

Manz CIGS turnkey production solution offers unrivaled profitability and realizes lowest costs for generating solar power

Turnkey CIGS production line maximizes return on investment and ensures flexible expansion to meet growing customer demand

- **Manz CIGSfab is the only turnkey production solution worldwide and is the result of 40 years of experience and engineering in Germany**
- **CEO Dieter Manz said, “Our CIGSfab offers a quick path to profitability for a relatively low investment and is the best you can get in solar industry in terms of production costs, energy yield and thus profit margins”**
- **Manz offers long-term technology partnership and hedges business model and long-term profitability of customer**

Reutlingen/Shanghai, 21 May 2014 --- China's photovoltaic industry faces the challenge of restructuring to meet growing global competition, while upgrading to the latest technologies in response to customer demand for increased efficiency and lower costs. Helped by recent government initiatives to support the country's huge solar industry, many manufacturers are adopting CIGS technology, which offers high efficiency at low costs.

Industry leader Manz AG is helping Chinese solar manufacturers to boost their profitability by offering the world's only turnkey CIGS production line, an integrated solution that produces thin-film modules at a guaranteed efficiency of 14%. Manz's CIGSfab solution makes the cost of solar power similar to that of electricity from traditional fossil-fuel power plants and significantly cheaper than electricity from offshore wind farms. The production line is available with output from 40MWp to 500MWp, and can be expanded readily as demand grows. Customers of Manz CIGSfab have exclusive access to a unique world-record technology, the co-evaporation method that manufactured a record-breaking CIGS thin-film solar cell with an efficiency level of 20.8% in 2013. With this technology, Manz can speed up the increase of efficiency on production size modules.

With more than 100 CIGS specialists on its staff, most of them engineers, Manz dominates the future development for mass production of these thin-film modules. It is the only supplier worldwide that can ship a fully productive, integrated manufacturing line to a producer in China, offering near-instant and long-term profitability. As a reliable technology partner, Manz provides full service and product IP to customers, including equipment and training.

The CIGS manufacturing process begins with a basic glass substrate, on to which thin conductive layers are deposited, and then connected electrically. This minimizes the use of cost-intensive materials such as silicon. An annual capacity of approximately 150 MW is sufficient to make production profitable. With crystalline solar technology, an investment in the gigawatt range is necessary to achieve the same result. One of the main benefits of CIGS is the low amount of material required. While present-day crystalline cells are around 200 µm thick, the CIGS absorber is less than 2 µm thick. This saves material during production, and is sustainable and environmentally friendly.

Today CIGS has already delivered energy yields 10% higher than polycrystalline panels. Even in blazing sunshine, the lower temperature coefficient of CIGS solar panels means that the power yield, despite the increased surface temperature, is significantly better than crystalline solar modules. CIGS solar modules also boast a constant high power yield, even in low or diffuse sunlight. This excellent performance in low light also makes CIGS panels perfect for integration into buildings or mounting on building facades.

Last year, CIGS modules made by Manz itself on its German R&D production line were installed at a pioneering solar park in Shilin, Yunnan Province, where they now contribute approximately 1MW to the Chinese grid – up to 10% more than the crystalline modules previously used in the park.

"The success of our installation in Shilin, together with the Chinese government's recent emphasis on CIGS technology, shows clearly that this is the best way forward for local solar manufacturers," said Dieter Manz, CEO of Manz AG. "Our CIGSfab solution offers a quick path to profitability for a relatively low investment, and is the best you can get in terms of production costs, energy yield and thus profit margins."

"Right now, Manz is the only company that can offer CIGS mass-production in China. With our 40 years' engineering experience in CIGS technology, our strong record of investment in China, and our recognized commitment to local customers, Manz is the partner of choice for solar companies as they face the current market challenges and seek a competitive edge."

Company profile:

Manz AG – passion for efficiency

Manz AG, headquartered in Reutlingen, Germany, is one of the world's leading high-tech engineering firms. Founded in 1987, in recent years the company has grown from an automation specialist into a supplier of integrated production lines. Manz has expertise in six fields of technology: automation, laser processes, vacuum coating, screen printing, metrology, and wet-chemical processes. These technologies are used and developed in three strategic business areas: Display, Solar, and Battery.

The company, led by founder Dieter Manz, has been listed on the stock exchange in Germany since 2006, and currently develops and manufactures in Germany, China, Taiwan, Slovakia,

Hungary, and Italy. Manz also has sales and service offices in the United States and India. At the beginning of 2014, Manz AG had approximately 1,900 employees, 900 employees in Asia. With its slogan, “Passion for Efficiency”, Manz is making a promise to offer its customers – all companies active in important future markets – increasingly efficient production equipment. As an engineering firm, the company plays a significant role in reducing the cost of manufacturing end products, making these products available to large groups of buyers worldwide.

Public Relations Contact

Manz AG

Axel Bartmann

Phone: +49-7121-900-0395

Fax: +49-7121-900-099

E-mail: abartmann@manz.com