DuPont and Yingli Solar Collaborate on Clean Energy

Rooftop Solar System at DuPont R&D Center Serves as Model for Distributed Solar Power Systems in China

Background

As the world's largest manufacturing region for solar panels, China has emerged as a powerhouse in the field of solar energy. In 2013 alone, the country installed nearly 13 gigawatts (GW) of solar power. In 2014, China's National Energy Administration (NEA) added incentives for distributed solar power projects, which are installed at or near where the electricity is used – often on rooftops.

One of the first distributed solar energy systems under this new initiative was installed on the rooftop of the DuPont China Research & Development (R&D) Center in Shanghai. It is the company's main center for research, product development, customer support and materials testing in this important, growing region.

In 2013 alone, the country installed nearly 13 GW of solar power.

The installation at DuPont was intended to serve as a model for Chinese distributed solar power systems, and was designed in collaboration with Yingli Solar, the world's leading solar panel manufacturer.

Partners in Progress

The strategic collaboration between DuPont and Yingli Solar illustrates a shared commitment to accelerate the broader adoption of solar energy to address the world's growing energy needs.

"DuPont and Yingli Solar established this project to model how solar power can be most effectively utilized to meet the growing demand for clean and sustainable distributed solar energy," said Chuck Xu, global business director, DuPont Photovoltaic Solutions.

Yingli Solar's dedicated distributed generation team was responsible for the system's design, installation, and interconnection. Yingli Solar also manufactured the solar panels for the installation. DuPont provided not only an ideal location for the installation, but also advanced materials used in the production of the panels, to help ensure improved power output, long-term durability and return on investment.

Challenges

The rooftop solar installation faced several unique challenges which required careful selection of materials and technologies for use in the production of the solar panels. The design had to take into account the high temperatures and weight load restrictions of the rooftop location, as well as the power output, reliability and durability expectations that this high-profile solar project required.

Materials proven to be highly durable and temperature-tolerant are critical on rooftop installations, because solar panels are subjected to significantly higher thermal stress on rooftops than they are on the ground. One of the most important components for the DuPont installation was the panel's backsheet, which needed to be able to protect the solar cells and circuitry from the environment and provide electrical insulation to ensure safe and uninterrupted electrical performance over the 25-year expected lifetime of the system.

Additionally, space was limited on the rooftop, so high-efficiency panels were required to maximize the power output of the rooftop system.

Minimizing the structural load on the rooftop was also key. Framing and mounting materials supporting the solar panels needed to be lightweight, easy to assemble, and resistant to salt corrosion and other sources of degradation.

Solution

The Yingli Solar team drafted a plan for a rooftop system composed of Yingli PANDA modules, incorporating three key advanced materials from DuPont to improve the power output, durability and overall system cost.

To help ensure long-term durability and reliability, the plan specified a tri-layer backsheet construction known as TPT, which contained a top layer of Tedlar® polyvinyl fluoride (PVF) film, a center layer of polyester and an underlayer of Tedlar® PVF film.

Yingli Solar chose TPT because Tedlar® film is the only backsheet material on the market today that has been field-proven to protect solar panels for over 30 years, even in extreme conditions. Tedlar® film-based backsheets have also been proven to provide the highest thermal stability for rooftop installations compared to other materials, reducing the risk of cracking, blistering and delamination that can compromise electrical performance and safety — the most critical attributes for rooftop installations.

"Selecting high-performing, long-lasting and cost-effective solar materials is important to help lower overall system costs and enable the achievement of grid parity worldwide."

— Walt Cheng, Greater China managing director, DuPont Electronics and Communications

The rooftop system featured monocrystalline PANDA solar panels developed by Yingli Solar using DuPont™ Solamet® PV3Nx silver and aluminum metallization pastes for high-efficiency solar cells. The technology and materials together helped maximize the power output of the system.

In addition, e-Frame, a concept product for framing in development from DuPont, was used to decrease the structural load on the roof and streamline the installation. Because it was easier to install, e-Frame reduced installation cost, and will also help provide resistance to potentially induced degradation and salt corrosion.

Results

Covering over 2,100 square meters, the project is expected to produce 202,000 kilowatt hours of solar-generated electricity each year, roughly the amount of electricity that 670 households consume every month in China.

"Technological innovation and the use of qualified materials are key," said Jia Miao, assistant general manager, Distributed Power Investment Management Company, Yingli Solar. "Yingli's mission is to provide affordable green energy for all."

For researchers at the DuPont Shanghai R&D Center, the collaboration with Yingli Solar and the solar power project supports their goal to develop product and application platforms that help to expand local markets, and also extend advances in solar energy worldwide. The Shanghai site is the 14th solar installation at a DuPont site to date, adding to the more than 11 million kilowatt hours of solar energy produced at DuPont facilities each year.

"Technological innovation and the use of qualified materials are key."

— Jia Miao, assistant general manager, Distributed Power Investment Management Company, Yingli Solar

"The key factors that impact return on investment for solar energy systems are power output, durability and overall system costs," said Walt Cheng, Greater China managing director, DuPont Electronics and Communications. "Selecting high-performing, long-lasting and cost-effective solar materials is important to help lower overall system costs and enable the achievement of grid parity worldwide."

Promoting clean, green energy is also the ultimate goal of this high-profile installation. Serving as a model of advanced solar technology and distributed generation solar, the project is an opportunity to demonstrate the power and potential of distributed solar power projects more widely, both across China and around the world.

YINGLI SOLAR | DUPONT

To learn more about DuPont Photovoltaic Solutions, visit photovoltaics.dupont.com