SEMI Member Forum, Milano

20. September, 2012
Agenda

• About SEMI
• Market update
• Q&A
About SEMI

- Global industry association
  - Europe: Berlin, Brussels, Grenoble, Moscow
- Established in 1970 to serve the semiconductor supply chain
- Association Management for:
  - Semiconductor and related technology
  - Photovoltaic
  - Emerging Markets (Plastic-Electronics, LED, OLED, OPV, etc.)
SEMI Global Membership

1’926 Members
As of June 2012

Location of SEMI Member

- China: 14%
- Europe: 14%
- India: 1%
- Japan: 22%
- Korea: 10%
- Americas: 26%
- Singapore: 2%
- Taiwan: 11%

Total Members by Size

- Under $5 M: 67%
- $5M - $25M: 22%
- $25M - $100M: 6%
- $100M - $500M: 3%
- $500M - $1B: 1%
- $1B - $2B: 1%
- Over $2.5B: >1%

Global presence:
Offices in Silicon Valley, Washington D.C., Belgium, China, France, Germany, India, Japan, Korea, Russia, Singapore, and Taiwan
Scope of activities

- Industry Advocacy and Public Policy
- Industry Standards (800 Standards)
- Executive Conferences, Technical Programs, Networking
- Industry Research & Statistics
- Expositions (SEMICON / SOLARCON)
- Special Interest Groups
  - CTM Group (PV)
  - Test, Chemical & Gas, Secondary Equipment
  - PE-SIG (Plastic Electronics)
  - SMG (Silicon Manufacturing Group)
- Work force development (high tech university)
SEMI Europe Advisory Board

Alain Astier
Group VP
STMi

Mike Allison
Managing Dir
Edwards

André Auberton
CEO,
Soitec

Frank Averdung
CEO
Suss MicroTec

Volker Braetsch
VP Marketing
Siltronic

Gabriel Crean
VP
CEA / Leti

Gilbert Declerck
Board Member
IMEC

Andreas Dill
CEO, Oerlikon
Advanced Tech.

Heinz M. Esser
CEO
R&R Ortner

Rob Hartman
VP,
ASML

Michael Hummel
General Manager
Texas Instruments

Paul Hyland
CEO,
Aixtron

Alain Jarre
CEO
Recive Techn.

Eric Maiser
Sector Head
VDMA

Steenkamp
COO
Centrotherm

Eicke Weber
President
ISE

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150 SEMI Europe Experts

European Advisory Board
- Mike Allison, Edwards
- Alain Aster, STMicroelectronics
- André-Jacques Aubertin-Hervé, Soltec
- Harald Binder
- Volker Braatje, Siltronic
- Gilbert Declercq, IMEC
- Heinz-Martin Eiser, Roth&Rau
- Rob Hartman, ASM
- Michael Hummel, Texas Instruments
- Eric Masier, VDMA Productronic
- Gerhard Kaiser
- Franz Richter, Thin Materials
- Andreas Dill, Oerlikon
- Eike Weber, FHG IE

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- Alain Aster, ST Microelectronics
- Martin Belig, M+W Group
- Jacques Berg, Tokyo Electron
- Alois Brandner, Applied Materials
- Jarek Dolek, SVCS
- Valery Dukhnyan, Angstrem
- Andrey Golushko, Mikron
- Andrey Kotenko, NTOI Solar
- Igor Kushnirenko, Tronic Pts. (chairman)
- Alexander Kurlandsky, ElectronenhoiLP SP
- Michael Lev, Camtek
- Elena Lyuyak, Centrotether SITec GmbH
- Hermann Marsch, Maxell错误!无法找到引用源。
- Anatoly Shushparov, Angstrem T
- Manfred Schröder, EBARA
- Dagmar Vogt, Vogt Group SE

SEMI PV Group Europe Committee
- Harald Binder
- Jim Thompson, Executive Vice President Sales & Marketing, Oerlikon Solar
- Andreas Guenther, President, Linde Nippon Sanso Europe
- Dagmar Vogt, Managing Director, B Vogt Group
- Dieter Marz, CEO, Marz Automation
- Harst Reichardt, CEO & President, DAS
- Jürgen Gutelkunz, CEO, Rena
- Lutz Redmann, Jonas & Redmann
- Prof. Eike Weber, Fraunhofer IE
- Louis Shaffer, Edwards Vacuum
- Karl Hesse, Director Process Design, Wacker
- Manfred Schröder, President, Ebara Europe
- Mr. Roth, Founders, Roth & Rau
- Peter Abel, CEO, PVA TePla
- Peter Paul, CEO, Meyer Burger

Semiconductor Technology Conferences
- Wolfgang Arden, Infineon
- Michael Arnold, PEER Group
- Livio Baldi, Numonyx
- Prof. J.W. Bartholomew Bartha, Technical University Dresden
- Tom Beasen, Unimicron
- Jacques Berg, Tokyo Electron
- Alain Brochet, STMicroelectronics
- Roger de Keersmaecker, IMEC
- Guy Dubois
- Bruns Ghyyselen, Soltec
- Mari Graaf, TU Delft (chairman)
- Martin Heinschop, GE Capital
- Dietmar Louis, CEA-Leti
- Martin McMullin, Nikon
- Richard Oechsliner, Fraunhofer ISB
- Lothar Pfitzner, Fraunhofer ISB
- Io Raajmakkers, ASM International
- Peter Schoaffler, Texas Instruments
- Karsten Schneider, Applied Materials
- Franck Taroni, Alis Semiconductor

Manufacturing Test Conference
- Davide Appello, STMicroelectronics
- Roger Barth, Numonyx
- Stefan Eichenberger, NXP
- Stefan Gasteiger, Advantest
- Michael Goldbach, L.TX
- Klaus-Detlef Paech, GlobalFoundries
- Chris Portelli-Hale, STMicroelectronics (co-chair)
- Ulrich Schottmüller, Verty
- Martin Stadler, Teradyne (co-chair)
- René Segers

MEMS Conference
- Jérôme Bouchaud, Suppli
- Jean-Christophe Etry, Vyle Developpement
- Markus Gabriell, Suss MicroTec
- Thomas Gavawer, FHG IZM
- Persina Vogt, FHG IZM
- Erik Jung, Fraunhofer MZ
- Gerhard-Lammert Hofmann, Fraunhofer IZM (chairman)
- Paul Lindner, EVG
- Mike Montemurro, Digital Micromirror Device
- Felix Rudolf, Colibrys
- Christian Schaefer, PVA Tepla
- Uwe Schreiber, X-Fab

Advanced Packaging Conference
- Rolf Aschenbrenner, Fraunhofer IZM
- Efal Bagerman, NXP
- Eric Beyne, IMEC
- Andreas Döllner, Oerlikon
- Andreas Fischer, Bosch
- Philip Homari, F-K Delvofox
- Andy Longford, PandA Europe (chairman)
- Jens Mueller, IMAPS Europe Chapter
- Graham Jones, Henkel
- Steffen Krohnert, Nanyum
- Thomas Oppert, PAC TECH
- Klaus Pressel, Infineon
- Mark Shaw, STMicroelectronics
- Ignas van Dommelen, Semico

ISS Conference
- Alan Aster, STMicroelectronics
- Paul Boulde, Soltec
- David Brough, Tokyo Electron
- Cor Claeyns, IMEC (chairman)
- Peter Comnok, memstar Technology
- Horst Gant, Infineon
- Maurice Geraets, NXP
- Bernd Haueiser, Bosch
- Leonard Hobbs, Intel
- Hans Richter, HP
- Gerd Teepke, GlobalFoundries

SEMI International Standards Program
- Wouter Bergnoud, University of Bremen (chairman)
- Roland Bindemann, Freiberger Compound Materials
- Maximus Camubba, Numonyx
- Jean-Marie Collard, Solvay (chairman)
- Gunmaar van Dyk, FFEM
- Gordon Ferrier, AER Products
- Alfred Honold, InfReCon
- Wolfgang Jantze, SEMIAp
- Andy Longford, PandA Europe
- Frank Petek, Trustsec IT Solution
- Lothar Pfitzner, Fraunhofer ISB
- Bert Planting, ASML
- Peter Wagner
- Arnd Dietrich Weber, SiCrystal

IP Committee
- Brandon Clark, Air Liquide
- Mensa Hendriks, ASML
- Erik Johannesson, Micronic Laser Systems
- Gerhard Kontras, LAM
- Coes Lanting, CSEM
- Michael Lev, Camtek
- Jan Halbe Lunshof, MAPPERS
- Thomas Renner, Siltronic
- Vincent Rykaardt, IMEC
- Gerhard Sibarich, Acon
- Thierry Suwel, Air Liquide
- Dieter Franke, SCHOTT Solar
- Geert Defeuvre, Unimicron
- Vincent DeRoche, Robert Dussouillez, CEA
- Joerg Baur, Oerlikon
- Robert Harrison, 24 IP Law Group
- Tandi van Hout, ASML

SEMI European Award
- Brendan Bold, X-Fab
- Michel Briffaut, CEA LETI
- Elmar Cullmann, Suss MicroTec
- Giorgio De Santis, Numonyx
- Mart Graaf, TU Delft (chairman)
- Jean-Pierre Joly, INES
- Peter Kuchner, Fraunhofer CNT
- Klaus-Dieter Lang, Fraunhofer IZM
- Loes Lauwers, IMEC
- Heiner Nysel, Fraunhofer ISB
Sales Trend by Unit

2000-2012 Quarterly IC Unit Volume Shipment Trend

Source: WSTS, IC Insights

18.09.2012
1990-2016 Semiconductor Industry Growth versus Worldwide GDP Growth

Source: IC Insights

18.09.2012
Installed Capacity by Region

Worldwide Installed Capacity (without Discretes)

In Millions
200mm Equivalent wafers/month


Source: SEMI World Fab Forecast, August 2012
SEMI Equipment Forecast

Source: SEMI, July 2012

Totals may not add due to rounding
# SEMI 2012 Equipment Forecast

<table>
<thead>
<tr>
<th>Region</th>
<th>2008 (A)</th>
<th>2009 (A)</th>
<th>2010 (A)</th>
<th>2011 (A)</th>
<th>2012 (F)</th>
<th>2013 (F)</th>
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<td>ROW</td>
<td>2.61</td>
<td>1.44</td>
<td>3.84</td>
<td>3.41</td>
<td>2.43</td>
<td>3.04</td>
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<td>China</td>
<td>1.89</td>
<td>0.94</td>
<td>3.68</td>
<td>3.65</td>
<td>3.10</td>
<td>3.92</td>
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<tr>
<td>S. Korea</td>
<td>4.89</td>
<td>2.60</td>
<td>8.63</td>
<td>8.66</td>
<td>11.48</td>
<td>12.14</td>
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<td>Europe</td>
<td>2.45</td>
<td>0.97</td>
<td>2.33</td>
<td>4.22</td>
<td>3.20</td>
<td>3.29</td>
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<tr>
<td>Taiwan</td>
<td>5.01</td>
<td>4.35</td>
<td>11.25</td>
<td>8.52</td>
<td>9.26</td>
<td>9.16</td>
</tr>
<tr>
<td>Japan</td>
<td>7.04</td>
<td>2.23</td>
<td>4.44</td>
<td>5.81</td>
<td>4.35</td>
<td>5.03</td>
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<tr>
<td>N. America</td>
<td>5.63</td>
<td>3.39</td>
<td>5.75</td>
<td>9.26</td>
<td>8.56</td>
<td>10.13</td>
</tr>
</tbody>
</table>

Source: SEMI, July 2012

Totals may not add due to rounding
Wafer Diameter Trend

Includes polished and epi wafers. Excludes reclaim, non polished, and SOI.

Source: Rose Associates 1978 to 1995; SEMI SMG 1995 to 2011; SEMI
World LED Capacity Trend

Source: SEMI Opto/LED Fab Forecast, August 2012
Material Market

The chart shows the global materials revenue in US $B from 2000 to 2013. The revenue has fluctuated over the years, with a peak in 2010 and a high growth rate in 2012. The annual growth rate, shown by the red line, indicates a declining trend from 2010 to 2013.
Regional Materials Markets

2011 = $47.9 Billion

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<tr>
<th>Region</th>
<th>2011 $B</th>
<th>2012F $B</th>
<th>% Change</th>
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</thead>
<tbody>
<tr>
<td>Europe</td>
<td>3.38</td>
<td>3.46</td>
<td>2%</td>
</tr>
<tr>
<td>China</td>
<td>4.87</td>
<td>5.17</td>
<td>6%</td>
</tr>
<tr>
<td>North America</td>
<td>4.92</td>
<td>5.01</td>
<td>2%</td>
</tr>
<tr>
<td>South Korea</td>
<td>7.15</td>
<td>7.46</td>
<td>4%</td>
</tr>
<tr>
<td>Southeast Asia</td>
<td>8.17</td>
<td>8.39</td>
<td>3%</td>
</tr>
<tr>
<td>Japan</td>
<td>9.34</td>
<td>9.50</td>
<td>2%</td>
</tr>
<tr>
<td>Taiwan</td>
<td>10.04</td>
<td>10.27</td>
<td>2%</td>
</tr>
<tr>
<td>Total Regions</td>
<td>47.86</td>
<td>49.26</td>
<td>3%</td>
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</tbody>
</table>

Totals may not add due to rounding

Source: SEMI Materials Market Data Subscription, July 2012
Silicon Area Shipment Index

Worldwide Wafer Area Shipment Index
(Three-month moving average)

Source: SEMI Silicon Manufacturers Group, July 2012
TSV Materials Forecast

Source: LINX-Consulting (www.linx-consulting.com)
EMPLOYMENT FOR TOP 5 EU COMPANIES IN SECTOR

Source: Future Horizon

18.09.2012
# Europe’s Equipment Firms

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<tr>
<td>1</td>
<td>Perkin Elmer</td>
<td>Perkin Elmer</td>
<td>TEL</td>
<td>Applied</td>
<td>Applied</td>
<td>Applied</td>
<td>ASML</td>
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<tr>
<td>2</td>
<td>GCA</td>
<td>TEL</td>
<td>Nikon</td>
<td>TEL</td>
<td>TEL</td>
<td>TEL</td>
<td>Applied</td>
</tr>
<tr>
<td>3</td>
<td>Applied</td>
<td>G Signal</td>
<td>Applied</td>
<td>Nikon</td>
<td>Nikon</td>
<td>ASML</td>
<td>TEL</td>
</tr>
<tr>
<td>4</td>
<td>Fairchild</td>
<td>Varian</td>
<td>Advantest</td>
<td>Canon</td>
<td>Teradyne</td>
<td>KLA-Tencor</td>
<td>KLA-Tencor</td>
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<tr>
<td>5</td>
<td>Varian</td>
<td>Teradyne</td>
<td>Canon</td>
<td>LAM</td>
<td>ASML</td>
<td>Advantest</td>
<td>LAM</td>
</tr>
<tr>
<td>6</td>
<td>Teradyne</td>
<td>Eaton</td>
<td>Hitachi</td>
<td>Advantest</td>
<td>KLA-Tencor</td>
<td>Nikon</td>
<td>Dainippon</td>
</tr>
<tr>
<td>7</td>
<td>Eaton</td>
<td>Schlumberger</td>
<td>G Signal</td>
<td>Hitachi</td>
<td>Advantest</td>
<td>LAM</td>
<td>Nikon</td>
</tr>
<tr>
<td>8</td>
<td>G Signal</td>
<td>Advantest</td>
<td>Varian</td>
<td>Teradyne</td>
<td>LAM</td>
<td>Novellus</td>
<td>Advantest</td>
</tr>
<tr>
<td>9</td>
<td>K&amp;S</td>
<td>Applied</td>
<td>Teradyne</td>
<td>Dainippon</td>
<td>Canon</td>
<td>Canon</td>
<td>ASML</td>
</tr>
<tr>
<td>10</td>
<td>Takeda Riken</td>
<td>GCA</td>
<td>SVG</td>
<td>Varian</td>
<td>Dainippon</td>
<td>Dainippon</td>
<td>Novellus</td>
</tr>
</tbody>
</table>

*Source: Future Horizons*
IMPACT ON CHIP MANUFACTURING IN EUROPE

Source: Future Horizons

18.09.2012
### 1Q12 Top 25 Semiconductor Sales Leaders

($M, Including Foundries)

<table>
<thead>
<tr>
<th>Rank</th>
<th>Company</th>
<th>Headquarters</th>
<th>2011 Tot Semi</th>
<th>1Q11 Tot Semi</th>
<th>1Q12 Tot Semi</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Intel</td>
<td>U.S.</td>
<td>49,697</td>
<td>11,819</td>
<td>11,874</td>
<td>0%</td>
</tr>
<tr>
<td>2</td>
<td>Samsung</td>
<td>South Korea</td>
<td>33,483</td>
<td>8,215</td>
<td>7,067</td>
<td>-14%</td>
</tr>
<tr>
<td>3</td>
<td>TSMC*</td>
<td>Taiwan</td>
<td>14,600</td>
<td>3,600</td>
<td>3,568</td>
<td>-1%</td>
</tr>
<tr>
<td>4</td>
<td>Toshiba</td>
<td>Japan</td>
<td>12,745</td>
<td>3,435</td>
<td>3,232</td>
<td>-6%</td>
</tr>
<tr>
<td>5</td>
<td>Qualcomm**</td>
<td>U.S.</td>
<td>9,828</td>
<td>1,962</td>
<td>3,059</td>
<td>56%</td>
</tr>
<tr>
<td>6</td>
<td>TI</td>
<td>U.S.</td>
<td>12,900</td>
<td>3,167</td>
<td>2,934</td>
<td>-7%</td>
</tr>
<tr>
<td>7</td>
<td>Renesas</td>
<td>Japan</td>
<td>10,653</td>
<td>2,897</td>
<td>2,344</td>
<td>-19%</td>
</tr>
<tr>
<td>8</td>
<td>Micron</td>
<td>U.S.</td>
<td>8,571</td>
<td>2,218</td>
<td>2,120</td>
<td>-4%</td>
</tr>
<tr>
<td>9</td>
<td>SK Hynix</td>
<td>South Korea</td>
<td>9,403</td>
<td>2,499</td>
<td>2,115</td>
<td>-15%</td>
</tr>
<tr>
<td>10</td>
<td>ST</td>
<td>Europe</td>
<td>9,631</td>
<td>2,523</td>
<td>1,997</td>
<td>-21%</td>
</tr>
<tr>
<td>11</td>
<td>Broadcom**</td>
<td>U.S.</td>
<td>7,160</td>
<td>1,752</td>
<td>1,770</td>
<td>1%</td>
</tr>
<tr>
<td>12</td>
<td>AMD**</td>
<td>U.S.</td>
<td>6,568</td>
<td>1,613</td>
<td>1,585</td>
<td>-2%</td>
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<tr>
<td>13</td>
<td>Sony</td>
<td>Japan</td>
<td>6,093</td>
<td>1,520</td>
<td>1,514</td>
<td>0%</td>
</tr>
<tr>
<td>14</td>
<td>Infineon</td>
<td>Europe</td>
<td>5,599</td>
<td>1,362</td>
<td>1,297</td>
<td>-5%</td>
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<tr>
<td>15</td>
<td>Fujitsu</td>
<td>Japan</td>
<td>4,430</td>
<td>1,148</td>
<td>1,216</td>
<td>6%</td>
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<tr>
<td>16</td>
<td>NXP*</td>
<td>Europe</td>
<td>4,147</td>
<td>1,071</td>
<td>1,071</td>
<td>0%</td>
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<tr>
<td>17</td>
<td>Nvidia**</td>
<td>U.S.</td>
<td>3,939</td>
<td>936</td>
<td>935</td>
<td>0%</td>
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<tr>
<td>18</td>
<td>Freescale</td>
<td>U.S.</td>
<td>4,391</td>
<td>1,155</td>
<td>912</td>
<td>-21%</td>
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<tr>
<td>19</td>
<td>GlobalFoundries*</td>
<td>U.S.</td>
<td>3,480</td>
<td>845</td>
<td>840</td>
<td>-1%</td>
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<tr>
<td>20</td>
<td>UMC*</td>
<td>Taiwan</td>
<td>3,760</td>
<td>995</td>
<td>834</td>
<td>-16%</td>
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<tr>
<td>21</td>
<td>Sharp</td>
<td>Japan</td>
<td>2,908</td>
<td>678</td>
<td>793</td>
<td>17%</td>
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<tr>
<td>22</td>
<td>Marvell**</td>
<td>U.S.</td>
<td>3,445</td>
<td>835</td>
<td>760</td>
<td>-9%</td>
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<tr>
<td>23</td>
<td>ON Semi</td>
<td>U.S.</td>
<td>3,443</td>
<td>871</td>
<td>744</td>
<td>-15%</td>
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<td>24</td>
<td>Elpida</td>
<td>Japan</td>
<td>3,891</td>
<td>1,120</td>
<td>735</td>
<td>-34%</td>
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<td>25</td>
<td>Rohm</td>
<td>Japan</td>
<td>3,303</td>
<td>817</td>
<td>716</td>
<td>-12%</td>
</tr>
</tbody>
</table>

**Top 10 Total**: 171,511

**Top 25 Total**: 238,068

*Foundry

**Fabless

Source: IC Insights' Strategic Reviews Database

18.09.2012
Semiconductor Industry in Europe: 316 Locations in 32 Countries
**316 Wafer Lines in Europe**

**Geographical breakdown - EMEA wafer lines**
*(based on 316 wafer line units)*

- **Germany**: 86 (approx. 27%)
- **United Kingdom**: 43 (approx. 14%)
- **Italy**: 19 (approx. 7%)
- **France**: 29 (approx. 9%)
- **Russia**: 23
- **Belgium**: 4
- **Ireland**: 5
- **Austria**: 9
- **Finland**: 10
- **Sweden**: 13
- **Netherlands**: 15
- **Switzerland**: 18
- **Hungary**: 3
- **Turkey**: 2
- **Czech Republic**: 2
- **Romania**: 2
- **Bulgaria**: 2
- **Spain**: 2
- **Norway**: 2
- **Denmark**: 2
- **Portugal**: 2

### Other countries in the chart and # of fabs

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<th>Country</th>
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</table>

- **Europe is home to 316 wafer lines** (from production to R&D, pilot and ongoing projects), many of which are involved in more than one industry segment.

- **Germany claims the largest number of microelectronic wafer lines in Europe and Middle East, with more than 25% of total units.**

18.09.2012
CENTERS OF EXCELLENCE IN EUROPE’S MEMBER STATES

- Dublin
- Leuven - Eindhoven
- Dresden
- Grenoble
~ 100 000 jobs
EUROPEAN IDM’S

> 20 000 jobs
EUROPEAN FABLESS & IP

> 110 000 jobs
EUROPEAN E&M SUPPLIERS

Source: Future Horizons
Transition to 450mm...
... and EUV
Building on European strengths

equipment

materials

R&D

state-of-the-art technologies

high-end systems
Industry advocacy activities

- Supporting and observing the KET initiative.
- Participating in EU competitiveness task forces.
- Accompany the 450mm EC initiative
- Mitigate EHS impact like RoHS, WEEE, etc.
- Free and fair trade (same level playing field)
- Funding options (Horizon 2020)
- Work force development
Summary

- **Semiconductor Equipment**
  - -2.6% spending decline in 2012
  - Forecasting 10.2% growth in 2013 ($47 billion)

- **Semiconductor Materials**
  - ~$49 billion market this year, growing to $51 billion in 2013
  - Other TSV materials (excluding interposers) to have 90+% CAGR from 2011-2016 (per Linx Consulting)

- **Equipment suppliers** in Europe growing. Horizon 2020 and KET intend to strengthen the entire semiconductor food-chain. More than 300 fabs in Europe.

- **Industry challenges:** 450mm, EUV, 3D-TSV
Thank you!

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