Die Halbleiter Industrie in der Welt, in Europa und in Deutschland

Dr. Andreas Wild
Executive Director
1. Semiconductors, a few basic ideas
2. Semiconductors in the world
3. Semiconductors in Europe
4. Semiconductors in Germany
5. What to do?
Moore’s Law Driver: Cost per Function

The unparalleled cost reduction is the combined effect of miniaturization of the devices and increased of wafer size.

Nanotechnology!
Semiconductor Total Available Market and Silicon Production

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Who Leads?

1. Number 1: U.S.A. with 48% market share, fastest growing: Asia/Pacific
   - U.S.A. is investing in semiconductors
     - Over 4 years, >3 times as much as Europe
     - about 1.5 times as much as Japan, Taiwan or Korea

2. Direction of U.S.A. investments:
   - 65 percent of capital spending on wafer fabs is in U.S.A.
   - 75% R&D spending is in U.S.A.
   - Offshore R&D spending mostly to Europe and ROW (India, Israel, Singapore, Malaysia...)
     - not to Korea, nor Taiwan
     - R&D spending in China is very small but growing

300mm Wafers Dominate

After IC Insights, July 2009

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No European company grew into Top 20 in the last 10 years
Would Joint Undertakings Help?

COUNCIL REGULATION No 72/2008
setting up the ENIAC Joint Undertaking

The ENIAC Joint Undertaking shall increase and leverage private and public investments in nanoelectronics contributing to strengthening Europe’s future growth, competitiveness and sustainability.
ROADMAP FOR JOINT TECHNOLOGY INITIATIVES

"Keys for success"

• **Additionality:** Each JTI must be able to demonstrate how its establishment will lead to additional research being undertaken by industry…

• **Market failure:** Each JTI is expected to provide details of the nature and extent of market failure in the areas it is addressing and to demonstrate how public intervention through a public-private partnership will overcome the market failure effectively and will achieve the desired economic and social effects.

• **Governance:** Each JTI must describe the decision-making and management bodies

• **Role of Member States:** For those JTIs which foresee the involvement of Member States as founding fathers, the role of Member States in the JTI decision-making process must be clarified ... This concerns notably the two JTIs in the field of ICT (ARTEMIS and ENIAC).

EC Communication from 9 November 2006
Additionality of funding in ENIAC Joint Undertaking
Governance of ENIAC Joint Undertaking

Governing Board
AENEAS, Public Authorities
Meetings chaired by IRC Chairperson

• The Governing Board approves the research agenda, the budget and procedures, provides overview

Executive Director
Secretariat

• The Executive Director makes it work (issues calls, selects and monitors projects)

Public Authority Board
European Commission, Member and Associated States

• The Public Authorities approve the annual strategy implementation and the grants

Industry and Research Committee
Nominated by AENEAS

• The Industry defines the strategy
Role of Member States

ENIAC Joint Undertaking
Total Eligible Costs and Public Funding Planned per Year

- R&D Actors
- JU
- MAS

55%
Member States Commitments 2008-2010

Seminconductors in Europe
### Modern Times Started 10 Years Ago in Germany…

#### Organization
Infineon / Motorola Joint Venture

#### Location
Dresden

### VISION

**Pioneer a breakthrough in semiconductor manufacturing effectiveness**

**2000 Award**

**The world’s first product**

**64 M DRAM from 300 mm wafers**

*December 1998 Functional September 1999 Qualified*

_Dresden, Germany_

- **Dr. Peter Kuecher (Infineon)**
- **Horia Grecu (Motorola)**

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<table>
<thead>
<tr>
<th>Organization</th>
<th>Infineon / Motorola Joint Venture</th>
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<tbody>
<tr>
<td>Location</td>
<td>Dresden</td>
</tr>
<tr>
<td>Development Line</td>
<td>Part of Module 2, Infineon Dresden Fab</td>
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<tr>
<td>Area</td>
<td>approx. 2000 m²</td>
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<tr>
<td>Class</td>
<td>1.0</td>
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<tr>
<td>Manpower</td>
<td>Engineer 140 Operator 230 Support 80</td>
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<tr>
<td>Sponsorship</td>
<td>BMBF 10/1997 k03/2001 (incl. partners) State of Saxony</td>
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<tr>
<td>Technology</td>
<td>0.25 µm k0.2 µm CMOS</td>
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<tr>
<td>Product drivers</td>
<td>64 Mb DRAM / 256 Mb DRAM</td>
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German Foundries

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Semiconductor Industry Association

“Choose to compete” recommendations to the U.S.A. Government

1. Fund basic research
2. Make R&D tax credits permanent
3. Ensure a world-class work force
4. Reform "green card" policies to attract the best and brightest
5. Streamline export regulations
6. Invest in clean energy
7. Enact competitive tax policies that encourage investment in America
SEMI White Paper

6 Recommendations to the European Union and National Governments to Increase Europe’s Microelectronic Industry Competitiveness

1. Develop a European vision for the industry
2. Increase funding for R&D and manufacturing
3. Promote the microelectronics supply chain
4. Cultivate education and welcome talent
5. Protect and enforce intellectual property
6. Involve SEMI Europe in new EHS legislation
EECA/ESIA

Nine immediate EU measures to preserve European semiconductor industry capabilities and ensure the industry’s contribution to economic growth

1. Reach quick and firm agreement between the EU and Member States on priority segments for lead markets
2. Support/implement identified lead market initiatives
3. Create critical mass encouraging standardization and interoperability
4. Drive demonstration projects
5. Double the funding levels from €0.6bn to €1.5bn per year within 5 years
6. Revise rules for eligibility for funding beyond pre-competitive projects
7. Recommend to Member States to introduce/expand R&D tax credits
8. Reconsider the EU’s state aid rules for semiconductor investments
9. Facilitate an EIB loan policy for the semiconductors with an allocation of up to €5bn
ZVEI Recommendations (Okt 2007)

Goal: stimulate investments in Europe, create a global level playing field

1. Common European strategy for semiconductors (investment incentives, legislation for global competition)
2. Adjustment of procurement regulations for R&D
3. Improvements in the German tax legislation (minimum taxation, loss carry forward)
4. Further development of PPP involving industry, academic research and public means
5. Investment-friendly ESH regulations
6. Consistent, efficient customs procedures
How are we doing?

1. EC: Key Technology Initiatives, High-Level Group
2. Intensive initiatives by various associations
   Difficulty to overcome fragmentation

Forecast budget consumption ENIAC JU
What to do?

Public Private Partnerships

marrying political will and private entrepreneurship

are the way forward

for the Key Enable Technologies