



Innovationstreiber Mikroelektronik – wie weiter in Europa?

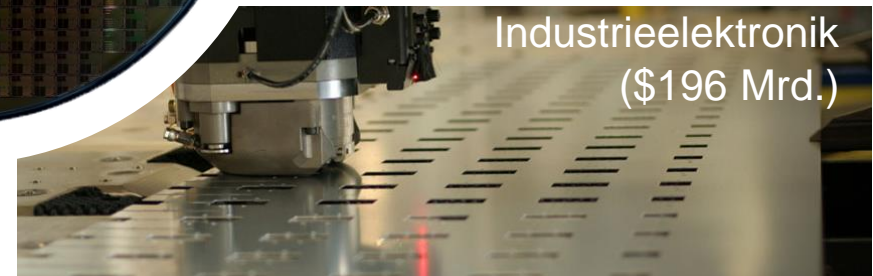
Jens Drews, Director Government Relations
GLOBALFOUNDRIES Dresden



GLOBALFOUNDRIES®

Halbleiter sind das Herz für komplexe Systeme

Marktsegmente in US\$



Source: ATIC, Gartner research, Sector market size, 2012 /13

F&E Ausgaben in der globalen Halbleiterindustrie

2013 Worldwide Semiconductor R&D Spending Leaders (Companies with ≥\$1 Billion in Spending)

2013 Rank	2012 Rank	Company	Region/ Country	Type	2012 Sales (\$M)	2012 R&D (\$M)	R&D/ Sales	2013 Sales (\$M)	2013 R&D (\$M)	R&D/ Sales	13/12 R&D
1	1	Intel	Americas	IDM	49,114	10,148	21%	48,321	10,611	22%	5%
2	3	Qualcomm	Americas	Fabless	13,177	2,655	20%	17,211	3,395	20%	28%
3	2	Samsung	South Korea	IDM	32,251	2,765	9%	34,378	2,820	8%	2%
4	5	Broadcom	Americas	Fabless	7,793	2,318	30%	8,219	2,486	30%	7%
5	4	ST	Europe	IDM	8,364	2,413	29%	8,044	1,816	23%	-25%
7	9	TSMC	Taiwan	Foundry	16,951	1,370	8%	19,850	1,623	8%	18%
6	8	Toshiba	Japan	IDM	11,217	1,710	15%	11,958	1,560	13%	-9%
8	7	TI	Americas	IDM	12,081	1,877	16%	11,475	1,522	13%	-19%
9	13	Micron	Americas	IDM	8,002	909	11%	14,433	1,487	10%	64%
10	6	Renesas	Japan	IDM	9,314	1,901	20%	7,975	1,343	17%	-29%
—	—	Top 10 Total	—		168,264	28,066	16.7%	181,864	28,663	15.8%	2%

Source: Company reports, IC Insights

... auch in Europa

Ranking of high R&D intensity EU industries in the 2009 Scoreboard*

Rank	Sub-sector (4-digit ICB) ²	R&D investment 2008 (€m)	Net sales in 2008 (€m)	R&D intensity (%)
1	Biotechnology	770.7	4075.9	18.9
2	Semiconductors	3942.9	21818.2	18.1
3	Pharmaceuticals	19485.3	122097.6	16.0
4	Software	3188.8	22976.8	13.9
5	Telecommunications equipment	11848.8	89651.6	13.2
6	Leisure goods	1856.1	30057.6	6.2
7	Aerospace & defense	7376.3	122563.2	6.0
8	Automobiles & parts	30116.7	567862.8	5.3

* High R&D intensity = Ratio of R&D investment over net sales higher than 55%.

Source: *The 2009 EU Industrial R&D Investment Scoreboard European Commission, JRC/DG RTD.*

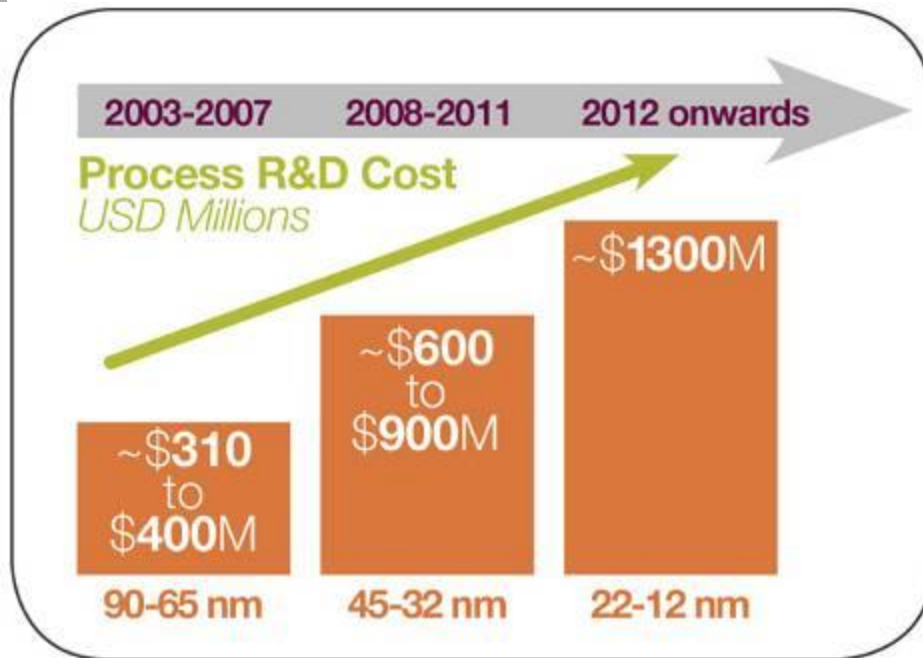
Die Halbleiterindustrie benötigt große Investitionen

North Stream Gas-Pipeline (2 Leitungen)	USD 16 Mrd
TGV Eisenbahn Infrastruktur 1981-2001	EUR 8-12 Mrd
GLOBALFOUNDRIES Dresden (1996 – 2013)	USD 10 Mrd
Leuna 2000, Raffinerie, Sachsen (2000)	EUR 5 Mrd
Eurotunnel (1994)	GBP 4.5 Mrd
BMW Produktionslinie in Leipzig (2001)	EUR 1.2 Mrd
Vasco da Gama Brücke in Lissabon (1998)	EUR 0.7 Mrd
Viaduc de Millau, Frankreich (2004)	EUR 0.4 Mrd
Frauenkirche Dresden Rekonstruktion (Spenden)	EUR 0.2 Mrd



Das Dilemma, in dem die Industrie steckt

- Moore's Law gibt seit 50 Jahren den Takt an: Chip-Leistung verdoppelt sich alle 18 bis 24 Monate, Preise halbieren sich
- ...während die Kosten für F&E, Prozessentwicklung und Produktion unaufhaltsam steigen



(1) Industry average for Logic process R&D;

(2) Average Capex of 300mm Logic fabs in World Fab Watch database.

Source: In-Stat World Fab Watch; analyst reports; press clippings;

Die Konsequenz: Eine globale Industrie im Paradigmenwechsel

130nm IDMs	90nm IDMs	65nm IDMs	45nm IDMs	32/28nm IDMs	22/20nm IDMs
Intel	Intel	Intel	Intel	Intel	Intel
Samsung	Samsung	Samsung	Samsung	Samsung	Samsung
IBM	IBM	IBM	IBM	IBM	IBM
ST	ST	ST	ST	ST	(3)
Panasonic	Panasonic	Panasonic	Panasonic	Panasonic	
Renesas	Renesas	Renesas	Renesas	(5)	
TI	TI	TI	TI		
Toshiba	Toshiba	Toshiba	Toshiba		
Fujitsu	Fujitsu	Fujitsu	Fujitsu		
AMD	AMD	AMD	(9)		
Motorola	Freescale	(10)			
Infineon	Infineon				
Sony	Sony				
Cypress	Cypress				
Sharp	Sharp				
ADI	(15)				
Atmel					
Hitachi	Foundries	Foundries	Foundries	Foundries	Foundries
Mitsubishi	TSMC	TSMC	TSMC	TSMC	TSMC
ON	UMC	UMC	GlobalFoundries	GlobalFoundries	GlobalFoundries
Rohm	SMIC	SMIC	UMC	UMC	UMC
Sanyo	Samsung	Samsung	SMIC	SMIC?	SMIC?
(22)			Samsung	Samsung	Samsung

Source: IC Insights' Strategic Reviews Database

Dies gilt auch für GLOBALFOUNDRIES Fab 1 in Dresden



Gestern

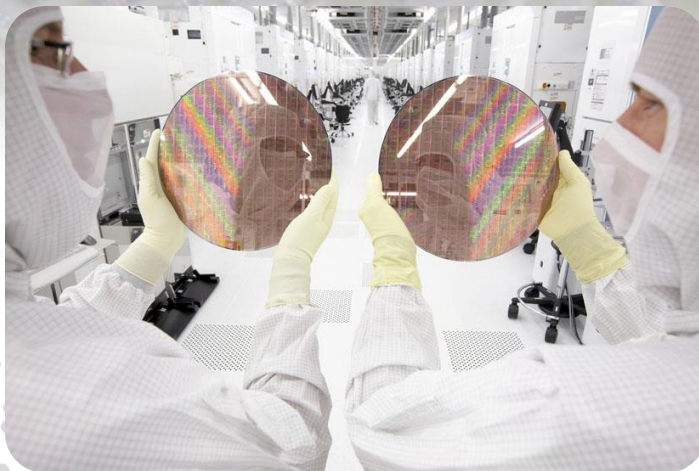
- Frühere AMD Fab
- 45nm Mikroprozessoren
- Ein Produkt, eine Technologie
- Ein End-Markt (Computing)

Heute

- 45 bis 28nm Bausteine
- Viele Produkte & Technologien
- Viele Kunden, viele Endmärkte

Morgen

- Weitere Diversifizierung des Technologie-Portfolios (z.B. Automotive, Industrial, etc.)

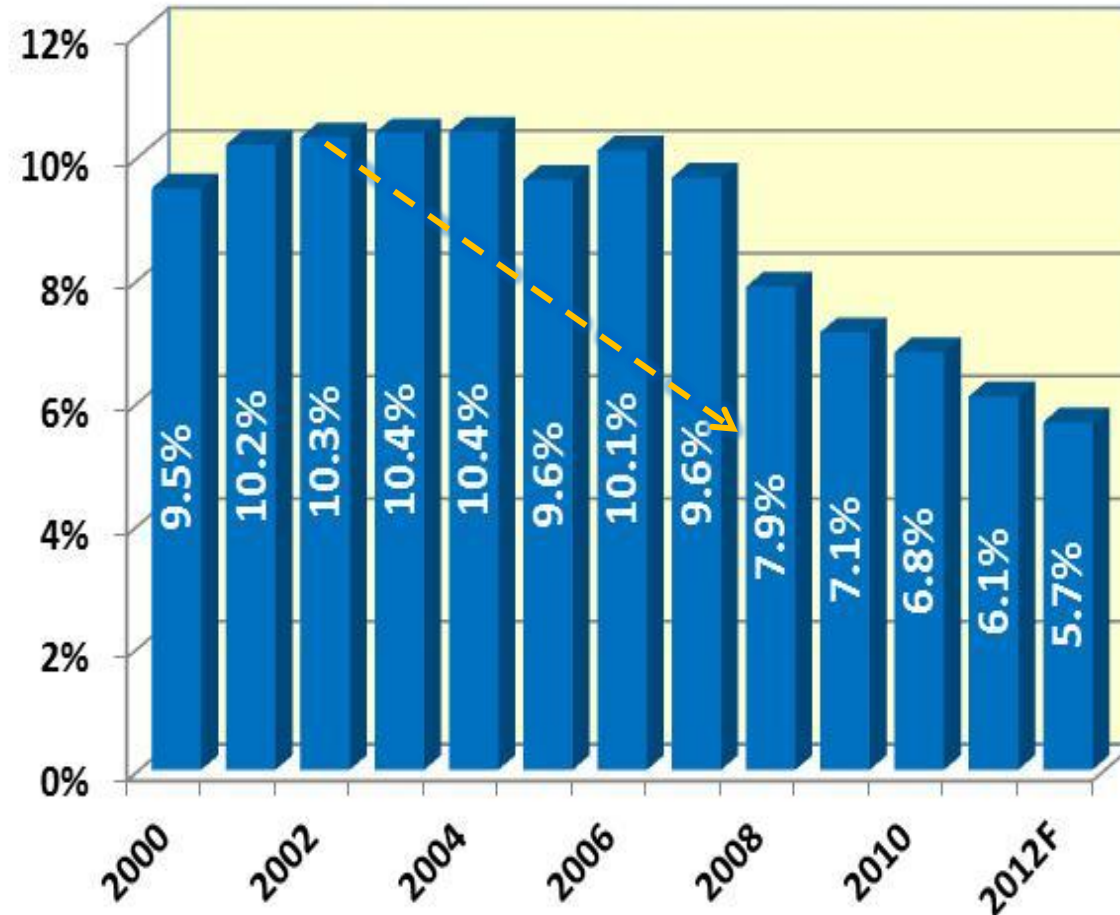


GF Fab 1 in Zahlen

- > 50.000m² Reinraum
- Kapazität von 80,000 Wafern/Monat
- ca.4.000 MA aus 54 Nationen (davon 1/3 mit Hochschulabschluss)
- Investitionen seit 1996: > 10 Mrd. USD

Europa hat viele Marktanteile verloren

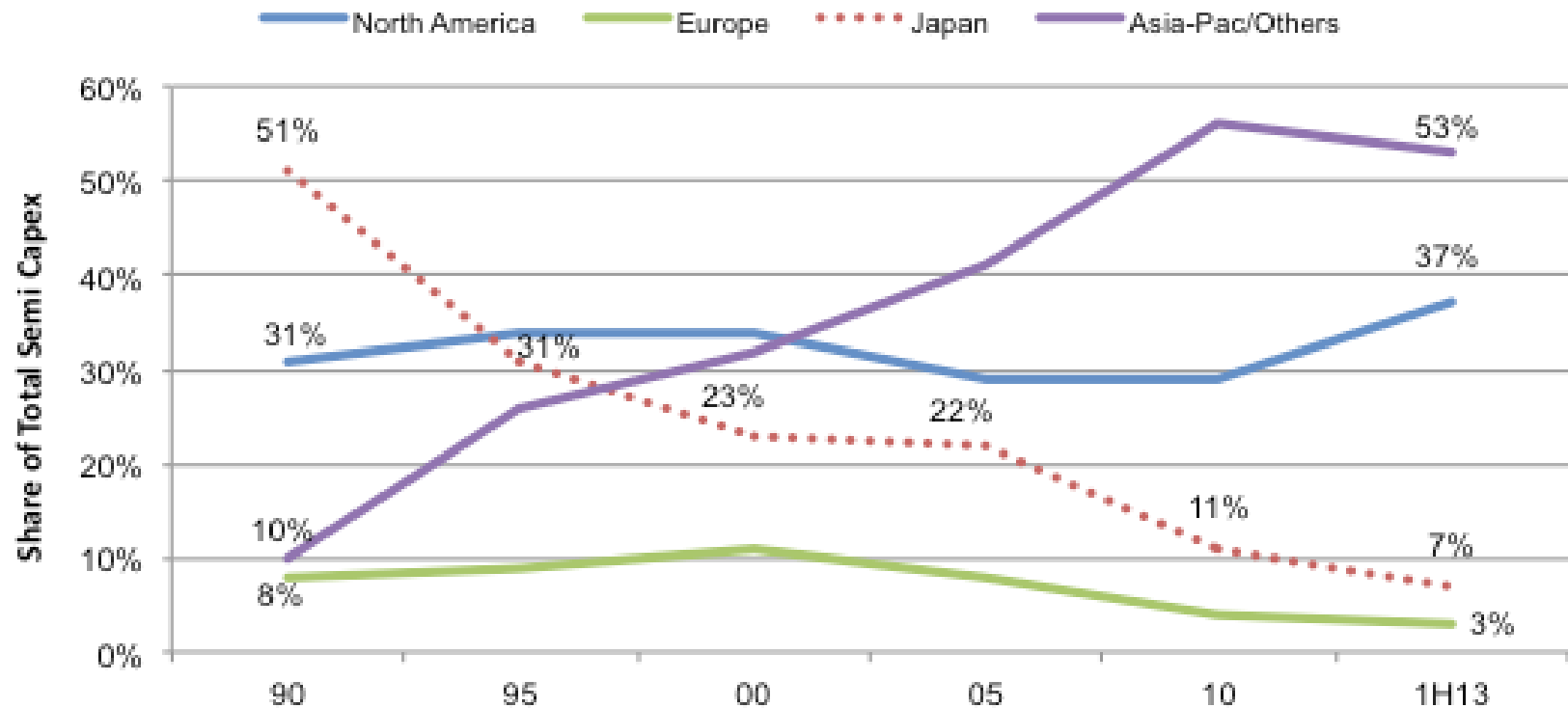
Market Shares of EU-based Semiconductor Companies



Source: ENIAC

... und fällt weiter zurück

Semiconductor Capital Expenditures by Region



Source: IC Insights



Umkehrschub durch den "Airbus of Chips" (VP Kroes)?



EUROPEAN COMMISSION PRESS RELEASE

Brussels, 23 May 2013

Commission proposes New European Industrial Strategy for Electronics – better targeted support to mobilise €100 billion in new private investments

Neelie Kroes, [Vice-President of the European Commission responsible for the Digital Agenda] said:

"I want to double our chip production to around 20% of global production... It's a realistic goal if we channel our investments properly."



COM(2013) 542/2

COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS

Towards a more competitive and efficient defence and security sector

{SWD(2013) 279}

...to be a credible and reliable partner, Europe must be able to decide and to act without depending on the capabilities of third parties. Security of supply, access to critical technologies and operational sovereignty are therefore crucial.



Should't we be looking for an "Airbus of Chips"?
Neelie Kroes, Vice President of the European Commission

Nano2017 : 600 millions d'euros pour développer la nanoélectronique



Photo : Pierre Chabaud/Matignon
23/07/2013

*... 600 millions d'euros c'est ce que l'Etat va investir dans le nouveau programme de recherche Nano 2017. A ce soutien de l'Etat se joindront donc les collectivités locales et au total l'ensemble des porteurs du programme engageront plus de **trois milliards d'euros** d'investissements industriels ou de recherche d'ici 2017.*

Source: ENIAC

State Aid for investments and R&D&I does make a difference where manufacturing and development stays - or goes

Experience in Saxony/Germany /EU regarding state aid:	Experience in Singapore: regarding state aid	Experience in New York State regarding state aid:
<ul style="list-style-type: none"> ▪ Cumbersome and complex processes involving state, national and EU institutions, lengthening time lines, higher hurdles ▪ Allowances and grants are based on laws/strict regulations, meaning there is little to no room for policy considerations (IPCEI?) ▪ No Cluster or Center of Excellence Strategy tied to state aid ▪ Internal and inward focus vs. Global orientation 	<ul style="list-style-type: none"> ▪ Quiet and efficient processes ▪ EDB = the only customer interface, no oversight ▪ The value of “local” microelectronics capabilities and capacities is recognized ▪ It is a strategic sector for the Singapore Govt and the EDB acts accordingly ▪ Very focused (and successful) innovation policy 	<ul style="list-style-type: none"> ▪ There is no Federal or any other kind of oversight – States are on their own ▪ Lengthy, very political and very public (“noisy”) process ▪ Once it is done, however, a solid basis ▪ NY is building an entire Semiconductor ecosystem ▪ At the Federal level, new focus on interdependence of “innovation & manufacturing” (bring jobs home!)