

# update

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## SEMI: Helping Members<sup>BE</sup> Sustainable

BY JERRY CODER

CHAIRMAN, SEMI INTERNATIONAL BOARD OF DIRECTORS

*When I took on the role of Chairman of the SEMI International Board of Directors in July, 2007, I made a commitment*



"I SEE THE FOUR FOUNDATION POINTS OF SUSTAINABILITY—PEOPLE, PRODUCT, PROFIT, AND PLANET—AS CRITICAL MEASURES OF HOW WE'RE DOING, AND I'M HAPPY TO SEE PROGRESS."

to further the cause of sustainability and environmental, health and safety (EHS) among SEMI members. I see the four foundation points of sustainability—People, Product, Profit, and Planet—as critical measures of how we're doing, and I'm happy to see progress. I also see that we have a long way to go.

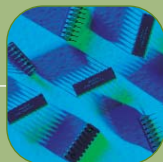
Many SEMI members are already aware of the need for and the benefits of EHS activities. Companies have reduced worker injuries and improved plant productivity through the use of SEMI standards, including the widely-adopted SEMI S2 standard. Many SEMI member companies have taken steps to redesign equipment to minimize the impact on the environment while improving tool efficiency and return on investment. These are all good steps, but there's a bigger challenge we all now face.

*SEMI presented the Akira Inoue Award* for excellence in EHS to Richard Templeton of Texas Instruments last December at SEMICON® Japan. Brenda Harrison, a vice-president at

TI, delivered his acceptance speech, and that speech is in this newsletter on page 8. I encourage you to read it, because she makes some excellent points about the success TI achieved and the lessons learned. These lessons are directly applicable to semiconductor equipment manufacturers and, to some extent to chemical and gas suppliers.

The "big-picture" lesson, though, is that it will not be sufficient for SEMI members to just do the best they can when building equipment. Customers who are following good fab design practices are going to heavily influence some of the design aspects of semiconductor manufacturing equipment as they specify exhaust practices, manifold inlet and outlet sizes and pressures, and so on. As new fabs install more efficient piping, delivery systems, monitoring systems, and energy delivery and recapture systems, semiconductor tool manufacturers will find that "fitting in" to these new fab design concepts will change their approaches. It's more than just "listening to the customer" for a spec—this is a holistic change that will roll through nearly all aspects of tool design. It's "design for

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INFORM, CONNECT, GROW

# SEMI: Helping Members Be Sustainable

CONTINUED FROM PAGE 1

sustainability,” a new discipline that requires using renewable raw materials, materials that can be easily recycled or disposed of and an entire life-cycle plan for each piece of equipment or each material delivered to a fab.

And it won't be simple.

*SEMI members have always been sustainable* in the area of “product,” because the products we enable—some containing billions of transistors—have a powerful role in measurement, analysis, and execution of sustainable practices. SEMI members have also been good in the area of “people,” especially with plant safety (through standards) and education of young people about the industry (through the SEMI Foundation's High Tech U program), but there's more to do. Concerns about aging populations and educational opportunities will impact how and where our industry grows, and planning for these changes is essential. In addition, having employees see and participate in the commitment

made by a fab to the environmental health of the local community inspires morale and employee satisfaction, and those are powerful levers for operational efficiency.

Members have also done reasonably well in “profit,” but there are many challenges coming. As our customers demand more efficient tools with lower environmental impacts, we must find ways to deliver these products while still being profitable. This may cause some changes in the industry as companies adapt, but the winners will be the ones who can rise to these challenges and still maintain high EHS awareness and performance.

*And finally, the planet.* Again, SEMI members have done well, but there is more to accomplish. When TI built their fab in Austin using intelligent environmental principles, they saved \$180 million in construction costs—and they estimate they'll save \$4 million each year in operation costs. This was accomplished by making a relatively small investment in environmental design and

by having committed executives, managers, and personnel develop appropriate solutions. All of our executive decisions and our manufacturing operations must consider the larger picture, and must consider how our customers are seeing this larger picture as well.

If you're not already involved, you soon will be as your customers and your stakeholders ask about your environmental policies. You can use SEMI as a resource, because SEMI has been actively supporting the industry in this regard for many years through such activities as Global Care. This is the semiconductor equipment and material industry initiative, which establishes a framework for companies to build and strengthen commitment to EHS programs. This SEMI initiative is based on five key principles: workplace health and safety, resource conservation, product stewardship, community service, and excellence. Visit the Global Care website at [www.semi.org/globalcare](http://www.semi.org/globalcare) for more information on how your company can take steps toward a more sustainable future.

## “SEMI LITERALLY WROTE THE BOOK ON STANDARDS.”

*Prior to the 1980s*, IBM and, I suspect, many semiconductor device manufacturers designed and built most of their own equipment. IBM always had very thorough, up-to-date safety design standards, as safety has always been a top priority at IBM. I do not believe, however, that design safety standards were necessarily identical among all semiconductor manufacturers.

As the trend toward buying equipment on the open market began, SEMI Standards provided a means for developing commonality across the industry with respect to design safety. It also spread the design costs across a broader equipment base.

*I have been involved with SEMI standards* for some 15 years now, going back to revisions of the SEMI S2 Environmental, Health, and Safety Guideline for Semiconductor Manufacturing Equipment standard, SEMI S3 Safety Guidelines for

Process Liquid Heating System, S6 EHS Guideline for Exhaust Ventilation of Semiconductor Manufacturing Equipment and a few other documents. However, I can think of a score of individuals who, over the years, have contributed much more time and effort and across more subject matter areas. It is through the work of those volunteers that the standards are written.

*SEMI standards are valuable* especially in those areas where there are few national or international standards that can be easily applied to our industry. SEMI standards have had a deep impact on the way equipment is built today, because SEMI literally wrote the book on many aspects of these standards. Defining and implementing these common standards ensures equipment consistency and reduces equipment development cost by spreading a single effort across all makers and users.

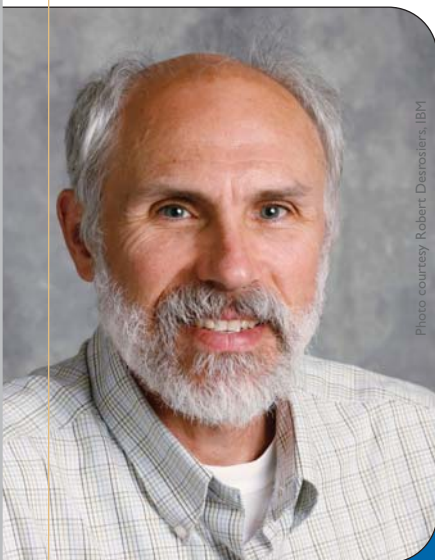


Photo courtesy Robert Desrosiers, IBM

**ROBERT DESROSIERS**  
**ADVISORY INDUSTRIAL HYGIENIST**  
**IBM**

*Robert Desrosiers is co-leader of the S6 Revision Task Force, and a member of the S3 Revision Task Force. He has also contributed to the creation or revision of the SEMI S2, S10, S14, and S18 Standards.*

2007 SEMI CUSTOMER SATISFACTION SURVEY



GAINS ARE MADE, BUT IMPROVEMENTS STILL NEEDED  
**LARGELY SATISFIED**

**IMPORTANT FINDINGS OF THE RESEARCH INCLUDE:**

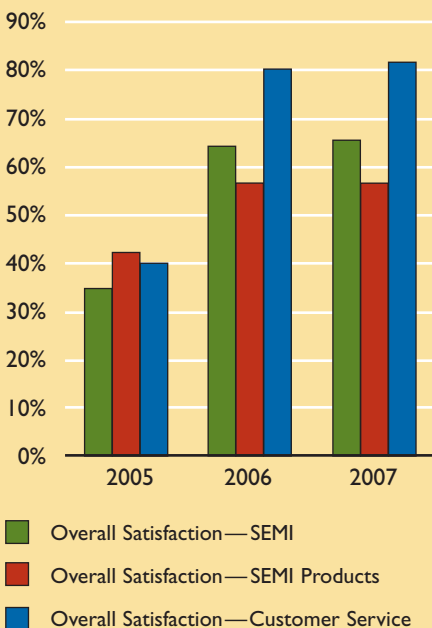
Overall satisfaction levels remain about the same this year as last year, with two-thirds of respondents giving “acceptable” and “above acceptable” scores (as determined by a 10-point scale). “Above acceptable” scores, however, increased significantly.

More than three-quarters of members perceive an improvement in SEMI performance.

Member loyalty has improved from last year. Loyalty is highest in China and North America.

Conducting expositions and conferences, providing market data, supporting industry standards and addressing industry-wide problems are the most valued activities of SEMI and the most well received.

**2005–2007  
HIGHER SATISFACTION**



While the 2007 SEMI Customer Satisfaction Survey (CSS) showed that two-thirds of SEMI members recognized an improvement in performance during the year, overall satisfaction with SEMI membership, products and services remain unchanged from the year before.

In order to assess the association’s effectiveness in meeting member needs, SEMI conducts a customer satisfaction survey on a yearly basis. Along with other Voice of the Customer programs—including transactional surveys, customer service feedback, executive interviews and other research—the customer satisfaction survey provides essential feedback that ensures continuous improvement on SEMI product quality, services and member satisfaction.

*SEMI received over 1,600 responses* to the survey from every region in the world, giving the survey strong statistical significance. The objective of this recurring study is to determine the key drivers of SEMI member satisfaction and the priorities for improvement. In addition to evaluating our tactical performance on managing events, delivering market research and other areas (“how is SEMI doing?”), the survey also asked members to provide input on strategic priorities (“what should SEMI be doing?”).

Among the top improvements in customer satisfaction were in product and service quality and in member communications (see last year’s *Quarterly Report to Members*, Winter 2007). Every product and service area (among 10 categories) achieved measurable improvement, and members’ opinion of the quality of communications rose a significant 12% with the largest improvements noted by members in Japan and North America. SEMI management targeted both product quality and communications for improvement following last year’s CSS, so achieving positive results in these areas was encouraging.

*While satisfaction has improved* in nearly all regions and all areas of activity, overall SEMI member satisfaction is not as high as SEMI management and the SEMI International Board of Directors believe it should be. There are a number of SEMI members who are disinterested, unaware of and/or unimpressed with the organization and its contributions to the industry.

To improve SEMI performance and thus member satisfaction with SEMI, many members suggested that SEMI should provide more informed and targeted solutions to meet member needs, and SEMI should offer more targeted member communications.

We thank all SEMI members who participated for your valuable feedback.

**SPECIFIC ACTIONS SEMI IS TAKING TO IMPROVE SEMI PERFORMANCE AND MEMBER VALUE IN THE COMING YEAR:**

Raising “Increased Member Value” to the highest priority in the SEMI performance appraisal system and integrating it into every SEMI employee’s goals and compensation.

Further enhancing member communications with a redesigned SEMI website to include industry segment areas, more sophisticated and targeted email programs, and more non-English member communications.

Expanding the number and activity of SEMI member advisory and special interest groups.

Further integrating rigorous metrics into all major product and service offerings.

Updating the Customer Service Plan for SEMI expositions in order to decrease the response time and increase the quality of SEMI communications to exhibitors.

# GLOBAL SEMICONDUCTOR PACKAGING MATERIALS OUTLOOK

*Semiconductor Equipment and Materials International (SEMI) and TechSearch International, Inc. have cooperated in the development of the **Global Semiconductor Packaging Materials Outlook**, a comprehensive market research report on the global semiconductor packaging materials markets.*

There has been strong adoption of chip scale packaging (CSP), flip chip, stacked die packaging, and wafer-level packaging (WLP) form factors over the past several years. Mobile phones and other portable electronics are big volume drivers for CSP, stacked die packaging, WLP and package-on-package (PoP). Flip chip package growth is driven by numerous applications: high performance processors, chipsets, and graphic devices, to name a few. Memory, integrated passive devices (IPD), analog devices, and power devices drive WLP demand. No single packaging technology meets all requirements or needs, so the proliferation of package types will continue and material needs will evolve.

Materials content is increasing in advanced packaging with materials being critical in solving the performance and reliability requirements expected of packaging. Customer or application-specific material formulations by suppliers have increased to meet various performance and process requirements. Some consolidation is occurring amongst the material supplier base; however, new entrants are also appearing in the market, especially companies in China.

Given pressures to reduce costs,

some of the advanced packaging technologies are becoming increasingly competitive to traditional packaging solutions. Quad Flat-pack No-lead (QFN), wirebond ball grid array (BGA), and CSP are generally considered commodity items, with manufacturers focusing development efforts to reduce costs. Rising raw material costs are a major challenge to material suppliers and their customers. Specific to the packaging materials markets are rising costs of important metals: copper, tin, gold, silver, and palladium. There has been a sharp rise in pricing for these metals over the past several years, and this has spurred development efforts to reduce the amount of metal consumed or, in some cases, to find replacements for some of these materials.

Advanced packaging applications are key growth drivers in the packaging materials market. Some of the highlighted opportunity areas in semiconductor packaging materials include:

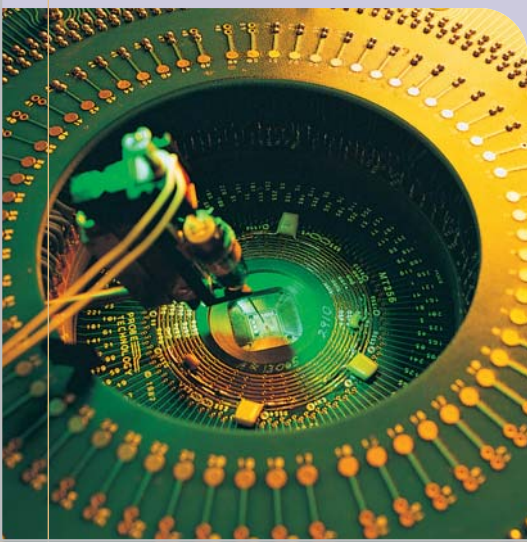
- *Thinner core substrates for small vias, finer lines and spaces, lower dielectric constant build-up layers and other requirements*
- *Thin core materials with suitable properties to reduce warpage effects and improve handling*

- *Leadframe surface treatments and plating process technologies to enhance packaging reliability and etching processes to produce thin leadframe substrates*
- *Alloy development to support on-going migration to smaller diameter gold bonding wire*
- *Die attach materials and processes compatible with ultrathin wafer technologies*

In the near-term, as device manufacturers transition to 45 nm process technologies several key challenges remain with materials compatibility with copper/low-k interconnects, planarity/warpage control, and CTE mismatch between large dies and substrates.

In total, the semiconductor packaging materials covered in this investigation are forecasted to grow from \$15,217 million in 2007 on a global basis to \$19,708 million in 2011, excluding thermal interface materials. This represents a compound annual growth rate of 6.8%, with laminate substrates driving growth. Subtracting out laminate substrate market growth the CAGR is reduced to 4.8%. Thermal interface materials will add another \$303 million and \$491 million in 2007 and 2011, respectively, to the packaging materials market. The global market for laminate substrates for IC packages is forecasted to experience a compound annual growth rate (CAGR) of 13.3% from

## CHINA SUPPLIERS TO THE SEMICONDUCTOR INDUSTRY



After extensive research, SEMI has released the *China Equipment Subsystems, Components, and Parts Vendors Overview* to identify the growing number of companies in China now devoted to manufacturing components and parts used in manufacturing semiconductor equipment and for spare parts consumed in refurbishing 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. Demand by local fabs, global equipment suppliers, and local equipment suppliers, as well as used equipment suppliers are the driving force in developing this local market.

This report contains detailed profiles of 32 companies in China offering components and parts manufacturing services for both front- and back-end semiconductor manufacturing. Information includes

# OOK

2006 through 2011 on a unit basis. With expansion of the use, laminate substrate pricing is decreasing; however, finer design and green requirements could push up the cost.

In revenues, the laminate substrate market is now almost double the size of the leadframe market. Bonding wire revenues will likely increase by 20% in 2007, though higher gold metal pricing is a significant factor in this growth. Assuming flat gold prices in 2007, bonding wire market revenues have grown by 11% to 13%. Higher gold pricing has contributed to the interest and on-going development in copper bonding wire and in the transition towards smaller diameter gold wire. It is estimated that a majority of the gold wire sold in 2007 will be of a diameter less than 25 microns. On a volume basis, the copper wire market is estimated to grow by 81% in 2007.

Revenue growth in the semiconductor packaging materials market correlates to overall expectation for semiconductor unit growth. Unit volume growth varies for each materials market, with price increases for certain segments and continued declines in others. The estimated 2007 global market size and key trends in each semiconductor packaging materials segment are summarized in the table at right.

company background, product offering, and market strategy. Local components and parts manufacturing covers more than 15 SEMI components and parts categories and serve both front- and back-end processes. Most of the products are medium- to low-end yet are essential components and parts that enable customers to meet significant cost reduction targets.

According to statistics obtained in this study, total sales revenues of the 32 semiconductor components and parts manufacturers reached an estimated USD\$450 million in 2006. This figure

includes 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 in the growing China market and profit margins are attractive. With the expanding domestic supplier base, intellectual property (IP) is a concern for foreign companies. Local components and parts are sold into fabs and to

equipment manufacturers in China as well as to overseas equipment manufacturers in a form of contract manufacturing.

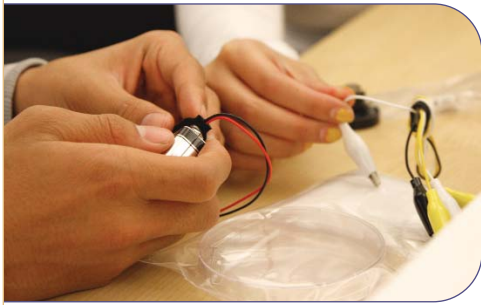
Massive adoption of locally made components and parts at leading fabs is not an immediate trend, as it is estimated that locally made parts make up just 10% of the total consumed currently by these fabs. Without a trusted equipment supplier certification, local components and parts suppliers must go through a long qualification process by fabs, which involves extra effort and carries potential risk.

<b>Semiconductor Packaging Materials Segment (Estimated 2007 Global Market Size)</b>	<b>Comments</b>
<b>Laminate Substrates</b> <i>(\$6,196,000,000)</i>	The substrate shortage experience in 2005 has been replaced by an oversupply of capacity for 2-2-2 structures. Suppliers continue to shift their business focus to laminate CSP substrates where margins make investment more profitable. Trends in flip chip build-up substrate design include stacked vias and vias over printed through-holes in the core. Low CTE, low Z-axis expansion, and low dielectric constant materials.
<b>Flex Circuit/Tape Substrates</b> <i>(\$263,000,000)</i>	TBGA is expensive compared to laminate technology. Volumes remain for tape CSP though many companies have converted to rigid laminate CSP.
<b>Leadframes</b> <i>(\$3,118,000,000)</i>	Continued strong growth in QFN family. Investments and new manufacturing capacity in China. Basis for competition is the lowest price and shortest turn around time.
<b>Bonding Wire</b> <i>(\$3,178,000,000)</i>	Market growth in revenues driven by soaring gold prices. Migration to smaller diameter gold wire continues, with <25 micron diameter wire representing over 50% of wire shipments. Total meters of copper wire sold increased by 81%.
<b>Mold Compounds</b> <i>(\$1,371,000,000)</i>	Continued adoption of green compounds and "niche" formulations to meet device/package specific designs. Aggregate average selling prices have declined, especially for green materials. Manufacturing capacity increasing in China to include production of green materials.
<b>Underfill Materials</b> <i>(\$138,000,000)</i>	Remains a bottleneck in flip chip manufacturing. Numerous suppliers in the market. Special formulations developed for compatibility with low-k dielectrics.
<b>Liquid Encapsulants</b> <i>(\$117,000,000)</i>	Low moisture absorption and formulations compatible with trend towards smaller diameter wire.
<b>Die Attach Materials</b> <i>(\$562,000,000)</i>	Strong growth in tape attach continues for stacked die packaging applications. Number of suppliers introducing dicing die attach tape technology. Companies developing processes to coat paste on the backside of the wafer.
<b>Solder Balls</b> <i>(\$265,000,000)</i>	Shipments of lead-free solder balls continue to increase. Estimated that 80% of shipments are lead-free. Numerous Suppliers.
<b>Wafer Level Package Dielectrics</b> <i>(\$9,800,000)</i>	DRAM adoption currently limited.
<b>Thermal Interface Materials</b> <i>(\$303,000,000)</i>	Continued use of indium-based solders for some high performance. New introductions of thermal grease anticipated. Increased interest in using phase change materials.

Source: SEMI Industry Research and Statistics and TechSearch International, October 2007

# 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, Arizona 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, local high school students were introduced to the "big picture" on 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 SCHEDULE

<b>April 2-3, 2008</b>	SEMI Executive Event in Israel	Tel Aviv, Israel	<a href="http://www.semi.org">www.semi.org</a>
<b>April 6-10, 2008</b>	NA Standards Spring Meetings	Dallas, Texas	<a href="http://www.semi.org">www.semi.org</a>
<b>April 9-12, 2008</b>	Global FPD Partners Conference (GFPC)	Miyazaki, Japan	<a href="http://www.semi.org/gfpc">www.semi.org/gfpc</a>
<b>April 28-30, 2008</b>	Strategic Business Conference (SBC)	Napa, California	<a href="http://www.semi.org/sbc">www.semi.org/sbc</a>
<b>May 5-7, 2008</b>	SEMICON Singapore 2008	Singapore	<a href="http://www.semiconsingapore.org">www.semiconsingapore.org</a>
<b>May 5-7, 2008</b>	ASMC 2008	Cambridge, Mass.	<a href="http://www.semi.org/asmc">www.semi.org/asmc</a>
<b>June 2-4, 2008</b>	SEMICON Russia 2008	Moscow, Russia	<a href="http://www.semiconrussia.org">www.semiconrussia.org</a>
<b>June 4, 2008</b>	New England Breakfast Forum	Woburn, Massachusetts	<a href="http://www.semi.org">www.semi.org</a>
<b>June 11-13, 2008</b>	Display Taiwan 2008	Taipei, Taiwan	<a href="http://www.displaytaiwan.com">www.displaytaiwan.com</a>
<b>June 12, 2008</b>	SEMI Member Forum	Munich, Germany	<a href="http://www.semi.org">www.semi.org</a>
<b>July 15-17, 2008</b>	SEMICON West 2008	San Francisco, California	<a href="http://www.semiconwest.org">www.semiconwest.org</a>

SEMI HOSTS TEST ADVISORY GROUP WORKSHOP

# Test: What Keeps You Awake at Night?

SEEKING INPUT AND DIRECTION FROM THE TEST, ASSEMBLY, AND PACKAGING INDUSTRY SEGMENTS, SEMI BRINGS EXECUTIVES AND THOUGHT LEADERS TOGETHER TO DEFINE CHALLENGES, OPPORTUNITIES, AND THE BEST PATHS FOR SEMI SUPPORT.

On January 22, 2008, SEMI brought together members and non-members from a cross section of the test, assembly, and packaging communities. Representatives from fabless companies, independent device manufacturers, subcontractors, electronic design automation, and assembly test equipment segments were present to help identify possible SEMI initiatives to help further the ATP industry. As with many other SEMI industry efforts, these discussions were pre-competitive explorations of future directions, so concerns about antitrust issues were clarified and prevented by careful scoping of the agenda and the discussion content.

The agenda for this meeting centered on defining the issues faced by these executives and thought leaders, and were summarized in the question: "What keeps you awake at night?" By identifying the major issues faced by the industry, SEMI would gain a fuller and deeper understanding of the most significant contributions that an industry association could make to the strategic value of its members in these markets.

The meeting started out with industry consultant Ron Leckie of Infrastructure Advisors presenting economic trends of semiconductor price pressures, growth and a research and development funding gap. Next,

Brad Robbins of Teradyne shared the outcome of a recent ITRS Test Workgroup meeting held in Japan, and then a round-table discussion began with each member sharing his or her ideas.

At the end of the discussion, the group had selected five major concerns that should be addressed first. These are interface standards, a greater focus in the academic world to boost the test profession, infrastructure standards, yield improvement, and a convergence of protocol testing.

These top priority items were discussed in detail with definition of possible next steps and the stakeholders or communities that should be included as participants. SEMI will assess the recommendations and respond to the workshop attendees with proposed next steps. A brief follow-up meeting with these workshop participants acting as a steering committee was scheduled around SEMICON West in July, 2008.



**Advisory Group Participants: Advantest, Amkor, ASE, Cadence, Credence, Intel, LSI, LTX, Mentor Graphics, Qualcomm, Roos Instruments, STATS ChipPAC, Teradyne, Verigy.**

## Debbora Ahlgren

Vice President  
and Chief Marketing Officer  
Verigy US, Inc.



**"As the Vice President and Chief Marketing Officer of Verigy, I look to get the best possible market information available when planning long-term marketing and positioning strategies. I have relied on SEMI for market statistics information for years, and I find the data to be the most complete, comprehensive, and timely information available. We have to react quickly to changing markets, and the timely delivery of these reports means the knowledge I can extract from SEMI information products can help keep Verigy ahead in the marketplace."**

**"Verigy has participated in the SEMI Semiconductor Equipment Data Collection Program for many years, and we receive great value from our participation. In this program, companies send data to a trusted third party, and that data is collated and then distributed by SEMI to participants and product purchasers. This means participants have timely and complete data, helping all of us get a good picture of the overall market and our positions in it."**

### SEMI QUARTERLY REPORT TO MEMBERS • A SEMI PUBLICATION

**Publisher: Jonathan Davis** • jdavis@semi.org • 1.408.943.6937  
**Marketing Director: Tom Morrow** • tmorrow@semi.org • 1.408.943.7948  
**Art Director: William Moeller** • wmoeller@semi.org • 1.408.943.6900  
**Designer: Kenneth Associates** • kenthasso@aol.com • 1.650.964.9602  
**Staff Writer: Steve Buehler** • sbuehler@semi.org • 1.408.943.7049

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# Succeeding in Sustainability

ON DECEMBER 4, 2007, SEMI PRESENTED THE AKIRA INOUE AWARD FOR EXCELLENCE IN EHS ACTIVITY TO RICHARD TEMPLETON, CEO OF TEXAS INSTRUMENTS. BRENDA HARRISON, VICE-PRESIDENT OF TI ACCEPTED THE AWARD FOR MR. TEMPLETON, AND SHE CHALLENGED THE AUDIENCE OF SEMI MEMBERS AND GUESTS TO ACCEPT UPCOMING CHALLENGES IN EHS. THIS IS AN EXCERPT FROM HER SPEECH.

Thank you again on behalf of Rich Templeton, Texas Instruments and TIers worldwide for recognition of Mr. Templeton as the recipient of the distinguished Akira Inoue Award.

At TI, we have a strong commitment and long history of stewardship. This “care about” principle was demonstrated with policies and programs that date back to our earliest days—long before I was born. Publicly we communicated our goals of Zero/Zero (Zero Illnesses and Injuries/Zero Wasted Resources) in the early 1990s. We know that there were many outside of our walls who

**“WE ARE ON A SUSTAINABLE JOURNEY. MANY OF YOU IN THE ROOM ARE SUPPLIERS TO US. YOU ARE CRITICAL TO OUR SUCCESSFUL JOURNEY; IN FACT, MANY OF YOU HAVE BEEN KEY CONTRIBUTORS TO OUR SUCCESS TO DATE. THERE IS MORE TO DO.” — BRENDA HARRISON**

thought the goals bold, challenging and aggressive. In fact, I have to admit that there were many people inside our walls who thought the goals were impossible. I’m happy to report that, today, many of our sites are achieving the goals—6 sites at zero lost/restricted days for safety and most sites with higher than 95% environmental efficiency. So why Zero/Zero? It’s simple—it’s about our employees and about the dollars. We want our employees to be safe in our work environment, and waste means lost dollars!

We are on a sustainable journey—delivering services without exhausting resources. We are set on using resources efficiently to achieve better results at a lower cost with less impact on the planet. We built the first 300 mm SC manufacturing site certified to LEED (Leadership in Environmental and Energy Design). We built it cheaper (about \$180M less than our previous 300 mm fab.) We spent less than \$1.5M on “green.” We focused on the site itself (location and orientation); on water efficiency; on energy and atmosphere; on materials and resources purchased and used; and

on indoor environmental quality. We expect savings of more than \$4M/year through 20% less use of energy, 35% less use of water, and 50% fewer emissions.

We are constructing an addition at our Baguio, Philippines site using many of the LEED criteria and in August of this year (2007), we broke ground on our newest AT (Assembly and Test) site—TI Clark—that is being built and will be certified to LEED criteria, another first for TI and the semiconductor industry.

We are taking our LEED focus beyond new construction and are planning retrofits to our existing buildings—all with the intent of more efficient resource use and less impact on the planet.

We are on a sustainable journey. Many of you in the room are suppliers to us. You are critical to our successful journey; in fact, many of you have been key contributors to our success to date.

We know that process tools directly consume 50% of the fab electrical power, with vacuum pumps consuming half of that tool power portion. See the box (below) for how you can help.

We are on the journey to Environmental, Safety, and Health Excellence—Zero Illnesses and Injuries, Zero Wasted Resources, and Sustainable Operations. Our goal is straightforward. We want to build a better future for not only our company and customers, but for those who work at TI and for the communities where we operate.

TIers are proud to play a part in creating great technology AND in improving the world in which we live. Thank you again for the Akira Inoue Award. We aspire to continue Inoue-san’s legacy of EHS excellence in the industry.



## HOW YOU CAN HELP:

- Apply SEMI S23. Measure energy consumption and develop aggressive plans to reduce usage.
- Minimize exhaust volumes.
- Incorporate more efficient chillers.
- Qualify the more efficient vacuum pumps on your tools and ensure communication for idle signal standby.
- Separate waste chemicals and water so recycling is easier.
- Design lower CDA pressures for stepper/scanners.
- Provide us with utility improvement retrofits that are cost effective, have low risk, and even give us other value in throughput, in yield; in water, energy, and chemical use reductions, in less exhaust, in a smaller footprint, in less support equipment, and more.