

Solar Power Pays Off Even without Subsidies

- **German high-tech engineering firm Manz achieves breakthrough in the thin-film solar sector with panel that sets the world record for efficiency**
- **Efficient production technology of CIGSfab cuts manufacturing costs**
- **Solar power now at similar cost level as electricity from fossil fuels and much cheaper than offshore wind**

Reutlingen, Monday, September 6, 2012. The German high-tech engineering firm Manz has achieved a technological breakthrough: its integrated production line for CIGS thin-film solar panels, the Manz CIGSfab, can be used to manufacture solar panels that in the future will supply power costing between four euro cents (Spain) and eight euro cents (Germany) per kilowatt hour, depending on the location. This means the cost of solar power is now at a similar cost level as electricity from fossil power plants and is significantly less expensive than electricity from offshore wind parks. Factoring in taxes and duties as well as the rapidly increasing costs of fossil fuels, the green electricity clearly trumps the competition. According to Dieter Manz, founder and CEO of Manz AG, “The new technology has the potential to revolutionize the solar industry.” The CIGS solar panel from Manz was manufactured on a mass production line and has a total panel efficiency of 14.6%. That is a world record in thin-film technology.

Manz not only cuts the cost of solar power through a significant increase in panel efficiency, but also through advancements in the production technology used to manufacture the panels, for example by integrating an increasing number of process steps within the process chain. “The thin-film panels manufactured on our systems are competitive everywhere in the world,” says Dieter Manz. “And as a result, the solar market’s growth will no longer be dependent on national subsidy conditions.”

CIGS thin-film solar panels (technical term for “copper indium gallium selenium”) can be manufactured for significantly less than crystalline silicon panels. This is because the semiconductor layer, which absorbs the sunlight, is comprised of one half affordable copper and is less than two millimeters thick – one-hundredth of a

crystalline cell. In addition, when manufacturing thin-film solar panels based on glass, both the complex silicon wafer production process and the need to connect the individual cells together are eliminated. The entire panel can be manufactured on a fully automated production line. In the past, however, thin-film panels could not keep up with the efficiency rates of crystalline silicon panels – a drawback that Manz systems like the fully automated CIGSfab now make up for. The world record panel is the first time the efficiency of polycrystalline silicon solar panels has been achieved with a thin-film panel. CIGS is considered the solar technology with the greatest potential to further cut costs and increase efficiency rates in the future.

Manz manufactured the world record CIGS panel on its own innovation line in Schwäbisch Hall, Germany. Manz acquired this line from panel manufacturer Würth Solar at the beginning of the year. As a result, the high-tech engineering firm has the ability to test and optimize new materials and production processes under mass-production conditions. Manz offers the only turnkey production line for CIGS thin-film solar panels currently available under the name CIGSfab. Manz has succeeded in cutting the investment costs for the line by around 40 percent since it began working with the technology back in 2010. In doing so, the company benefited from its wide-ranging expertise in a variety of technological fields, including automation, laser processes, vacuum coating, metrology, and wet-chemical processes. In this process, the high-tech engineering firm uses synergies that result from making advancements to these technologies in its three strategic areas of business: Solar, Display, and Battery.

Video statement by Dieter Manz, founder and CEO of Manz AG

<http://tinyurl.com/ckc6hmw>



Picture 1: Dieter Manz



Picture 2

Picture 3

Picture 2 and 3: High-tech engineering firm Manz achieves breakthrough with world record panel. The photo shows Dieter Manz, founder and CEO of Manz AG and Dr. Kay Orgassa, Head of R&D Manz CIGS technology (Picture source: MANZ AG).

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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, Israel, Slovakia, and Hungary. Manz also has sales and service offices in the United States, South Korea, and India. At the beginning of 2012, Manz AG had approximately 2,000 employees, 900 of whom in Asia. With its slogan, "Passion for Efficiency," Manz's engineers are 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.

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