

PV cell and module manufacturing equipment: the likely winners start to emerge

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ABSTRACT

In the few years since the PV cell and module manufacturing industry first hit the radar, the identities of the winners and losers in the race to supply equipment have started to emerge. While some companies can genuinely claim to have been involved in the solar industry for some time, the majority are relatively new on the scene. This is hardly surprising, as the explosive growth in demand spurred any company with matching competences into action. In fact, over 300 equipment companies have been attracted to the industry since 2003 by the prospect of a share in a market valued at US\$4.4 billion in 2008. For the first time, a detailed analysis of the PV equipment suppliers has been compiled by VLSI Research. The Top 10 in this list are presented here and discussed in relation to their achievements in the industry and their outlook for 2009 and beyond.

The Top 10

Applied Materials made it to the No. 1 position despite only entering the market in 2006. This rapid advancement has been achieved through an aggressive acquisition strategy, starting with Applied Films. Baccini S.p.a. was another major acquisition at the beginning of 2008 and there have been others that have helped to give Applied a broad coverage of PV manufacturing technology. Baccini brought Applied Materials a significant position in silicon wafer cell manufacturing with their screen printing and test lines, while Applied Films provided the platform for the 'Sunfab' silicon thin-film panel factories. Sunfab will have a major impact on Applied's revenues in 2009.

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Oerlikon's 'Fab 1200' turnkey silicon thin-film solution continues to gain momentum and the company recognised revenue on several lines in 2008. Ulvac is the third major supplier of turnkey silicon thin-film lines and also performed well in 2008. All three companies are introducing tandem cell technology, which allows a 50% increase in cell efficiency over the current single amorphous layer cells. The extra deposition steps required for tandem cells will help to drive strong equipment growth in this market going forward.

Centrotherm and Roth & Rau continued their dominance of the PECVD market for silicon wafer-based cells. In 2008, it became clear that Roth & Rau will focus on offering more steps in the value chain for this market while Centrotherm is looking at the realm outside silicon wafer cells with equipment for polysilicon material production and non-silicon thin-film cells. Two automation companies made the Top 10 this year: Schmid Gruppe and Manz Automation, highlighting the increasing importance in cell manufacturing of inline processing and factory automation. Von Ardenne Anlagentechnik supplies PVD systems primarily for thin-film on glass applications and boasts extensive experience from the world of architectural glass. Rena Sondermaschinen is the top-rated supplier of wet etch equipment while 3S Swiss makes a range of equipment including laminators, tabbers and stringers for the manufacture of modules.

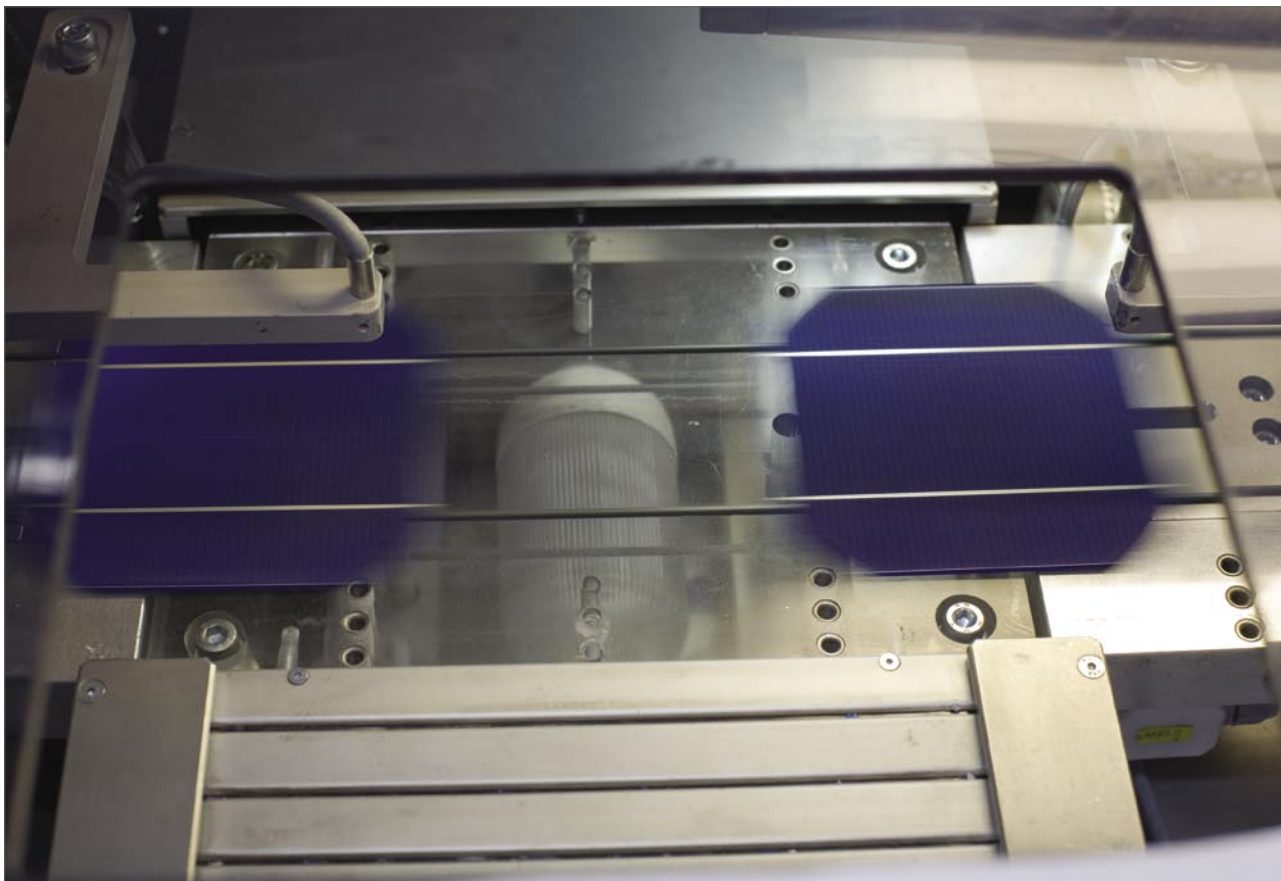
Equipment trends for 2008

The key trend in 2008 was the explosive growth of the thin-film equipment companies, which explains the emergence of Applied, Oerlikon and Ulvac in the top half of the equipment suppliers ranking. While Ulvac has been involved in the PV industry for decades, Applied Materials and Oerlikon are relative newcomers and their fast ascent to the top of the table is indicative of the influence the semiconductor industry is having on the PV industry.

Overall, about a quarter of all equipment suppliers to the PV industry have a long pedigree in semiconductors, yet they account for over half the PV industry's revenues. This is because they have been invaluable in bringing key technologies and expertise to bear on manufacturing problems, particularly those associated with thin-film cell technologies.

2008 Rank	Company	2008 US\$M
1	Applied Materials	455
2	Roth & Rau AG	275
3	Centrotherm GmbH + Co. KG	270
4	OC Oerlikon Balzers AG	250
5	Ulvac, Inc.	240
6	Manz Automation AG	140
7	Schmid Gruppe Technology Systems GmbH	125
8	Von Ardenne Anlagentechnik	120
9	RENA Sondermaschinen GmbH	85
10	3S Swiss Solar Systems	70

Preliminary ranking of top 10 suppliers of PV cell and module manufacturing equipment, 2008.



Courtesy of Deutsche Solar.

Outlook for 2009

While 2008 was a spectacular year in terms of growth, the outlook for 2009 is less certain. The solar cell manufacturing industry is losing its immunity to the credit crisis as demand for cells starts to cool while existing fabs are ramping up to full capacity. As a result, weaker companies are struggling to find the finance to fund the next round of expansion. The impact on the equipment industry has seen some order delays and push-outs, but so far there are no reports of cancellations. The real worry is the lack of new contracts for delivery of equipment through to the end of 2009 and early 2010. This trend is unsettling as it is likely to result in the shaking out of some of the less well-resourced equipment companies as they too struggle to finance their activities.

As a result of the deteriorating order situation, the outlook for the PV cell and module manufacturing industry is for growth in sales to slow to 8% average in 2009 across all technologies. Given the current economic climate, this is still a very

attractive market, but compared to the huge growth rates experienced in recent years this feels like a serious downturn for the industry. Equipment companies that have been ramping up to meet the strong growth in demand are now finding they have overshot the market and are having to pull back from some of their earlier expansion plans.

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The indications are that the larger, well-resourced equipment companies are best placed to weather the next few years, and that many of the smaller companies that do not have good product and service differentiation will fall by the wayside.

About the Author

John West is the managing director of VLSI Research Europe and has been analysing the PV equipment market since 2006. He was awarded an M.B.A. from Cranfield University and has a degree in medical physics from the University of London.

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