



Leading the charge in PV inverter solutions

Photovoltaic (PV) inverters play a crucial role in solar energy systems, converting direct current into alternating current for use in homes, businesses, and the grid. PES sat down with Yao Qu, President, Europe, at Sineng Electric, to look at its strategic approach to market demands, its commitment to sustainability, and how its products stand out in a competitive landscape.

PES: It's great to chat to you Yao. Perhaps we can begin by looking at what factors drove Sineng's decision to enter the PV inverter solutions market, and how the company has evolved since then?

Yao Qu: Our decision to enter the PV inverter solutions market was primarily driven by the

burgeoning photovoltaic industry in 2010. Recognising the increasing demand for PV inverters, Sineng seized the opportunity by initiating a partnership with Emerson Network Power. Concurrently, we continued to increase investments in research and development, expand our talented team, and prioritise technological innovation.

Initially focusing on the development of PV inverters tailored for utility-scale applications, the company has since undergone considerable transformation, diversifying our product offering and fortifying our competitive edge by delivering top-tier services. Moreover, aware of the vast potential within the energy storage



market, we strategically introduced PCS to our portfolio.

Since then, Sineng has steadily emerged as a global leading PV+ESS solution provider, supplying PV inverters, PCS, and power quality products. In April 2020, Sineng was successfully listed on the Shenzhen Stock Exchange.

With three manufacturing bases in Ningxia and Wuxi, China, and Bangalore, India, our annual production capacity has reached 50 GW, reaffirming our commitment to meeting the growing demands of the renewable energy sector. By establishing four R&D centers and leveraging top-notch resources, we have enabled more people to access cost-effective, reliable, and sustainable energy.

Presently, Sineng has earned recognition as a BloombergNEF tier 1 PV inverter maker and has maintained its position among the global Top 10 PV inverter suppliers for 10 consecutive years.

PES: In your view, what are the distinguishing factors that separate your PV inverter products from those offered by competitors in the market?

YQ: Sineng Electric distinguishes itself with its innovative PV inverter products, thanks to a strategic fusion of advanced technology,

extensive R&D, and a commitment to sustainability. Leveraging the research and development expertise of Emerson Network Power, we offer a versatile range of products, including string inverters, central inverters, MV turnkey stations, and energy storage systems.

This partnership ensures our products excel in efficiency, performance, and reliability. Our dedication to quality, backed by rigorous testing and quality control processes, guarantees that our PV inverters meet the highest standards. By prioritising innovation, customer value, and environmental responsibility, we remain at the forefront of advancing global sustainable development.

PES: Could you discuss some of the flagship products offered and their key features?

YQ: Our flagship offerings, the SP-275K-H1 and SN125PT string inverters, are engineered for utility and commercial applications respectively.

The SP-275K-H1 is designed for the 1500 Vdc utility segment. It features 12 MPPTs, a high input current of 40A per MPPT, and an enhanced DC/AC ratio of up to 1.8. The inverter supports active and reactive power control with the 'Q@Night' function for grid support, as well as LVRT and HVRT capabilities for grid stability. Additional features include PID recovery for maintaining efficiency, as well as IP66 and C5 anti-corrosion protection for durability. It is also compatible with bifacial modules and is fully certified for the EU market.

The SN125PT, tailored for the 1100 Vdc C&I segment, includes 5 MPPTs and other advanced features such as night-time PID recovery and a built-in arc-fault circuit interrupter for enhanced safety. Its smart I/V curve diagnosis is a powerful tool for real-time PV system monitoring. Additionally, it adheres to VDE 4105/4110 standards.

PES: Can you elaborate on any recent technological advancements or developments in your products?

WP: We continue to focus on improving our products' efficiency, safety, and reliability. For instance, our SN125PT string inverter features a new built-in arc-fault circuit-interrupter, significantly enhancing system safety by preventing electrical fires. Additionally, we've increased the maximum DC/AC ratio up to 1.8 for our SP-275K-H1 and EP-4400-HA-UD models, allowing for greater flexibility and efficiency in solar energy conversion.

Our EP-4400-HA-UD model features a remarkable modular design for internal components such as fans, IGBTs, and fuses, which simplifies maintenance and increases system reliability. Moreover, this model incorporates innovative liquid vaporization circulation for cooling.

We have also introduced 350 kW string inverter for the 1500 Vdc segment, with



Yao Qu

a DC/AC ratio of up to 1.8, catering to the needs of utility-scale solar projects. Our 2MW central PCS features a modular design, improving both performance and reliability.

All our string inverters are equipped with optional smart I/V curve diagnosis technology, enabling precise performance analysis and troubleshooting. Furthermore, our SAU-1000-A logger facilitates remote updates and configuration of string inverters, streamlining system management. These developments in products underscore our pursuit of delivering superior energy solutions.

PES: Reliability and efficiency are key, so what strategies do you employ to ensure these are provided?

YQ: To ensure the reliability and efficiency of our products, Sineng Electric employs a comprehensive strategy that emphasises rigorous testing, certification, and the utilisation of high-quality components. Through extensive field testing, we guarantee that our products maintain robustness across diverse operating conditions.

In our laboratories located in Wuxi and Shenzhen, China, we conduct continuous product testing, including stress testing, to evaluate how the product performs under extreme conditions. Moreover, we collaborate with esteemed third-party organisations such as DNV GL, TÜV SÜD, and TÜV Rheinland, ensuring unbiased validation of our products' reliability and efficiency.

Our commitment to excellence is further demonstrated by obtaining relevant IEC and ISO certificates, which attests to our adherence to international standards.

By using components from renowned suppliers, such as Infineon and Onsemi for IGBTs, Texas Instruments for boards, and Siemens and ABB for RMUs, along with transformers from Huapeng, we ensure the high quality and durability of our products.

PES: In what ways do you adapt your products to meet the varying needs and demands of different markets worldwide?

YQ: Sineng Electric strategically conducts thorough market research and maintains its presence in the industry. We begin by studying the Requirements for Generators (RFG) and grid codes specific to each market to ensure compliance and technical compatibility with local regulations. To gain in-depth insights into market needs, we engage in dialogue with key stakeholders such as Key Accounts, EPCs, installers, and investors. These interactions allow us to gather valuable feedback.

We also stay informed of industry trends by attending trade shows and conferences, as well as participating in online events organised by reputable institutions. This allows us to stay ahead of evolving technology standards, thus tailoring our products to specific market demands effectively.

PES: Are you seeing any emerging trends or challenges within the solar energy market, particularly in relation to PV inverter solutions?

YQ: In the dynamic landscape of the solar energy market, particularly within the PV inverter sector, emerging trends and challenges are shaping the industry. One notable trend is the increasing difficulty in obtaining approvals for new PV installations in certain countries, such as Germany, where grid capacities are nearly maxed out. This situation highlights the need for innovative solutions to integrate solar energy more efficiently into existing grids.

We are also observing a trend towards higher environmental standards for string inverters, which is likely to influence future design and production to prioritise eco-efficiency. Additionally, the production of larger string inverters faces limitations due to concerns about AC cable sizes and potential cable losses, posing challenges for scaling up solar installations.

Moreover, network operators are imposing stricter requirements on active and reactive power support, alongside faster response time from inverters, necessitating advancements in inverter technology. Concurrently, there is a growing demand for energy storage across all sectors, signaling a shift towards more resilient and flexible solar energy systems. These trends underscore the importance of continuous innovation in PV inverters to meet changing requirements within the solar energy market.

PES: In your business operations and product offerings, how do you prioritise sustainability and environmental considerations?

YQ: In our business operations and product development, sustainability and environmental considerations are at the core of Sineng's ethos. Our operational



processes, primarily organised through CRM tools, are designed to streamline workflows, minimise the waste of resources, and reduce our carbon footprint. This approach extends to a paperless work environment, that significantly reduces paper consumption and promotes digital alternatives for communication and documentation.

Our R&D team is dedicated to continuously improving the efficiency of our inverters. Through relentless innovation, we aim not only to enhance product performance but also to ensure they consume less energy, thereby reducing overall system losses. This commitment to efficiency directly translates into lower energy consumption for our clients and a reduced environmental impact.

Sineng's string inverters are designed with eco-friendliness in mind, avoiding the use of hazardous RoHS (Restriction of Hazardous Substances) materials. Furthermore, we intend to introduce SF6-free gas-insulated switchgear by 2025. SF6 is the potent greenhouse gas. The plan reflects our dedication to reducing greenhouse gas emissions.

Additionally, we participate in an inverter recycling program to ensure disposal of our products at the end of their life cycle. Through these strategic initiatives, Sineng Electric prioritises sustainability and environmental considerations in every aspect of our operations and product offerings, contributing to a greener, more sustainable future.

PES: Do you have specific regions or market segments that you are particularly focused on or consider as growth opportunities?

YQ: Our market strategy is meticulously tailored to each region's unique needs and opportunities. This approach enables us to effectively penetrate diverse markets. Our team primarily focuses on Western and Southern Europe, the Benelux, and the Nordics, where we identify significant

growth potential. For each of these regions, we develop tailor-made solutions that not only address the specific requirements of the local market but also offer promising prospects for collaboration.

By customizing our approach and offerings, we ensure that our products and services are closely aligned with regional preferences. This strategy allows us to maximise our impact and promote sustainable growth. Additionally, it enables us to capitalise on the distinctive opportunities presented by each market segment, positioning Sineng Electric as a key player in the global solar energy industry with a robust presence in strategically important regions.

PES: Would you be able to share any success stories or case studies showcasing instances where Sineng's PV inverter solutions have made a substantial impact on solar energy projects or installations?

YQ: One notable achievement was the signing of a framework agreement with one of the most significant players in the PV market, through which we delivered 110 MW of 275 kW string inverters. Furthermore, a 300 MW PV plant which deployed our MV turnkey solution has been commissioned, showcasing our proficiency in delivering high-performance solar energy solutions.

Additionally, we are in the final stages of integrating our products with industry-leading monitoring providers such as Meteocontrol, Gantner, GPM, and Inaccess. This integration ensures that our inverters work seamlessly with top-tier monitoring systems, enhancing the overall efficiency and reliability of solar energy installations.

These successes highlight Sineng's impact on the solar energy sector and demonstrate our commitment to innovation, quality, and customer satisfaction.