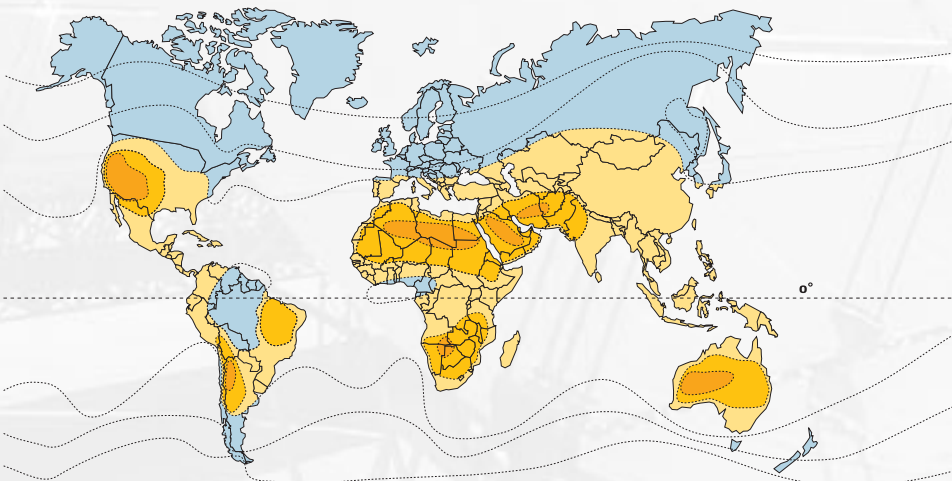


**MAN Solar Millennium GmbH**  
Hohenzollernstraße 24  
45128 Essen  
Germany  
Tel.: +49 201 8185281  
Fax: +49 201 8185208

[www.man-solarmillennium.com](http://www.man-solarmillennium.com)  
[info@man-solarmillennium.com](mailto:info@man-solarmillennium.com)



#### The parent companies

##### **Solar Millennium AG**

Solar Millennium AG, Erlangen, is a project development and technology concern active in the field of renewable energies all over the world. As project developer and technology supplier of parabolic trough power plants, the Solar Millennium company already disposes of technology in commercial use, as well as many years of experience in the development of solar thermal power plants. The company developed Europe's first parabolic trough power plants, located in Spain, each with 50 megawatts. Two plants are already under construction; they are also the biggest solar power plants in the world. Flagsol, a technology subsidiary of Solar Millennium, is a worldwide leader in parabolic trough power plants.

For further information, please see [www.SolarMillennium.com](http://www.SolarMillennium.com).

##### **MAN Ferrostaal AG**

MAN Ferrostaal AG, Essen, with 4,300 employees and a turnover of 1.4 billion euros (2006), is the industrial service provider for the MAN Group. The MAN Group is one of Europe's leading vehicle, motor and mechanical engineering concerns, with approximately 13 billion euros annual turnover. MAN Ferrostaal is a subsidiary of the MAN corporation, Munich, which is a member of the DAX German share index of 30 leading German corporations. With the divisions "Project" and "Services", MAN Ferrostaal is active on behalf of clients in more than 60 countries worldwide.

For further information, please see [www.manferrostaal.com](http://www.manferrostaal.com).

## MAN Solar Millennium GmbH

### Solar Thermal Power Plants





Parabol Technology



Linear Fresnel Technology



Parabol Technology



Linear Fresnel Technology

### MAN Solar Millennium GmbH

Specialised in Solar Thermal Power Plants MAN Solar Millennium GmbH is one of the leading companies doing project development, financing and the construction of solar thermal power plants. The power output covers the range from 20 to 250 megawatt. As a general contractor, the company offers solar thermal power plants, combined solar and gas fired power plants, industrial plants for the generation of steam and heat, cooling, and desalinated water.

MAN Solar Millennium is a joint venture of MAN Ferrostaal AG and Solar Millennium AG. The company combines the skills of both parent companies in project development and the construction of solar thermal power plants. As a general contractor for industrial plants with subsidiaries and offices in 60 countries, MAN Ferrostaal is in a position to realise large international projects.

Solar Millennium is a globally active company in the renewable energy sector. With many years of experience in the development and realisation of solar thermal power stations, the company has established itself as a key player in the solar industry.

The solar thermal power plants of MAN Solar Millennium can generate dispatchable and secure electricity at stable tariffs on long term basis without producing green house gases. The company follows a strategy of sustainable business and aims to reduce the dependence from fossil fuels, to raise the stability in the supply of electricity with long term reliable prices.



### The solar thermal power plant business of MAN Solar Millennium comprises:

- Project evaluation and feasibility studies
- Compiling and analysing meteorological data
- Project development and definition
- Financial engineering
- Equity participation in selected cases
- Technical engineering
- Provision of technologies
- Provision of key components
- Procurement
- Construction with local partners
- Commissioning
- Operation and maintenance

### Technologies for the 21st century

Solar thermal power plants utilise the sun's rays, converted into heat, for the large-scale generation of electricity. A plant produces environmentally-friendly dispatchable electricity in the range of up to 250 megawatts. The integration of a thermal storage permits the generation of electricity according to schedule. Solar thermal power plants are also able to generate electricity after sundown, so that solar thermal power plants possess the potential to replace fossil-fuel fired power plants. In hybrid power plants, solar energy generation can also be combined with the utilisation of other sources of energy, such as natural or biogas.

In solar thermal power plants mirrors concentrate the rays falling onto an absorber pipe located along the caustic line of the collector. Absorption of the rays heats a heat transfer fluid contained in the pipe, which generates steam within the thermal power plant unit by means of heat exchangers. As in conventional power plants, the steam is utilised for the generation of electricity inside a turbine. In research projects direct steam generating in the pipe is being tested.

### Competences

With its competences, MAN Solar Millennium stands out from its competitors:

- Established general contractor: project developer and manager with financing, EPC and turnkey expertise
- Technology leader: The solar trough is an established technology, Fresnel is a future technology which has its merits already today in process heat applications
- Integration of local partners
- Strong international presence through the parent companies, especially in the regions Southern Europe, Americas, Middle East and North Africa and South East Asia/Pacific
- Comprehensive project management expertise
- Concentration on the solar thermal systems sector
- Flexibility with the business models: BOO, BOT, BOOT
- Equity participation in selected cases
- The company covers the complete value chain



### Parabol Technology

In a parabolic trough power plant, a proven and reliable technology, trough-shaped mirrors bundle the sun's rays. These power plants provide the highest level of efficiency throughout the year and the lowest electricity production costs of all solar power stations built to-date. This technology has been used commercially in California for over 20 years, and has proven its reliability and market-maturity. The technology supplier of parabolic trough power plants is Flagsol GmbH, a 100 %- owned subsidiary of Solar Millennium AG. Flagsol is now active in the realisation of parabolic trough power plants worldwide, and is a worldwide leader in this technology ([www.flagsol.com](http://www.flagsol.com); [www.SolarMillennium.de](http://www.SolarMillennium.de)).



### Linear Fresnel Technology

As a second technology, MAN Solar Millennium GmbH is offering the construction of Fresnel collectors. Flat mirrors capture and concentrate the sun's radiation. Mobile mirror arrays, arranged in parallel rows, divert the energy of the sun's radiation onto a pipe located eight meters above the mirrors. Their arrangement makes the mirrors less sensitive to wind. This technology, currently being developed by MAN Ferrostaal Power Industry and Solar Power Group ([www.spg-gmbh.com](http://www.spg-gmbh.com)), is now being tested under real conditions in a demonstration project at Almería in southern Spain, and is comparatively simple in both production and construction.

