

## SEMI AROUND THE WORLD

### **SEMI Fab Database Reports Indicate Decline in Equipment Spending for 2008**

A recent analysis of SEMI Fab Database reports shows that spending on fab construction projects and fabs equipping will likely see double digit declines in 2008 as many fab construction projects are put on hold or pushed out into 2009.

Capital equipment spending on equipping fabs in 2008 is expected to decline 15% compared to the 9% growth achieved last year. The analysis represents a downward revision of the outlook reported in the SEMI October 2007 *Fab Database Report*.

The reports indicate a decline in equipment spending by almost 10% for foundries, about 15% for memory, and about 30% for the logic/MPU segment.

Spending on fab construction projects is expected to decline in 2008 by 9%, compared to the strong growth in 2007. In 2008, 12 new volume fabs are expected to start construction, which represents a total capacity addition when fully operational of 1.53 million wafers per month in 200 mm equivalents. The five biggest spenders on fab construction projects in 2008 are expected to be Flash Alliance (Toshiba/Sandisk JV), Samsung, Hynix, Rexchip (Elpida/Powerchip JV) and Powerchip.

Semiconductor manufacturing capacity is projected to grow by about 11% in 2008. Memory still retains the largest share of total fab capacity, and is expected to increase this year to 41% from 38% in 2007.

Memory fabs are projected to increase capacity by 18% year over year, followed by logic/MPU, which are expected to see 5% growth. Foundries are forecasted to add about 8% more capacity.

For more information about fab database products from SEMI, please visit [www.semi.org/fabs](http://www.semi.org/fabs). •

### **Silicon Wafer Area Shipments Continue to Grow; Revenues Up 21%**

Worldwide silicon wafer area shipments increased by 8% in 2007 when compared to 2006 area shipments according to the SEMI Silicon Manufacturers Group (SMG) in its year-end analysis of the silicon

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## **Innovation at Risk**

**PROTECTION OF INTELLECTUAL** property (IP) rights is an important area of concern for the semiconductor manufacturing industry. In a competitive global business environment, IP protection is essential to the survival of equipment and materials suppliers, enabling them to make the significant R&D investment needed to sustain technological advancement of the semiconductor industry.

In recent years, suppliers have been increasingly funding a larger portion of the escalating R&D costs needed for the continued success of the semiconductor device industry. Continued IP violations of various forms undermine the development of the next generation equipment and materials needed to remain on the Moore's Law technology curve.

In response to calls from our members to support efforts in protection and enforcement of IP rights, SEMI recently commissioned a detailed study on the extent and impact of IP challenges facing the industry. A white paper, based on the survey findings, has been developed and will be published this month.

About 90 percent of respondents reported that they have experienced some form of IP violation, including infringement, counterfeiting, and theft of core technologies or products, spare parts and component, trade secrets, and trademarks. More than half of all companies characterized these infringements as serious.

While more than half of the companies surveyed have taken legal action against IP violations, approximately 56 percent were not satisfied with the outcome. Legal processes are slow, expensive, and unpredictable, and the companies were concerned about the significant costs and variability in outcome of litigation.

More than 60 percent of the companies have experienced adverse economic impact caused by IP violations, mainly due to reduced sales and lost market share.

In addition, IP violations lead to pricing pressures and reduced average selling prices, resulting in further revenue losses. In fact, total industry financial losses and damages amount to billions of dollars per year, according to the survey estimates.

The companies identified China, Korea, North America and Taiwan as regions of the greatest concern. However, the form and nature of IP violations in each region varies and occur for different reasons. Surprisingly, more than 50 percent of the companies reported IP-related issues with their device-making customers, which was obviously seen as a sensitive issue that suppliers are reluctant to confront or discuss in detail.

Strong and effective IP is critical for SEMI member companies in all regions and throughout the supply chain. For their part, countries and governments must recognize that they will greatly benefit from robust IP policies through the attraction of outside investment and the encouragement of innovation by domestic companies. It is also critical to educate device customers on the value of IP to the equipment and materials industry. Most chip makers heavily invest in IP themselves. They should in turn recognize the impact on their suppliers, and work with them to avoid IP violations.

To address these issues SEMI will focus on public policy and work with governments to foster global IP protection. We will also drive customer dialog and work with SEMI member companies to promote a global culture of respect for the industry's IP assets as well as providing IP management education to our members.

For further information on IP-related resources from SEMI, please visit the SEMI Web site. — *Stan Myers* •





## SEMI STANDARDS

# SEMI Standards—Simplifying the FPD Manufacturing Process

**IN A COMPLEX WORLD, HOW DOES AN INDUSTRY MEET AND** maintain required levels of compatibility while controlling manufacturing cost and improving productivity? SEMI knows the answer comes down to a single word—Standards. Industries worldwide use standards to meet and maintain required levels of compatibility both inside and between organizations. Since the early days of semiconductor manufacturing, standards have played a critical role in ensuring the ongoing progress of the industry as a whole as well as the growth and prosperity of the equipment sector, and SEMI-developed international standards have supported semiconductor manufacturing for the past 35 years. With the strong emergence of flat panel display (FPD) manufacturing in the 1990's, SEMI expanded its International Standards Program activities into this segment, aided by key similarities between chip making and display fabrication technologies.

The current roster of SEMI Standards for the FPD industry includes over 50 specifications, with new ones continuously being developed. In February 2008, SEMI announced the publication of two new FPD-focused standards—SEMI D51, Specification for Handshake Method of Single Substrate for Handling Off/On Tool in FPD Production, and SEMI S26—Environmental, Health, and Safety Guideline for FPD Manufacturing System.

“These new FPD-focused standards represent new ground which the volunteers in the SEMI International Standards Program have broken over the years,” said Bettina Weiss, SEMI director of International Standards. “As the FPD industry continues to grow, and technical requirements are defined earlier and in concert with suppliers and panel makers, these new Standards provide critical solutions to FPD manufacturing challenges.”

### SEMI D51—Makes the Handshake Easier

As the FPD market experiences increasing commoditization, and as panel sizes become larger, there is a growing need for additional cost-cutting measures. Currently, substrates in the FPD fab are transferred between AMHS/robots and equipment, using a wide range of handshake protocols. Due to the use of multiple protocols (many times within the same fab), both equipment suppliers and panel makers are forced to spend significant amounts of time to ensure new equipment interoperability.

The SEMI D51 specification aims to simplify this process by providing a standardized approach to handshake protocols. It is expected that by implementing this standard, fabs will improve efficiency in design, production and installation of equipment, and will realize significant cost reductions as a result. In addition, use of this standard is expected to improve overall operating efficiency and

delivery. “This specification seeks to standardize the handshake methods for transferring single substrates, which are at this point, different at each FPD fab,” said Weiss. “Implementation of this standard should help ensure a faster and more seamless equipment ramp-up.”

### SEMI S26—Addresses EHS Issues in FPD

While environmental health and safety (EHS) concerns have gained visibility in recent years, the display industry has not had any formal EHS guideline for FPD

manufacturing systems—despite rapid generational changes of substrate sizes. The semiconductor manufacturing industry has embraced SEMI S2 Safety Guideline for Semiconductor Manufacturing Equipment, but due to the differences in semiconductor and FPD manufacturing, as well as the nature of safety challenges in an FPD fab, this safety guideline is not entirely applicable to FPD equipment. With SEMI S26 now in place, this void has been filled.

“The creation of SEMI S26 represents the FPD industry’s growing commitment to defining existing environmental, health and safety issues in the fab,” said Weiss. “This common framework is expected to help adopters standardize safety designs and significantly reduce FPD manufacturing system costs and development times.”

### Current SEMI Standards for FPD

In addition to the two new SEMI FPD Standards, SEMI has developed over 50 standards for the FPD industry. These standards fall into five main categories:

- 1) **Terminology:** FPD Masks, Mask Defects, and Mask Pattern Accuracy; FPD Polarizing Films; FPD Substrates and Substrate Deflection; and LCD Backlight Units.
- 2) **Test Methods:** Chemical Durability of FPD Glass Substrates; Chemical Resistance of FPD Color Filters; Heat Resistance in FPD Color Filters; Color, Transmittance of FPD Color Filter Assemblies; FPD Polarizing Films and Surface Hardness of FPD Polarizing Film; CCFL Characteristics; Bent Cold Cathode Fluorescent Lamps; and Mechanical Vibration in AMHS for FPD Manufacturing.
- 3) **Measurement Methods:** FPD Glass Substrate Surface

## SEMI ISS Europe 2008: Is Europe Still Competitive?

SEMI EUROPE'S ANNUAL INDUSTRY Strategy Symposium (ISS) has just concluded in Malta. With distinguished speakers and illuminating panel discussions, the audience heard often opposing perspectives on the strengths and concerns of Europe's semiconductor industry.

Over the one and one-half day meeting, leading economists, company executives, product visionaries, and manufacturing experts presented their views on Europe's opportunities. While it would be easy to ascribe much of today's concerns with exchange rate woes, the presenters at this conference looked much deeper into the global perspective before making their conclusions.

The seminar opened with Alain Dutheil, the well-known chief operating officer of STMicroelectronics delivering the keynote speech on European competitiveness and the changing semiconductor industry landscape. Dutheil noted that the European landscape was much different from other regions—there were many more but smaller companies, and it was

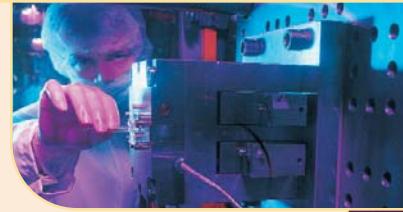
difficult for them to achieve a “critical mass” that could sustain research and development. The founding of European consortia to work on common pre-competitive R&D projects was and still is a significant strength of the European industry. Projects like JESSI, MEDEA, MEDEA+, and today's examples, CATRENE and ENIAC have shown that cross-border, cross-cultural and even cross-language communication is a strength of the European semiconductor industry.

### Serious Challenges Exist

Dutheil noted that the European share of the world market for semiconductor devices is shrinking; the \$41B of semiconductor products sold in Europe in 2007 was some 15% of the world market. However, he also highlighted the strength of the European design activity, where leading-edge competence in automotive products, wireless and connection products, and the general industrial market have kept European firms able to hold their own with the rest of the world.

He also identified the current exchange rate as a concern, but also noted that innovation knows no currency, and that the European consortia such as IMEC and Fraunhofer can rely on continued governmental support to expand their research work. The models they have developed to involve leading-edge semiconductor manufacturers and equipment and materials suppliers allows for a rapid move from research to development and product release, and Dutheil sees no end in this competitive advantage.

In conclusion, Dutheil sees that the higher costs of European manufacturing are more than offset by the many years of European experience in using universities, private companies, and government support to stay competitive. Exchange rates are of course a concern, but the best products based on the best innovation will always succeed in the market. He remains positive on a strong, competitive Europe for many years to come. •



Roughness; SEMI MURA in FPD Image Quality Inspection; Resistance of Resin Black Matrix with High Resistance for FPD Color Filter; Measuring Method of Optical Characteristics for Backlight Unit; Definition of Measurement Index (Semu) for Luminance Mura in FPD Image Quality Inspection; and Guide for Quality Area of LCD Masks.

- 4) **FPD Specifications for Substrates:** Glass Substrates Used to Manufacture FPD; Edge Condition of FPD Substrates; LCD Mask Substrates; Edge Length and Thickness for LCD Mask Substrates; Marking of Glass FPD Substrates with a Two-Dimensional Matrix Code Symbol; Improved Information Management for Glass FPD Substrates Through Orientation Corner Unification; Quality Area Specification for FPD Substrates; Standard Size for FPD Substrates; and Provisional Specification for Large Area Masks for FPDs (North America).
- 5) **FPD Specifications for Handling, Transport, Shipping:** FPD Glass Substrate Cassettes; Cassettes Used for Horizontal Transport and Storage of FPD Substrates; Mechanical Interface Between FPD Material Handling System and Tool Port; Mechanical Interface between FPD Material Handling

Equipment and Tool Port, Using AGV, RGV, and MGV; FPD Substrate Shipping Case; Ultra-Large Size Mask Substrate Case; Reference Position of Single Substrate for Handling Off/On Tool; Single Substrate Orientation for Loading/Unloading Into/From Equipment to Specify ID Reader Position; Reference Position of Substrate ID to Specify Datum Line for ID Reader for Handling Off/On Tool.

Other SEMI FPD Standards include a Guide for Cost of Equipment Ownership (CEO) Calculation for FPD Equipment, LCD Pellicles, and Markers on FPD Polarizing Films.

### International Standards

As one of the key services offered by SEMI for the worldwide semiconductor, FPD, MEMS and related industries, SEMI International Standards help companies increase productivity, while enabling compatible business processes and technological interoperability on a global scale. SEMI Standards are published three times a year, and SEMI S26 and D51 join a roster of more than 770 standards and safety guidelines published by the association over the past 35 years.

For more information about SEMI Standards, visit [www.semi.org/standards](http://www.semi.org/standards). •



## HIGH TECH U

# SEMI High Tech U Goes Solar

**THE FUTURE IS BRIGHT, BUT THAT** could be because it will rely on solar energy to help light the way. SEMI High Tech U, the successful math- and science-based career exploration program produced and presented by the SEMI Foundation and SEMI members worldwide, is now developing solar education modules to nurture interest in scientific and engineering careers for high school students.

As Michael Lesiecki, the director of the Maricopa Advanced Technology Education Center in Phoenix, AZ says, "Major semiconductor equipment companies see an opportunity to use their process and manufacturing expertise in solar applications. This expands the possible careers for students considering high tech. In High Tech U students get an opportunity to design a solar solution to a power challenge, analyze its feasibility and present their work as a team to an industry panel."

He continues, "In today's world there is an increased awareness of the potential of solar as an alternative, renewable energy source. Solar energy can power devices to create unique technology-based projects to solve global challenges. The semiconductor manufacturing industry has developed new methods for creating solar panels that can make it more efficient and cost effective to supply power from the sun."

Lesiecki says that the new photovoltaic (PV) module for High Tech U students will explain the concepts of the amount of light energy falling on a collector surface, how and how much of that light can be converted to electrical energy, and the amount of energy

required to power the proposed application or product solution.

As planned today, the High Tech U participants will be given various open-ended problems to resolve, and they will form teams of innovators to incorporate solar power sources into their product designs.

In their activity, students will learn the physical process of converting light to electrical energy and will employ mathematics to make calculations and projections of feasibility. They will employ various sources of data for their analyses, and they will develop teamwork skills as a member of product conceptualization and development groups.

In addition, as part of a three-day program designed to introduce high school students to some of Silicon Valley's cutting edge technology including solar and nanotechnology, high school students were recently introduced to the "big picture" of the emerging solar energy industry to learn about the design and physics of solar cells. At Applied Materials' locations on February 21, 2008, these students saw the processes that create solar cells on silicon wafers (similar to the semiconductor process), used digital instruments to measure solar voltage and recorded the measurements in a computer software program, and learned how solar array circuitry collects the voltage.

Many SEMI member companies see an opportunity to use their process and manufacturing expertise in thin film solar applications, and they will be hiring qualified personnel to create and fulfill the opportunities. SEMI High Tech U is developing the interest for these future careers among students today. •

## SEMI AROUND THE WORLD *continued*

wafer industry. Revenues also grew by 21% in 2007 compared to 2006, as a result of 300 mm contributing to an overall better product mix.

Silicon wafer area shipments in 2007 totaled 8,661 million square inches (MSI), up from the 7,996 MSI

shipped during 2006. Revenues grew to \$12 billion from \$10 billion posted in 2006. "Robust demand and the 300 mm ramp led to an overall strong year for the silicon industry," said Kazuyo Heinink, chairwoman of SEMI SMG and vice president, New Product Marketing for

## CALENDAR OF EVENTS

### APRIL

**April 6-19**

**NA Standards Spring Meetings**

Dallas, Texas

[www.semi.org](http://www.semi.org)

**April 9-12**

**Global FPD Partners Conference (GFPC)**

Phoenix Seagaia Resort

Miyazaki, Japan

[www.semi.org/gfpc](http://www.semi.org/gfpc)

**April 28-30**

**Strategic Business Conference (SBC)**

The Meritage Resort

Napa, California

[www.semi.org/sbc](http://www.semi.org/sbc)

### MAY

**May 5-7**

**SEMICON Singapore 2008**

Suntec Singapore International Convention & Exhibition Centre

Singapore

[www.semi.org/semiconsingapore](http://www.semi.org/semiconsingapore)

**May 5-7**

**ASMC 2008**

Hyatt Regency

Cambridge, Massachusetts

[www.semi.org/asmc](http://www.semi.org/asmc)

### JUNE

**June 2-4**

**SEMICON Russia 2008**

World Trade Center Moscow

Moscow, Russia

[www.semiconrussia.org](http://www.semiconrussia.org)

**June 4**

**New England**

**Breakfast Forum**

Hilton Hotel

Woburn, Massachusetts

[www.semi.org/nebf](http://www.semi.org/nebf)

**June 11-13**

**Display Taiwan 2008**

Taipei World Trade Center

Taipei, Taiwan

[www.displaytaiwan.com](http://www.displaytaiwan.com)

**June 12**

**SEMI Member Forum**

Hotel Le Meridien

Munich, Germany

[www.semi.org](http://www.semi.org) •

MEMC Electronic Materials. "We expect that these drivers will fundamentally remain in place for 2008, with silicon shipments likely continuing to grow at a healthy rate." •