

Technological change is clearly on the horizon

Dieter Manz, founder and CEO of Manz AG talks to PES about the German high-tech engineering firm's unwavering commitment to the CIGS thin-film solar technology and how it is about to pay off.

Inside a CIGSfab focus on glass coating/co-vaporization



Dieter Manz

PES: Would you like to begin by explaining a little about the background of your organization and how you currently serve the Solar/PV industry?

Dieter Manz: The automation company I founded in 1987 just outside of Stuttgart, Germany, is a globally active high-tech equipment manufacturer today. We have about 1,800 employees, 750 of which work in Asia.

We see ourselves as key enablers of new technologies: manufacturing equipment “Made by Manz” makes innovative products, for a start, possible, and secondly, affordable. Think touch screens for smart phones, or batteries for electric vehicles, or ever-efficient solar modules. You might agree, these products would not have found – or are about to find – a global mass-market without reliable equipment for mass-production.

Our technological expertise covers six wide-ranging sectors: automation, metrology, laser processing, wet chemistry, printing and coating, as well as roll-to-roll processes. These technologies we deploy and develop further in three strategic fields of business:

electronics, solar and energy storage.

We have served the PV industry for almost 30 years now. We can deservedly claim to be one of the pioneers in designing and building high-tech equipment for the first mass production lines of this industry. Our solutions have helped cell and module makers offer their products at a fraction of their original cost and get them on the market faster and faster.

We had a footprint in the crystalline solar market for many years. Nowadays, we focus exclusively on thin-film solar, especially CIGS which stands for copper, indium, gallium and selenide. Why? This is the most-promising thin-film technology, for Manz, when it comes to production process efficiency and scalability. With our CIGSfab, we are the sole provider of an integrated turn-key production line for CIGS thin-film modules.

PES: Is solar/PV still a growing business area for you? How are you capitalising on this growth?

DM: We got into CIGS thin-film in 2010 by taking three steps. We first partnered with Wuerth Solar, the leading manufacturer of CIGS modules. A year later, we bought their production line, in Schwaebisch Hall, as well as the rights to commercialize the CIGS technology they had developed together with the ZSW, a globally renowned research institute and current holder of the efficiency world record in thin-film solar on a cell level.

Finally, we converted the production line to what we call our CIGSinnoline. It has 6 MW of capacity and we use it as our testing ground for new equipment and materials that will be part of our CIGSfab offering. So, what comes out of the ZSW lab, we can immediately test under factory-floor conditions.

We have invested heavily in the CIGS solar technology over the last few years. And we did this for a reason: The solar energy story is just about to begin. As we speak, solar power reached grid parity in more than half of all countries worldwide. This means that solar energy costs are now at the same level as conventionally produced electricity,

or even lower. This will make photovoltaics increasingly attractive, without subsidies. The result will be strong growth worldwide and I think Manz has everything lined up to capitalise on this growth.

PES: How important is China, and indeed, Asia as a whole to Manz AG?

DM: We already went to China in the late 90s. Because we could see it was emerging as one of the most important markets for us. In 2012 we opened a new factory in Suzhou in order to serve our Chinese customers better from the solar, energy, and electronics sector.

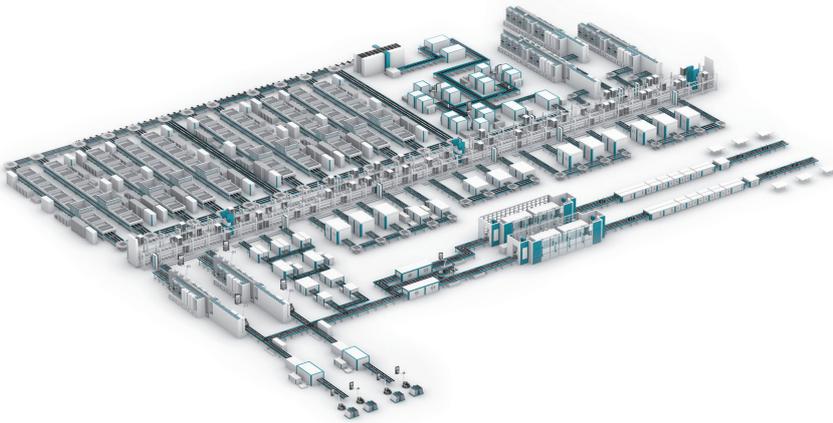
We have an even longer history in Taiwan, where we bought a company focussing on wet-chemistry for the display and PCB industry in 2008. In India and in South Korea we have had local sales & service teams for many years now.

Besides Europe, Manz is nowhere stronger than in Asia. I think, that shows how important the Asian markets are for us, and here, I am talking about all three of our strategic business segments: solar, energy storage and electronics.

PES: We see that in the beginning of 2017, Manz AG and affiliated subsidiaries of Shenhua Group, Shanghai Electric, and Beijing Future Science Park Development Group founded a unique R&D joint venture dedicated to the CIGS thin-film technology. Can you tell us how this works?

DM: Unique indeed. But let me start with the big picture. Shanghai Electric Group Co., Ltd. is the biggest manufacturer of fossil power plants in China and a major shareholder of Manz since May 2016. One of the goals of the collaboration is to speed-up the further development and commercialisation of the CIGS-technology.

The Shenhua Group is the largest and most modern coal enterprise as well as one of the biggest electricity producers of China. Now, the leadership of China is committed to reducing carbon intensity of its economy by 4 percent this year alone. This means, the share of clean energies must rise, no way around that.



CIGSfab layout

The R&D joint venture you are asking about will cater towards this trend and will become the world-leading research company dedicated to CIGS thin-film technology. The joint venture will set up a CIGS R&D line in Beijing with 44 MW capacity, similar to our CIGSinnoline, which is now also part of the newly formed R&D joint venture. Completion of the new 44 MW line is already planned for 2018 and with both lines located in Germany and China we will contribute significantly to the further development of the CIGS technology.

Despite selling the Manz CIGS Technology GmbH including the CIGSinnoline to the R&D joint venture, Manz keeps the exclusive rights of use for the CIGS technology for projects outside China. Within China, we exclusively market our turn-key CIGSfab through another joint venture. This joint venture is called Suzhou Manz New Energy Equipment Co., Ltd. and includes Manz, Shenhua, and Shanghai Electric.

A first order for a production line, with 306 MW capacity, has been placed with Manz AG

already. It will be the largest CIGS production line in China and the second largest worldwide. It will be built in Chongqing, with a completion date in early 2019.

PES: Why is R&D so important?

DM: We should not forget that the processes involved in CIGS are relatively complex and thus require a continued research effort.

Our partner ZSW is the current world record holder in CIGS efficiency on a cell format, they pushed the number up to 22.6 percent. On the other hand, the best Manz CIGS module from Schwaebisch Hall achieves 16 percent efficiency right now. So, here one can clearly see the potential and we keep investing in R&D to narrow this gap by reaching 18 to 20 percent within the foreseeable future.

As we speak, CIGS thin-film modules from Manz already provide cheaper electricity than crystalline-silicon modules. If I multiply the targeted higher module efficiency with highly scalable optimised processes, I see

a significant percentage of cost-reduction for CIGS thin-film in the medium term. That would lower the cost per watt to about 30 US-cents.

I think the technological change in solar I have been talking about for years – away from silicon towards thin-film – is now clearly on the horizon with our advancements in CIGS.

PES: Can you tell us what R&D projects are currently being worked on?

DM: Well, we strongly believe in CIGS thin-film and we focus all our solar resources on this technology. Right now, I see three parameters which are not maxed out yet: the composition of the materials, the optimised application of processing steps, optimisation of form factors or of the module form factor.

PES: We note that Manz AG has been awarded some sizeable contracts recently in this market, a well-publicised fact! This must give you immense satisfaction and confidence moving forward?

DM: You bet. We have been working on CIGS for quite some years and our unwavering commitment is paying off now. These two recent contracts, for the CIGS R&D line Beijing and for the first CIGSfab in Chongqing, will break the ice.

At first prospective customers hesitated to go with the CIGS technology. But now it is evident that this technology is worthwhile investing in and its potential can be seen on real projects.

We are now able to show our capabilities and I am thus very optimistic for follow-on contracts, especially in China, the Middle East or Latin America.

PES: How about the scope of services? Together with production equipment and the right to use the CIGS technology, what other services can Manz provide?

DM: Of course, our engineers will be on the factory floor when a CIGSfab customer is about to ramp-up its production. And these customers will also benefit from extended technology upgrade packages, as our CIGS R&D efforts warrant such upgrades of already-installed fab lines.

Another service designed and proposed especially for utilities in developing countries, are Manz' continuous education and staff training programs on various levels. We also provide hands-on training per the highest German engineering standards for local engineers and operators. Because to me, this is what the term turn-key implies: Provide your customer with all he needs to just turn the ignition on a CIGSfab. So, when I said, we at Manz see ourselves as enablers, we really mean it!



CIGS module in operation - building-integrated

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