: With only two buttons and a simple menu structure the set-up is done in a few minutes. As a plus the two models offer, besides the RS485 interface, an Ethernet and Wi-Fi connection

option – enabling the retrieval of system data, even if the product is mounted in hard to access places, like under the roof or below canopy constructions. Ideally suitable for rooftop installations with common east-west orientation is the new SOLIVIA 10 EU TL. An extended power balancing function of the two integrated MPP trackers ensures higher yields and flexibility in regards to the system design. The SOLIVIA 30 EU TL model is based on the concept of the established 20 TL model, offering higher power output and the same housing of the SOLIVIA 20 TL model. The new transformerless models will be available on the European market in the fourth quarter of 2012 and can be purchased through Delta distribution partners. **Hall 3.1, Booth C14**



Image: Delta Energy Systems

**Best practices
and case studies on
"PV Production Forum"**

The "PV Production Forum 2012" addresses best practices and case studies that can assist management, purchasing staff, and product managers how to increase throughput, efficiency and save money in their production fabs. The forum will encompass energy storage within the Market Session and the afternoon will include presentations on OPV, thin film as well as silicon technologies. (IPVEA)

Continued on page 13

**Participants from
over 100 countries expected
at the 27th EU PVSEC**

The 27th European Photovoltaic Solar Energy Conference and Exhibition opens its doors on Monday, 24 September 2012, and is ready to welcome the global PV business and research community in Frankfurt, Germany. This unique PV solar gathering constitutes the world's leading science-to-science, business-to-business and science-to-industry forum for the global PV Solar sector.

The 27th EU PVSEC is the international platform to exchange the latest progress in PV development and manufacturing. Addressing the burning topics the global PV industry is facing, the 27th EU PVSEC confirms its role as a melting pot with the potential to provide new momentum to the further development of the PV solar sector. With 1,600 scientific, technical and market-related presentations, the 27th EU PVSEC is the leading international Conference in Photovoltaics in 2012. Participants from over 100 countries are expected to attend the 27th EU PVSEC.

27th EU PVSEC exhibition

The EU PVSEC Industry Exhibition represents the entire PV value chain. The 652 international exhibitors include manufacturers of PV production equipment, manufacturers of photovoltaic solar cells and modules, systems suppliers, companies and organisations specialised in project development, research institutes, finance and consultancy. Manufacturers of PV production equipment represent the largest industry segment at this show, followed by manufacturers of PV solar cells and modules, PV distributors and assemblers as well as manufacturers of balance-of-systems components. (WIP)

Continuation page 1

PV Production Forum 2012

An international platform for photovoltaic manufacturing technologies

The 27th EU PVSEC will host the global PV community at the Messe Frankfurt, Germany, fairgrounds, from 24 to 28 September 2012. The five-day EU PVSEC Conference shall be held from 24 to 28 September 2012, and the four-day EU PVSEC Exhibition runs from 25 to 28 September 2012.

The PV Production Forum 2012 addresses best practices and case studies that can assist production management, purchasing staff, and product managers how to increase throughput, efficiency, and save money in their production fabs. This educational meeting will feature presentations arranged around several focal topics including silicon, thin-film and future photovoltaic module and cell production technologies.

IPVEA members and PV industry professionals are invited to submit proposals to speak at this technology forum. (IPVEA)

For more information on the program and registration information, please visit the website <http://www.ipvea.org/pv-market-data/pv-forums-2012.html>.



Silicon carbide technology and DC voltages up to 1500 V

REFUso/ GmbH, one of the leading manufacturers of solar inverters, will exhibit at this year's European Photovoltaic Solar Energy Conference and Exhibition (EU PVSEC) from 24 - 28

September in Frankfurt. The company will showcase inverters in all performance classes, as well as a innovative monitoring solutions for photovoltaic systems. Highlights include the he high-end 20 kW string REFUso/ 020K-SCI inverter featuring silicon carbide technology a peak efficiency of 98.7 percent, the highly efficient REFUso/ 333K outdoor rated central inverter, as well as REFUgak , the connection box for PV Systems with strings up to 1000 und 1500V.



Image: REFUso/ GmbH

carbide semiconductor, which has circuit losses that are lower than in silicon transistors commonly used in power electronics. REFUso/ also increased the performance of the transformerless device to up to 20kW AC. In addition, the premium solar inverter performs without noise and can be operated in high temperature environments. Further characteristics of the new solar inverter 020K-SCI include a broad input voltage range, a precise and quick MPP tracking and a low weight of only 40kg. Most recently, REFUso/ was awarded the Plus X Award -- across four different categories -- innovation, high quality, functionality and ecology - for its REFUso/ 020K-SCI inverter. The innovation prize for products from the fields of technology, sports, and lifestyle honors manufacturers for the quality advantage of their products.

With 333kW of nominal power and the patented UltraEta® circuit topology, the solar inverter REFUso/ 333K reaches a peak efficiency of over 98.5 per cent, which allows for optimised energy conversion and usage. The REFUso/ 333K features a higher AC-voltage of 690 V, which is the established standard voltage level in industrial networks and wind power plants. It also features a higher DC-voltage of up to 1500 V. Due to this high input voltage, longer strings can be realized, which means less loss with the same power. Consequently this concept of higher voltages increases the efficiency of the whole PV system.

Hall 3.1, Booth J6

Roth & Rau achieves industry-leading silver savings in solar cells

Meyer Burger Technology Ltd (SIX Swiss Exchange: MBTN) today announced that its Group member Roth & Rau AG [Frankfurt stock exchange: R8R] has developed a process which uses inexpensive nickel in busbar metallisation for the electrical contacting of solar cells. The coating process includes both the front and rear sides of the cell within a production tool. This process, which is immediately available, significantly differentiates Roth & Rau from its competitors.

Depending on the contact technology, a saving of between 50 and 70% in expensive silver can be achieved and therefore significantly reduce the production cost of solar cells. A further benefit from the process is the fact that nickel is a readily available material. This means that solar cell manufacturers are not tied to specific suppliers as is the case with other materials.

The HELIA system, which was developed primarily for the production of high efficiency heterojunction cells, coats the solar cells with nickel in a shortened system configuration to form the front and rear busbars. This is achieved by means of a sputtering process. In contrast to other systems, the HELIA system permits simultaneous processing not only of the rear surface but also of the front surface on which there is a significantly greater potential for savings.

A further decisive benefit of this new process is the outstanding adhesion of the cell connectors to the front and rear surfaces of the solar cell as a result of the nickel metallisation in standard soldering processes. The metallisation of the fingers can thus take place regardless of the electrical characteristics of the busbar and be optimised to match them. In this way, the metallisation of the fingers is de-coupled from the solderability of the busbar, thereby enabling the use of new pastes and metallisation processes that do not currently achieve reliable solderability. The performance of solar cells coated with this process is comparable with that of solar cells metallised in the conventional way by screen printing. The concept and associated system will be presented at the Meyer Burger stand (Hall 3, E2) at the upcoming EUPVSEC trade fair in Frankfurt (MBTN)

Extra-class of High-speed-kinematics at PVsec, Francfort, 2012

New Stäubli TP80 fast Picker: The next generation of four-axis high speed Pickers – Setting new benchmarks for Pick & Place Applications in the PV & solar industry

Stäubli Robotics is introducing the TP80 fast Picker, an ultrafast four-axis new technology of high-speed pickers for standard pick & place applications. This innovative series of high-speed pickers deliver greater speeds of more than 200 picks per minute, and more flexibility at a lower cost to all markets. Stäubli has long set the standard for high speed and precision in robotic performance, ensuring the highest possible throughput and shortest cycle times.

This new robot represents the latest innovation – one that is more agile and lightweight while delivering extremely fast cycle times while maintaining high precision with homogenous repeatability "throughout the entire work envelope",



New Stäubli TP80 fast Picker

Image: Stäubli Tec-Systems GmbH, Robotics

unlike rival delta robots. A simple base or wall mounting eliminates the need for a large, costly gantry, further enhancing the robot's cost effectiveness and ease of integration. Additional advantages include a slim forearm for moving into slotted machine openings as well as harness and user lines feed-through the Z-axis that are all internal. The TP80 fast

Picker is also extremely rigid, and competitively priced offering an

economical alternative for numerous standard applications without sacrificing quality, durability or performance.

The TP80 robot is available in a 4 axis version, offering great flexibility depending on the user's needs. Standard features include a maximum payload of 1 kg, 200 picks per minute (sustained); 800 mm reach, and a Z-axis stroke of 100 mm. Additional features include very high rigidity, repeatability of +/- 0.05 mm at IP65 Protection Class when equipped with bellows. User lines such as pneumatic (4 and 6 mm) and electrical lines (4 twisted shielded pairs) are protected inside the arm and are available at the tool flange. Optional features include 2 solenoid valves, user installation and bellows.

The TP80 is controlled by the CS8 controller series, a single control platform able to pilot Stäubli robots. Various VAL software packages are available and perfectly suited for all end users, integrators, OEMs and machine-builders.

This enables the TP80 to become the first choice for a large variety of applications traditionally requiring delta robots until today.

In addition to packaging, the robot is ideally suited to the needs of all industries such as PV/solar power, pharmaceuticals, consumer goods, food, as well as electronics and automotive. Typical applications include high-speed pick and place, assembly, material handling, packaging and machine tending.

STÄUBLI

Hall 3.0, Booth H11a
www.staubli.com

Continuation page 1

Rapid examination avoids irritation on the market

Of course, it is the responsibility of European politics to advocate for the competitive position of companies based in Europe. But this can only be achieved by the strengthening of free trade and the fight against protectionist trends. In general protectionism harms the machinery industry. Chinese solar manufacturers are accused of selling their products below production cost worldwide in the long run. This accusation should be examined as soon as possible by the European Commission to avoid longterm irritation to the market. The last thing the German photovoltaic equipment industry now needs is a lengthy and unprofitable trade conflict with one of its core markets.

Uncertainties are detrimental to upturn – cost reduction as opportunity

Faced with the current efforts of the EU initiative ProSun the PV equipment companies fear that punitive tariffs on Chinese photovoltaic products could slow down the investment confidence of cell and module manufacturers worldwide sustainably as well. (VDMA)

Continued on page 14

REIS ROBOTICS expanding in China

With a new building comprising both production areas and offices, Reis Robotics enhances its presence in China. In the past years the Chinese subsidiary grew to about 200 employees who are selling, commissioning, and attending with service and maintenance the complete product range of Reis Robotics on site.



Image:
REIS
ROBOTICS

Now Reis is planning the building related to a further expansion on the Chinese market. A suitable parcel of land was already secured in Kunshan, East of Shanghai, where a new building will be erected that is already dimensioned for further growth. Completion of and moving into the new building is planned for the first quarter of 2013. (RM)

Continuation page 2

All-time Record:

1,843 abstracts from 74 countries apply for presentation at the 27th EU PVSEC

An all-time record number of 1,843 research and industry contributions from 74 countries have been submitted for presentation at the 27th European Photovoltaic Solar Energy Conference and Exhibition (27th EU PVSEC).

This is the largest number of abstracts ever received for a PV solar conference worldwide; it exceeds the number of abstracts submitted for the previous EU PVSEC and even for the joint 25th EU PVSEC and 5th World Conference on Photovoltaic Energy Conversion in 2010. This overwhelming contribution from PV research and industry experts confirms the EU PVSEC as the platform hosting the world's leading conference on Photovoltaic solar energy and the trendsetting PV industry exhibition. The EU PVSEC constitutes the world's leading science-to-science, business-to-business and science-to-industry forum for the global PV Solar sector.

A preliminary analysis of the submissions shows a significant trend towards further internationalisation, including a particularly strong participation from continents outside of Europe. The abstracts applying for presentation at the 27th EU PVSEC in Frankfurt, Germany, are currently being reviewed and scored by the international Scientific Committee made up of more than 200 leading research and industry experts from the global PV community. The 27th EU PVSEC is chaired by Dr. Stefan Nowak, Chairman of the Photovoltaic Power System Program, International Energy Agency (IEA PVPS). Dr. Arnulf Jäger-Waldau, European Commission, DG Joint Research Centre, coordinates the international Scientific Program Committee to set up a Conference Program of highest scientific standards. (WIP)



LumiSolarProfessional

High resolution electroluminescence module inspection

greateyes GmbH, the developer and manufacturer of high performance CCD cameras and solar cell/module inspection systems based on the methods of electro (EL)- and photoluminescence (PL), is happy to present you its newest product developments on the EU PVSEC 2012!



Discover what the eye can't see

Image: greateyes GmbH

LumiSolarProfessional system is a HiRes EL inspection system for conventional or thin film solar modules. The scanning system consists of a highly sensitive cooled 16 bit CCD camera and a precision linear drive unit to image cell strings or modules. A dark chamber allows measurements under ambient light conditions. The system can be flexibly configured and offers numerous functionalities for image analysis and user guidance.

New version: LumiSolarProfessional Top-Loading system offers a brilliant resolution of up to 32 Mpixel images of solar modules. The modules have to be put with their "sunny side" down on a frame in the upper part of the dark chamber whereas two cameras and a linear precision table are located close to the bottom side.

For measurements directly on-site: the transportable EL inspection system LumiSolarOutdoor allows to investigate the actual condition of solar panels in the solar park or in other PV constructions without detaching them from the installations. For imaging a highly sensitive CCD Camera system with range finder is used. A barcode scanner allows the identification and allocation of the solar modules.

The system is available in two versions. 1) A battery-based system allows to measure single solar modules. 2) A line-powered system allows examination of the whole string of solar modules in a stepwise procedure.

Hall 3.0, Booth D3

**CSUN exhibits at the
EU PVSEC showcasing new
innovative solutions**

CSUN, a specialized solar cell and module manufacturer, will participate in the EUPVSEC exhibition taking place in Frankfurt, Germany. The booth is located in hall 3.1, stand number G18. In addition to its recently introduced QSAR and Bifacial modules and its standard products, CSUN will also show a further innovative solution with increased efficiency and further reduced costs.



*Dr. Jianhua Zhao, CTO
from China Sunergy Co. (CSUN)*

Image: CSUN

Dr Jianhua Zhao, CTO at the CSUN Nanjing headquarters will present the new solution during the industry presentations on Tuesday the 25th of September at 15.15h at the Exhibition Forum in hall 3.1. "We are very excited to showcase a further milestone of our efficiency roadmap. While we are still at pilot stage we are confident that we will be able to bring this new development into production in the second half of 2013 emphasizing our commitment to smart and efficient solar solutions.", comments Dr. Zhao. Besides its R&D efforts, CSUN also strengthened its European presence by appointing William Sheng as CEO CSUN Europe GmbH. In addition to the EMEA region Mr Sheng and his team are also in charge of the growing South American market. William Sheng who will relocate to Frankfurt in November explains "the EMEA region together with the Latin American markets are the largest growth markets for PV outside of China. I am very excited to take over this further responsibility and lead the team directly from our German headquarters of the European organization."

Hall 3.1, Booth G18

Novelties at the EU PVSEC 2012

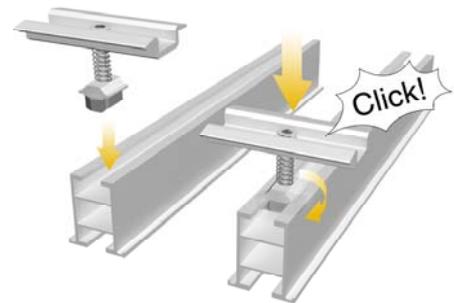
TRIC Mounting Systems – Fast, Flexible, and Simple



Wagner & Co and the solar system house Frankensolar jointly present the novelties surrounding the successful TRIC mounting system at the PVSEC 2012 in Frankfurt. From 2012 on TRIC box and TRIC clip panel fasteners complement the growing portfolio of TRIC mounting systems.

With their patented design the TRIC clip panel fasteners save precious installation time while increasing reliability and safety.

Wagner & Co and Franken-solar together present the TRIC mounting systems at the EU PVSEC in Frankfurt from Sept. 24 – 28, 2012. Particular emphasis is laid upon the new products TRIC box and TRIC clip. Interested parties are invited to inform themselves about the TRIC assembly systems at booth E6 in Hall 3.1.



The TRIC principle: fast and easy installation to save time and hence money

TRIC box already joined the successful TRIC range of solar racking systems in June 2012. TRIC box is suitable for all industrial flat roofs and impresses with its easy installation, flexible operation and low weight. Only two tools are required to assemble TRIC box, which minimizes installation time by up to 50% compared to existing alternatives. The two variants of the TRIC box – system allow for southern as well as east / west orientation of the solar power system. The vertical panel arrangement and their 10° pitch allow to utilize up to 95% of the roof area (east / west system).

Aerodynamically optimized, the design reduces additional weight load of roofs to the minimum, without requiring to penetrate the roofing. Individual project-related structural calculations are carried out by design engineers free of charge and are available through both partner companies, Wagner & Co and Frankensolar.



TRIC clip – panel fasteners will be available within the TRIC product portfolio as of October 2012. They are the perfect solution for time- and cost-saving installations of solar panels. The trick with the clip is simple but surprisingly efficient. Its patented TRIC clip mechanism turns fixing of the fastener in the mounting rail into a breeze – it just takes one-click. The audible "click" signal instantly confirms the correct position of the clip-TRIC nut. The self-securing TRIC clip always immediately places itself in the correct position, while it still can be moved

flexibly in the mounting rail. T head and the clamp itself are secured against accidentally changing their position, and the TRIC clip prevents the connecting member from sliding.

TRIC clip increases the reliability of the installation process and reduces costs, while providing a high level of user comfort. Since 2010 the cooperation of Frankensolar and Wagner & Co aims at stronger positioning their brand TRIC in the market – and successfully so!

Convince yourself of the trick with the clip and the variability of TRIC mounting systems and visit us at the EU PVSEC in Frankfurt.

Hall 3.1, Booth E6

www.wagner-solar.com

www.frankensolar.de

Reis Robotics - Standardized module production systems

Reis Robotics presents the latest developments for quality assurance and cost saving in fully automated production lines for solar modules. The innovative company from Obernburg am Main, Germany demonstrates to the world market again how production output and quality of solar modules can be increased simultaneously in existing production systems.

Reis Robotics will once again demonstrate their quality and cost reduction capability. Reis Robotics is a company known worldwide for its reliability in the field of automated production of solar panels. Since 2005 renowned solar panel manufacturers worldwide have been relying on both flexible and standardized module assembly systems of this supplier from the Frankfurt area. Meanwhile more than 130 installed Reis automated systems are producing solar modules for more than 6 GW annually of additional solar power.

Reis knows every necessary production process step of solar panels because the company itself helped developing them on the basis of their automation and handling know-how. As a result, every customer will get an individual solution based on standards with best possible price/performance ratio.

So, single production cells are provided as well as complete production lines - from project planning to commissioning. At customer's request the options include manual, semi-automatic or fully automatic production systems for crystalline silicon, thin film, and solar thermal module production. Eight subsidiaries worldwide ensure constant high integration results, after sales service and customer service.

Hall 3.0, Booth E7



Continuation page 2

Investors Day

Risk mitigation in PV investments - the key to sustainable market development

The Investors Day 2012 highlights finance topics including the risk mitigation in PV investments. Featuring CEO-level speakers from the industry and representatives from banks, investment funds, insurance companies and analysts explore how the finance world sees the PV industry.

What is a fair price for PV electricity?

As PV becomes more widely affordable and retail electricity prices continue to skyrocket, governments may well distance themselves from political involvement in PV market growth. What will be the approach to widespread deployment of PV taken by the electricity network businesses and their industry regulators?

Very Large Scale PV Systems for sustainability

This event evaluates the potential of Very Large Scale Photovoltaic Power Generation (VLS-PV) Systems, which would have a capacity of GW-scale, and how to accelerate and implement real VLS-PV projects.

Photovoltaics, forms, landscapes: How to use PV for shaping nearly zero energy communities

This event highlights the interaction of PV systems with buildings and landscape, and outlines the vision of a transition from PV Architecture into urban and non-urban landscapes and how architects take up this challenge. How could buildings look like to incorporate this energy source? How would out-of-city landscapes offer opportunities to satisfy the energy-hunger?

PV Production Forum

The PV Production Forum focuses on new production processes and equipment reducing manufacturing costs and increasing the performance for thin-film and crystalline PV technologies. (WIP)

More details on the EU PVSEC Parallel Events are available online under: www.photovoltaic-conference.com/parallel-events.html



Grenzebach presents high performance technology for efficient production

Cutting production costs, increasing product output- at the EU PVSEC the equipment supplier and automation specialist Grenzebach shows to be well prepared for the challenges of the market. The high tech experts present their solutions for the efficient production of thin-film-modules, CSP and CPV in hall 3, stand J41.



Image: Grenzebach Maschinenbau

With over 40 years of experience as glass equipment manufacturer Grenzebach is established as one of the leading global players for integrated solutions for the solar industry. With their concepts and designs the specialists have repeatedly set new standards for a more efficient production process.

At the trade fair Grenzebach presents a complete portfolio for the thin film, CPV and CSP market. This includes front end and back end technology with conveyors, washers, cutters and stackers, accumulators, handling robots, inspection systems, laser processing and process simulation, as well as MES systems for production planning and control.

The specialists place great emphasis on intelligent solutions in the areas of CPV and CPS. Experts predict good growth rates for both markets in the next few years- provided these technologies manage to realize their potential cost savings. An area that may also benefit from Grenzebach's longstanding experience in the industrialization of complex production processes.

Hall 3, Booth J41

SolarWorld welcomes anti-dumping investigation by European Commission

SolarWorld AG welcomes today's decision by the European Commission to launch an investigation into dumping practices by Chinese photovoltaic manufacturers. After the EU ProSun industry initiative filed a trade complaint at the end of July, the EU Commission had 45 days to review the facts presented and to decide whether to initiate an investigation. As one of the leading manufacturers of solar technology and solar power applications worldwide, SolarWorld supports the EU ProSun industry initiative which represents the majority of the European PV industry. The initiative supports fair competition and the sustainable expansion of solar energy in Europe.

The European Commission now has nine months to come to a decision on provisional anti-dumping duties, but has the option, however, to impose these at an earlier date. SolarWorld's U.S. subsidiary had already launched its own similar initiative in the United States at the end of 2011. In May, the U.S. Department of Commerce set provisional anti-dumping duties in excess of 30 percent. A final decision on U.S. duties is expected this fall. (SW)



"Q_BEE ES" can operate directly with the photovoltaic panels

The Q_BEE ES is designed to increase the self consumption in private homes or small businesses. The system is based on a transformerless inverter for solar or wind power with 1.5 kW, a Li-ion battery with 2.0, 4.0 or 8.0 kWh and a grid sensor.

The battery capacity is thereby modularly expandable. Up to six different batteries can be connected to one inverter.

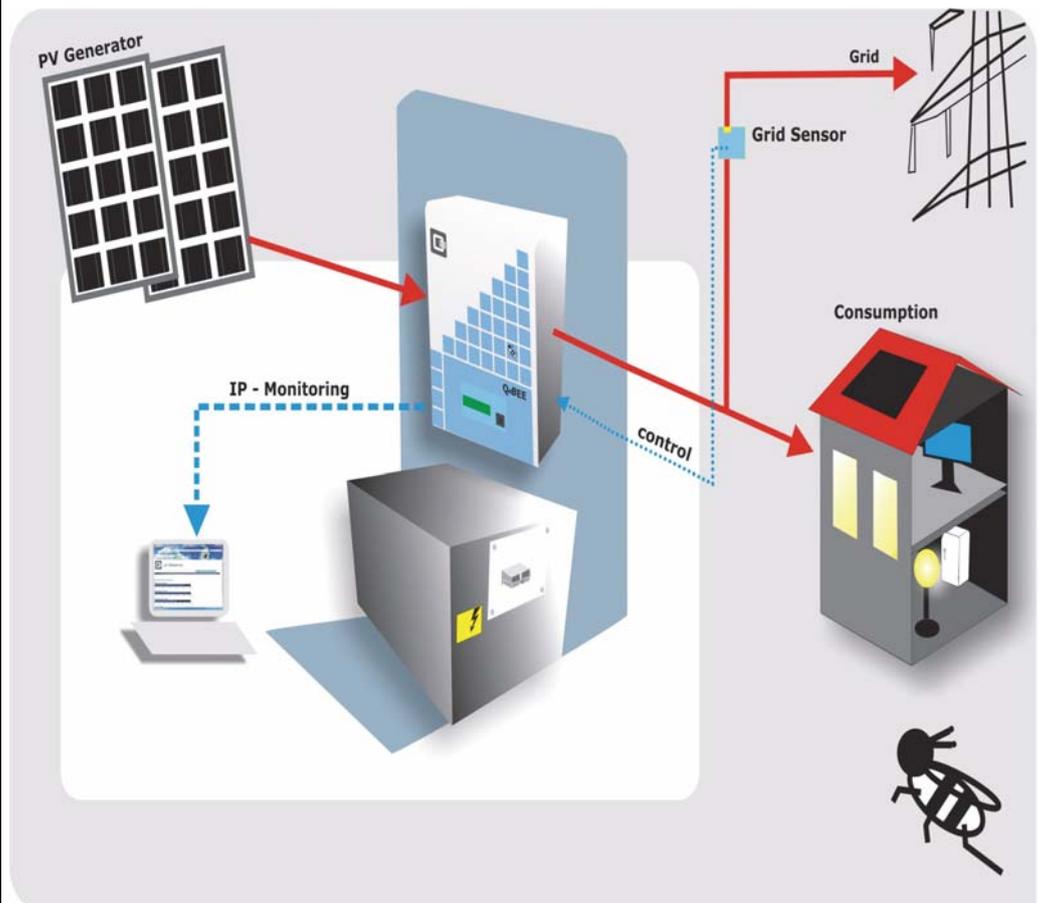
For a new energy system the Q_BEE ES can operate directly with the photovoltaic panels. Already existing PV systems can be retrofitted without major installation costs. The DC input can thereby optionally be connected with an additional solar or wind power system.

The integrated energy management system operates fully automatic and decides whether the electricity is used for self consumption, is stored in the battery system or to be fed into the public grid. The integrated battery management system ensures an optimum loading and discharging of the battery and ensures a long lifetime of up to 20 years.



Image: Q3 Energieelektronik

New energy system



With the Q_BEE Energy System, Q3 Energieelektronik presents at the PVSEC its new innovative energy storage solution.

Image: Q3 Energieelektronik

All information of the solar power, the power consumption, the fed in data and the battery conditions are logged in real time via the integrated web server and can be read through the integrated touch screen or the Q3 web app for PC or smart phone.

Another advantage of the system is its emergency function. In combination with the Q3 Bridge Box the Q_BEE ES enables a complete multi-phase emergency power supply.

Hall B9, Booth 3.1

New inverter for varying shadowing conditions

Solutronic AG is using this year's EU PVSEC trade fair, this time held in Frankfurt, Germany, to launch its new SOLPLUS 40 S2 inverter. This inverter is also a component part of the PV company's energy management and storage system, SOL-Energymanager.



Image: Solutronic AG

The transformerless SOLPLUS 40 S2 inverter is equipped with two MPP trackers and operates with a maximum DC output of 4.8 kW. Thanks to the two MPP trackers, the unit is capable of combining different roof alignments and varying degrees of shadowing. The two boost converters also integrated gives the inverter a wide input voltage range of 120 to 500 V, enabling it to be used with a broad selection of modules. The SOLPLUS 40 S2 operates even when insolation is relatively low and therefore makes the most of the sunshine available.

When it comes to communication, the SOLPLUS 40 S2 is equipped not only with a display, but also two M12 plug-in connectors that can be used to network several SOLPLUS inverters by means of a RS485 interface and also to retrieve the data of the inverter using a PC. And it goes without saying that a data logger, annual energy logger as well as a fault and alarm memory are integrated.

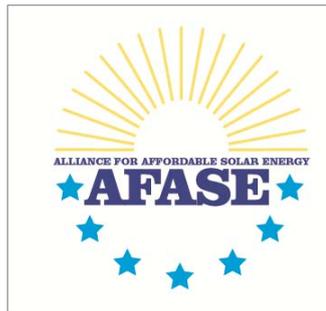
Direct and inexpensive remote access is guaranteed by the Ethernet port built into the SOLPLUS 40 S2 and by the integrated web browser. The Ethernet port can be used for graphical monitoring of the yield with the aid of Solutronic's own graphics software, SOLPLUS+. This facilitates reliable, cost-effective and fast retrieval of the inverter data at any time and from any place.

Hall 3.1, Booth B7

AFASE

Alliance for affordable solar energy

The alliance for affordable solar energy (AFASE) is a group of about 120 companies from the European solar sector that advocate free trade and a competitive European solar industry. The AFASE members operate mainly upstream and downstream of the actual production and include for instance raw material suppliers, equipment manufacturers, project developers, installers and servicing firms.



Open markets bring down solar energy prices, thus promoting solar energy. This contributes to a balanced European energy mix and helps the EU and the national government to reach the ambitious European climate protection targets.

AFASE is opposing calls for any type of protectionist measures. They would not only push up prices and place

greater strains on consumers and government finances; they would also harm large parts of the European solar industry.

First and foremost, such measures would **destroy upstream and downstream jobs in the solar industry.** Many leading European companies including raw material providers and equipment manufacturers successfully sell their products globally. And the survival of many smaller and medium-sized companies at the very end of the value chain such as installers and servicing companies would be jeopardised, too.

The growth of the European solar industry is contingent upon free trade and a global value chain. **Open markets are the prerequisites for progress in the solar industry.**

AFASE on the EU PVSEC

AFASE will attend the solar trade show EU PVSEC with its own stand in **pavilion 3.1 stand H12b.** Here, the alliance provides information on its activities and free trade and competition in the solar industry. AFASE members will hold **short presentations** each day at 12 PM noon at the stand. AFASE will always be available for companies interested in information on free membership. In view of the opening of anti-dumping proceedings against Chinese solar products, AFASE will be happy to advise solar companies on ways to make their active support of free trade heard by the European Commission. (AFASE)

Absolute ray of hope: Five at one shot

Innovations smithy J.v.G. Thoma presents a new LED flasher for module manufacturing

Quality assurance is an absolute imperative in the PV manufacturing. The solar specialist J.v.G. Thoma, based in Bavaria, is about to present on the dot at the industrial trade fair PV-SEC its new flasher model: the worldwide first LED based inspection device in the market. Its advantage? With it the test results will be more accurate than with conventional devices.



Image:
J. v. G. Thoma

The better one beats the good one: that is the philosophy of Diplom-Ingenieur Hans Thoma, General Manager of J.v.G. Thoma GmbH. That is why the company also continued to work on the development of its existing high-performance flasher, despite good performance. And now it focuses on the strong points of LEDs. With the new flasher each module is put to the acid test not just once, but five times in one go. From this an average is derived which in turn will ensure that the results are more accurate. And that means, later for the dimensioning all wiring connections can be done much more precisely.

Faster than lightning: from zero to five in 0.1 seconds

The amazing thing about the LED variant is that it requires less time to determine these five readings than a common flasher for only one reading. There is an obvious reason behind this: the LED light burns continuously, whereas a conventional flasher takes nearly 20 seconds until the condenser is recharged for the next "flash light".

Hall 3, Booth H12

A new partnership in the United Arab Emirates is spreading its wings

Wagner & Co joined forces with Bin Moosa & Daly, a company that focuses on one of the not so abundant resources in the region: Water. Bin Moosa & Daly, an established specialist for all aspects concerning water supply and treatment, was founded in 1967 as one of the first trading companies in the country. In 2011 a sales agreement was signed between Wagner & Co and Bin Moosa & Daly, and especially the highly efficient SECUterm thermosiphon hot-water system that was especially developed for tropical and subtropical regions, integrates well with the high quality of the Moosa-Daly product portfolio.



Wagner & Co and Bin Moosa & Daly: A new partnership in the United Arab Emirates is spreading its wings

Image: Wagner & Co. Solartechnik

And as the Abu Dhabi based company with branches in Dubai, Al-Ain, Qatar and Oman clear-sightedly states „In the Gulf Region solar energy is one of the most important energy sources for the future.“ As Andreas Krenz, operations manager at Bin Moosa & Daly, assesses: „There is a huge potential for Solar Thermal Energy in the UAE and for Bin Moosa & Daly“. Already now the SECUterm system is selling in impressive numbers, and further product introductions and co-operations are planned.

After returning from a recent visit with Bin Moosa & Daly, Alex Storek, Sales Manager New Markets with Wagner & Co, remarked: „I was very impressed by the dedication and motivation the staff at Bin Moosa & Daly has shown during product training and solar thermal design lessons.“

Bin Moosa & Daly is excellently positioned to serve the Arabian Gulf Region with solar technology through their sales and service branches in Abu Dhabi, Dubai, Al-Ain & Doha Mr. Storek reckons: „I am convinced that the co-operation of Wagner and Bin Moosa & Daly will be a highly successful one.“ (WS)

Continuation page 1

27th EU PVSEC presents “The Europe-Asia PV Forum”

The 27th European Photovoltaic Solar Energy Conference and Exhibition presents The Europe-Asia PV Forum on Monday, 24 Sep. 2012. The event takes place on the first Conference day from 14:30 to 18:00 and addresses key questions for the global PV solar sector. Two Introductory Presentations will be followed by a moderated round table discussion focusing on topics of strategic relevance for PV industry leaders, representatives from politics, finance and research:

- How to support PV solar political cooperation, PV in the energy mix!
Which innovation and industry policy is required to get sustainable markets on a fast track?
- How to facilitate PV trade opportunities in the globalized PV markets?

The following representatives have confirmed their participation in the moderated panel as of 18 September 2012:

- Giovanni De Santi, Director, Institute for Energy and Transport, European Commission, Joint Research Centre, JRC
- Ben Hill, Head of Europe, Trina Solar
- Winfried Hoffmann, President, EPIA – European Photovoltaic Industry Association
- Izumi Kaizuka, Manager Research Division, RTS, Japan
- Paula Mints, Director, Energy and Principal Analyst, Solar Services Program, Navigant Consulting
- Eric Peeters, Global Solar Executive Director, Vice President, Dow Corning Solar Solutions
- Stefan Rinck, President & CEO, Singulus Technologies
- Chetan Solanki, Principle Investigator, NCPRE – National Centre for Photovoltaic Research and Education, India
- Tom Wu, Secretary General, APVIA – Asian Photovoltaic Industry Association

The Europe-Asia PV Forum is moderated by Melinda Crane, Chief Political Correspondent, Deutsche Welle, Berlin. Stefan Nowak, Chairman IEA PVPS, International Energy Agency, and Murray Cameron, Chief Operating Officer, Phoenix Solar, will provide two Introductory Presentations.

The Europe-Asia PV Forum is presented by the European PV Solar Energy Conference, together with the European Commission JRC – Joint Research Centre and in cooperation with EPIA – European Photovoltaic Industry Association. It is supported by APVIA – Asian Photovoltaic Industry Association and IPVEA – International Photovoltaic Equipment Association. (WIP)

SINGULUS TECHNOLOGIES presents machines for the production of PERC solar cells

The SINGULUS TECHNOLOGIES AG (SINGULUS) continues to expand its activities in the Solar segment. Numerous product innovations will be presented at the 27th European Photovoltaic Solar Energy Conference and Exhibition, which will take place in Frankfurt am Main. In order to make the manufacturing of silicon photovoltaic modules competitive, a further reduction of the production costs with an increase of the efficiency at the same time is required.

For the market of silicon solar cells SINGULUS presents a new production solution for rear side passivated silicon solar cells (e. g. PERC; Passivated Emitter and Rear Cell). This solution was developed especially for the upgrade of existing cell production lines. With an additional dielectric coating on the rear side electric and optical efficiency losses of the cells are reduced compared with the traditional cells. In particular, this technology is required for increasingly used very thin wafers in the future.

For the upgrade of a production line three additional production steps, which SINGULUS offers solutions for, are required. Before coating the rear side the cell is smoothed with a wet-chemical polish process in a LINEA II Single Side Etch Polish machine. The dielectric passivation layer is emitted in the ICP-PECVD machine SINGULAR. For the rear side contacts through a laser process, SINGULUS is closely cooperating with a partner. With the integration of these additional production steps into existing manufacturing lines PERC cells with levels of efficiency of up to 20 % can be achieved.

In March 2012 the Institute for Solar Energy Research Hameln (ISFH) increased the conversion efficiency of screen-printed silicon solar cells in cooperation with SINGULUS from today's industry typical 18.5 % to a record value of 20.1 %. This was also confirmed by an independent measurement from the photovoltaics calibration laboratory of the Fraunhofer ISE (CalLab). An improved cell rear side with an ICP-AIOx/SiNy double layer (ICP: "inductively coupled plasma") enables this progress without "selective emitter" technology. 20.1% is one of the highest efficiencies worldwide reported for industrial type silicon solar cells with screen-printed metallization. **Hall 3.0, Booth H18**



Image:
SINGULUS

Innovative PV measurement equipment for use at the training system and at real PV plants

„One device – double benefit“ is the motto of the new product innovation of IKS Photovoltaik. Be-cause the PV training system Solartrainer profi for vocational education and training was expanded with an innovative Photovoltaic measurement equipment – consisting of an innovative multifunction instrument, remote datalogger with radio transmission, transducer clamps and an ISET Sensor irradiation sensor with dimmable halo-gen spot for setting of irradiation values as well as practice-oriented didactic materials.



Image: IKS Photovoltaik

The background: Today PV plants are working very reliable. Never-theless they often generate only a part of the maximum possible power. In practice the possibility of monitoring the characteristic curves of single solar modules, strings and the test of complete photovoltaic installations become more and more important. How-ever, this also means that this subject has to be an integral part of the vocational education and training in the field of photovoltaic. So this is the background for the new innovation of IKS Photovoltaik.



Image: IKS Photovoltaik

And the particular feature: The newly into the Solartrainer profi inte-grated Photovoltaic measurement equipment can be used afterwards for measurements and tests at reals photovoltaic installation. A system with double benefit!

Hall 3.1, Booth G25

Germany Trade & Invest uncovers the latest business opportunities in the photovoltaic industry

More than 4.3 GWp of photovoltaic (PV) systems were installed in Germany during the first half of 2012, according to the latest figures from the German Federal Network Agency. The increase of about 2.5 GWp compared to the same period last year marks the continuation of solar as a force in the German energy mix. The new PV installations confirm Germany's position as the world's largest solar market. Industry experts from *Germany Trade & Invest* will be at the 27th EU PVSEC in Frankfurt from September 24-28, in hall 3.1 at stand C17 to discuss investment opportunities in Germany.

„Germany is the leader in solar power generation and continues to innovate and bring new products to market, especially in the rooftop segment where energy is consumed on site,“ stated Tobias Rothacher, photovoltaic industry expert at Germany Trade & Invest in Berlin.

Most recently, Solarion AG opened its first flexible thin film solar cell plant in the former East German state of Saxony. The company aims to target the commercial rooftop market for own-consumption.

As the industry matures, homes and businesses that consume the energy they generate are a growing market segment. Leasing, power trading and plant management are up-and-coming service sector fields that are driven by the commercial rooftop market.

Germany's solar market is the most extensive in the world. Currently it features more than 1.2 million PV installations with a capacity of approximately 29 GWp. (GTAI)



Tobias Rothacher,
Germany Trade & Invest
(GTAI)

Image: GTAI

Comprehensive range of solutions for the photovoltaic industry

Siemens will be showcasing its comprehensive range of solutions for the photovoltaic industry at the EU PVSEC Solar Fair. The Siemens portfolio covers the entire value chain from the manufacture of raw materials through the production of solar panels to complete power plants.

This will be the third time that Siemens has exhibited its extensive photovoltaic (PV) portfolio at the EU PVSEC. Under the banner „Bringing you closer to the sun“, Siemens will be presenting complete solutions in the fields of polysilicon, solar glass, solar production, infrastructure and project financing.



Image: Siemens

Siemens offers integral solutions for the process and production industry combined under a single control system. These plant-wide integrated solutions are based on a TIA (Totally Integrated Automation) solution combined with engineering software, automation and instrumentation. Siemens will also be exhibiting its portfolio for the efficient production automation of large-format lithium-ion batteries and the universal process gas chromatograph Maxum for flexible process applications with wide-ranging analysis options. The Siemens Poly Power Unit (PPU) modular power supply solution for polysilicon manufacture will also feature at the show. Alongside its efficient central inverter Sinvert PVS, Siemens will additionally be showcasing solutions for solar tracking. Also on show at the EU PVSEC will be wide-ranging solutions for photovoltaic power stations: Siemens will be presenting its extensive portfolio of products and services in its role as general contractor for the planning, supply, construction and commissioning of largescale turn-key ground and roof-mounted PV projects. Using Siemens' planning and layout tool PVplanet, the projected power plant revenue and costs can be optimized in cooperation with the customer before the construction stage.

Hall 3.1, Booth 3.1/H5

AICON Acquires German 3D metrology company

AICON 3D Systems GmbH, located in Braunschweig / Germany, took over 80% of Breuckmann GmbH, Meersburg / Germany. Austrian voestalpine Group, which had held the major interests in Breuckmann, and AICON, sealed the treaty on 2 August 2012. Dr. Bernd Breuckmann, founder and former owner-manager, still holds 20% shares in the company. The brand Breuckmann GmbH will remain unchanged.

The Breuckmann GmbH is a world leading manufacturer of high-value optical systems for contact-free measurement, digitization and inspection in the third dimension. The company, founded in 1986, has approximately 40 employees. Since 1995 AICON and Breuckmann are in a very close collaboration. As the Breuckmann's product range ideally completes the AICON portfolio, the merging offers the possibility to operate in the market as a full-range supplier of 3D metrology systems. (AICON)

Photovoltaic thin-film module production

CTF SOLAR GmbH will be exhibitor at the 27th PV SEC. The exhibition takes place from 25th to 28th September 2012 at the fair in Frankfurt/Germany. The Exhibition, running in parallel with the Conference, provides a showcase for the technology and service providers involved in the PV Solar field. CTF SOLAR GmbH is designing, planning and delivering innovative and competitive Photo-voltaic thin-film module production facilities for the world market. In order to provide fully functional production systems with a maximum of benefit to our customers, CTF SOLAR offers a total production solution, providing products AND all services necessary to reach the goals in this challenging market.

Hall 3.0, Booth D 14



Innovative Photovoltaic Insurance Policy at European Solar Energy Conference

Willis Germany, part of Willis Group Holdings (NYSE:WSH), the global insurance broker, will be demonstrating the special features of "Willis Electronic Plus", an innovative insurance product for photovoltaic systems, at the 27th European Photovoltaic Solar Energy Conference and Exhibition. Willis' political risk expert will also deliver a speech at the event on the rise of resource nationalism and its impact on the renewables sector.

Willis Electronic Plus provides solar panel manufacturers, developers and dealers with all-risk insurance protection against property or revenue losses caused by property damage. It also puts in place cover against yield reduction due to a lower outcome of the forecast annual energy yield. Willis' renewable energy experts will be available to discuss the new product at the Willis stand located at booth number 3.1/A16.

Other special features of the solar insurance product include:

- It guarantees the owner and lenders a minimum 90% revenue return
- Coverage possible for almost all high-quality panels



Van Den Born, Executive Director of Willis Financial Solutions

Image: Willis

Political risk presentation

As natural resources become scarcer and global demand for energy continues to grow, renewable energy investors and project lenders are increasingly looking for new opportunities in high risk markets. Andrew van den Born, Willis' political and credit risk expert, will be focusing on this topic at the conference in a speech entitled: "The rise of Resource Nationalism - why Political Risk Insurance Matters".

In his presentation on Wednesday, Sep. 26 at 10:45 am in the main Exhibition Forum, Van Den Born, Executive Director of Willis Financial Solutions, will address the risk of government expropriation.

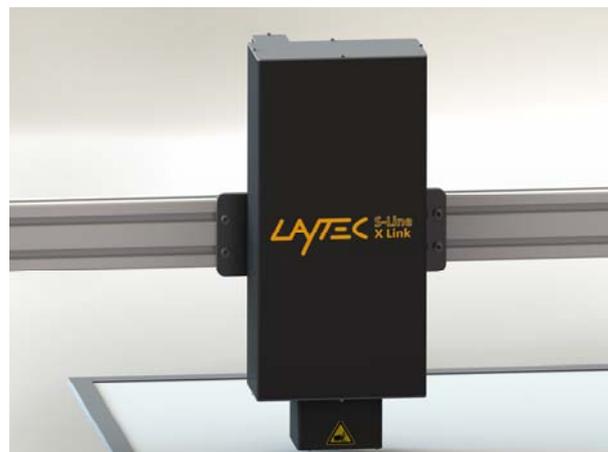
The Willis booth will also feature demos and information about:

- Willis' client technology solutions
- Supply chain risk management
- Political Risk insurance

(WSH)

X Link - evaluating EVA cross-link within seconds, in-line and non-destructively

LayTec's newest product X Link was launched in May 2012. Directly after lamination with the EVA foil LayTec's X Link system enables a fast and non-destructive evaluation of the degree of cross-linking. This makes X Link an unique solution for routine PV production line process control.



LayTec X Link can be applied during the manufacturing of Si solar cell modules and offers complete coverage. The degree of cross-linking is derived in a few seconds and can be directly fed back for quality control and process optimization.

Image: LayTec AG

The current standard tests like gel content test or DSC are slow, destructive, manual, and rather inaccurate. Only small sample fractions are possible and results are delayed for several hours or even days.

X Link replaces these costly tests and eliminates module failure due to inhomogeneous EVA foil feedstock. X Link generates additional savings by optimizing lamination process times and thereby increasing throughput of the vacuum laminator tools.

The 100% proof of proper lamination of every module enables the module customers and investors to improve their risk management and thus the bankability of PV projects.

Hall 3.0, Booth D3

Solar engineering and consulting services since 1991 by the DGS Berlin

The DGS Berlin yield expertises are accredited by banks, investors and project developers. Up to now more than 3 gigawatts installed PV capacity has been performed in 20 countries all over the world.

For the studies at least two different simulation programs are used. The simulations are based on long-term climate records of the relevant meteorological services and other sources.

The DGS Berlin inspects the system concept, the particular components, materials and the installation in situ, measures certain modules, strings or the whole system electrically and works out a detailed report with photo documentation.

Hall 3.1, Booth E20

New products of the Ventec³ product family for all flat roofs

Creotecc GmbH, manufacturer of innovative photovoltaic mounting systems is presenting new products of the Ventec³ product family, the ideal mounting solution for all flat roofs, in hall 3.1, booth F16.



Image: Creotecc

VENTECC-BASIC for south orientation and VENTECC-BINUS for east-west orientation allow for mounting without roof penetration. VENTECC-PREMIUM makes it possible to develop the roofs of modern halls that don't have sufficient load-bearing reserves for conventional mounting frames. Customers benefit from low-cost mounting and the installation of large numbers of modules.

For trapezoidal roofs with a low pitch, the company has developed the VARIOTECC model, a mounting profile that adapts to the specific roof conditions. Various heights of profiles allow modules to be mounted without complex triangular structures. An innovative joint system ensures that the profile adapts automatically to the preferred inclination of the PV modules. The profiles are compatible with TSM4 retaining clamps.

Hall 3.1, Booth F16

Continuation page 3

Best practices and case studies

"PV Production Forum 2012"

The PV Production Forum 2012 addresses best practices and case studies that can assist management, purchasing staff, and product managers how to increase throughput, efficiency and save money in their production fabs.

The forum will encompass energy storage within the Market Session and the afternoon will include presentations on OPV, thin film as well as silicon technologies. As an official event of the 27th EU PVSEC, the PV Production Forum 2012 is jointly organised by IPVEA - International PV Equipment Association and the EU PVSEC.

Location: Europa, Hall 4.0 **26 Sep. 2012 (Wednesday)** **Time:** 9:00 – 18:00

9:00 - 9:30 **Business Outlook: Solar Industry 2013**
Finlay Colville, Vice President and Team Leader, NPD Solarbuzz

9:30 - 10:00 **Panel Session -Equipment Executive Roundtable Discussion**
Moderator: Panel Session John West, President, VLSI Research Europe Limited

Networking Break

10:30 - 11:10 **Panel Session - Energy Storage: The Next Frontier in Technology**
Moderator: Markus A.W. Hoehner, CEO, Hoehner Research & Consulting Group

Panelist:

- Markus Monßen-Wackerbeck , Partner , 360|Consult
- Dr.Hugette Kolb-Aust , Sales Director of the PV Off-grid division, Steca Elektronik
- Frédéric Ridou, Sales Manager, Energy Storage Systems, Renewable Stationary Markets, Saft Batteries
- Andreas Schlumberger, Director of Corporate Communications, KACO new energy
- Allen Lei, Senior Country Manager for Germany, BYD

11:10 - 11:40 **The Power of the Buying Group**
Andreas Schöni, Managing Partner, Solar Purchasing Group Europe

11:40 - 12:30 **Panel Session- Quality Counts, Focus and Aspect on Materials**
Moderator: Mark Osbourne, Senior Editor, Photovoltaics International, PV-Tech.org

Program Outline

Subject to change without notice

Continued on page 14

(IPVEA)

KYOCERA establishes new company to operate 70 MW solar power plant in Japan

Kyocera Corporation (KC), along with six other companies, today announced the completion of capital investment procedures for the establishment of Kagoshima Mega Solar Power Corporation, a new company which will be tasked with operating a 70 megawatt (MW) solar power plant in southern Japan. The utility-scale solar power plant will become the largest in Japan.

The new company will develop and operate the previously announced 70MW solar power plant in Kagoshima City (Kagoshima Prefecture) on land owned by IHI Corporation - with the power generated to be purchased by Kyushu Electric Power Co., Inc. under the guidelines of the new feed-in



Artist rendering of the completed mega-solar power plant

Image: Kyocera Group

tariff (FIT) program which was implemented on July 1 in Japan. The total project cost is estimated at approximately 27 billion yen (approx. 345 million US dollars), with seven investment companies involved (including Kyocera), and Mizuho Corporate Bank, Ltd. set to devise a financing plan for the project. Construction is set to commence in September of this year, with plans for completion by fall of 2013. The Kyocera Group will be responsible for the supply of 100% of the solar modules and part of the construction & maintenance of the system. Kyocera is the largest shareholder in the establishment of the new company. (KC)

SolarWorld AG invests in innovations

Groupwide shipments of modules and kits grew to 316 (H1 2011: 269) megawatts in the first half of 2012. While the first quarter saw pull-forward effects in the German market, the largest volume of shipments was abroad in the second quarter. Shipments outside Germany accounted for 60% (H1 2011: 69.1%) in the first half of 2012. Demand in Germany for kits for roof-mounted systems dropped noticeably in the second quarter for political reasons. An increase in sales abroad, particularly in Italy, was only partially able to offset this reluctance. The full integration of Solarparc AG in the SolarWorld Group paid off in the area of large-scale projects.

The drop in prices caused by price dumping is the main reason why group revenue decreased in the first half to € 340.1 (H1 2011: € 533.6) million. As a result of the drop in prices, impairments of € 33.5 million had to be made on our inventories. In addition, we had to make an impairment of € 80.8 million on advance payments. Neither impairment influenced the group's cash position. These factors had a negative impact on the group's earnings before interest and taxes (EBIT). In the first half of 2012, EBIT amounted to € -143.8 (H1 2011: € 70.5) million. From today's perspective, Solar World AG will not generate a positive EBIT in the 2012 fiscal year in light of the aggressive market situation characterized by illegal trade practices.

The financial result improved overall in the first half of 2012 to € -26.9 (H1 2011: € -31.3) million. In the first half of 2012, SolarWorld's earnings totaled € -159.3 (H1 2011: € 22.2) million. As of the reporting date, liquid funds amounted to € 320.1 million, after SolarWorld bought back U.S. private placement senior notes totaling \$ 175 million. "We have to fight price dumping with technological innovations," explained Dr.-Ing. E. h. Frank Asbeck, CEO of SolarWorld AG. The group will invest an additional € 50 million, primarily in new products specifically for highly efficient self-consumption of solar power as well as in bringing research results and patented innovations to German and American cell production. These new processes will improve the performance of solar modules while decreasing material consumption and thus production costs. (SW)

Continuation page 13

Best practices and case studies

"PV Production Forum 2012"

Location: Europa, Hall 4.0 **26 Sep. 2012 (Wednesday)** **Time:** 9:00 – 18:00

Afternoon Technology Session

- | | |
|---------------|--|
| 13:00 - 13:20 | Integrated Engineering Solutions for Next Generation Digital PV Factories
Dr. Roland Schreieck & Mr Manuel Müller, Siemens AG |
| 13:20 - 13:40 | High Performance, Low Costs Solar Cells – Role of Gases and Liquid Precursors
Andreas Weisheit, Head Global Solar Market Development, Linde AG Electronics |
| 13:40 - 14:00 | New Production Technology for CIGS Thin Film Solar Cells
Dr. Peter Wohlfart, Singulus Technologies AG |
| 14:00 - 14:20 | Next Generation Silicon Crystallization System for Multi and Mono2TM Ingot Casting
Henrik Franz, ALD Vacuum Technologies GmbH |
| 14:20 - 14:40 | CIGS - Take the Short Cut to Success
Dr. Thomas Umschlag, Head of Sales Thin-Film-Solar, Manz AG |
| 14:40 - 15:00 | Commercial Production of CIGSse by In-Line Selenization/Sulfurization of Metallic Alloys
Prof. V. Alberts, Photovoltaic Technology Intellectual Property Ltd, South Africa |

Networking Break

- | | |
|---------------|--|
| 15:20 - 15:40 | Metallic Sputtering Targets for High Efficiency CIGS Manufacturing
Dr. Christoph Adelhelm, Manager Application Group Solar, PLANSEE SE |
| 15:40 - 16:00 | In-line RTP Selenisation Solutions for CIGS Precursors
Wiro Zijlmans, CEO, Smit Ovens B.V. |
| 16:00 - 16:20 | Laser Processes and System Technology for the Production of High-Efficient Crystalline Solar Cells
Richard Hendel, Intern. Sales Manager Solar, ROFIN-BAASEL Lasertech GmbH |
| 16:20 - 16:40 | Keeping It Green: Recycling Procedures for Photovoltaic Waste
Dr. Wolfram Palitzsch, Loser Chemie GmbH |
| 16:40 - 17:00 | Innovative bonding solutions for PV mounting systems – Key for efficient module production and long term module quality
Michael Niederfuehr, Marketfield Engineer Solar, Sika AG |
| 17:00 - 17:20 | Metrology Systems for Quality and Process Control of Solar Thin film Coating
Mathias Hummel, Project Manager Solar, Dr. Schenk GmbH Industriemesstechnik |
| 17:20 - 17:40 | New Requirements and Solutions for Inline Quality Inspection Based on Cameras for High Efficiency Solar Cells
Richard Moreth, Sales Director PV, VITRONIC GmbH |

Program Outline

Subject to change without notice

End of Conference (18:00)

(IPVEA)

Continuation page 5

VDMA Photovoltaic Equipment

Commitment to manufacturing in Germany

The industry is groaning under overcapacity. New factories will increasingly be built again, as soon as the worldwide demand for photovoltaics rises further. The anti-dumping action whips up uncertainty in the market. Thus it delays the recovery. PV equipment makers perceive the current cost pressure in the PV industry even as an opportunity because PV manufacturers have to rely on highly efficient technology and production machines in order to operate economically on the market. This is true regardless of whether PV production takes place in Europe or the Far East.

Despite their traditionally strong Asian markets the commitment for Germany as place for business and production is deeply rooted in the machinery industry. The core competences of the photovoltaic supply industry will stay at their home bases in Germany. The industry has greatly benefited from the guaranteed legal- and investment certainty in Germany. The excellent infrastructure and the high skill level of workers and innovative engineers are also strong points in favor of domestic production of manufacturing equipment. Even perspectives for photovoltaic production in Germany itself are much more positive than currently perceived. VDMA is a strong supporter of Germany as production location – for PV machinery as well as for cell and module production. If the right measures are taken, production in Germany is competitive to China. (VDMA)

CENTROSOLAR expanding in Asia

CENTROSOLAR Group AG, one of the leading suppliers of photovoltaic roof systems and solar glass, continues its drive to expand internationally. For example the company has now commissioned a first anti-reflective (AR) coating line in Huzhou, China, at a partner company that has been operating a glass melting furnace there on behalf of Centrosolar Glas GmbH & Co. KG since 2009. Some of the world's biggest PV module manufacturers are based in Asia. The Far East market, which has the highest potential in the world for solar glass, will then be served with material produced locally. Solar glass is used to cover crystalline photovoltaic modules. An anti-reflective layer supplied by Centrosolar Glas increases the power yield of PV modules by up to 6 %. This CENTROSOLAR subsidiary is among the world market leaders for solar glass with such anti-reflective properties. Particularly solar module manufacturers with premium standards rely on this AR glass. Centrosolar Glas currently exports AR glass grades from its production plant in Fürth, Germany, to destinations ranging from the USA to the Far East. However, in view of the high shipping costs it has not yet been possible to tap market potential in Asia adequately. (CSG)

The cetisPV-IUCT-Super-Highspeed system enables ultra-high speed

h.a.l.m. elektronik gmbh releases the cetisPV-IUCT-Super-Highspeed system which is based on the new flasher control, regulation and power supply design cetisPV-XF3. The cetisPV-IUCT-Super-Highspeed combines an extremely long illumination and measurement time (60ms+60ms) with extreme high throughput rate of up to 1sec resp. 3,600 cells/hour. This combination allows for reliable measurements, even of the demanding next solar cell generations. The system is available in two options: As cetisPV-IUCT-Super-Highspeed-solo with a single lane or cetisPV-IUCT-Super-Highspeed-duo with a dual lane cell-sorter layout. With the dual lane solution, the mechanical stress on solar cells can be reduced, since the material stream of the cellsorter can be split into two separate lanes. In this case, the alternative switching capability of the cetisPV-IUCT-Super-Highspeed-duo enables to maintain the total throughput rate while reducing the speed per lane down to almost 2 sec/cell.

Hall 3, Booth H20

SolarWorld expands project business:

PV plants with a total of 33 MW connected to the grid in record time

Investors in photovoltaic systems are increasingly relying on high-quality products "Made in Germany" and "Made in USA" not only for installation on home or industrial roofs but also for installation on the ground. SolarWorld AG, based in Bonn, Germany, is currently expanding its large-scale system business, and with success. In the second quarter of this year, it connected five solar farms in commercial and industrial areas in the German states of Saxony, Saxony-Anhalt, Lower Saxony, and Mecklenburg-Vorpommern with a total power of 33 megawatts to the grid, including one 18.8-megawatt system in Mahlwinkel, Saxony-Anhalt, and one 10.2-megawatt system in Barth, Mecklenburg-Vorpommern.

The farms will supply over 30 million kilowatt-hours of solar power a year, which is equivalent to the average annual consumption of around 7,500 households. Solarparc AG, which was integrated into the SolarWorld Group early this year as a 100-percent subsidiary, made it possible to expand this business division so quickly. The company has specialized in this type of large-scale project for years and completed construction and technical setup and sold the solar parks to investors in just a short time. Solarparc will handle operational management for some of the projects.

"Getting a volume of over 30 megawatts ready for operation in such a short time and successfully selling installations this large is something to be proud of," said Dr.-Ing. E. h. Frank Asbeck, Chairman and CEO of SolarWorld AG. "You need the years of experience of a Solarparc as well as the support of a strong manufacturer like SolarWorld to be able to pull off such an achievement." According to Asbeck, the full integration of the company into SolarWorld is now paying off.

SolarWorld supplied 79,800 modules with a total power of 18.8 megawatts for the solar farm near Magdeburg, which was built in a record seven weeks on green space at the former Mahlwinkel airfield. Approximately 555 metric tons of aluminum were used to build the substructure for the modules, and 26 central inverters in 13 concrete stations weighing 40 metric tons each were set up on the former landing strip. Roughly 750 kilometers of cable were installed.

SolarWorld supplied 41,808 modules for a 10.2-megawatt solar farm in Barth on Mecklenburg's Baltic Sea coast. The SolarWorld modules are perfectly suited for installation in the immediate vicinity of the Barther Bodden lagoon. They passed the salt spray test in compliance with DIN EN 61701 and meet the requirements for weathering several decades in a maritime climate intact. (SW)



Dr.-Ing. E. h. Frank Asbeck, Chairman and CEO of SolarWorld AG

Image: SolarWorld

The "SenSol Haze" for quality control and spectral resolved Haze mapping

The SenSol Haze is designed for quality control of transparent coatings in PV manufacturing of thin film solar cells. A couple of different measurement techniques are available in one single mapping



Image: SENTECH Instruments

platform. It offers uniformity mapping of film thickness, spectral resolved Haze(λ), sheet resistance, spectral resolved reflectivity, and transmission in VIS / NIR. All standard glass sizes can be measured.

Key features are the high accuracy and compatibility of Haze mapping. The SenSol H comprises the computer controlled conveyor transport system and the sensor platform for Haze, thickness, reflectivity, transmission, sheet resistance or spectroscopic ellipsometry. The system design allows measurements at every position of the glass sheet, especially at the edges.

The high measurement speed allows even the integration of the system into a manufacturing line. Oerlikon Solar in Trubbach, Switzerland, uses SenSol H for improvement and control of their TCO coatings and offers it to their customer for quality control in production of Si Thin Film Cells with high efficiency.

Hall 3.0, Booth G23

**J.v.G. Thoma GmbH
presents flasher with
LED technology**

Right on time for the PV-SEC the Bavaria-based solar specialist J.v.G. Thoma GmbH is presenting its new flasher model: an inspection device that delivers more accurate readings than the conventional ones. Right on time for the PV-SEC the Bavaria-based solar specialist J.v.G. Thoma GmbH is presenting its new flasher model: an inspection device that delivers more accurate readings than the conventional ones. With the innovative J. v. G. LED 12.20 Flasher each module is put to the acid test not just once, but five times in one go. From this an average is derived which in turn will ensure that the results are more accurate. And that means, later for the dimensioning all wiring connections can be done much more precisely. The advantage is that the LED variant requires less time to determine these five readings than a common flasher for only one reading.

Hall 3.0, Booth H12

**SRU Solar AG with
established VEGA systems at EU PVSEC 2012**

SRU Solar AG from Berga, a leading photovoltaic company in central Germany, is represented this year for the fifth time as an exhibitor on the joint stand of Saxony-Anhalt's Solar Valley at the EU PVSEC. Main elements of this year's exhibition are the new developments in solar construction, which have been presented at the beginning of the year: the VEGA carport as a wood or steel construction and the VEGA wooden hall.



Image: SRU Solar AG

the storage of grain. The solar system installed on the slanted roof guarantees full refunding of the investment.

By offering VEGA carports, SRU Solar follows the increasing trend of electric mobilization. Both in the private and commercial sector the need for efficient and economical charging facilities is growing. The combination of carport and solar system represents one of the most environmentally friendly options. Both systems, whether in wood or steel, can be extended modularly and are therefore also suitable for large-scale roofing. The VEGA carport can be used as an independent, stand-alone system for self supply or implemented as a grid connected system. Currently, SRU Solar for example registers an increase in demand from cities and townships that are considering the purchase of electric vehicles for public access.

Hall 3.1, Booth D14

"Since we have launched the VEGA products on the market, we have seen an ever-growing demand," says Sören Lorenz, a board member of SRU Solar. "This proves we are on the right track with our concepts." VEGA wooden hall, being sized slightly smaller than the steel version, is particularly suitable for agricultural use, for example, for garaging of commercial vehicles or for

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Chinese solar imports drop for three consecutive months

For the third straight month, imports of Chinese solar cells and panels into the United States decreased year-over-year, according to the Coalition for American Solar Manufacturing (CASM). In June, Chinese solar imports totaled \$99.6 million, down almost 60 percent from \$241.5 million in June 2011, according to the Department of Commerce's "U.S. Imports of Merchandise" database. The year-over-year decline is significant and reflects the market's rising recognition of the costs, risks and uncertainties associated with importing Chinese solar cells and panels, according to CASM.



While some of the year-on-year decrease is due to sharply falling module prices from 2011 to 2012, June 2012 imports of Chinese solar cells and panels were also down 20 percent from the previous month's total of \$124.1 million. Between the same two months in 2011, the value of Chinese imports increased 7 percent.

June import value declines 60% from 2011 levels

Despite three months of declines, Chinese import levels for all of 2012 are still ahead of last year's record pace: For the first six months of this year, the total value of Chinese cell and panel imports reached \$1.32 billion, up from \$1.23 billion for the same period of 2011, an increase of 7.3%, according to the Commerce data.

The increase is even more significant because dumped and subsidized Chinese pricing has lowered the per-watt average import values so dramatically in 2011 and 2012. (CASM)

Changes in CTF SOLAR Management

Sven Frauenstein and Andrew Goeppert supports the company's CEO Dr. Michael Harr

With immediate effect, Mr. Sven Frauenstein was appointed CTO, and Mr. Andrew Goeppert was appointed Authorised Signatory, in order to support the company's CEO Dr. Michael Harr. .

Prior to his appointment as CTO, Sven Frauenstein was Authorised Signatory and Technical Director. He first entered the solar industry in 2008 as head of the Facility, Maintenance and Equipment Engineering division at the Q-Cells affiliate Calyxo, and earlier in his career played a major role in semiconductor industry establishing the world's first production process with 300 mm wafers.



Image: CTF Solar

Andrew Goeppert first joined CTF SOLAR in 2010 as Director Equipment and Contracts, responsible for Equipment Engineering. Like Sven Frauenstein, he also gained experience of the PV business at Calyxo, where he was responsible for equipment selection and project coordination in the context of capacity expansion.

"I very appreciate these new appointments," Dr. Michael Harr, CEO of CTF SOLAR, said. "With their new positions both colleagues are enabled even to enforce the valuable support given to me already up to now. CTF SOLAR intends to expand its business also in the challenging environment of the today's solar industry. This requires a powerful management." (CTFS)

Spectroscopic ellipsometer for the analysis of antireflective coatings on Si-solar cells

The SE 800 PV is especially designed for quality control and R&D of antireflective coatings on silicon solar cells. It offers highest sensitivity in measurement of polarized light reflected from textured monocrystalline and multicrystalline silicon solar cells. Single films and layer stacks can be analyzed. The dispersion of refractive index and absorption index can be measured.

The system can be operated by recipe. Recipes for the measurement of single SiN_x films, thin SiO_x films, SiO_x/SiN_x, and SiN_{x1}/SiN_{x2} double layers are offered.

Fixed stages for the measurement of textured monocrystalline and multicrystalline silicon solar cells facilitate the use of the instrument which is especially suited for quality control in manufacturing process of such cells. Both stages can be easily and quickly replaced by each other.



Image: SENTECH Instruments

The SE 800 PV comes with SENTECH's comprehensive software for spectroscopic ellipsometry SpectraRay that allows applying the instrument to any other thin film application as well.

SENTECH Instruments GmbH develops, manufactures, and sells worldwide advanced quality control instrumentation for Thin Film Metrology (reflectometers, laser ellipsometers, spectroscopic ellipsometers) and equipment for Plasma Process Technology.

Hall 3.0, Booth G23

Launch of Solar Purchasing Group

Solar Purchasing Group (SPG) works on the principle of cooperative purchasing. Member companies are able to collectively assert greater purchasing leverage for the materials and components they need, such as glass, cells, back sheets, junction boxes, EVA, stringing material along with other peripheral materials. All discounts are negotiated before member companies make purchases, based on the amount of material/components the SPG members require collectively. SPG is already negotiating purchasing contracts with the world's most renowned material producers, vendors and distributors. (SPG)

Purity media supply systems and turn-key solutions

SEMPA SYSTEMS GmbH develops, manufactures and distributes globally highest purity media supply systems and turn-key solutions for bulk gases, specialty gases and special chemicals to the semiconductor, photovoltaic, printed electronics and glass fiber industries.

Our offering includes: stainless steel piping systems, bulk gas and specialty gas distribution systems, specialty chemical distribution and evaporation systems, metrology for exhaust gas analysis and water vapor permeation rates of ultra barrier films, control software and automation of all system solutions, joint development projects with customers, entire fab solutions, safety concept, installation and operation, strong Asian presence via Sempa Asia.



Image:
SEMPA SYSTEMS GmbH

Specific solutions for: TMAI and ozon systems for AIOx backside passivation, chemical supply systems for IGZO depositino, DEZ distribution system for ZnO TCO's, chemical distribution solutions for compound semiconductor integration on Silicon ... and many more.

Within our R&D department we focus on innovative solutions for our customer base, such as the development (HiBarSens) of a water vapor permeation measurement system till a detection limit of 10⁻⁶g/m²d.

Hall 3.1, Booth D15

Continuation page 2

Global Alliance

World leading solar research institutes sign agreement

Three leading solar research institutes: the U.S. Department of Energy's National Renewable Energy Laboratory, NREL (USA), Fraunhofer Institute for Solar Energy Systems ISE (Germany) and the National Institute of Advanced Industrial Science and Technology AIST (Japan)



yesterday signed a Memorandum of Understanding to form the Global Alliance of Solar Energy Research Institutes GA-SERI. The signing ceremony was part of the opening session of the fifth Intersolar North America in San Francisco, a leading trade show and conference for the solar industry in North America and co-located with SEMICON West, the leading semiconductor industry exhibition.

Dr. Michio Kondo, AIST, Dr. Dan E. Arvizu, NREL and Prof. Eicke R. Weber, Fraunhofer ISE, from left to right.

Image: © Solar Promotion International GmbH

In the Global Alliance of Solar Energy Research Institutes, regular scientific exchanges between the three institutions will be the basis for close cooperation. It is intended to have two scientists from each institute in residence at each of the other research centers.

The forming of this Alliance is a response to the rapidly growing relevance of solar energy harvesting thermally or with photovoltaics at rapidly decreasing costs. These technologies will form a key pillar of the future energy system which will be sustainable and carbon-free. The newly founded alliance will give the research in this important field a global voice. (ISE)

Excelling the Norm -

The "cetisPV-Moduletest3" surpasses the IEC 61853-1 standards

h.a.l.m. elektronik gmbh has developed a highly intelligent thermo-chamber cetisPV-Therm2-M to optimize the overall performance of their standard laboratory tester, a ready-to-go class-A+A+A+ rated high precision manual tester system for the IV-measurement of solar modules. Developed for high R&D, for laboratory, and for quality control use, the cetisPV-Moduletest3 in combination with cetisPV-Therm2-M allows to automatically perform irradiance and temperature performance measurements and power rating according to IEC 61853-1.

The complex but easy to operate tester includes a thermally insulated test chamber with the additional heating- and cooling-device cetisPV-Therm2-M which is connected with the insulated module test chamber via flexible tubes. The system easily allows driving temperature profiles defined by the IEC norm from 15°C to 75°C while measuring the electrical performance of photovoltaic modules. Nevertheless, the cetisPV-Therm2-M even allows for automated and quick measurements of a wider temperature range from 10°C to 80°C. Driven by a user-defined grid which describes the measurement series in detail for the whole temperature profile, temperature accuracy and temperature homogeneity exceed the demands of the IEC norm by far.

With an accuracy of better than ±0.2°C in temperature and ±0.5% in irradiance, the complete cetisPV-Moduletest3 measures the module performance at following conditions specified by IEC 61853-1: STC (Standard Test Conditions), NOCT (Nominal Operating Cell Temperature), LIC (Low Irradiance Condition), HTC (High Temperature Condition) and LTC (Low Temperature Condition). In addition, the system readily performs at all conditions in between as per customer requirements. Using the cetisPV-Therm2-M, temperature coefficients can be analysed within less than two hours.

Hall 3, Booth H20



Image:
h.a.l.m. elektronik