

SEMI AROUND THE WORLD

SEMI Establishes Global Photovoltaic Initiative

SEMI has formed a Photovoltaic (PV) Group to enhance member support in this important and high growth area. With technologies and industry structure similar to the semiconductor industry—and with 20% of SEMI members currently active in PV—SEMI is uniquely positioned to support the PV industry growth through efficient technology transfer, global market development, industry standards, market statistics, and other services.

While recent estimates project the global PV market to grow from US\$13 billion today to over \$40 billion in 2012, the PV indus-



try is dependent upon continued technological development, cost reduction, responsible public policies and industry collaboration for continued long term growth. Given the significant growth opportunities for SEMI members and enormous societal benefits to rapid adoption of solar energy, SEMI has been quickly escalating services to members in the PV industry for several years. To expand these services, the SEMI PV Group was conceived by leaders in photovoltaic manufacturing to address the opportunities and obstacles to bringing low-cost PV technology and sustainable, clean energy to the world. As the only global industry group focused on PV materials, equipment, and manufacturing, SEMI believes it can play a critical role in the cost reduction and rapid expansion of solar energy.

The SEMI PV Group is comprised of SEMI members active in PV, SEMI PV Advisory Committees, and dedicated staff resources in Europe, North America, Korea, Taiwan, Japan, Singapore, and China. Currently, SEMI organizes a range of PV-related events including PV-focused technical events at executive and technical conferences such as the Industry Strategy Symposia (ISS), all SEMICON expositions in Europe, Asia, and North America, PV Fab Managers Forums, and executive forums and roundtables held throughout the world. Additional

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Growing Flat Out

INDUSTRY ANALYSTS FORECAST that the global flat panel display (FPD) industry will experience a boom year in 2008 thanks to the fast-growing LCD TV market. They project a strong increase in global LCD TV panel shipments, spurred in part by consumer demand ahead of the August Beijing Olympics and the mandatory shift to digital broadcasting in the U.S. market in early 2009.

In fact, 2008 will likely mark the first time that annual global LCD TV panel shipments exceed 100 million units. Last year, the world market for TV panels grew 58% to reach 86 million units, according to industry research firm DisplaySearch.

Consequently, after taking a breath in 2007 in terms of capital investment, the TFT-LCD industry is expected to increase capital spending 40% this year to more than \$11.6 billion, says DisplaySearch.

The new investments over the next two years will increase capacity, help keep prices on a declining curve, and likely stimulate consumer demand even more than previously expected.

These trends bode well for the future of the FPD industry. DisplaySearch notes that TFT fab utilization levels increased from just over 85% in the first quarter of last year to almost 96% in the third quarter 2007, the highest level recorded since 2000.

LCD TVs are by no means the only major application for FPDs, but they are the largest in terms of sales. Other significant end-markets (in order of size by revenue) are PC monitors, notebook PCs, mobile phones, “other” consumer electronics, industrial applications, cameras, automobiles, and projectors.

In 2008, SEMI will continue to strengthen our commitment to the

FPD industry. SEMI brings global influence, a proven standards operation, and a track record of using cooperative industry efforts to speed industry progress.

In a new initiative, SEMI will launch an FPD market data collection program in conjunction with the Semiconductor Equipment Association of Japan (SEAJ), which has long been SEMI’s partner in collecting data on semiconductor equipment and materials. The FPD data program will include 11 equipment categories and cover four market regions, beginning with first quarter 2008 data.

This year SEMI will continue to host its FPD-focused expos and conference events. First up is FPD China 2008, scheduled for March 11–13 in Shanghai, which this year includes a special China FPD Conference running concurrently with the exhibition. Next up is Display Taiwan 2008 from June 11–13 in Taipei, Taiwan, followed in October by FPD International 2008, a SEMI co-sponsored event held in Yokohama, Japan.

For those wanting to keep up with the latest business and technical challenges facing the FPD industry, I recommend attendance at the SEMI Global FPD Partners Conference (GFPC) to be held April 9–12 in Miyazaki, Japan. GFPC features high-level display industry speakers from China, Europe, Japan, Korea, North America and Taiwan, as well as panel discussions on topics of keen interest to the industry.

For companies in the FPD supply chain that need to work together to advance the industry, SEMI is the global industry association that helps support industry growth and profitability.

— *Stan Myers* •





MEMS BY JEAN-CHRISTOPHE ELOY and DR. ERIC MOUNIER, *Yole Développement*

Update of MEMS Markets

Are MEMS for Consumers The New Gold Rush?

“THE NEW YOLE MEMS MARKET FORECAST shows steady growth for the coming years, with some applications really boosting the market,” says Jean Christophe Eloy, CEO of Yole Développement.

The new Yole 2007–2012 MEMS market forecast expects the market to reach a value of \$14 billion (at the chip level) by 2012. This would represent a doubling of the 2007 value of \$7.1 billion. For 2008, Yole expects the market to be \$7.8 billion. This represents a CAGR (Compound Annual Growth Rate) of 14% for the 2007–2012 period. The 2007–2010 growth will be more modest (11%) with stronger growth expected after 2010. The year 2007 corresponded to new MEMS devices coming to market: auto-focus, oscillators and dual-axis gyroscopes, just to name a few.

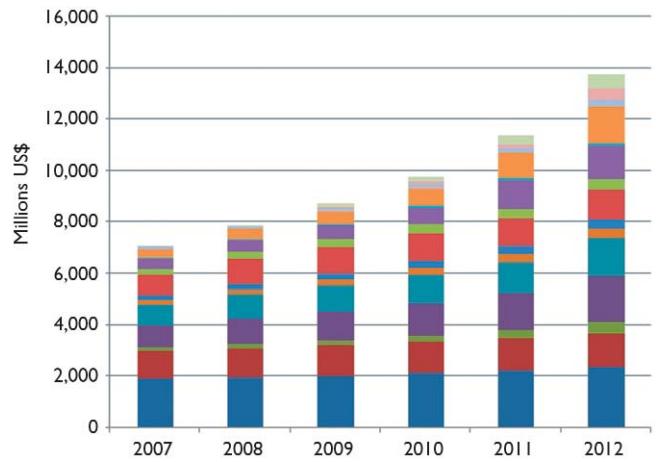
Yole also looked at a unit-based forecast for the 2007–2012 period. In 2007, 2 billion MEMS units have been produced and it is expected that 2.5 billion will be produced this year. By 2012, 6.7 billion MEMS devices will be shipped worldwide. After 2009, RF MEMS and Si microphones will both contribute to an increase number of MEMS devices (over 45%). It is interesting to note that, despite the large 2007/2008 increase in units for MEMS (25%), the market value growth is “only” 9%. This is explained by the strong price pressure MEMS devices are currently experiencing.

MEMS applications can be divided into seven major fields: Automotive, Aeronautics, Consumer, Defense, Industrial, Medical & Life Science and Telecom. While the automotive applications have historically been the driver for the MEMS market, they will only grow at a modest rate of 3.5% over the period 2007–2012. On the other hand, medical and life sciences, consumer and (wireless) telecommunications will contribute significantly to the MEMS market after 2010. Their growth rate will be respectively 18%, 11% and 40%. In 2012, consumer applications (including inkjet heads, inertial MEMS, micro-displays and emerging MEMS devices such as energy harvesting systems, auto focus, micro zoom, and micro motors) will be more than 40% of the total market value. It is interesting to note the strong growth (21%) for defense due to the use of high-value inertial MEMS for munitions guidance systems, for example. MEMS markets for new applications and fuel cells will have an impact after 2009 and over the 2009–2012 period, their CAGR will be 67% and 158% respectively.

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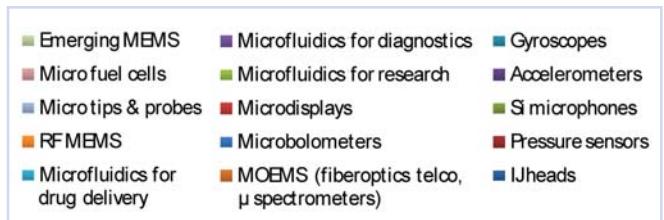


MEMS Market Forecast 2007–2012 in Value

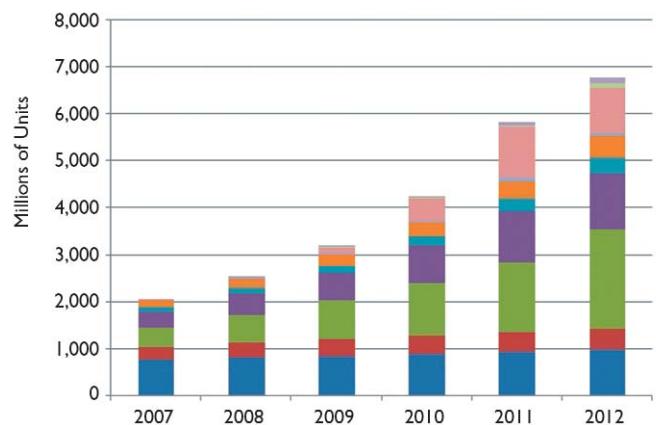


Source: Yole Développement

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



MEMS Market Forecast 2007–2012 in Volume



Source: Yole Développement

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



SEMI ISS U.S. Speakers See Resilient High Tech Sector, Strong Unit Growth Continuing in 2008

ALTHOUGH "RECESSION" WAS mentioned frequently during the economic sessions on the first day of SEMI ISS 2008, most speakers did not see it as a certainty for the U.S. economy.

"Housing is at the epicenter of the crisis," said Nariman Behravesh, chief economist with Global Insight. "High tech is relatively insulated. There are no excesses, nothing to be worked off [in high tech]," he said.

Behravesh noted that stronger growth in exports—helped by the weaker U.S. currency—will cushion the blow of a U.S. downturn. Furthermore, he said the low inflation and low interest rate environments would be favorable to capital investment.

"This is the best climate in a decade for U.S. exports," added Robert Fry, senior associate economist for DuPont. "Don't get hung up on the R-word. If we do fall into recession it will be mild."

Shawn DuBravac, economist for the Consumer Electronics Association (CEA), pointed out that if the housing market is excluded, U.S. GDP growth in 2008 is forecasted at 3%. "A lot of credit issues are contained within the financial community. Businesses do not seem to have any problem getting credit," he said.

ISS 2008 also presented an opportunity for semiconductor industry analysts to present their forecasts for the year ahead. According to Semico Research, the 2008 semiconductor device market will grow 12% in term of revenues and 15% in terms of units.

Jim Feldhan, president of Semico, pointed out that component inventories have come down significantly and predicted that utilization rates will remain above 90% throughout the year, resulting in stabilization of average selling prices (ASPs). He added that consumers are still enamored by technology and will continue to spend disposable income

on new electronics products.

Bill McLean, president of IC Insights, highlighted the continuing strong unit growth in the IC industry. "The demand for ICs, as far as unit growth is concerned, has never been better," he said. In fact, 2008 will mark the seventh consecutive year of double digit unit growth in chips. Growth in the past five years has averaged 14% per annum.

McLean is also optimistic that ASPs will stabilize, and even start to rise. A strong upward force on ASPs will be the trend for more IDMs to become "fab lite", and McLean says there's a trend for foundries to reduce capex spending to increase profitability. "We'll see better pricing in the IC industry because of this collision course of manufacturing demand growing faster than manufacturing capacity", he said.

VLSI Research forecasts 7.5% growth in the IC market for 2008, based on 6.8% growth in the electronics market. The semiconductor equipment industry will decline about 5% in 2008, after experiencing 7% growth last year, according to VLSI.

Gartner Dataquest forecasts 6.2% growth in semiconductors this year (including solar), while the capital equipment market will decline by 10%. "We anticipate return to growth in 2009," said Dean Freeman, research vice president at the market research company.

The worldwide wafer fab materials market is forecasted to grow 12% this year to reach \$28.4 billion, according to SEMI data presented at ISS. The largest single segment in fab materials is silicon wafers, worth \$14.4 billion this year. The semiconductor packaging materials market is forecasted to grow 9% this year to \$18.4 billion.

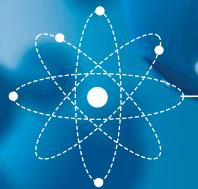
Steve Newberry, president and CEO of Lam Research, who spoke on the third day of ISS, said the semiconductor industry has slipped into a state of "profitless prosperity."

"The trend since 1995 has been down and to the right. You can't be prosperous if price declines faster than cost," said Newberry. Excluding the 17 most profitable device players—which include Intel, Texas Instruments, TSMC, and the analog and fabless companies—the average

ISS 2008

WHEN TRENDS COLLIDE:

Consolidation and Growth



industry operating profit is minus 1%, according to Newberry. "If you can't make money in a 50% unit growth market, you are in trouble," he said.

Although manufacturing cost is important, it is not the root cause impacting the profitless prosperity problem. Instead, other factors are contributing to the destruction of profits, including imbalance in supply/demand, a continuous push for higher market share in commodity markets, too many players in each market, and business models that are too costly. In general, cost reduction works but it can't overcome a supply/demand imbalance or the use of more effective business models, Newberry explained.

He sees strong parallels with the aluminum industry, which used to face similar problems to the semiconductor

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INDUSTRY STRATEGY SYMPOSIUM 2008 *continued*

industry until it took steps to improve profitability. Newberry urged the chip makers to look at other industry sectors and learn from their mistakes. "If we continue to behave as other industries before us have behaved, we will suffer the same fate," he said.

What does this profitless prosperity mean for the equipment suppliers? Although

device makers constantly put downward pressure on equipment prices, the problem is not going to be solved through cost reduction. Even if equipment suppliers gave away all their profits to customers, the profitless semiconductor players would still lose money, according to Newberry. "We are not going to help our customers by giving away our profits," he said. •

MEMS *continued*

Our analysis is based on a daily review of 150 MEMS applications. We have ranked all of them to highlight what are the sweet spots in the MEMS business.

Based on the CAGR, RF MEMS are expected to have the highest growth (50%), followed by microfluidic chips for drug delivery (42%), Si microphones (32%), microfluidic chips for diagnostics (23%), micro tips and probes (22%) and microbolometers (20%). By looking into those applications more precisely, we can highlight the most promising MEMS devices based on CAGR.

Accelerometer for Human-Machine Interface tops the list with a CAGR exceeding 120% and an expected market value of \$500 million by 2012. Then we have RF MEMS for ATE (81%), microbolometers for automotive (54%), inhalers (41%), microfluidics for cell chips R&D (37%) and proteomics analysis (26%). The presence of three microfluidic devices in the top 6 MEMS

devices bringing the highest CAGR was a surprise, and good news for the medical and life science field.

This analysis, done for the first time based on applications, unit volume and growth rates, has allowed Yole to detail the MEMS market global growth and pinpoint some interesting facts. •

About Yole Développement

Yole Développement is a market research and strategy consulting company, specialized in the MEMS fields offering various kinds of market research services.

Founded in 1998, Yole Développement is the world leader in the analysis of the microtechnologies and compound semiconductors markets. Each day, Yole's team of 20 consultants is in contact with the worldwide key industrial companies, R&D institutes and investors in order to help them to understand the markets and technology trends. In our analysis, we take into account the complete value chain including materials and equipment suppliers, device and system manufacturers and devices.

SEMI AROUND THE WORLD

SEMI services and activities in the PV area include market research and statistics programs, support for public policy initiatives through direct advocacy and coordination with other information groups, Environmental, Health, and Safety (EHS) regulatory support, serving as information clearinghouse for PV manufacturing news and information, and facilitating international industry standards that reduce costs and expand business opportunities for SEMI members.

The PV advisory committee is comprised of executives representing major PV regions around the globe. The SEMI PV Group is currently working with a diverse set of industry associations to achieve its member goals including the European Photovoltaic Industry Association (EPIA), the Japan Photovoltaic Energy Association (JPEA), the Solar Energy Industry Association (SEIA), as well as many others. For more information on the SEMI PV Group, visit www.pvgroup.org. •

CALENDAR OF EVENTS

MARCH 2008

March 9-11
SEMI Photovoltaic Fab Managers Forum
International Congress Centre
Dresden, Germany
www.semi.org/pvfmf

March 11-13
FPD China 2008
Shanghai International Exhibition Center (INTEX)
Shanghai, China
www.semi.org/fpdchina

March 18-20
SEMICON China 2008
Shanghai New International Expo Centre
Shanghai, China
www.semi.org/semiconchina

March 19-20
China Semiconductor Materials International Conference (CSMIC)
Pudong
Shanghai, China
www.semi.org

APRIL 2008

April 1-2
Empowering the Silicon Revolution
Computer History Museum
Mountain View, California
www.semi.org

April 9-12
Global FPD Partners Conference
Phoenix Seagaia Resort
Miyazaki, Japan
www.semi.org/gfpc

April 28-30
Strategic Business Conference (SBC)
The Meritage Resort
Napa, California
www.semi.org/sbc

MAY 2008

May 5-7
SEMICON Singapore 2008
Suntec Singapore International Convention & Exhibition Centre
Singapore
www.semi.org/semiconsingapore

May 5-7
ASMC 2008
Hyatt Regency
Cambridge, Massachusetts
www.semi.org/asmc. •