

PV MAGAZINE AWARDS 2025 年度大奖 制造部门

FSS 4 斩获高度评价 荣获银奖



Industry & suppliers

The pv magazine Awards 2025

In a year that has posed challenges for the solar industry, the 2025 crop of pv magazine Award entries presented our expert jurors with a vision of what the future might hold. From world-first technologies supporting grid stability to second-life solutions that tackle sustainability, along with action in rapidly growing PV markets and innovation in emerging market segments, technical progress is driving the energy transition. The time has come to reveal the pv magazine Awards 2025 winners.

More than 260 entries were received for the pv magazine Awards 2025, and the additional year and expert juror profile were taken into account. The winners were selected from a list of 40 categories, including solar and storage technologies. These were chosen through a series of categories that cover broader industry trends. How solutions to reduce O&M costs and maximize plant performance, increase engagement with the G&E regions, heightened interest from growing markets, and technical solutions to grid stability challenges.

What has been going on? In 2025, the industry's focus on sustainability in both storage and emerging categories, from responsive PV to mobile performance optimization to innovative and advanced energy storage. This was arguably the year that the solar industry really woke up to the pressing need for greater grid flexibility and better battery storage systems (BESS) deployment. And the time has come to reveal the winners across 40 categories.

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260 entries received from 40 countries
20 independent jurors
Eight winners

pv magazine AWARDS 2025

Winner: Würth & Energy Storage, Blockstacker BESS (PAGE 52)

Winner: Long Green Energy Technology Co., Ltd., H190-2.0 (PAGE 54)

Winner: Sun8 Energy, High-performance second-life BESS (PAGE 56)

Winner: SMA Sunny Central Storage 100-S (PAGE 58)

Winner: H&K Solartron, H&K Quicktech (PAGE 60)

Winner: Solar Materials, solar recycling (PAGE 62)

Winner: Invert Solar, Invert Solar (PAGE 64)

Winner: H&K (PAGE 66)

Industry & suppliers

Manufacturing: Sustainable innovation

Despite difficult market conditions for many in the sector, solar manufacturers and technology suppliers have continued to innovate in 2025. This year's winner reflects the emergence of PV recycling as a manufacturing and technology sector in its own right, while the highly commended entry provides a great example of equipment supplier ability to quickly adapt to changes in cell technology and the new requirements they bring.

太阳能面板再利用

Winner

Solar Materials, solar recycling

Germany's Solar Materials has developed a set of proprietary processes it can recover 98% of all raw materials in a typical solar panel waste per year with plans to scale this capacity and open a new site in Italy in 2026, as well as further sites in France and Spain later on – targeting a total capacity to handle 100,000 tons of PV waste by 2028.

Solar Materials uses the processes required to recycle 98% of raw materials and 80% of CO₂ emissions from the production of panels.

The company takes a "reverse production" approach, with automated processes to separate the panels layer by layer, including chemical treatments and high-temperature processing.

In April 2025, it opened its first industrial PV recycling facility in Magdeburg, Germany, capable of handling 7,000 tons of solar panel waste per year with plans to scale this capacity and open a new site in Italy in 2026, as well as further sites in France and Spain later on – targeting a total capacity to handle 100,000 tons of PV waste by 2028.

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Also, the company also continues to invest in optimization and further green the transport and storage efficiency of its recycling process, and to be prepared to handle ever-evolving technologies and materials as they start to reach end-of-life solar solutions.

Jury comments

Alison Clarke: "It's an effective solution for PV recycling, and well-welcomed results for cell recycling are particularly impressive.

Peter Fuchs: "Shocking silver content will put a lot of pressure on their business model, but they are already recycling lot of modules successfully. They are serious and it's great to see a strong and dynamic company making this a reality.

Hans-Joachim: "Recycling solutions like this are so exciting the industry regularly needs. It'll be very interesting to see how they can scale up and expand to process more materials."

Industry & suppliers

革新性尖端技术 探针排 FSS4

Highly commended

Kynobin Electronic, FSS 4 Probe Bar

Changing PV cell architecture comes a challenge for suppliers of testing equipment, with new architectures and cell interconnections strategies increasingly incompatible with testing equipment. Older pin-type cell probes struggle to maintain a consistent and uniform contact with these electrodes as cells requiring more approach.

Kynobin's FSS 4 probe bar offers a flexible spring-assisted mechanism to align and support approximately 200 contact strips. The solution features dual row configurations with a contact probe and voltage probe in parallel with a diameter of 0.2 mm – meaning the device is able to measure fine interconnects. It can also measure cell sizes from 362 (37 mm) to 612 (28 mm), in various formats including full-size, half cell, and double half cell.

The device is ready to use – both as standalone or as a probe bar. The manufacturer says it has been proven to work for more than 10 million test cycles, and can be integrated into existing equipment with minimal modifications.

The Jury

Alison Clarke: "It's a highly innovative and effective solution for a common problem in the industry. It's a highly innovative and effective solution for a common problem in the industry. It's a highly innovative and effective solution for a common problem in the industry."

Peter Fuchs: "The FSS 4 probe bar, which works in parallel with global industry, government, and financial bodies to establish a comprehensive manufacturing facility for producing advanced engineering services. It's a highly innovative and effective solution for a common problem in the industry."

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共进电机 (KOPEL) : FSS 4 Probe Bar

太阳能电池 (PV) 硅片架构的变化, 正在成为检测设备制造商的新课题, 新的金属化 (电极形成) 及硅片连接方式, 与传统电池检测设备的兼容性正不断降低。传统针型硅片探针难以针对变细的电极维持稳定且均匀的接触, 因此需要新的解决方案。

共进电机的 FSS4 探针排采用了可支撑约 200 个接触件的柔性弹簧式悬挂机构。该解决方案的特点是采用电流探针与电压探针并列配置的双排结构, 两者之间设有 0.2 毫米的微间隙, 因此也可进行 4 端子电池的测量。同时, 该产品可适配从 M2 (157 毫米) 到 G12 (210 毫米) 的硅片尺寸, 可测量全尺寸、半切、双半切等各种规格的电池硅片。

制造商表示, 该设备已在研究所以及生产线中投入使用, 拥有 1000 万次以上测试循环的实绩。此外, 该设备也可通过最小限度的改造, 整合至现有设备中。



评审委员评语



Dr. Peter Fath
首席执行官

该解决方案是未来光伏（PV）硅片检测中不可或缺的技术。可适配叠层硅片及无主栅结构的传统型针式探针已经达到极限，本产品是解决这一根本课题的革新性方案。



Dr. Alison Ciesla
悉尼新南威尔士大学高级讲师

这是目前行业面临的一个非常重大的问题。主栅和指栅变得极细，有时甚至完全消失，在组件内对硅片进行精确匹配的方法正在缺失。许多企业都在研究针对这一课题的解决方案，而该解决方案相较于我所了解过的非接触式方案，更为简单且实用。

主力产品阵容

- TFS4 探针排可通过增加接触子的数量，适配从 M2 规格 157mm 到 M12 规格 210mm 的全系列标准尺寸。
- 可支持任意规格、尺寸的电池片定制！

全规格/尺寸电池硅片

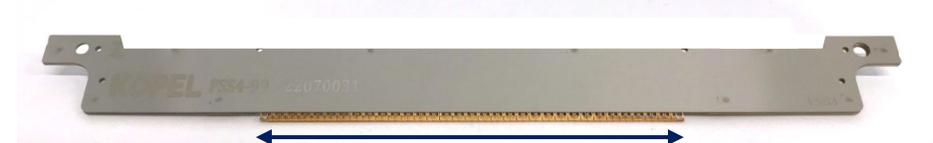
对应 M6 尺寸 (165mm)



165 mm

适用于单半切电池硅片

适用于 M12 规格单半切电池硅片 (99mm)



99 mm

黑色类型



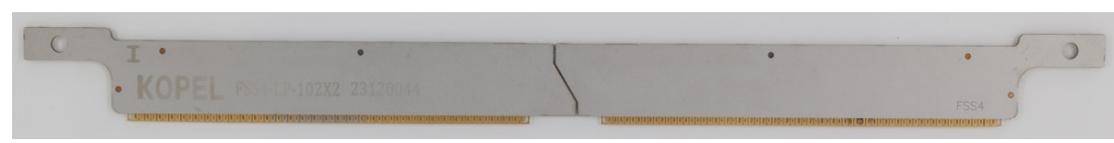
对应 M12 尺寸 (210mm)



210 mm

适用于双半切电池硅片或全尺寸电池硅片

适用于 M12 规格双半切电池硅片 (99mm×2 通道)



99 mm

(16 mm)

99 mm

※Flexible

FSS4 双路型:

配备 2 通道，可同时对双半切电池硅片进行一次性探针接触与闪光测试