



China Power Investment Opts for High-Quality, Field-Proven Materials from DuPont

DuPont Expertise, Tedlar® Films and Solamet® Metallization Pastes Help World's Largest Solar Developer Drive Solar Advances in China

Background

Urbanization and a rapidly growing economy are reshaping China's energy industry. It is anticipated that the country's gross domestic product (GDP) will increase fourfold by 2050. The Chinese government has set a goal to achieve 15 percent of total energy consumption from non-fossil fuels by 2020¹, recognizing the growing need for clean, renewable energy.

Already well on the way to achieving this goal, the network of state-owned organizations that manage China's energy framework are embracing solar energy with new approaches and the latest technology.

China Power Investment Corporation (CPI) is one of China's largest energy companies, and is the world's largest solar power developer. Most of its installations are located in Western China. For CPI, which manages all aspects of its solar installations, including project design, panel manufacturing and installation, choosing the right materials—and the right materials provider—is key to the successful expansion of solar power.

For the third year in a row, CPI has opted to use DuPont™ Tedlar® polyvinyl fluoride (PVF) film-based backsheets and DuPont™ Solamet® photovoltaic metallization pastes exclusively in its solar panels, for three reasons: the superior quality of the materials, the expertise and support that DuPont provides, and the ability of DuPont to align precisely with the requirements of CPI's supply chain processes.

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Challenges

Climate is an important factor for CPI in selecting materials, because the climate in the west and northwest sections of China, where its solar projects are sited, can be extreme. Across China, solar radiation is highest in the province of Qinghai and the area around Tibet, and most of CPI's solar farms are installed there. A large part of the area is desert, subject to grueling temperature highs and lows, which range from -20° Celsius (-4° Fahrenheit) in the winter to as high as 65° C (150° F) in the summer. The strong winds constantly drive sand against the panels. Blowing sand can potentially abrade the backsheets. Materials have to stand up to the elements and provide consistent performance and power output for the panels' expected lifetime of more than 25 years.

Another important point is the sheer size and scope of CPI's solar program, which covers the provinces of Qinghai, Gansu, Inner Mongolia and Xinjiang. By the end of 2013, CPI had installed an accumulated total of 2.5 gigawatts (GW) of panels alone.

For a solar program of this scale, encompassing multiple projects, all running at different stages from inception to connection to the grid, product delivery delays or panel failures can cause major problems.

For this reason, selection of materials and supply chain efficiency are critical and can make the difference between projects that run smoothly, and those that take up too much time and resources, and overrun costs.

Solution

Recognizing the need for high-quality, field-proven solutions, CPI chose DuPont™ Tedlar® PVF film-based backsheets, which offer protection against the harsh elements, provide safe electrical insulation, and ensure the longevity of the panels for the expected lifetime of at least 25 years, and DuPont™ Solamet® photovoltaic metallization pastes, which help to ensure that installations are efficient at producing maximum power. In the past two years, CPI has enhanced its solar panel power performance with a 0.8% gain in solar cell efficiency and achieved a 12% decrease in the amount of paste needed for each solar cell. The use of Solamet® paste has made a significant contribution to reaching these goals.

In research testing and in real-life settings, Tedlar® film-based backsheets consistently outperform the competition. In a recent ‘falling sand’ test conducted by DuPont, where sand is poured onto a backsheet until the protective coating is abraded, it took more than six times as much sand to damage the Tedlar® film compared to the smaller amount of sand that caused damage to other backsheet materials. Because severe abrasion or deep scratching can compromise the backsheet, risking system safety and panel failure, the durability of the backsheet material is crucial. The performance of Tedlar® film is proven in desert environments where sand and wind can take a heavy toll and solar panels endure harsh ultraviolet rays and thermal stress.

Sharing expertise is also part of the DuPont/CPI relationship. For CPI, expanding on its original emphasis on hydroelectric to include new wind and solar power projects, having access to the knowledge base of a global leader in solar and advanced materials—including research, field testing results and analysis from solar projects across China and all over the world—has been helpful.

DuPont also made sure that its sales approach aligned with CPI’s needs for the most efficient supply chain management possible. It is important for CPI to have a single point of contact at its materials provider, and the DuPont team even oversees the lamination process during the manufacture of the backsheets made using Tedlar® films.

Results

For CPI, a seamless supply chain process and materials that perform precisely as expected, for as long as specified, are helping to advance the Chinese government’s clean energy goals and provide energy to over one million households. The technical support and expertise that DuPont provides are key in this collaboration.



CPI manages all aspects of its solar installations, including project design, panel manufacturing and installation. Choosing the right materials and the right materials provider is key to providing sustainable solar power.

Sharing field research and working together to analyze the performance of solar panels are some of the ways the CPI/DuPont specialists collaborate together. Their joint examination of lightly doped emitter (LDE) technology showed that it could optimize solar cell efficiency in the solar panels manufactured by CPI. By adding the technology to its solar panel assembly line process, CPI was able to significantly boost power output.

“As a global leader in solar energy ourselves, we are glad to collaborate with DuPont, another giant when it comes to innovation and technology. The size and history of DuPont gives us confidence that they are a partner in whom we can confidently place our trust. The product is proven, and DuPont backs it up with knowledge and support.”

– Mr. Xie Xiao-Ping, Chairman, Huanghe Hydropower

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

¹ <http://www.dupont.com/products-and-services/solar-photovoltaic-materials/media/press-releases/report-addresses-sustainable-energy-for-china.html>