



○ Sustainable and cost effective solar process heat

High Efficiency Solar Thermal Systems for Industrial Applications. Savings in Fuel Consumption, Energy Efficiency and Reduction in Emissions.

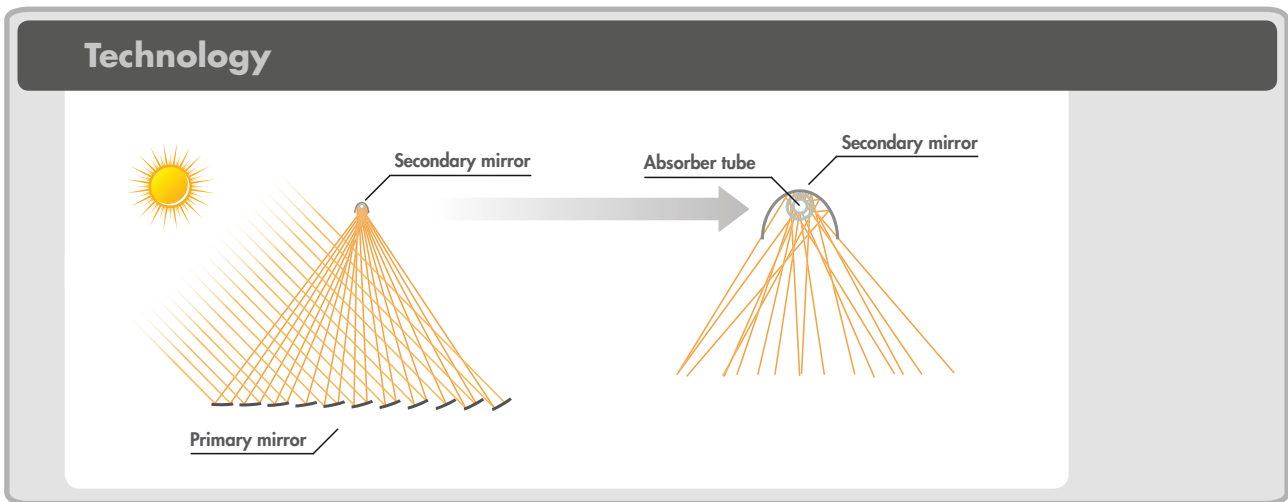
○ Description of Function and Application

The solar collector from Industrial Solar uses a line-focusing system with Fresnel reflectors, which concentrates the solar irradiation onto a vacuum absorber tube, generating heat at temperatures of up to 400 °C.

The Fresnel collectors use the direct irradiation, which reaches the highest levels in regions with high solar radiation and clear sky. Auxiliary systems for thermal storage can complement and balance the energy production during cloudy periods or days without sunshine.

The Fresnel collectors also present a good land utilisation (using smaller area), low wind load and great ease of maintenance and cleaning in comparison to other collectors. The precise temperature control prevents overheating and stagnation.

Now more than ever customers are demanding products with low environmental impact. Industrial Solar offers efficient solutions for the reduction of fuel consumption and carbon emissions.



FACTSHEET FOR A TYPICAL INDUSTRIAL PROJECT

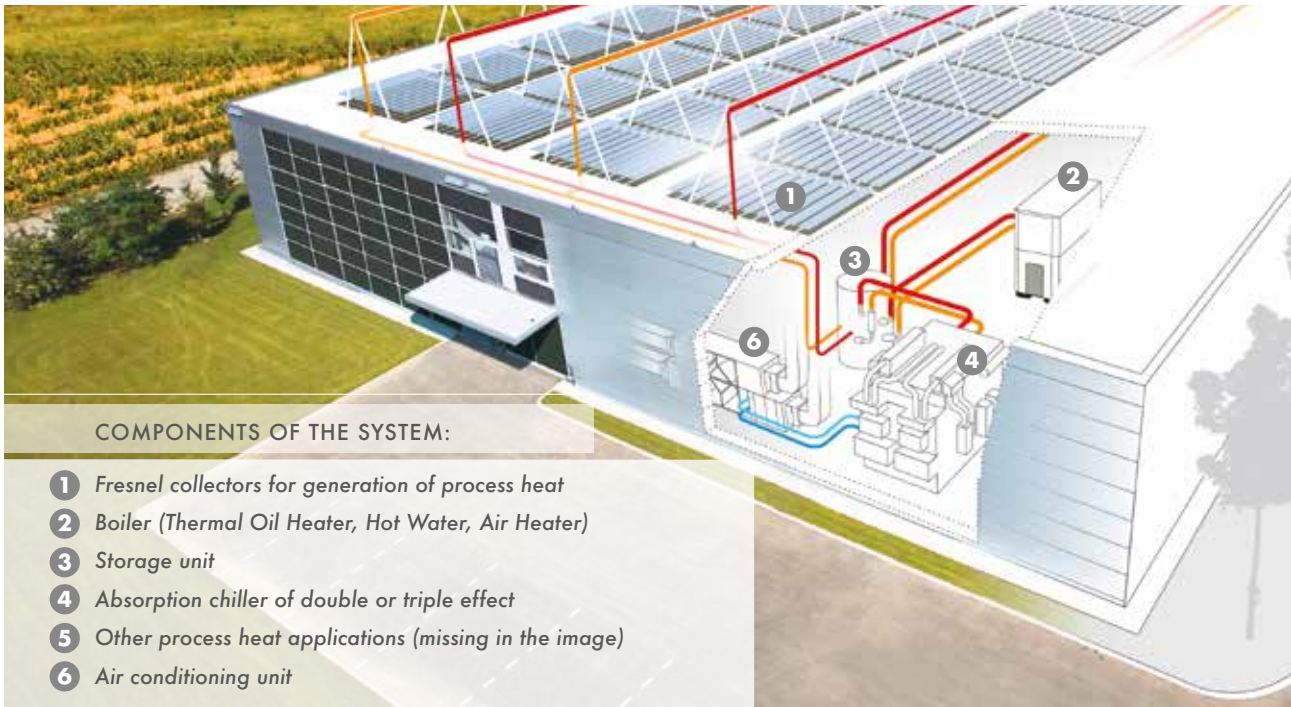
A 2MW peak process heat application requires 3,600 m² collector aperture area in Perth Australia generating approx. 3,820 MWh annual carbon-neutral energy which equals:

5,000,000	km	By flight or upper middle-sized vehicle traveled
4,500,000	kWh	Primary energy savings
3,000,000	miles	By flight or upper middle-sized vehicle traveled
350,000	liter	Oil savings
92,500	gallons	Oil savings
900	tonnes	CO ₂ savings compared to oil
99	%	Recyclable materials
80	%	Local value creation possible
52	individuals	Average yearly CO ₂ consumption in USA
30	%	Internal rate of return depending on period and energy price development
4	years	Payback Time depending on location and energy price development
1	year	Until positive energy balance of collector is achieved
1	\$ Cent/kWh	Solar process heat costs after financing period

○ Renewable energy for the industry made simple

Regions with levels of Direct Normal Irradiation – DNI above 1500 kWh/(m2.a) are more suitable for applicati-

ons of solar process heating based on the Fresnel collector technology from Industrial Solar.



○ Applications in different markets and segments

A great part of the energy demand in industry lies in processes of low energy intensity, allowing a wide application of solar energy. The constant variation in fossil fuel prices is

another important factor contributing to the migration to renewable sources.

INDUSTRIAL MARKETS FOR APPLICATION OF THERMAL AND REFRIGERATION SYSTEMS

MARKETS	APPLICATIONS
Food	<i>Production of hot water and steam Drying and dehydrating processes Animal food and preheating material Evaporation Pasteurisation and sterilisation Washing and cleaning Chemical reactions Bleaching and dyeing Extraction Fusion Refrigeration and acclimatisation processes Food blanching</i>
Beverage	
Paper	
Textile	
Automotive	
Pharmaceutical	
Chemical	
Mining	

ADDITIONAL MARKETS AND APPLICATIONS

Heating Networks	<i>Building complexes such as hospitals, offices and holiday resorts</i>
Cogeneration	<i>Combined production of electricity and heat or cooling</i>

○ Application throughout the national territory

Most parts of Australia and North Island of New Zealand offer the ideal conditions for the application of the Fresnel collectors from Industrial Solar in industrial processes.

Location	Geographic Coordinates	Mean Annual Irradiation (kWh/m ² .a)
<i>Sydney / AUS</i>	<i>S33.89 E151.19</i>	<i>1734</i>
<i>Melbourne / AUS</i>	<i>S37.83 E144.93</i>	<i>1529</i>
<i>Adelaide / AUS</i>	<i>S34.93 E138.60</i>	<i>1949</i>
<i>Perth / AUS</i>	<i>S31.95 E115.86</i>	<i>2290</i>
<i>Brisbane / AUS</i>	<i>S27.45 E153.07</i>	<i>1875</i>
<i>Bathurst / AUS</i>	<i>S33.42 E149.57</i>	<i>2067</i>
<i>Tauranga / NZL</i>	<i>S37.65 E176.18</i>	<i>1469</i>
<i>Palmerston North / NZL</i>	<i>S14.40 E174.60</i>	<i>1460</i>
<i>Napier / NZL</i>	<i>S39.50 E176.88</i>	<i>1613</i>
<i>Christchurch / NZL</i>	<i>S43.53 E172.57</i>	<i>1560</i>



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Industrial Solar GmbH, located in Freiburg (Germany), was founded as a spin-off of PSE AG under the Fraunhofer Institute for Solar Energy (ISE). Since 1999 the company has specialised in concentrating solar thermal technology. In 2005, the first pilot-collector facilities were commissioned. Since then the Industrial Solar collector has been successfully integrated into industrial energy systems in numerous projects around the world.

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Gasco is a leading Australian company involved in the design and manufacture of process, combustion and energy related products and systems. The 26 year old company prides itself in delivering reliable and quality products to the ANZ and other markets. Gasco is a sole licensee of Eck Rohr Kessel of Germany for specialised steam boilers and has recently partnered with Industrial Solar for their renewable energy products for the ANZ market.

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ERK (Eckrohrkessel GmbH) is a long standing German engineering company specialising in the design of steam boilers for a variety of fuels including biomass, heat recovery, power generation and solar thermal. It offers the patented single drum, corner tube, natural circulation boiler design, other innovative heat exchange products including the compact, light weight and fouling resistant ERK Tube® technology and specialised engineering services.