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VDMA: German manufacturers in glass machinery revolutionising the photovoltaic industry

Düsseldorf, July 30th, 2008 – German manufacturers in glass machinery are about to revolutionising the international photovoltaic industry with their new products and techniques – such as the first ever world-wide thin film solar module totally free of laminate. In as early as 2010 electricity produced with the help of thin film solar modules is expected to cost the same as electricity made in conventional power plants. Fully automated mass production leading to low prices are likely. The leading trade fair, glasstec 2008, which will take place in Düsseldorf from October 21st to 25th, 2008, will provide a comprehensive and highly informative overview of the industry’s activities.

The only difference between a normal double glazed window, as it can be found in millions of houses, and its thin film module counterpart basically is that there is no organic material or protective gas but solar cells between the two window panes. This is exactly what German manufacturers in glass machinery found out – they modified the techniques accordingly and made their discovery usable for the production of solar modules. With this, Mr Siegfried Glaser, chairman of the Forum Glass Technology which is part of the German Engineering Federation (VDMA), said to journalists in Düsseldorf, it will soon be possible to manufacture thin film solar modules a lot more efficiently, quicker and finally also more cost effectively.

Differently from the technology based on silicon wafers, which currently are largely in use, the new thin film technology allows a constant exploitation in energy even if there is no direct solar radiation. As Mr Glaser puts it – this technology is “exactly right” for countries such as Germany. It will not take very long anymore until thin film solar modules will be used as normal construction parts in houses. And this – as Mr Glaser predicts – “affordable for practically any house builder – professional or private. “



Robots by Grenzebach Maschinenbau GmbH are responsible for handling the production process of thin film solar modules

It is when it comes to building-integrated photovoltaic where the thin film technology shows its special advantages to the fullest. Here the module not only produces energy, it is at the same time part of multifunctional glasses and systems used in facades, roofing and dressing, which can be combined with functions such as heat and sun protection, safety and noise protection, guiding of light and shadowing as well as design. There are hardly any limits to size, colour and shape. Thin film cells are something like "allrounders" among the solar cells.

The industry, according to Mr Glaser, does not only offer machinery and equipment for some production areas but also so-called "turnkey-solutions" - which are complete production lines and one-stop services. Many German manufacturer of glass technology currently experience a steady parade of interested people from all over the world - in the true sense of this sentence, said Mr Glaser. Many companies stated that they had signed secrecy agreements and therefore needed to be careful with the information they gave. All visitors of the trade fair can therefore expect to see many a highly



This robot developed by Lenhardt Maschinenbau GmbH is core to the machinery used in the production of thin film solar modules totally free of laminate

innovative development made by German manufacturers of glass technology not only in photovoltaic but also in solar heating.

Two companies that are significantly involved in redefining the industry's offer and which will present their products at glasstec, are Grenzebach Maschinenbau GmbH from Hamlar near Donauwörth and Lenhardt Maschinenbau GmbH from Neuhausen-Hamberg. "With our technology," says Mr Egbert

Wenniger, member of Grenzebach's management board, "it will be possible to reduce the production cost per watt installed to less than a Euro, from currently three to five Euros." With this, electricity made with thin film cells will become competitive to conventionally produced electricity. Mr Wenniger expects the first modules to be available on the market already in 2010. The technology developed by his company allows mass production of thin film modules, he says. And it would not be important what kind of solar cell is used in the module.

The first ever worldwide solar module totally free of laminate developed by Lenhardt Maschinenbau GmbH is also suitable for any thin film cells. Even large scale modules could be produced at intervals of only a couple of seconds with this new technology, believes Mr Bernhard Schmitt, Managing Director of Lenhardt Maschinenbau GmbH. Currently, the production still requires several minutes. Laminating - in which the solar cells, embedded in thin synthetic foil, need to be merged with the pane; a very expensive and time-consuming process - is no longer required with the new technology. A window-frame is no longer needed either. The space required for a production line also is drastically reduced as the modules are transported standing and

not laying anymore between the different production phases. "In future, factories", according to Mr Schmitt, " will be a lot smaller." Also the modules are a lot easier to be recycled. There is no need to take off any laminate anymore - which normally is an important step to take in recycling. There also is said to be hardly any waste.

Apart from Lenhardt and Grenzebach, exactly 111 domestic and foreign companies have registered as exhibitors for photovoltaic and solar heating at glasstec 2008 so far. For its special show "glass technology live", which will be held in hall 11, there are already 28 registrations up to now. Manufactures of modules are, among others, Scheuten Solar, Schott, Schüco, Sulfurcell and Sunways. For the production-side, there are Applied Materials, Jenoptik, Reis Robotics, Solarwatt as well as Ardenne and Wagner & Co. Solartechnik GmbH. The latter together with other exhibitors will present its innovations in solar heating.