

# Case Study

## LEAN SOLAR GMBH

### Commercial Rooftop Castrop-Rauxel



Castrop-Rauxel, Germany



624 Solar Frontier CIS modules are now producing energy on both the southern and the northern part of the roof of this industrial plant. (Image: lean solar GmbH)

#### Site Overview

<b>Location</b>	Castrop-Rauxel, Germany
<b>Coordinates</b>	51.31° N, 7.19° E
<b>Average global irradiance</b>	1,023 kWh/m <sup>2</sup> /yr
<b>Average temperature</b>	9.7 °C, 49.5 °F
<b>Average precipitation</b>	838 mm/yr, 33 in/yr

#### Technical Overview

<b>Date onstream</b>	July 2013
<b>System capacity</b>	87.4 kWp
<b>Panel type</b>	SF 140-S (140 W)
<b>Number of installed panels</b>	1,248
<b>Tilt angle, orientation</b>	10°, 0° (S), 180° (N)
<b>Expected output</b>	1,011 kWh/kWp (south side), 840 kWh/kWp (north side)
<b>CO<sub>2</sub> reduction</b>	132,022 kg/yr, 291,010 lbs/yr (south side), 112,840 kg/yr, 248,770 lbs/yr (north side)
<b>Inverter</b>	1x Solarmax 80C (south side), 1x Kaco Powador 36.0 TL3 INT-M (north side), 1x Kaco Powador 60.0 TL3 INT-M (north side)

#### Financing Bank

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*"The client was unsatisfied with the performance of his former PV installation. Solar Frontier's high-performance CIS modules were the best solution here. The innovative modules are offering him a maximum energy yield."*

*Hartmut Bauer,  
general manager of lean solar GmbH*

lean solar GmbH is a system provider in the solar and renewable energy field. They offer custom-made energy consulting and individual solutions for environmental energy generation and cost reduction. As a "one-stop" provider they can pass significant benefits and costs transparently to their customers. From planning to commissioning, lean solar GmbH remains the sole contact for customers.

This project is a 174.8 kWp photovoltaic plant of which 87.4 kWp were installed both on the southern and the northern part of the roof of an industrial warehouse in Castrop-Rauxel. Since July 2013, a total of 1,248 Solar Frontier CIS modules are generating solar energy, which are predicted to produce an annual output of 1,851 kWh/kWp. The plant stands out due to the fact that it is a repowering project: the client already had a photovoltaic installation on the southern part of his rooftop. As his former PV plant did not show the calculated performance anymore he now decided to replace the old modules by new 140 W Solar Frontier modules which are more powerful. In addition, he also equipped the northern part of the roof with further 624 innovative CIS modules. The reinvestment payed off for the client due to the combination of the formerly high compensation for electricity fed into the grid and the high yields per installed kWp of the mounted Solar Frontier modules.

Due to the good low-light behavior of the modules, not only the southern part of the building but also the northern part can be used for efficient energy production. The client is convinced of the quality and performance and therefore already put into practice further photovoltaic projects in collaboration with Solar Frontier.

#### 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)