

# Case Study

## MES - MODERNE ENERGIE SYSTEME

### Commercial Rooftop Kröpelin



Kröpelin, Germany



Solar Frontier CIS thin-film modules installed on one of the biggest rooftop installations in Germany. (Image: MES GmbH)

#### Site Overview

<b>Location</b>	Kröpelin, Germany
<b>Coordinates</b>	54.07° N, 11.78° E
<b>Average global irradiance</b>	1,047 kWh/m <sup>2</sup> /yr
<b>Average temperature</b>	8.8 °C, 47.8 °F
<b>Average precipitation</b>	591 mm/yr, 23.3 in/yr

#### Technical Overview

<b>Date onstream</b>	March 2012
<b>System capacity</b>	961.14 kWp
<b>Panel type</b>	SF130-L (130 W), SF150-L (150 W)
<b>Number of installed panels</b>	5,013 x SF130-L, 2,063 x SF150-L
<b>Tilt angle, orientation</b>	14°, -113° NE/ 14°, 67° SW/ 10°, -33° SE
<b>Expected output</b>	860,220 kWh/yr
<b>CO<sub>2</sub> reduction</b>	559,143 kg/yr, 1,236,687 lbs/yr
<b>Inverter</b>	56 x SMA Tripower

#### Financing Bank

VR Bank Schwerin

*"The simulated yields were exceeded in reality. During the transport and installation process, we had no single module with glass breakage - despite very problematic winter weather conditions."*

*Christian Garbe, Managing Director MES GmbH*

Moderne Energie Systeme GmbH (MES) offers planning, design, construction and maintenance services for photovoltaic systems. Headquartered in Parchim in northern Germany, the company works exclusively with manufacturers selected for their reliability. It serves customers in all segments - from residential to commercial and utility-scale.

The installation on five rooftops of a potato warehouse in the town of Kröpelin, approximately 20 km west of Rostock, was connected to the grid in March 2012. On the previously renovated rooftops of the buildings, 7,076 Solar Frontier CIS thin-film modules were installed. The 961.14 kWp system, with predominantly east/west orientation of the gable rooftops, achieves high efficiencies due to the good low-light behavior of the CIS thin-film modules, even with unfavorable irradiance levels.

Thanks to the unique properties of Solar Frontier's CIS thin-film modules, the system is expected to produce a high annual output of 860,220 kWh. This is the equivalent of supplying 200 four-person households in Germany and offsets about 559 tons of CO<sub>2</sub> emissions.

Like all of MES's installations, this system is equipped with a monitoring system that provides the service teams with current data including CO<sub>2</sub> savings. Initial analysis of the output data convinced the owner, that choosing the CIS thin-film modules was the right decision for these conditions.

#### About Solar Frontier

Solar Frontier is committed to creating the world's most ecological, economical solar energy solutions. Our proprietary CIS technology (denoting key ingredients copper, indium, and selenium) has the best overall potential to set the world's most enduring standard for solar energy. For more information visit [www.solar-frontier.com](http://www.solar-frontier.com) and [www.solar-frontier.eu](http://www.solar-frontier.eu)