



## FABS

# The Next Generation Fab: Defining 300 mm Prime

**300 MM PRIME CAN BE VIEWED AS AN UMBRELLA** strategy under which the semiconductor industry can pursue waste reduction and significantly improve efficiency in the wafer fab, according to a panel of industry executives.

"There is still some confusion because a lot of people think of 300 mm Prime as synonymous with the next generation fab. To me, it is an evolution of the things we need today," said Elizabeth Williamson, director of 300 mm Semiconductor Operations, IBM Systems and Technology Group.

Williamson was one of a five-member panel at a symposium entitled "Next Generation Fab: Defining 300mm Prime", held during SEMICON West 2007 in July. Steve Buehler of SEMI moderated the panel, described as "raising issues, explaining the benefits, and building consensus" around the need for such an approach.

"When you look under the covers, there is a lot of room for improvement," according to Williamson, especially in terms of idle wafer time during WIP. She said the "day to day distractions" take up a lot of resources. A 10 to 15 percent productivity gain can be made simply through continuous improvement efforts, she noted. After that, the industry can start talking about new approaches that may require more capital. "As you fix certain problems, you have time to focus on bigger issues," said Williamson.

Shigeru Kobayashi, chief engineer, EES and e-manufacturing for Renesas, pointed out that fab engineers are busy dealing with multiple products and reduced cycle times, and therefore the focus should be on improving engineering efficiency. "The history of the past three or four years is that we are fighting inefficiency in production," he said. "What we expect from 300 mm Prime is higher efficiency. We need a smart means to control the complex environment."

To further that goal, Renesas would like to deepen its cooperation with equipment and materials suppliers. "The next step is bringing in real effective co-operation between suppliers and [device makers]," said Kobayashi.

Iddo Hadar, chief technology officer for Applied Materials, said the changes that need to happen to redefine fab productivity will cut across multiple users and multiple suppliers, requiring a lot of collaboration. "They will require a common vision and common understanding of what the opportunities and what the issues are," he said.

Hadar pointed out that the importance of faster cycle times has come about because of the shift to a consumer electronics-driven market, where product life cycles are shorter and time to market or time to volume is critical to meet market windows.

Christopher Hofmeister, vice president of engineering for Brooks Automation, said the 300 mm Prime effort has seen the focus move from yield towards productivity improvements. "When you talk about productivity, there are two key elements: cycle time improvements and cost reduction," he explained. "In terms of cycle time reduction, we are doing things such as cutting lead time of tool deliveries ... looking at alternative automation architectures, and small lot manufacturing," he said. Hofmeister added that, due to the consumer-driven environment, focusing on cycle times was "a cornerstone of the 300 mm Prime effort."

Dave Gross, director of global manufacturing systems technology for Advanced Micro Devices, said the approach with AMD's 300 mm fab in Dresden, Germany was to target waste and cycle time reduction in order to improve productivity without the need to spend more on capital. "We did it through lean methodologies. There are many opportunities to improve productivity, cycles times and reduce inefficiencies," he said. "Eighty percent of the time that it's in a fab, a wafer is waiting for something to happen to it — not being processed, but waiting."

Gross lamented that a lot of the work on waste elimination was being done "behind closed doors", whereas it should be "out there" as a co-operative, industry-wide effort. More discussion with the supplier community was the key to solving problems, according to Gross. He added that the productivity

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## SEMI AROUND THE WORLD

### Worldwide MEMS Systems Market Set to Reach \$72 Billion by 2011

The market for micro-electromechanical systems (MEMS) totaled \$40 billion in 2006, and is expected to top \$72 billion by 2011, according to Global MEMS/Microsystems Markets and Opportunities, a market research report from SEMI and Yole Développement.

The MEMS devices at the heart of these systems totaled \$5.9 billion in 2006, and are projected to grow to \$10.8 billion by 2011, with a compound annual growth rate (CAGR) of 13%, fueled by increasing use in consumer electronics.

The materials and equipment used to manufacture MEMS devices topped \$1 billion in 2006, with MEMS materials forecasted to grow at CAGR of 13%. MEMS equipment is forecasted to grow at a CAGR of 9% through 2011. Materials demand is driven by substrates, making up over 70% of the market, packaging coatings and increasing use of chemical mechanical planarization (CMP). The report is available for no charge to SEMI members at [www.semi.org/mems](http://www.semi.org/mems). Non-SEMI members can purchase the report directly from Yole Développement for €2,000. •



## FABS *continued*

improvements envisioned under 300 mm Prime are not something for the future — they are being implemented today, and can also be applied to 200 mm fabs that upgrade to 300 mm.

Applied's Hadar urged the industry to do more than just “attend conferences and talk about” the problems. “Left to its own devices, this is not going to happen [by itself]. There is a risk that we agree intellectually, and not execute it because there is

not the business impetus to make that happen,” Hadar said.

A question-and-answer session brought numerous interested attendees to the microphones, and lively discussion about the maximum benefit from this effort, the contrast and complement to 450 mm discussions, and implementation were discussed. The panel closed with the observation that SEMI's Manufacturing Task Force was a good place to gather current information and steps for attendee participation. •

## SEMI FPD STANDARDS

### What's Next?

BY BETTINA WEISS, *director,*  
*SEMI International Standards*

“SEMI HAS LONG BEEN ACTIVE in setting FPD standards,” said Bettina Weiss, director of SEMI International Standards, “but we see some strong opportunities coming up in the near future. The question is: Will the industry realize the collective need, step up and help get these standards developed?”

SEMI has a long history in the FPD industry. Because of the similarities between the technologies utilized in chip making and display fabrication, many SEMI members who began in the semiconductor industry also support FPD panel makers. Consequently, SEMI events, market statistics, International Standards, EHS support, and other SEMI activities have increasingly addressed the important needs of the FPD community. The oldest SEMI FPD Standard still in existence is SEMI D3-91 Quality Area Specification for Flat Panel Display Substrates, which was published in 1991 and reapproved in 2003. Over the past 15 years, over 50 other SEMI standards addressing topics ranging from substrate size to Mura measurement to large area masks have been developed.



“There are some serious challenges to developing FPD standards,” continued Weiss. “In many areas of the semiconductor field, manufacturers and OEMs sat down and defined a ‘standards roadmap’ largely based on device manufacturer (user) guidelines, to show what should be done first, or second, or not at all. We haven't seen that to the extent necessary yet among FPD equipment manufacturers, panel makers, or display manufacturers.”

“But I am extremely optimistic about what we're doing and how we're moving forward,” she continued. “We've been working to develop a ‘standards needs assessment’ survey, and we expect to release that in September of this year. That will help us define a standards development process based on the data we receive. It is important that we understand the needs and requirements of our stakeholders and help them develop critical industry standards that address these needs. I fully expect that we'll have a

comprehensive SEMI global FPD strategy in place, and standards will be a large part of that,” she said.

“SEMI is perhaps the only organization that can fill this need,” she added. “With our global infrastructure, our ability to provide local support in all FPD manufacturing regions of the world, and our experienced standards support staff, SEMI is ready to help. The biggest part, though, is that manufacturers, suppliers, and everyone involved have to step up and participate in the process. We have over 1,500 standards volunteers in the semiconductor, FPD, and MEMS manufacturing industries, we're about to expand our program into the photovoltaic sector, and we've demonstrated the value of this collective effort many times. We need to have that same participation in order to get the same success in FPD standards.”

For more information contact Bettina Weiss at [bweiss@semi.org](mailto:bweiss@semi.org). •

## CALENDAR OF EVENTS

### OCTOBER 2007

**October 9-11**  
**SEMICON Europa 2007**  
New Stuttgart Trade Fair Centre  
Stuttgart, Germany  
[www.semi.org/semiconeuropa](http://www.semi.org/semiconeuropa)

**October 17**  
**SEMI Awards Dinner**  
Santa Clara Marriott  
Santa Clara, California  
[www.semi.org/semiaward](http://www.semi.org/semiaward)

**October 24-26**  
**FPD International 2007**  
Pacifico Yokohama  
Yokohama, Japan  
[www.semi.org](http://www.semi.org)

### NOVEMBER 2007

**November 4-7**  
**International Trade Partners Conference 2007 (ITPC)**  
Grand Wailea Resort  
Maui, Hawaii  
[www.semi.org/itpc](http://www.semi.org/itpc)

### DECEMBER 2007

**December 5-7**  
**SEMICON Japan 2007**  
Makuhari Messe  
Chiba, Japan  
[www.semi.org/semiconjapan](http://www.semi.org/semiconjapan) •