

# Robin Hoods of PV

Consulting companies want to make sure knowledge from the chemicals industry is transferred to the PV sector

Steal from the rich and give to the poor – that was the motto of Robin Hood and his merry men. And that is exactly what is happening in the silicon industry at the moment. Former employees of the few large manufacturers are making sure knowledge is filtering through about the expert production of the sought-after raw material in the PV branch. So the monopoly-like state of the market leaders could soon be broken – that is, if interested parties are ready to pay a certain amount of money. And that is where the Robin Hood analogy ends.



Hemlock Semiconductor Corporation



On Nov. 5, 2004 Siltronic AG, a subsidiary of Wacker Chemie AG, announced it sacked both of its board members Michael Nitzert and Albrecht Mozer. Looking back, it was a very dark day for Wacker.

Together with Peter Fath, Mozer founded SolMic GmbH, a »dynamic, future-oriented, young, and internationally-active company in a strongly growing, technical field.« Fath sees himself as a veritable Robin Hood, and his aim is to consult companies in the »manufacturing of polysilicon for the PV branch and microelectronics,« or as Fath puts it, to make sure »that the mean Sheriff doesn't win.«



The secret of how to manufacture polysilicon is still in the hands of a few large corporations (bottom left: Hemlock's production site). This won't be the case for much longer if consultants Peter Fath (large photo on the left) and ex-Wacker manager Albrecht Mozer have it their way. One of the customers of their company SolMic GmbH is the Dutch company Scheuten Solar, whose head Frans van den Heuvel (top) wants to solve »the problem with the silicon shortage« once and for all.

accept higher prices? »We are in the position to counteract the constantly rising demand for silicon and the corresponding bottleneck professionally, competently, and effectively,« promises SolMic. Mozer and Fath help newcomers build silicon factories. And they are not alone with the idea behind their company; in the meantime, a whole bunch of ex-employees from silicon manufacturers and their suppliers have formed teams offering their experience in building new factories. The whole thing is coordinated by German consulting companies just like Burghausen-based SolMic, Bollig Jungermann Unternehmensberater from Oberursel, and GEC Graeber Engineering Consultants from Ottobrunn close to Munich.

#### No turnkey factories yet

They all want to make new silicon production capacity a reality as quickly as possible. »We would like cheap silicon for solar production. It's not about helping people to make a quick buck,

The Sheriff would be Mozer's ex-employer.

Wacker is the second biggest manufacturer of highly purified silicon after the US-based manufacturer Hemlock Semiconductor Corporation. These two, as well as Renewable Energy Corp. from Norway and Tokuyama Corporation from Japan, own three-quarters of the market altogether. Besides these companies there is the semiconductor part of Mitsubishi, Sumitomo Corporation (both from Japan), as well as MEMC Electronic Materials Inc. (US). Those looking for silicon today don't really have a lot of choices. What's more aggravating is that all of these companies are sold out years in advance.

So what would be wrong with stirring up a little competition? Particularly as the production of solar silicon is currently very close to the point where the companies involved hold power on par with a license for printing money. At the end of August Wacker was able to inform its shareholders that the »profit per share [has] more than doubled« – the »price increases« in the polysilicon sector were outlined as »positive.« The PV branch has to expect further price increases over the next few years, wrote PHOTON Consulting in its report »Solar Annual 2006,« which was released in July (see PI 7/2006, p. 70).

But does the branch really have to just

but rather helping PV with its breakthrough,« says Heinz Jungermann from Bollig Jungermann, explaining why he is involved in this business. And Fath affirms this view, saying that his main motivation is not so much about financial interests as it is about »breaking the monopoly.« Fath, who holds a PhD in physics and has years of experience in the PV sector, just doesn't comprehend the business conduct of the established silicon producers: »It annoyed me how one can be squeezed out by them. When I see what MEMC is doing to Motech – that's just not nice anymore« (see article, p. 138). And like his role model he says, »I am working here for PV's dissemination, and not so some people get richer and richer.« Besides the noble motives the silicon consultants all seem to share, there is another thing they have in common: not one of them has built a turnkey factory as yet.

That hasn't kept interested parties from getting in touch with the consultants. The stampede is big – Fath says that his company has already received 50 requests. However the first meeting usually ends in disappointment for the potential customers. »First I have to explain to them that such a factory cannot be bought off the shelf.« While one can buy ready-to-go production lines for solar cells, for example, it just doesn't work that way for silicon production. »One can't just turn up with a suitcase full of money, order a factory, and then say: in a few years I will come back and press the start button,« says Mozer. With regard to dashing such expectations, he says, »We are far from the ideal case.« While the knowledge on cell production is widespread, »the know-how on how to build a polysilicon factory lies in the hands of



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**Heinz Jungermann isn't from the silicon branch himself, but he has all the right contacts – »ex-employees of large silicon manufacturers that have retired« work for him on occasion.**



**Searching for customers in China: In October last year, Bollig Jungermann Unternehmensberater arranged an information evening on the topic of silicon production in China. There was lots of interest but no orders as yet.**

five or six large companies worldwide,« he adds. Of course he says the major companies would also be in the position to deliver a factory, however, »Up until now that hasn't been the case and they won't do it in the future.«

That's a rather trivial insight that Jungermann can only confirm: »Such a possibility would be there, but the established companies are not open to that. They only want to use the know-how for themselves and – my guess is – keep production capacity low to drive up the price.« Mozer estimates that only after taking 20 silicon factories on line would the situation be like that of cell production today: put in an order for the construction of a production line, transfer money, press the red button at

the opening. There are a lot of hurdles to overcome until that can be realized.

The first difficulty is that the necessary system parts cannot all be simply bought from suppliers. A silicon factory is basically made up of a reactor to produce trichlorosilane, a distillation column to purify the trichlorosilane, a deposition reactor for the silicon, and a conversion reactor to recycle the unwanted byproduct silicon tetrachloride. This is the most common setup. The problem is, »only around 70 to 75 percent of these individual systems can be bought from system builders,« says Mozer. The conversion reactor in particular, which is necessary for a factory to operate with a closed loop, is not available for purchase off-the-shelf. »We