

SEMI AROUND THE WORLD

European Standards Meeting to Focus on PV, Silicon Crossover

The SEMI Europe Standards Spring Conference and Meetings will be held March 5–7 in Brussels, Belgium. The event, which includes a strong emphasis on the synergies between photovoltaic and semiconductor manufacturing, consists of a conference, standards technical committee and task forces meetings, and company tours to Photovoltech and AMI Semiconductor.

The conference, titled “PV and Mo(o)re: Energy—Efficiency—Electronics,” will feature speakers from the equipment and materials supplier community, and from their customers and downstream users. The conference content includes: new trends in high efficiency PV silicon technology; PV standardization; factory integration, traceability and automation; and organic semiconductor technologies.

The SEMI Standards technical meetings address issues that encompass the entire spectrum of IC manufacturing and will tackle a wide range of topics, including innovation and improvement of the photomask supply chain for the semiconductor industry; standards for photovoltaic facilities; precursors; silicon wafer specifications; photovoltaic equipment interfaces; and more.

For complete information on the event and the agenda of the programs and meetings, visit the SEMI website at www.semi.org/eustandards or contact Saviour Alfino at SEMI Europe (+32.2.289.66.12, salfino@semi.org).

Packaging Materials Market to Reach \$20B by 2011

The market for semiconductor packaging materials, including thermal interface materials, is expected to reach \$15.5 billion in 2007 and grow to \$20.2 billion by 2011, according to a new study by SEMI and TechSearch International. Laminate substrates remain the largest segment of the market, worth an estimated \$6.2 billion globally in 2007, and on a unit basis are projected to grow at a compound annual growth rate (CAGR) of over 12% over the next five years.

continued on page 54

An Exciting Year in China

2008 WILL BE AN EXCITING YEAR IN CHINA. ACROSS the region, anticipation is building towards the staging of the Beijing Olympic Games scheduled for August. SEMI, too, has a series of exciting events coming up.

SEMICON® China 2008, to be held March 18–20 in Shanghai, marks the 20-year milestone for the exposition. Since it launched in 1988, SEMICON and the Chinese semiconductor industry have experienced strong parallel growth. From 100 booths in the first year to over 2,000 booths this year, SEMICON China has become the premier semiconductor manufacturing event in that country.

Over the past five years, China’s leading fabs have narrowed the technology gap at an accelerated pace. However, it will be challenging for China’s fabs to completely close that gap in the next five years. Over the next three years 0.18 micron to 90 nm process technologies will be the mainstream in China, representing 60% of the total capacity by year 2010, according to the *SEMI 2007–2008 China Semiconductor Wafer Fab and Foundry Outlook Report*.

The majority of new fab capacity being added in China will be for 300 mm and 200 mm wafer fabs, with such fabs accounting for well over 80 percent of China’s total wafer capacity by 2010. Over this period, annual fab equipment spending, for both new and used equipment, is expected to be in the \$2.5 billion to \$3.0 billion range.

In conjunction with SEMICON China 2008 we present the inaugural China Semiconductor Material International Conference (CSMIC) 2008, to be held March 19–20 at the Holiday Inn in Pudong, Shanghai. CSMIC is organized by SEMI China in partnership with the China 863 Material Expert Group. The conference aims to provide a platform for executives, engineers and researchers to exchange the latest information

in materials technology. China’s semiconductor materials market is growing strongly and by 2010 the region is forecasted to account for about 7% of global fab material spending, according to SEMI data.

CSMIC will be co-located with the second International PV Technology Conference, which will include sessions on topics such as crystal solar cell technology, PV standards, silicon materials, thin film solar cells, and more.

The week prior to SEMICON China will see FPD China 2008, held March 11–13, also in Shanghai. Celebrating its fifth year, FPD China will feature innovative product and technology exhibits, business and technical seminars and industry standards meetings. The growth of FPD China reflects the exciting time for the FPD sector in China, with a number of companies moving toward the leading-edge in fabrication technologies and facilities.

There are now five Generation 5 (G5) technology TFT-LCD fabs in production in China, and reports indicate that Sharp is planning a G7.5 line in the 2008–2009 timeframe. China’s FPD makers will invest more than \$4 billion in TFT-LCD equipment in the period 2005–2009, according to the *SEMI China TFT-LCD Industry Report*.

To fully understand the China market you need to be “on the ground.” The annual SEMICON China and FPD China expos are “must-visit” events for anybody serious about doing business in China’s microelectronics and display industries. I look forward to seeing you in China.—*Stan Myers* •





CHINA BY LILY FENG

Fab Equipment Components And Parts Vendors in China

THE MAJORITY OF NEW FAB CAPACITY TO BE CREATED IN CHINA will be for 300 mm and 200 mm wafer fabs, with such fabs accounting for well over 80% of China's total wafer capacity by 2010. Over this period, fab equipment spending, for both new and used equipment, is expected to be in the \$2.5 billion to \$3.0 billion range per year. Overseas equipment companies are very active in China providing sales and service support to customers, and in some examples, operating research and development programs. Meanwhile, local vendors for fab equipment have emerged in recent years to explore the opportunities in the 200 mm and 300 mm tool market. Initiatives and programs are in place to encourage the development of domestic infrastructure to support local equipment vendors and fab tool maintenance and refurbishment.

As such, a growing number of companies are now devoted to manufacturing components and parts in China used in semiconductor equipment and consumed in equipment refurbishment and maintenance. Most of these companies have developed their components and parts manufacturing capabilities in the past couple of years as demand for a local source has increased significantly. To better understand this dynamic market, SEMI surveyed 32 companies in China offering components and parts manufacturing services for both front- and back-end semiconductor manufacturing.

According to statistics obtained in the survey, total sales revenues of these components and parts manufacturers reached an estimated US\$450 million in 2006. This figure includes estimates for company components and parts sales into the FPD, solar cell, medical equipment, and aviation sectors as well.

The number of local components and parts companies, including foreign-owned companies, is growing significantly as there is a need for a local supply chain to support the growing China market. Also, a local supply chain can relieve, to a certain level, the high duty charges associated with imported parts.

Other key observations include:

- Major overseas semiconductor equipment suppliers are very active in China and dominate component and parts sales to the leading wafer fabs to ensure product quality.
- Some manufacturers provide a "total package" related to component and parts from refurbishing services to parts cleaning.
- Local semiconductor component and parts services have expanded into related industries such as FPD and solar cell manufacturing.

Significant adoption of locally-made components and parts at leading fabs is not an immediate trend, as it is estimated that locally-made parts comprise just 10% of the total parts consumed currently by these fabs. Without a trusted equipment supplier certification, local components and parts suppliers must go through a long qualification process by fabs, which involves extra effort and carries potential risk. Local fabs tend to use components and parts that do not directly come into contact with the wafer, especially when the fab is not under full utilization.

Going forward, it is expected that demand by local fabs, overseas equip-

ment suppliers, local equipment suppliers, and providers of used equipment will be the driving force in the on-going development of the local components and parts supply chain in China. As semiconductor and related industry investments continue in the growing China market, the supply chain to support equipment manufacturing and maintenance will further develop. •

All of the information in this article was derived from a recently completed market research study, *China Fab Equipment Components and Parts Vendors Overview*, produced by SEMI.

The report highlights trends related to the development of the components and parts manufacturing market in China, along with profiles of 32 companies in China manufacturing. SEMI conducted in-person interviews with all the 32 components and parts manufacturers in China. In-depth company interviews included validation through input from equipment suppliers, fabs, local industry associations, government agencies, and other industry sources within China. Local components and parts manufacturing covers more than 15 SEMI components and parts categories and serve both front- and back-end processes.

TO ORDER YOUR COPY of *China Fab Equipment Components and Parts Vendors Overview*, please call SEMI Global Sales & Services at 1.408.943.6901. You can also visit www.semi.org and select STORE from the horizontal menu to find order information for this report.

About the Author

Lily Feng is a market research analyst at SEMI China and the co-author of SEMI's report of *China Fab Equipment Components and Parts Vendors Overview*. Ms. Feng can be contacted by email at lifeng@semi.org.



Update of MEMS Markets

Yole Développement Forecasts a US\$ 7.8 Billion Market for MEMS in 2008



YOLE DÉVELOPPEMENT HAS JUST UPDATED ITS analysis of the MEMS market. Based on 1,500 industry interviews worldwide and the in-depth analysis of more than 150 different applications, Yole Développement is continually following the evolution of the MEMS industry.

According to our analysis, the MEMS markets in 2007 reached US\$6.9 billion, slightly above our expectations. Indeed our latest forecasts were predicting a US\$6.6 billion market for MEMS devices in 2007. The main explanation for the difference is due to the stronger growth of the consumer applications segment for MEMS devices. Overall MEMS market growth is above 11%, indicating a healthy industry.

Growth for the MEMS industry in 2008 is forecasted to be slower compared to 2007 market growth. Yole Développement expects that the total MEMS market will reach US\$7.8 billion and 9% growth. This expected slight decrease of the growth rate of MEMS device sales in 2008 is mainly due to increased pressure on the devices' prices. Indeed the growth rate of the number of shipped units between 2007 and 2008 amounts to 30%, which means that price pressure is very high.

In the long run, we expect an annual growth rate between 12 and 13 percent on average over the 2007–2012 period. Yole Développement has increased our estimates of the forecasted growth of the MEMS markets after 2010. We expect the MEMS markets sales to reach US\$13.4 billion in 2012. According to our forecast, sold units should exceed 8 billion units in 2012, compared to the 2.5 billion units produced in 2007. Our experts are expecting that the unit growth rate will be on average of 33% per year, far above the sales CAGR.

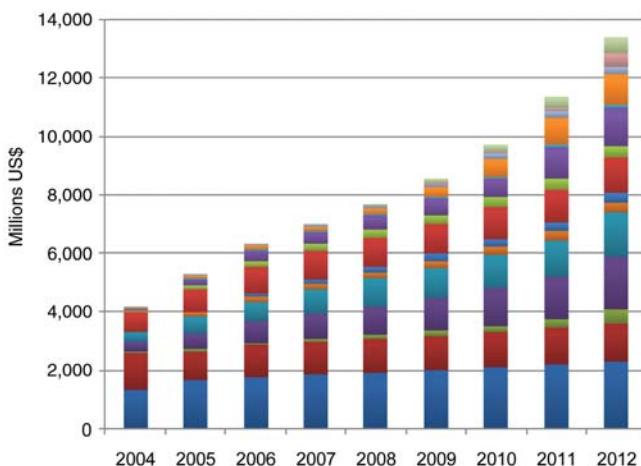
See Figures 1 and 2 for further information on these forecasts along with a detailed description of the 15 main product families.

The main growth applications fields are consumer medical/life science and automotive applications. Figure 3 details the evolution of the sales per applications fields. Applications like accelerometers, gyroscopes and RF MEMS for consumer applications are mainly driving the growth of the MEMS industry.

Alongside these "classical" MEMS products, new applications are emerging. In 2007, they have reached a business of more than US\$200 million. A few examples of these promising products are: microbolometers (infra-red image sensors), probes for wafer and device testing, microfluidics for R&D and diagnostics. Yole Développement is now doing separate forecasts for these new applications to better highlight the diversity of the MEMS applications and the arrival of new large volume businesses.

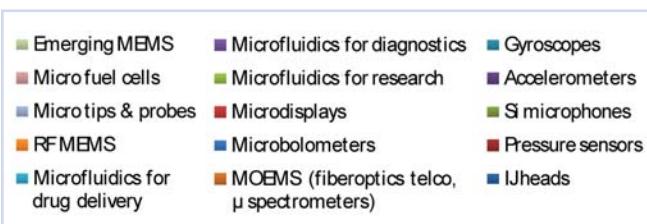
The emerging MEMS applications are slowly finding their way to commercialization: energy harvesting devices, autofocus

MEMS Market Forecast

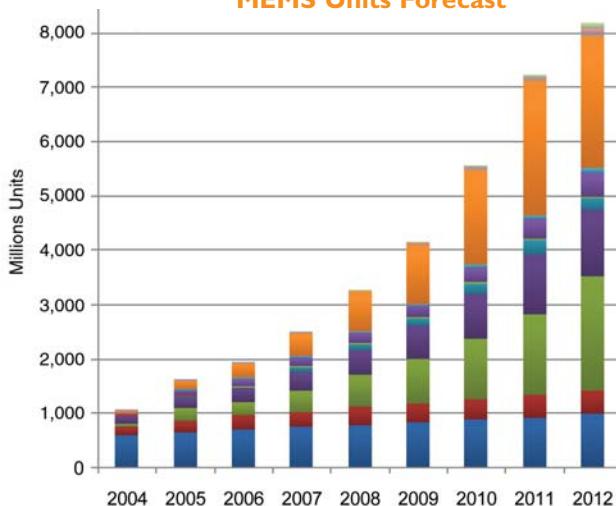


Source: Yole Développement

Figure 1: Evolution of the MEMS markets in millions US\$.



MEMS Units Forecast



Source: Yole Développement

Figure 2: Evolution of the MEMS markets in millions of units.

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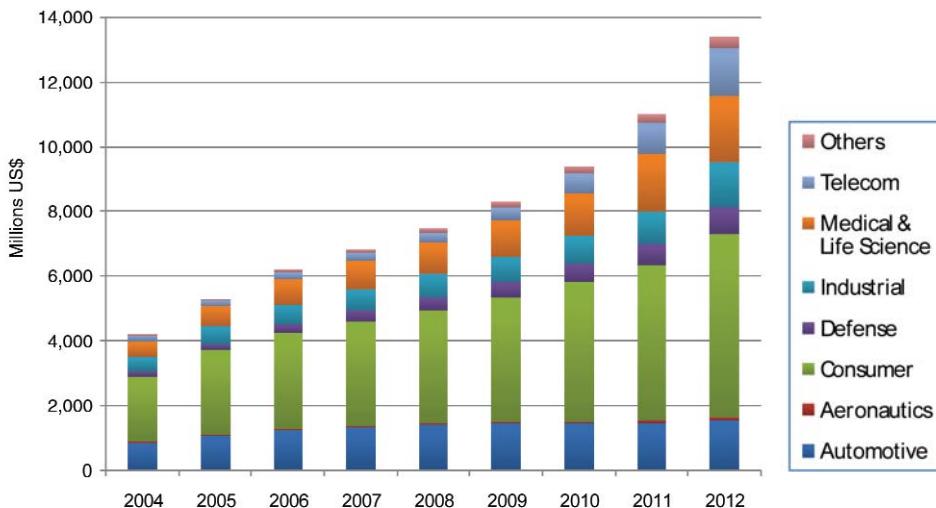
MEMS *continued*

controls for camera modules, micro motors and micro valves will gradually reach the first commercialization steps in 2008 and become real business within five years. We expect that these brand new devices should reach almost US\$600 million sales in 2012, compared to a few million dollars in 2007.

The MEMS business is growing in many different application fields. New busi-

nesses are coming not only from the existing products but also from brand new applications, which are emerging in every industrial field. This is great news for the whole MEMS community: MEMS manufacturers as well as suppliers to the MEMS industry (equipment and materials). Growth and investment are expected to remain at a high level in 2008. •

MEMS Market Forecast per Application



Source: Yole Développement

Figure 3: Evolution of the MEMS markets by application fields in millions of US\$.

SEMI AROUND THE WORLD *continued*

The report, titled *Global Semiconductor Packaging Materials Outlook—2007/2008 Edition*, covers laminate substrates, flex circuit/tape substrates, leadframes, bonding wire, mold compounds, underfill materials, liquid encapsulants, die attach materials, solder balls, wafer level package dielectrics and thermal interface materials.

The findings in the report are based on more than 125 in-depth interviews conducted with packaging subcontractors, semiconductor manufacturers and materials suppliers. It includes previously unpublished data on revenue, unit shipments and market shares for each packaging material segment; a five-year forecast of revenue and units

(2007–2011), average selling price data and trends; and an analysis of regional market trends.

The report also identifies important technology and business trends affecting the packaging materials market, as well as opportunities for suppliers. Some of the key opportunities include: Reduced cost structures for standard laminate products; thin core substrate materials with suitable properties to reduce warpage effects and improve handling; alloy development to support on-going migration to smaller diameter gold bonding wire; die attach materials and processes compatible with ultrathin wafer technologies; resin materials that do not degrade moisture sensitivity levels and are

compatible with low- κ dielectrics, lead-free processing, and underfill solutions for fine bump pitch and large die.

The report is available for purchase from SEMI for \$4,000 (SEMI members), and \$5,000 (non-members). A company-wide site license is also available. •

CALENDAR OF EVENTS

MARCH 2008

March 2–4

ISS Europe 2008

Hotel Westin Dragonara

Malta

www.semi.org/lisseurope

March 11–13

FPD China 2008

Shanghai International Exhibition Center (INTEX)

Shanghai, China

www.semi.org/fpdchina

March 18–20

SEMICON China 2008

Shanghai New International Expo Centre

Shanghai, China

www.semi.org/semiconchina

March 19–20

China Semiconductor Materials International Conference (CSMIC)

Pudong

Shanghai, China

www.semi.org

APRIL 2008

April 1–2

The Past, Present and Future of the Semiconductor Equipment and Materials Industry

Computer History Museum

Mountain View, California

www.semi.org

April 6–10

NA Standards Spring Meetings

Adam's Mark Hotel

Dallas, Texas

www.semi.org

April 9–12

Global FPD Partners Conference

Phoenix Seagaia Resort

Miyazaki, Japan

www.semi.org/gfpc •