INSIDE...

skytron energy's monitoring, control, and supervision system for photovoltaic applications

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Today, it's an entirely different story, which is reflected by the more than 4.5 gigawatts of installed solar capacity worldwide relying on the company's monitoring components, all of which are developed and manufactured in Germany.

"We have about 100 employees, most of them assigned to the development of software and hardware applications for our monitoring solution," says Monika Hennessen, key accounts manager for solar applications at skytron energy.

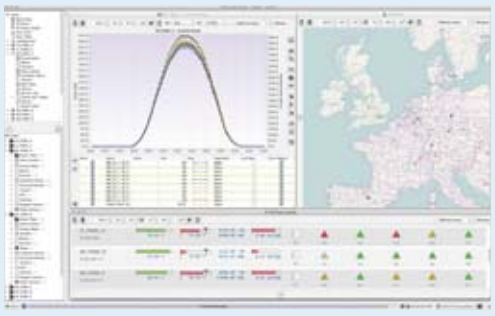
Controlling the entire power generation plant

skytron energy operates its own control room in Berlin and can supervise their customers' power generation plants all over the world. In fact, they frequently provide complete operations and maintenance services for their customers.

"Our goal has always been to cover the entire plant—from the point of power generation in the solar field up to the grid connection point," explains Hennessen. "We call our system a 'fully integrated monitoring control and supervision system,' because it provides real-time condition monitoring of all function groups in the power plant and can communicate with virtually all solar inverters in the market."

High-precision measurement equipment is one of the key advantages skytron energy provides. The data collected in the plant serves as the information basis for remote plant supervision in the control room, and also provides details about the plant's performance.

"A powerful visualization system in the control room enables remote inspection of every single component in the plant," says Hennessen. Every measurement value logged in the plant can be zoomed in on and examined in high resolution in charts and graphs at the high-resolution of 1-minute mean values. This makes fault diagnosis and systematic service and maintenance work efficient and cost effective."



The PVGuard SCADA system manages all your power plants, worldwide. All plants in a single platform. At-a-glance overview of the entire power plant portfolio. Geographic display of all sites and their status. (Courtesy of skytron energy)

Another feature of the system is the power plant controller, which is highly adaptable to local grid connection regulations—it's not restricted specifically to the German grid. Utility-scale photovoltaic installations are fully-fledged power stations. This means they are industrial objects with extremely high demands on reliability and safety and a long service life of 25 to 30 years out in the field.

Real-time monitoring protects investments

The prevailing business models of renewable power generation projects are investments, primarily rewarded by special feed-in tariffs—at least in most European countries. Or they're based on special power purchase agreements.

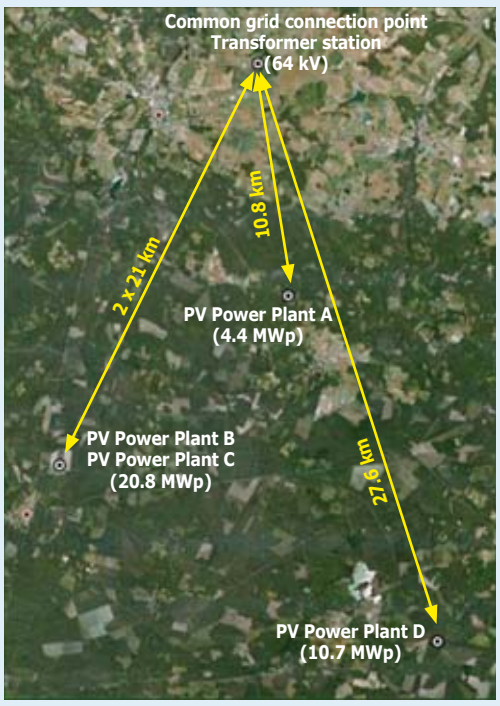
Investors in these plants have a keen interest in producing as much energy as technically possible. "Any diminution in energy yield cuts their return on investment, so any flaws in the plant that aren't remedied instantly can turn into painful financial losses for the investor," explains Hennessen.

Without a proper real-time monitoring system, a failure or the underperformance of just a few solar panels is difficult to detect. "With high-precision monitoring in place, you can spot when something goes wrong in the plant and do the necessary repair work as quickly as possible," Hennessen notes.

Other applications

skytron energy's instrumentation system is also finding use in other renewable energy applications such as wind and hybrid power plants.

Hybrid installations typically use solar panels, often combined with wind power, batteries for energy storage, and diesel generators as emergency backup. "These installations are usually much smaller than a solar power plant, typically below 1 megawatt. They're much quicker to develop and build and not as complicated to finance. Their prime fields of application are currently in African and South American countries," says Hennessen.



Complex power plant control of a cluster of four autonomous PV power plants with skytron's skycontrol power plant controller. (Courtesy of skytron energy)

Their key characteristics lie in the fact that different forms of power generation are integrated into one plant. The installation must be capable of deciding which kind of energy source to use at a specific moment—whether it's wind, solar, battery, or diesel generator. "Since this needs to be automatically controlled, we're seeing a new field for our monitoring and control equipment," Hennessen notes.

Future goals

skytron energy strives to expand its presence and venture out into new geographic markets, especially into the U.S, South America, South Africa and Eastern Europe, but also into Asian countries. The company is deeply committed to knowledge transfer and offers full-scale training programs to ensure that local staff will be able to take over and run their own plant's operations and maintenance within 1 to 3 years.

"From a technology point of view, we are also opening up our system. Although it was originally designed for photovoltaics only, we are expanding it to cover other types of renewable power generation. We strive to offer an open- architecture system that can be used in photovoltaics, wind, and hybrid installations," Hennessen says.

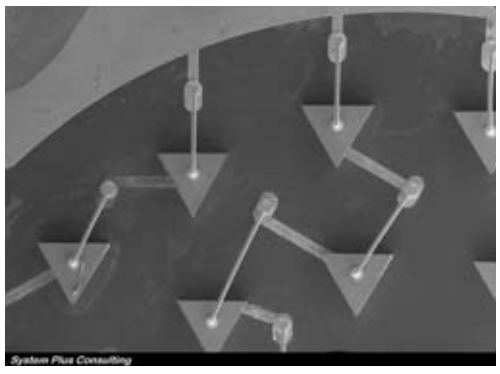
www.skytron-energy.com

REVERSE COSTING

SORAA: GaN on GaN LED

Developed by the pioneer of blue LED, Shuji Nakamura and fellow scientists at University of California, the first GaN on GaN LEDs are today commercially available.

With the GaN epitaxy on a GaN substrate, there are no dislocations, no strain, no piezoelectric fields in the multi quantum well with for result a very high brightness per mm². The 36 LEDs of 0.07 mm2 GaN-on-GaN revealed in tearing down Soraa's MR16 lamps give an equivalent 50W halogen light.



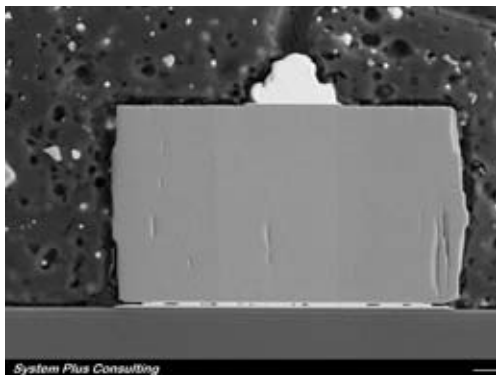
Lightchip package (Courtesy of System Plus Consulting)

Technology analysis

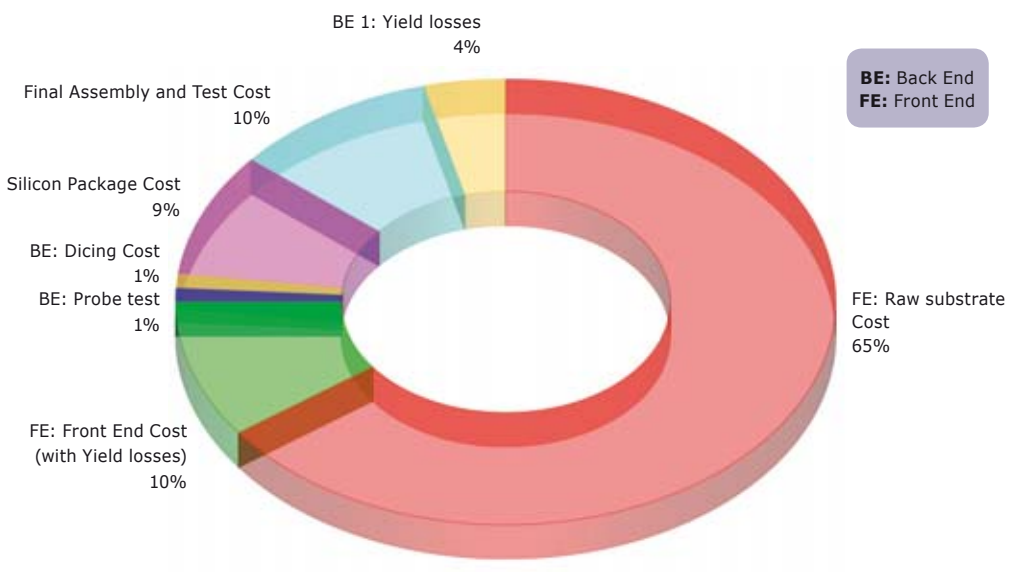
Packaged in an original and clever housing in silicon, the SORAA LED integrates three phosphors, blue, green/yellow, red. The LED emits in violet to obtain a broader color spectrum. The GaN epitaxy on a GaN substrate eliminates the need of a buffer layer with consequently a very thin epitaxy layer. The good GaN conduction allows a vertical structure for the LED, very simple to manufacture.

Costing results

With a manufacturing realized on 2-inch GaN wafers, the substrate cost is the main part of the cost, around 60%. The silicon package called Lightchip represents 20%. The full reverse costing report combining technological analysis of the devices and detailed manufacturing cost is already available.



SORAA LED cross-section (Courtesy of System Plus Consulting)



SORAA MR16 LED cost breakdown (Courtesy of System Plus Consulting)

Recent reverse costing reports

- Sensirion Humidity sensor SHTC1
- Genesic SiC BJT
- Infineon hybridpack 2 module
- Citizen CLL050-1825A1 LED
- Osram Oslon 2mm² blue LED

System Plus Consulting develops costing tools and performs on-demand reverse costing semiconductor studies (from integrated circuits, power devices and single-chip packages to MEMS and multichip modules), as well as studies of electronic boards and systems.

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