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EXPANDING MARKETS • IMPROVING ACCESS

OUR NEW FRONTIER

BY RICK WALLACE, PRESIDENT AND CEO, KLA-TENCOR
AND CHAIRMAN, SEMI INTERNATIONAL BOARD OF DIRECTORS

Not that long ago, many of us wouldn't have fathomed the technology that is now crucial to our everyday lives. As we enter the second decade of the 21st century, the world continues to undergo a technological transformation as significant as the Industrial Revolution. Today's technology is enabling a whole new frontier of productivity and connectivity—breaking down barriers both in the workplace and at home in a way we never thought possible. It's allowed us to be more nimble and more responsive. It has brought us closer together across the globe. At a pace that's evolving ever so rapidly, technology has changed us forever and **the end of the technological revolution is nowhere in sight.**

In a competitive landscape dominated by form factors, app stores, and operating systems, the glory days of the processor wars—when silicon innovation drove each wave of new technology—would appear to be ancient history. Nothing could be further from the truth. Semiconductor technology is very much at the heart of today's revolution. Daily, we chart new territory in our collective quest to innovate and push the limits of Moore's Law,

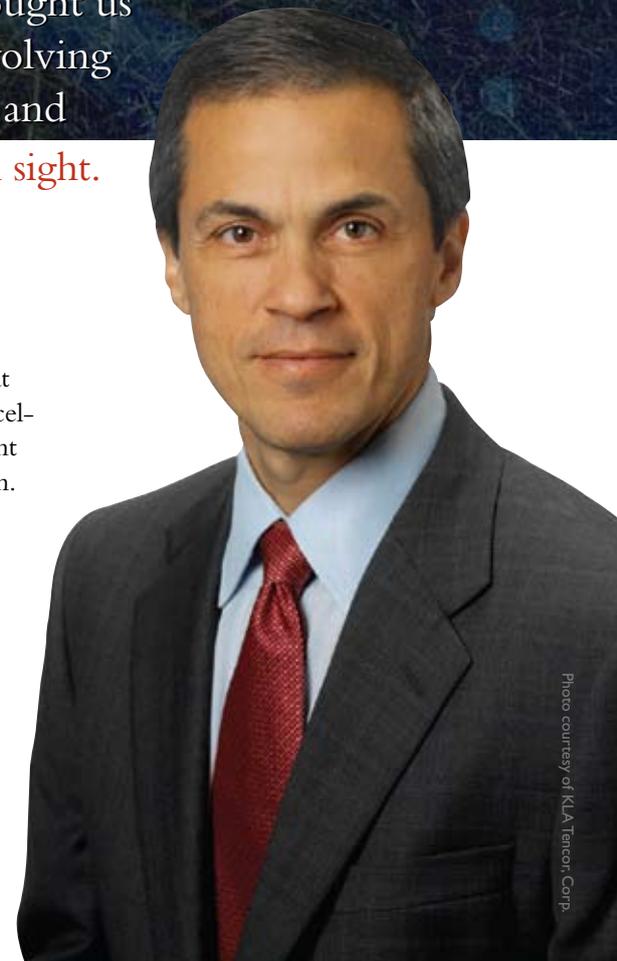
enabling next-generation semiconductors that will power tomorrow's life-changing technology.

And with great progress comes great change. Today, our industry is at a critical inflection point—facing accelerated required technology investment and the need for increased innovation. Innovation will take many forms, including our traditional technology innovation, but also innovations in

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"WE MUST REMAIN FOCUSED ON THE FUTURE WHILE
LEARNING FROM THE LESSONS OF OUR PAST AND
NOT LOSING SIGHT OF OUR PASSION TO INNOVATE."

— RICK WALLACE



Our New Frontier

CONTINUED FROM PAGE 1

how the industry works together to solve the economic challenges that face us all. SEMI also is in need of ongoing innovation in order to transition to the future. Over the next year, SEMI must develop and begin to execute on a strategy which will allow the organization to assist the industry in facing the challenges of tomorrow.

As an organization, we must look at our current approach and devise a clear-cut strategy for change that involves careful thought, collaboration with customers and peers, and courage to act upon our convictions. We must remain focused on the future while learning from the lessons of our past and not losing sight of our passion to innovate.

Over the years, SEMI has helped to advance the industry's collective agenda on important matters such as strengthening IP enforcement, developing globally accepted technical standards, addressing environmental sustainability, and advocating for the industry on many important public policy issues. Our new strategy cannot abandon the progress we've already made in these areas, but instead it must renew our focus and commitment so as to constantly improve our industry.

I want to thank Stan Myers and the members of SEMI for the opportunity to be part of this organization at this critical time. I look forward to working with the SEMI Board and global membership to drive innovation, transition and change.



NEW FROM SEMI: OPTO/LED FAB WATCH

SEMI has released the newest in its line of fab database information products, the *Opto/LED Fab Watch* database. With the rise of eco-friendly or “green” lighting, light-emitting diodes (LEDs) are now in the spotlight. While LEDs represent a more efficient lighting solution, the cost of implementing LEDs in general purpose lighting has been comparatively prohibitive. However, with the push from government regulations and on-going technology advancement, the adoption of LEDs in major lighting applications is expected to quickly rise in the coming years.

The exploding demand forecast has propelled LED chip manufacturers and also new players to invest in new facilities and to expand capacities. In SEMI's latest new report—the *Opto/LED Fab Watch*—the database tracks and lists Optoelectronic and LED chip manufacturing facilities worldwide. Our data reveals key information on fab capacity, technology capability, location, products, wafer size, expansion plans, investment amounts, and more. Currently, the report contains information on 168 Opto/LED fabs worldwide with 86 LED fabs and 82 opto-related fabs. The database shows Japan as having the largest number of Opto/LED fabs with a total of 42 facilities in this region. The regions with the most LED fabs are Taiwan (40%), Japan (23%) and China (22%).

While LED manufacturing has long employed 2-inch wafer substrates, the SEMI *Opto/LED Fab Watch* shows that increasing numbers of LED fabs are adopting 4-inch wafer substrates and some have even migrated to 6-inch sapphire substrates. With the adoption of larger wafer sizes, LED manufacturers can further reduce cost and significantly expand capacity.

The *Opto/LED Fab Watch* database is the newest member of the SEMI suite of fab databases, which includes the *World Fab Forecast*, *FabFutures*, *World Fab Watch*, and the *300 mm Fab Report*. For additional information or to download a sample of this new database, please visit www.semi.org

SEMI is exploring ways to help support member needs for ongoing roadmap and cost information and other possible pre-competitive working groups. For more information, please visit the SEMI website to view “U.S. DOE Publishes Solid State Lighting Manufacturing Roadmap,” visit the SEMI Emerging Markets web page, or contact Tom Morrow at tmorrow@semi.org.

SEMI SCHEDULE

July 11–13, 2010	ASMC 2010	San Francisco, California	www.semi.org
July 13–15, 2010	SEMICON® West 2010	San Francisco, California	www.semiconwest.org
July 13–15, 2010	InterSolar North America	San Francisco, California	www.intersolar.us
July 28–30, 2010	SOLARCON® India 2010	Hyderabad, India	www.solarconindia.org
September 8–10, 2010	SEMICON Taiwan 2010	Taipei, Taiwan	www.semicontaiwan.org
October 19–21, 2010	SEMICON Europa	Dresden, Germany	www.semicon.europa.org
October 26–28, 2010	PV Taiwan 2010	Taipei, Taiwan	www.semi.org

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SEMI BRUSSELS OFFICE'S ADVOCACY EFFORTS



HEINZ KUNDERT, PRESIDENT OF SEMI EUROPE, PRESENTS EUROPEAN COMMISSIONER NEELIE KROES WITH A 300 MM WAFER.

SEMI Industry Advocacy Event Informs European Commissioners

The fourth SEMI Brussels Forum was held March 4 and 5 in Brussels, Belgium, to increase awareness of the need for Europe to retain semiconductor manufacturing expertise and to raise the importance of semiconductors on the EU agenda. The event reached out to a significant number of EU stakeholders: the message was delivered to more than 250 people, including 50 representatives from the European Commission, and in a private meeting with European Commission Vice President Neelie Kroes, in charge of the Digital Agenda.

SEMI staff led members and industry leaders through the lobbying effort to ensure a more competitive environment for the semiconductor and photovoltaic manufacturing industry. Ten meetings were arranged with EU representatives, and a cluster collaboration meeting and a press conference reinforced the major messages.

Using the SEMI White Paper on European Competitiveness (available on the SEMI Web site) as a foundation for discussions, the event achieved extensive visibility through meetings with European

Commissioners for Industry and Entrepreneurship, Competition, Trade, Internal Markets, Education, Digital Agenda, Research, and Energy.

Follow-up actions for SEMI members and staff include providing additional information to several of the European Commissioners and arranging continuing informational meetings with many of them. Several commissioners also expressed interest in visiting European Centres of Excellence (including Fraunhofer Institute and IMEC), and on-site meetings will be scheduled.

PV Group Advances Solar Policy Best Practices at Congressional Briefing

In support of the PV Group's policy position on feed-in tariffs (FITs), the PV Group recently took part in a renewable energy policy briefing on Capitol Hill. PV Group was able to reinforce and discuss the policy principles detailed in the PV Group White Paper, "Advancing a Sustainable Solar Future."

The Renewable Energy Policy Briefing took place in the Rayburn House Office Building in the shadow of the Capitol Building in Washington, D.C. on January 21. Representing the PV Group was Jamie Girard, manager of public policy at SEMI North America. "It's clear that one of the biggest barriers to implementing a feed-in tariff is lack of education," said Girard. "Briefings like this one go a long way to helping our Congressional leaders understand the basic principles behind such a system, and the right steps to take to make it work."

The briefing featured an appearance by Congressman Jay Inslee (D-WA), who addressed the packed committee room and spoke about his work on reintroducing a version of a bill to establish a feed-in tariff on a national basis. Despite some skepticism, Inslee was insistent that the establishment of a feed-in tariff could be done on a national level saying, "Some may say this sort of action should be at the regional or state level, ...but we're never going to solve the energy challenge unless we take national action," Inslee said. "We didn't go to the moon one municipality at a time."

Inslee concluded the briefing by noting that in the United States feed-in tariffs are "rapidly growing traction", but still require an "educational process" and that will take time to get policymakers on board through educating them about the issue. "There's no better policy than a feed-in tariff to give the investment community confidence to invest in technology that will lead to a low carbon economy," said Inslee.

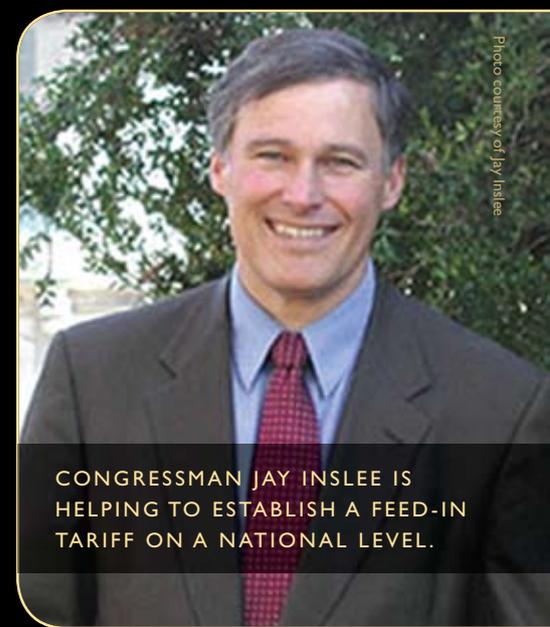


Photo courtesy of Jay Inslee

CONGRESSMAN JAY INSLEE IS HELPING TO ESTABLISH A FEED-IN TARIFF ON A NATIONAL LEVEL.



BEYOND EXPECTATIONS



SPENDING FOR
MEMORIES SURGES
AGAIN, WHILE LEDS
BRIGHTEN THE FUTURE

BY CHRISTIAN GREGOR DIESELDORFF
SEMI INDUSTRY RESEARCH AND STATISTICS

It's no surprise that fab spending will double this year. Back in June 2009, the SEMI *World Fab Forecast* already predicted higher 2010 growth rates (~60 percent) than anyone else. Now, the latest report predicts 2010 fab spending will reach 117 percent in 2010. And as this article is being published, some rumors are surfacing about more capex increases to be announced, which may push growth even beyond 117 percent. However, celebrating this fast growth may be overshadowed by rising concerns.

Table 1 (below) shows fab spending with and without discretes (which includes LED fabs). Construction costs typically account for 15 to 20 percent of total fab spending.

The Spending Spree is Back

At the beginning of this year, it was clear that just a few companies would spend more than \$1 billion in 2010. This has suddenly changed, as some companies have announced record levels of capex plans. One may wonder where all the money comes from after the industry experienced a historically dreadful 2009.

How much of the announced capex actually goes into fabs depends upon the market situation, the product, and

TABLE 1 WORLDWIDE FAB SPENDING IN US \$ MILLIONS

	2007
Fab spending with Discretes*	\$46,559
Change %	11.5%
Fab spending without Discretes*	\$45,290
Change %	

* Discretes include LED fabs



TABLE 2 WORLDWIDE INSTALLED CAPACITY WITH AND WITHOUT DISCRETES
(IN 200 MM EQUIVALENT WAFERS PER MONTH)

	2007	2008	2009	2010	2011
Installed capacity with Discretos	15,030,511	16,170,208	15,647,484	16,827,643	17,905,172
Change %		7.6%	-3.2%	7.5%	6.4%
Installed capacity without Discretos	12,963,151	13,955,106	13,447,357	14,577,160	15,586,892
Change %		-7.7%	-3.6%	8.4%	6.9%

the company's strategy (such as fab-strong or fab-lite). In general, 60 to 80 percent of announced capex goes directly into fabs. This year, however, a much higher percentage (70 to 95 percent) is projected to go directly into fabs. Last year most capex went for upgrades, but this year, more capex will be spent on rebuilding and building up capacity.

Companies Roar Again— and LEDs Light Up

After a year of negative growth, installed capacity is expected to pick up again. (See Table 2, above.)

Last year the industry underinvested. This year, spurred by business growth, robust demand, and strong chip prices, many companies have launched aggressive expansion plans. Most of the investments in 2010 are still for upgrades, but we see investments for new capacity to increase.

Foundries are expected to show an increase of installed capacity, growing 13 percent year over year from 2009 to 2010, and another 11 percent by 2011. After a year of memory loss (installed capacity decreased by more than 8 percent year-over-year in 2009), memory companies are starting to regain their position, rebuilding and growing. Installed capacity for memories will grow 9 percent from 2009 to 2010, and an additional 8 percent in 2011. Capacity for logic and analog, however, will grow less than 5 percent in 2010.

A New Wave of LED Facilities Lighting Up the Way

Since November 2009, SEMI has added about 26 dedicated LED facilities to its *Opto/LED Fab Watch* and *World Fab Forecast* reports. The growth rate for capacity for the LED industry is phenomenal, with strong double-digit growth rates (year-over-year). LED capacity growth is expected to be more than 3 times higher than for memory and 2 times higher than foundry this year and next year.

Following the Elation, Concerns Increase—but Someone Will Prevail

Everything grows so fast so quickly.

Capex spending plans are revised upwards several times, new chip facilities are announced and an entire industry segment (LEDs) surges with new facilities and capacity growth never seen before. A key contributor to the latest adjustment in SEMI's reports was Samsung, which nearly doubled its capex plans for 2010.

Some begin to raise concerns that chipmakers may face a backlash from their aggressive drive to boost investment. Such a move can result in another oversupply, which will erode their profitability over time.

Another concern is that certain equipment makers may not be able to meet the sudden rush in demand. The supply chain may be stretched and will have a hard time meeting the 100 percent or so growth. This bottleneck may slow down expansion and upgrade plans. Chip companies may compete fiercely for the services of equipment makers.

Time will tell if a new bubble is building up, or if this just a correction to meet demand after historic lows last year.

One thing seems to be clear: this is will be a banner year for the equipment and materials industry.

Please visit www.semi.org/fabs for additional information on these reports.

ING (CONSTRUCTION AND EQUIPPING)

2008	2009	2010	2011
\$30,931	\$16,339	\$35,514	\$42,035
-33.6%	-47.2%	117.4%	18.4%
\$29,694	\$15,554	\$33,553	\$40,718
-34.4%	-47.6%	115.7%	21.4%



For over 35 years, the SEMI Standards Program has been developing manufacturing Standards for the semiconductor, FPD, and PV industries. While the Program has historically enjoyed strong contributions from members in North America, Japan, and Europe, we are now seeing substantial participation from other regions, particularly Korea and Taiwan.

This stronger regional participation is paying dividends, as SEMI has announced the publication of three new FPD Standards that originated from the Taiwan FPD Committee. Although Taiwan has previously contributed to Standards efforts led by other regions, these three Standards are the first approved documents that originated in Taiwan.

“SEMI offers an open and trusted platform with a strict procedure of international standards development. It provides a great opportunity for Taiwan to participate and even lead global FPD international technology standards development,” said Dr. Victor Tzeng-Yow Lin, Deputy General Director of the ITRI Center for Measurement Standards. “The newly-passed international standards set a benchmark for manufacturers and their suppliers to follow, which not only lowers the communication cost but also prevents unnecessary transportation and production risk.”

SEMI D56

MEASUREMENT METHOD
FOR AMBIENT CONTRAST OF
LIQUID CRYSTAL DISPLAY

Although most consumers use LCDs in bright environments, such as offices or living rooms, existing standards only consider measurement methods for dark

room contrast. In addition to providing a measurement method for ambient light conditions, SEMI D56 provides measurement methods for different viewing angles, giving manufacturers a better understanding of their display’s performance in likely actual use.

SEMI D57

DEFINITION OF MEASUREMENT
INDEX (VCT) FOR MURA IN
FPD IMAGE QUALITY INSPECTION
Mura (brightness non-uniformity defects) are typically checked for by human inspectors, but have always been difficult to quantify. This Standard provides a definition of measurement index which quantifies mura in different sizes and positions based on the response to human perception. In addition, this Standard provides an important basis for realization of automated mura inspection. It will not only save cost and manpower (by reducing labor), but also improve communication between panel makers and buyers by quantifying mura with a common criteria.

SEMI D58

TERMINOLOGY AND TEST PATTERN
FOR THE COLOR BREAKUP OF
FIELD SEQUENTIAL COLOR DISPLAY
SEMI D58 defines the terminology of the common effect called color breakup in field sequential displays.

By standardizing the terminology used to describe the color breakup phenomenon, manufacturers do not need spend extra effort to explain this effect to their customers or suppliers. Defining the terminology also makes it possible to establish a measurement method for color breakup.

In addition to FPD, Taiwan has standards Committees in EHS, Information and Control, and PV. SEMI S26—Environmental, Health, and Safety Guideline for FPD Manufacturing System—benefited from constructive input from Taiwan, and the Taiwan EHS Committee is also involved in revising existing Safety Guidelines, such as SEMI S18—Environmental, Health, and Safety Guideline for Silane Family Gases Handling. The Taiwan PV Committee is an important part of the Global PV Standards Committee, consisting of key players from all segments of the PV manufacturing chain—manufacturers of materials, equipment, wafers, cells, modules, and thin films, as well as academia, local industry associations and research institutes.

The Committee is at work on multiple standardization efforts, including PV wafer metrology, module vibration test methods, and cell appearance, all sharing the goal of improved industry communication, reduced costs, and greater efficiency.

Taiwan’s experience in manufacturing (companies such as AUO, CMO, TSMC, and UMC are all involved in SEMI Standards) will increase the value of SEMI Standards, and Taiwan may make a vital contribution in promoting the use and development of SEMI Standards in the Greater China economy.

SEMI STANDARDS UPDATE

EIGHT NEW TECHNICAL STANDARDS

SEMI has published eight new technical standards applicable to the semiconductor, MEMS, FPD and photovoltaic (PV) manufacturing industry. The new standards, developed by technical experts from equipment and materials suppliers, device manufacturers and other companies participating in the SEMI International Standards Program, are available through the SEMIViews Standards product, available at www.semi.org/semiviews.

The new standards, part of the July 2010 publication cycle, join more than 790 standards that have been published by SEMI during the past 36 years.

“The release of these eight new SEMI International Standards covers a wide range of applications, including display, PV, and 450 mm wafers,” said James Amano, Director, SEMI International Standards. “These standards address issues that are active today, and those that will arise when and if the industry moves to larger-diameter silicon.”

SEMI D59

3D Display Terminology

This terminology standard is directly related to the FPD supply chain as well as retail and their consumers. There are many terminologies related to 3D displays that are not clearly defined, and communication problems happen often. This Standard defines the basic and most necessary terms of the 3D display (especially for those different from 2D displays).

SEMI D60

Test Method of Surface Scratch Resistance for FPD Polarizing Film and Its Materials

This standard helps manufacturers of polarizing film and its related materials to develop improved surface-scratch-resistant films, and to test the products accurately. This standard also promotes efficient and consistent communication between FPD components manufacturers to other materials and components manufacturers, FPD panel, or FPD set manufacturers, concerning surface toughness of the materials.

SEMI M76

Specification for Developmental 450 mm Diameter Polished Single Crystal Silicon Wafers

Silicon wafer standards reduce product development cost by setting common technical specifications for equipment and silicon manufacturers. Process test wafer standards reduce development costs and enable availability of a uniform global wafer supply for R&D with lower investment. Use of a standard process test wafer reduces or even eliminates duplication of efforts and provides a common basis for new equipment characterization.

SEMI E156

Mechanical Specification for 450 mm AMHS Stocker to Transport Interface

As the semiconductor industry transitions to 450 mm, the development of the standardized stocker interface to the AMHS system requires global cooperation. As an international effort, SEMI standard E156 allows AMHS and carrier suppliers to efficiently collaborate on the development of 450 mm FOUP storage and transportation systems for semiconductor factories. By standardizing the interface dimensions of the stocker and the AMHS systems, SEMI E156 signifies faster product qualification which will lead to better factory integration and lower cost of ownership.

SEMI E157

Specification for Module Process Tracking

The front-end process equipment in 300 mm fabs uses “recipes” to control wafer processing. The next generation of process advancements requires a granular view of the process execution. This new software standard provides a common paradigm for equipment to report data associated with recipe step execution without requiring equipment to change existing recipe definitions.

SEMI E158

Mechanical Specification for Fab Wafer Carrier Used to Transport and Store 450 mm Wafers (450 FOUP) and Kinematic Coupling

For a 450 FOUP to operate in a semiconductor factory, it must effectively interface with factory AMHS systems. SEMI standard E158 promotes the standardization of the overall FOUP envelope and also the dimensional interface between the FOUP and the load ports, delivery systems, and stockers. This allows for suppliers to focus on product design and verification and reduces the cost and time for a customer to qualify a product.

SEMI PV4

Specification for Range of 5th Generation Substrate Sizes for Thin Film Photovoltaic Applications

The thin film photovoltaic industry now uses varying substrate sizes. It is commonly said that unification of the substrate into one size is difficult, considering variation of usage and handling of the panel, and so on. From an equipment standpoint, developing equipment for all the substrate size variation is a big waste for the industry.

SEMI T20.3

Specification for Service Communication for Authentication of Semiconductors and Related Products

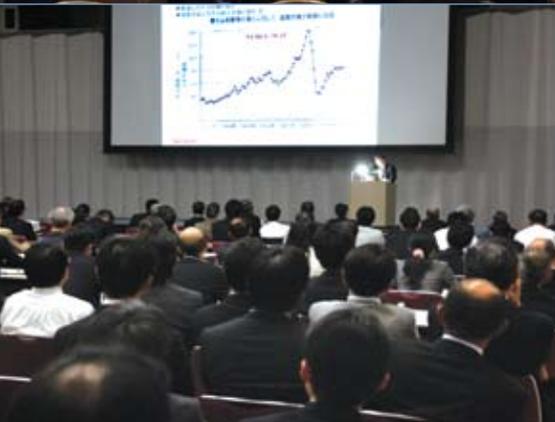
The semiconductor industry has lacked standardized methods to validate the integrity of goods from non-certified distributors or suppliers. The purpose of this specification is to describe the system architecture aspect of an authentication process to establish the trusted identity of products or objects. This specification is one element of a suite of standards aimed at enabling automated, reliable, and secure product authentication for the semiconductor industry, thereby reducing the presence of illegal counterfeit items in the marketplace.

SEMI AROUND THE GLOBE: LEADING-EDGE TECHNOLOGY LEADS THE WAY



The 6th annual Global Flat Panel Conference

was held at the Sheraton Grande Tokyo Bay Hotel on April 8 and 9, attended by over 150 industry executives from around the world, with large delegations from Japan, Korea, Taiwan, North America, China and Hong Kong. Reflecting the improved business conditions, attendance was up 15% from the previous year. The main topics of discussion this year at GFPC were 3D displays and organic LEDs, and all participants enjoyed the speeches and networking opportunities.



The 10th SEMI Forum Japan

was held at the Grand Cube Osaka on May 31 and June 1. After the keynote speech by Dr. Kenji Ohta, the CTO of Sharp, seven programs covered topics from the basics of lithography and interconnections to leading emerging technologies like renewable energy and LEDs. In a show of wide-scale cooperation, other industry associations (JASVA, SSIS, Society of Applied Physics and VANS) held their events concurrently, with a shared friendship party bringing everyone together during the event.



SEMI India's PV Group

organized a panel discussion in Bangalore, held on May 3, to discuss its efforts on public policy principles related to solar/ photovoltaic Feed-In Tariffs (FITs) and their relevance to the Jawaharlal Nehru National Solar Mission (JN NSM).

A SEMI/PV Group White Paper on Policy Principles and Recommended Global Best Practices for Solar Feed-In Tariffs, titled "Advancing a Sustainable Solar Future," along with comments on its relevance to the Indian context was presented and discussed. The white paper describes current industry "best practices" that support FITs as a mechanism to advance solar energy in markets. FITs are implemented in over 30 countries today and have been present for more than 20 years in mature PV markets. FITs are an effective and versatile mechanism and can be successfully integrated with any country's existing energy and renewable resource policies.

The White Paper describes key best practices and characteristics of FITs in use today, including support for technology differentiation, setting of generation cost-based rates, fair purchase and interconnection requirements, use of fixed price and long term payments, and the use of predictable incentive declines to ensure long-term capital availability.

Sathya Prasad, President SEMI India was joined by prominent solar industry leaders including K. Subramanya, CEO, Tata BP Solar & Chair SEMI India PV Advisory Committee, and Dr. J. Gururaja, Honorary Executive President, REAF (Renewable Energy Advocacy Forum) on the discussion panel, with Mr. Subramanya as chair. The session addressed results of the SEMI PV Group global survey of FIT policies, and discussed in detail the JN NSM and these global FIT best practices, the current status of the Mission and the importance of its successful and effective implementation to support the growth of Solar/PV in India.

From left to right: Dr. J. Gururaja, Member, SEMI India PV Advisory Committee and Executive President, Renewable Energy Action Forum; Mr. K. Subramanya, CEO of Tata-BP Solar and Chairperson, SEMI India PV Advisory Committee; and Sathya Prasad, President, SEMI India