Creating wealth from sunshine

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In Shanghai's summer, noon is the best time for favorable light conditions. As the hot sun beats down, the photovoltaic (PV) panels on the roof of the factory of Siemens Circuit Protection Systems Ltd., Shanghai (SCPS) are glowing. Due to the action of the roof-mounted distributed PV system, energy from the sun is converted directly into clean electricity, powering the factory's lighting and mechanical equipment.

Unlike a conventional power supply system where power is generated from a central source and then transmitted to load centers via grid systems, the PV system deployed at the SCPS factory is a distributed energy system. It is located at the factory to meet the energy needs of the plant with electricity that is generated by itself. Furthermore, it can feed any surplus electricity in to the main power grid for greater economic benefit.

Compared to a centralized power supply, distributed energy system is clean and efficient due to its usage of renewable energy resources and avoidance of energy loss caused by long-distance transmission.

At a time when much attention is being paid to environmental issues, distributed energy is becoming the preferred choice of major energy consumers, such as industrial parks and energy-intensive factories. Among all kinds of distributed energy systems, distributed PV systems are relatively more in demand since they offer low cost, high yield and remarkable emission reductions, and are supported by national environmental policies.

In 2015, as the construction of the new factory of SCPS was near completion, SCPS joined hands with its partners to start building a roof-mounted distributed PV system compliant with the local geographical conditions, and requirements on energy saving and emission. After two years of construction, the system was officially connected to the grid on May 17, 2017, and has maintained stable operation since commissioning. "The project has now become a demonstration for Siemens to promote its distributed energy business in China," said Jia Qing, Strategy Program

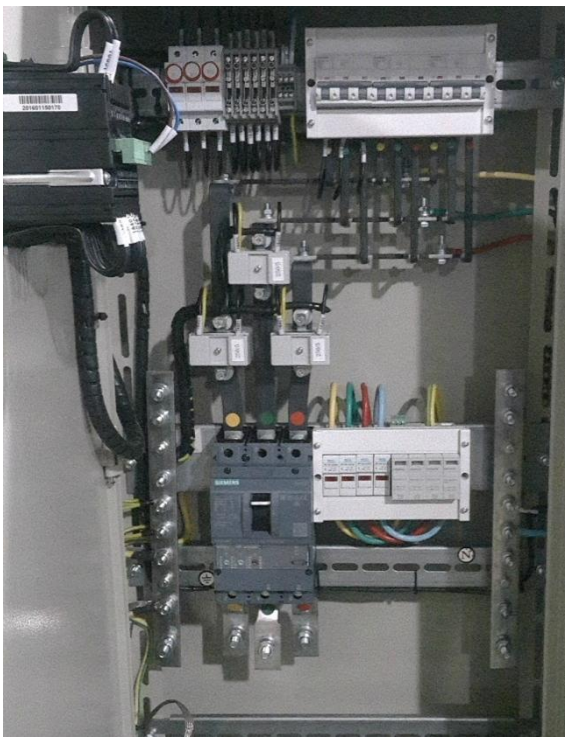
Manager of Energy Management Division, Siemens China. “It will also help us further develop the distributed energy market in China.”

Yavor Nikolov, General Manager of SCPS, said, “Siemens plans to achieve a net-zero carbon footprint by 2030. We are contributing to the achievement of this target, starting from our home base.”

Benefiting from the sun

Looking at the rows of PV panels shining in the noon sun on the roof of the factory, Shi Junfei, Manager of General Administration in SCPS, said, “We have received the gift from the sun."

SCPS deployed PV panels of over 2,000 square meters on the factory roof. Ample solar energy is collected by the panels and converted into direct current, which is then converted into alternating current through an inverter. The alternating current is transmitted via the combiner box into the power distribution cabinet in the distribution room, and finally sent to every part of the factory to support the operation of equipment and buildings.



The interior view of the combiner box in SCPS

At SCPS, electricity generated from this solar source is connected to the grid at the low-voltage output side. In other words, the electricity will be consumed directly when there is a demand at the factory, or will be routed back through the transformer to the grid when there is no energy load at the factory, for example when production has completely stopped.

At SCPS, the PV system is operated in parallel with the main power grid. In demand fulfillment, priority is given to electricity from solar energy, and power from the main power grid is used only when there is a shortfall. At present, PV power output accounts for about 15% of the factory’s total power demand.

Creating the conditions for the successful project implementation are advanced and reliable products and the professional guidance of experts. Experts from Siemens Energy Management (EM) Division helped SCPS plan and design a comprehensive solution. The Low Voltage & Products business unit in EM provided the combiner box and power distribution system, and the Digital Grid business unit provided SCPS with energy management system and power quality management system.

The customized energy management system developed by Siemens experts can acquire real-time data such as the PV system’s outputs and loads. In combination with the light condition information collected by the weather station at the factory, the system gives a clear picture of power generation at different periods of time, allowing factory employees to know status of the operation of the PV system, and to create a reference for possible future investment in electricity.

The PV system has brought SCPS gratifying economic and environmental benefits, including a saving of RMB 60,000 per year in electricity costs and an estimated 15% reduction in carbon dioxide emissions.

Nikolov believes that the project is very promising, “It is possible for the factory to achieve zero carbon emission in the future, if the PV system capacity can be expanded through usage of additional unoccupied

roofs, such as the bicycle shed roof. By then, electricity consumption will no longer be an expense. We can not only eliminate our electricity costs, but also feed electricity back to the main power grid, so as to tap wealth from the sun."

Penetrating the distributed energy market

In addition to the booming PV market, Siemens has also been strengthening its position in other distributed energy-related markets. Committed to energy and environment sustainability, the company delivers complete distributed energy solutions, covering project financing, design, supply chain, operation, maintenance and service. The financing solution provides customers with innovative funding options to support the upfront investments. For distributed energy projects with a capacity above 6 MV, Siemens can provide quality warranty for five years.

"With energy demand in China getting diversified and the enterprises' requirement for energy saving and emission reduction increasing, we have seen the great opportunity in the distributed energy market," said Markus Mildner, Executive Vice President of Siemens Ltd., China and General Manager of Energy Management Division, Siemens Greater China. "As one of the leading distributed energy solution providers, Siemens has abundant experience, complete product line and proven solution in this area. We are committed to helping Chinese customers achieve improved financial and environmental performance through this new energy paradigm."

Every day, the sun emits light and heat. Siemens distributed energy solutions make the process of creating wealth from the sun easier and more efficient. Based on advanced technologies and profound market insights, Siemens is actively involved in a number of distributed energy projects, which include municipal works, industrial parks, factories, etc. The company will continue to strive for excellence while providing outstanding services and creating values for customers.

Contact:
Huang Yi
Communications, Siemens Ltd., China
Tel: +86-10-6476 5977
E-mail: yi-huang@siemens.com

Shi Junfei
Siemens Circuit Protection Systems Ltd., Shanghai
Tel: +86-21-3733 0666-346
E-mail: junfei.shi@siemens.com