

DuPont Apollo Thin Film Photovoltaic Manufacturing Facility



The U.S. Green Building Council has awarded DuPont Apollo's Shenzhen site with the Leadership in Energy and Environmental Design (LEED) Gold Certification for Existing Building, Operations, and Maintenance. DuPont Apollo is the first thin-film photovoltaic component manufacturing site to obtain this certification.

GREEN FEATURES AND SUSTAINABLE TECHNOLOGIES

ENERGY EFFICIENCY

LED lamps and T8 daylight lamps are used, saving about 160,000 kilowatt hours (kWh) annually (compared to business as usual). Wet master humidifiers replaced electrical heating humidifiers to conserve over half a million kWh per year. In addition, all electrical appliances pass Energy Star and Electronic Product Environmental Assessment Tool (EPEAT) standards.

SOLAR ROOFING

13,000 amorphous silicon thin film photovoltaic modules, produced onsite, cover 23,000 square meters of the facility's rooftops. The installation generates 1.5 million kWh per year and saves nearly 1,480 tons



of CO₂ emissions annually. The installation has a 1.33 megawatt peak (MWp) capacity.

ADVANCED HUMIDIFIER

The Heating, Ventilation, and Air Conditioning (HVAC) system utilizes an advanced humidifier system and the Facility Management Control System (FMCS) to operate green technologies and decrease overall energy use. It implements space heating/cooling methodologies, reduces water-related energy consumption, improves air quality through greater ventila-

PROJECT DETAILS

LOCATION

Shenzhen, China

NAME

DuPont Apollo Thin Film Photovoltaic Manufacturing Facility

ARCHITECTURAL DESIGN

DuPont Apollo Ltd.

SIZE

538,000 ft² (total site area)
20 m (building height)

TYPE

Manufacturing

BUILDING DETAILS

2-story manufacturing facility
1.3 megawatt (MW) rooftop photovoltaic installation covering 23,000 m²

RATINGS

Leadership in Energy and Environmental Design (LEED) Gold Certification for Existing Buildings, Operations and Maintenance (EB: O&M) from the U.S. Green Building Council (USGBC)

International Electrotechnical Commission Quality (IECQ) QC 080000 certified

First LEED certified thin-film photovoltaic module production facility and the first LEED-EB certified photovoltaic module manufacturing plant

COMPLETION

First quarter 2009

MEASURABLE RESULTS

OVERALL SOLID WASTE REDUCTION (FROM A BUSINESS AS USUAL BASELINE)

ONGOING CONSUMABLES

50%

DURABLE GOODS

75%

FACILITY ALTERATIONS

70%

BATTERIES

80%

SUSTAINABLE PROCUREMENT PRACTICES

At least 60% of annual consumable materials and 80% of durable materials meet one of the following standards:

Pre-consumer materials $\geq 20\%$ and/or post-consumer materials $\geq 10\%$

Rapidly renewable materials $\geq 50\%$

Local materials extracted and processed within 500 miles $\geq 50\%$

Forest Stewardship Council certified paper products $\geq 50\%$

OTHER ENVIRONMENTAL MEASURES

DuPont also arranges dormitories and free transportation for commuting employees as well as a recycling program to increase the site's sustainability. In addition, industrial chillers use R-123 refrigerants which, according to Lifecycle Direct Global Warming Potential (LCGWP) and Lifecycle Ozone Depletion Potential (LCODP) calculations, significantly contribute to reducing chlorofluorocarbons emissions and ozone depletion.

tion, acquires raw materials from regional sources, and incorporates EnergyStar waste management.

LOCAL SUSTAINABILITY

The facility aims to protect the local habitat by prioritizing environmentally friendly operations. To boost water efficiency, a greywater system is employed to recycle and irrigate wastewater. An Integrated Pest Management program is designed to ensure human safety while preserving the environment. A Landscape Management Program guides the facility's interaction with the surrounding ecosystem, such as protecting nearby land, reducing water and power consumption, and preventing air/water contamination.