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Automotive, Industrial & Multimarket

Arunjai Mittal, Senior Vice President & General Manager Power Mgmt. & Drives

Roland Stierle, Vice President Sales Automotive Europe

Never stop thinking

Overview

- **AIM**
- Industry & Energy Savings potential
- Automotive & Hybrid Electric Vehicles

Automotive, Industrial & Multimarket Overview

Product Range

- Power discretes, -modules, -ICs
- Pressure -, Temperature -, Magnetic sensors; RF ICs
- 8-bit, 16-bit, 32-bit TriCore® microcontrollers
- AF and RF diodes and transistors; SSICs
- Security ICs
- ASIC Design Solutions

Core competencies

- Highest quality products and services
- Leading edge technology and IP portfolio
- System expertise with broad application competence
- Strong worldwide presence with local sales and R&D support
- Dedicated and committed account teams and distributors

Market Positions

No. 1 in Power Semiconductors

No. 4 in Industrial applications

No. 2 in Automotive ww, no. 1 in EU

No. 1 in Chip Card ICs

Sources: IMS (2006), Strategy Analytics (2006), iSuppli (2005), Gartner Dataquest (2005)

AIM serves multiple markets with commodities, dedicated products and chipset solutions

Market	Automotive	Industrial	Communication, Computing, Consumer
Application Field	Powertrain 	Renewable Energies 	
	Safety Mgmt. 	Automation / Motor Control *Industrial Drives* 	Automation / Motor Control *Consumer Drives* 
	Body & Conve-nience 	Transportation 	
	Infotainment 	Power Supplies *Uninterruptable Power Supplies* 	Power Supplies *- AC / DC - DC / DC* 
	Hybrid	Building Control 	
		Medical 	
		Payments 	Communi-cation 
		Identification 	Entertain-ment 

"Controlling Power"

"Chip Card & Security ICs"

Overview

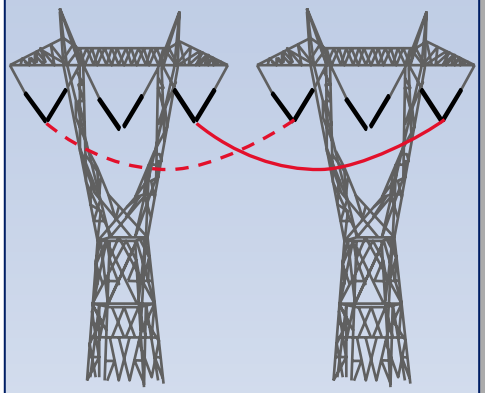
- AIM
- **Industry & Energy Savings potential**
- Automotive & Hybrid Electric Vehicles

Infineon supplies products for efficient energy management along the entire power supply chain

Generation

e. g. IHM-Module (IGBT)

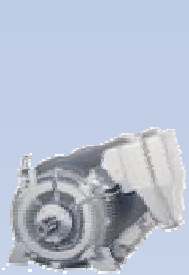
Transmission



DC Tower DC Tower

e. g. LTT (Thyristor)

Consumption



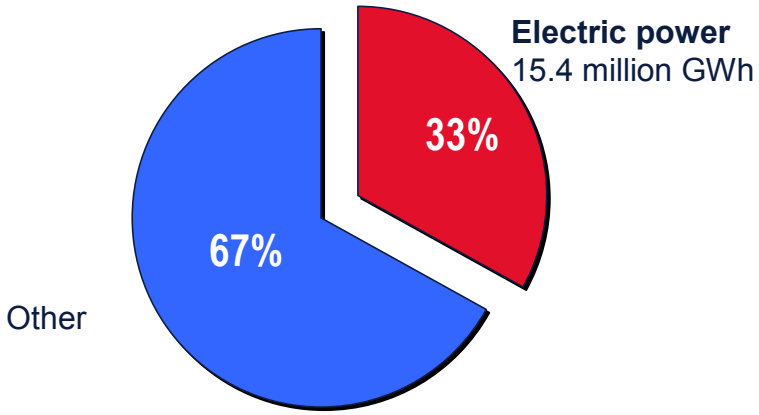
e. g. IGBTs / CoolMOS, SiC diodes

Global electricity consumption 2004: 15.4 million GWh

USA and China are the biggest consumers

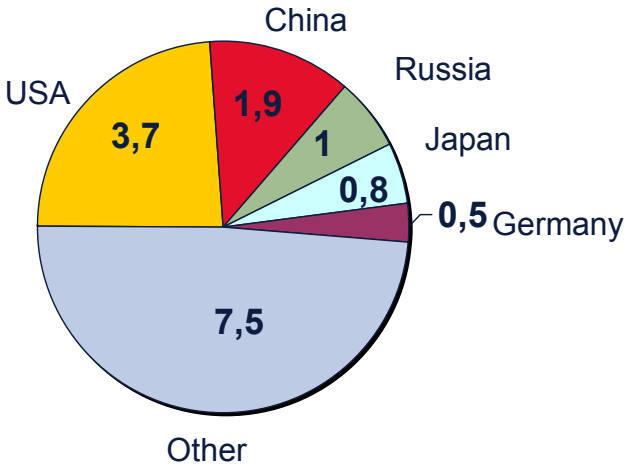
1/3 of all energy consumed worldwide is electricity

Global energy consumption 2004



USA and China are the biggest consumers

Global electricity consumption 2004
Total: 15.4 million GWh



The biggest power consumers by application


Motors
~40%


Lighting
~15%


Power supply
~6%*

*US figures
Source: BP World Energy Report; EIA – International Energy Outlook 2005

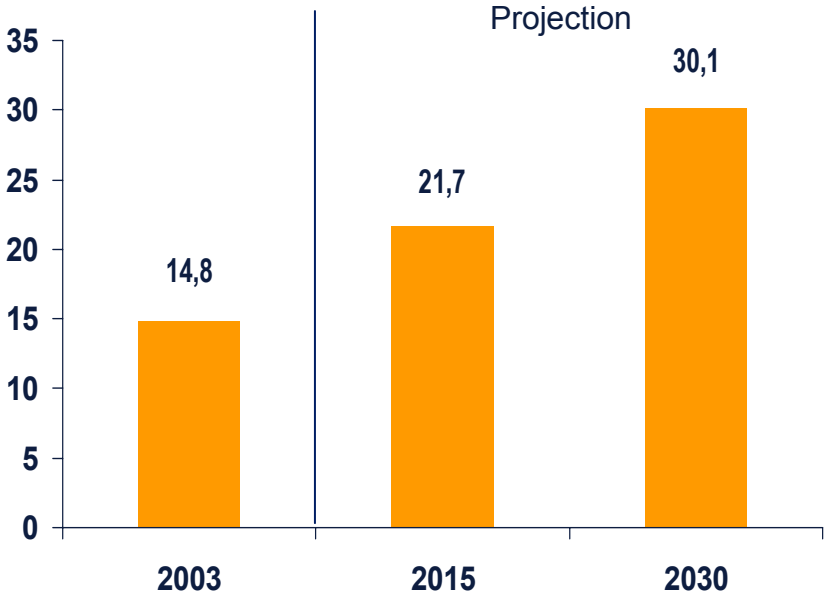
World electricity needs expected to double by 2030

Annual increase in electricity demand of 2.7%

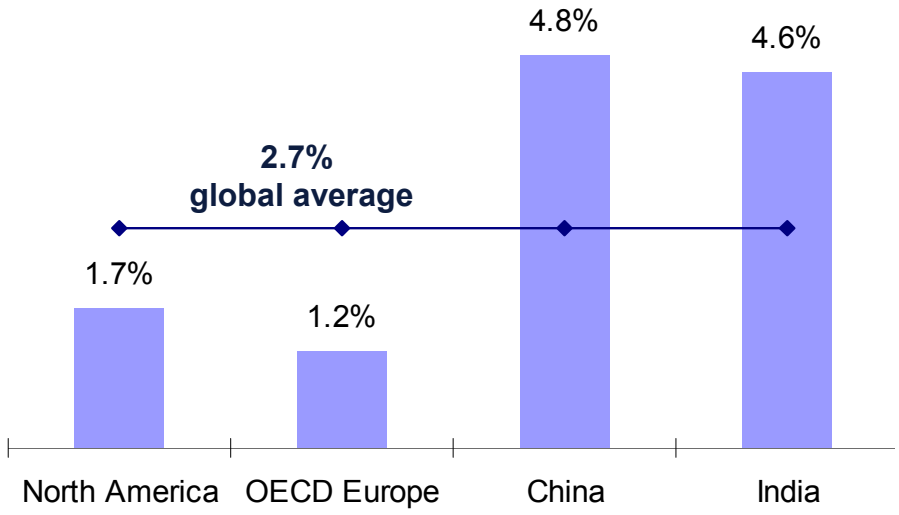
World electricity needs to double by 2030

Growth strongly driven by China and India

Annual electricity consumption 2003 – 2030
in million GWh



Electricity consumption – annual growth 2003 - 2030 in %



Source: EIA (International Energy Association), International Energy Outlook 2006

Significant savings are possible in many application areas

Standby mode (TV)

90% savings potential

Server power supplies

1% increase in efficiency possible

Lighting

25% saving
(using electronic instead of magnetic ballasts)

Induction ovens

25% savings potential
(use of induction instead of electric ovens)

Drive control

20-30% savings potential
(through use of power semiconductors)

Air conditioning systems

30-40% saving
(using Intelligent Compressor Control)

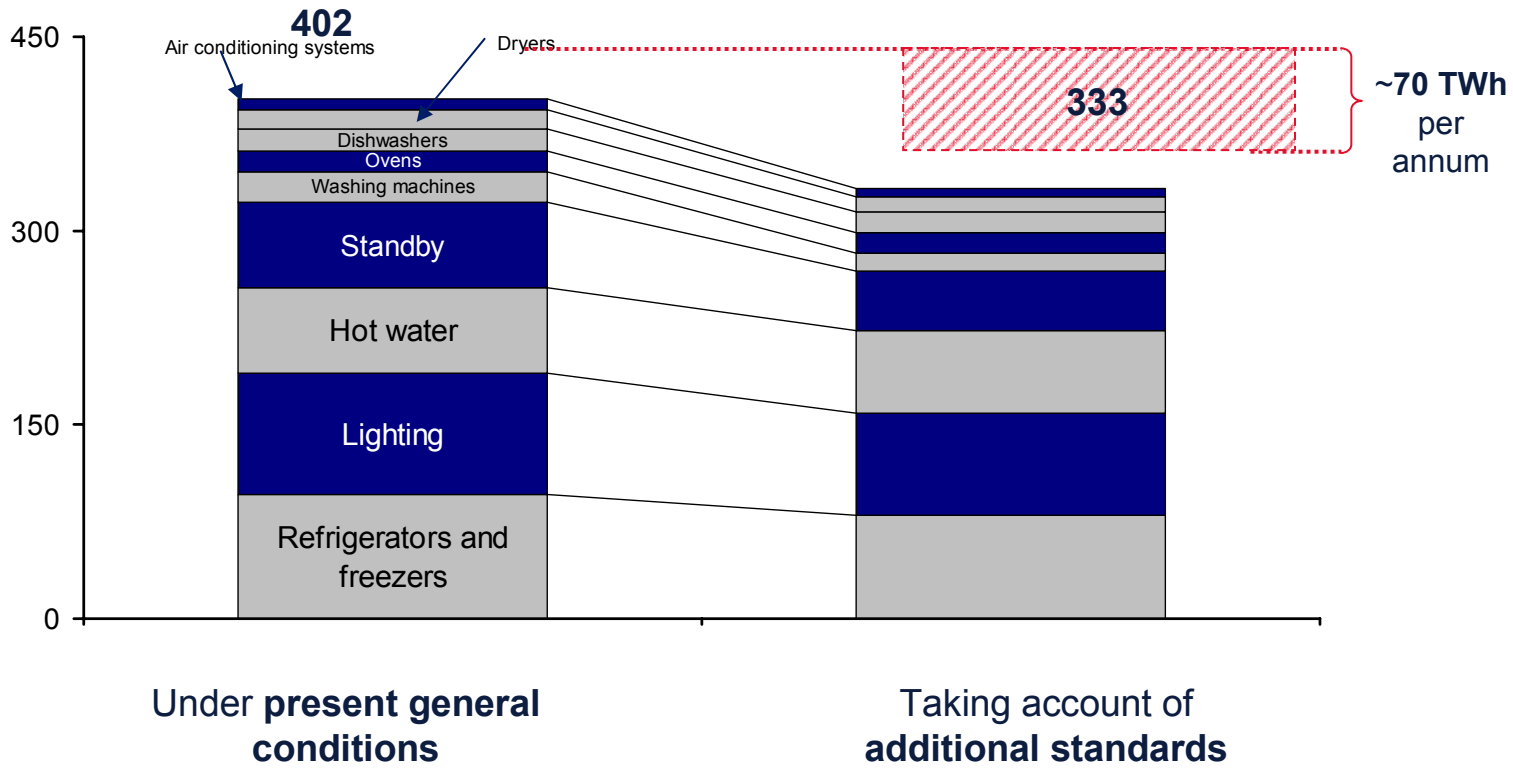
Source: eupec GmbH, 2005; BVG – Berlin, 2005; Siemens/ECPE, 10/2005

Significant savings potential also present in households

Additional measures like regulations or incentives (PFC; 80+…) can help in influence mindset/decision making of the end user

Electricity consumption in European households - projection 2010
in TWh

Savings potential – equivalent to the capacity of ~ 4 nuclear power stations @ 2 GW



Source: Wal, Kern 2004

Energy Waste During Standby Operation

Example: TV Set

Number of TV sets in Europe	~200 million
ϕ power consumption during standby operation by day (20h runtime)	200Wh/day = 73kWh/year
Annual power consumption in Europe	~14.6 billion kWh/year
Annual energy consumption by standby operation	2000MW

New energy saving recommendation (e.g. IEA) implies an energy saving potential of 90% (1800MW).

European Standby

power consumption p.a.

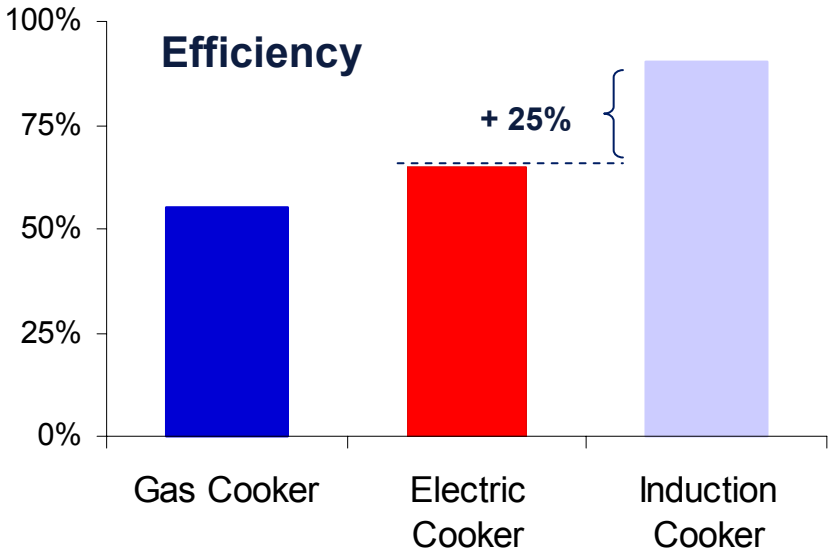
Rated Output Power	Phase 1 Jan. 2001	Phase 2 Jan. 2003	Phase 3 Jan. 2005
> 0.3W and < 15W	1.0W	0.75W	0.30W
> 15W and < 50W	1.0W	0.75W	0.50W
> 50W and < 75W	1.0W	0.75W	0.75W

Implementation of IEA recommendation would save power of 1 nuclear power plant (1,8 GW)

Induction Cooker- Case Study for Germany

25% Efficiency Improvement Compared to Conventional Electric Cookers

Number of German households with electric cookers	35.8 million
Avg. energy consumption of electric cookers per household	300 kWh/y
Avg. energy consumption in Germany	10.7 Mrd. kWh/Jahr
Efficiency improvement by induction cookers*	25%



Potential energy saving through induction cookers amounts to 2.7 bn kWh/year. This corresponds to ~ 0,1 AKW @ 2GWh

Cost saving potential for German households at €0.155/kWh reaches ~ € 420 m p.a.

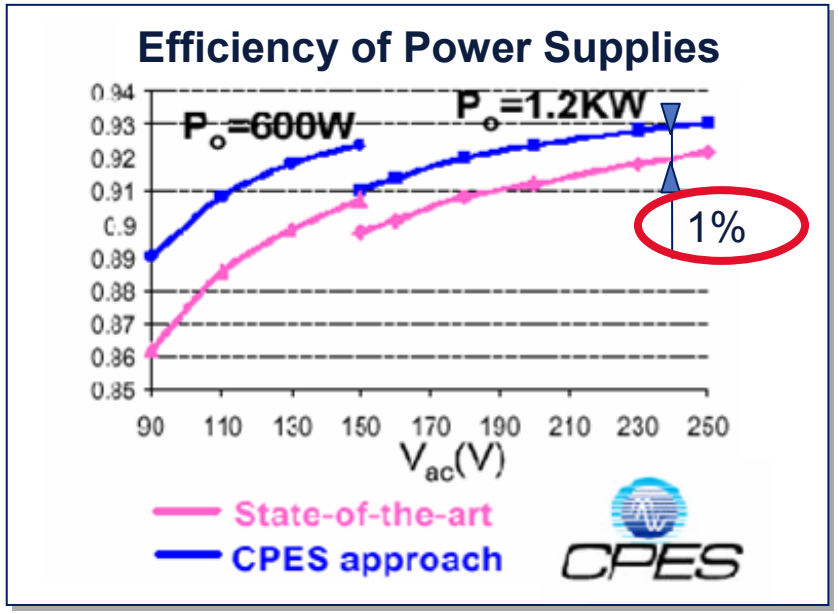
* Source: www.theinductivesite.com

Server Power Supplies as Energy Saving IT-Equipment

Efficiency increase of only 1% could save energy of one hydroelectric power plant!

Number of servers ww in 2006*	~9.5 m
Number of additional servers till 2011	~30 m
ϕ power usage of one server	~1200 W
Overall power usage of servers ww	36.000 mW

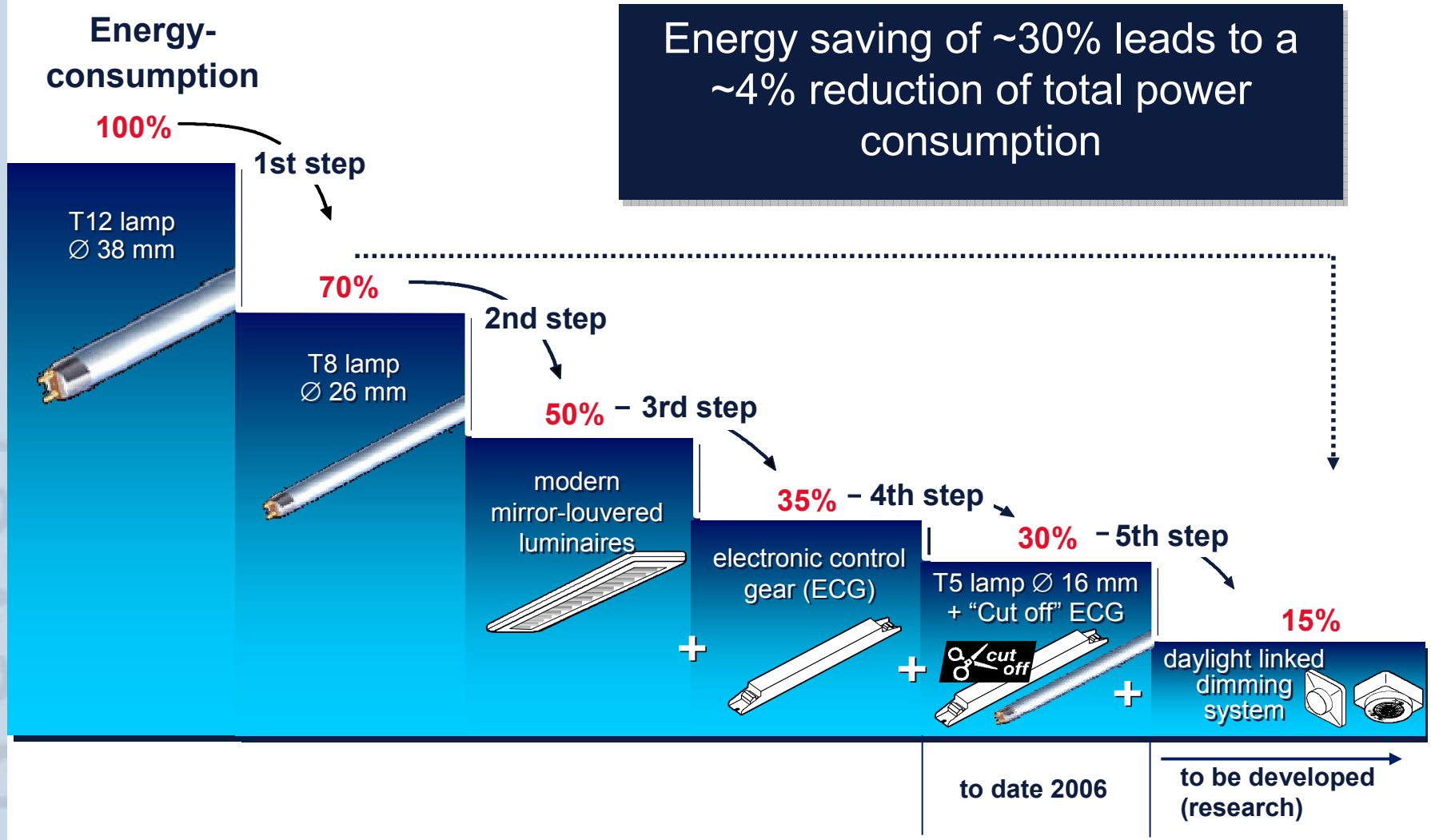
Usage of energy saving IT equipment makes an efficieny increase of 1% possible (360 mW)!



Efficiency increase of 1% corresponds to the annual output of a conventional hydroelectric power plant (360 MW) not to mention the additional power savings potential due to less cooling needs!

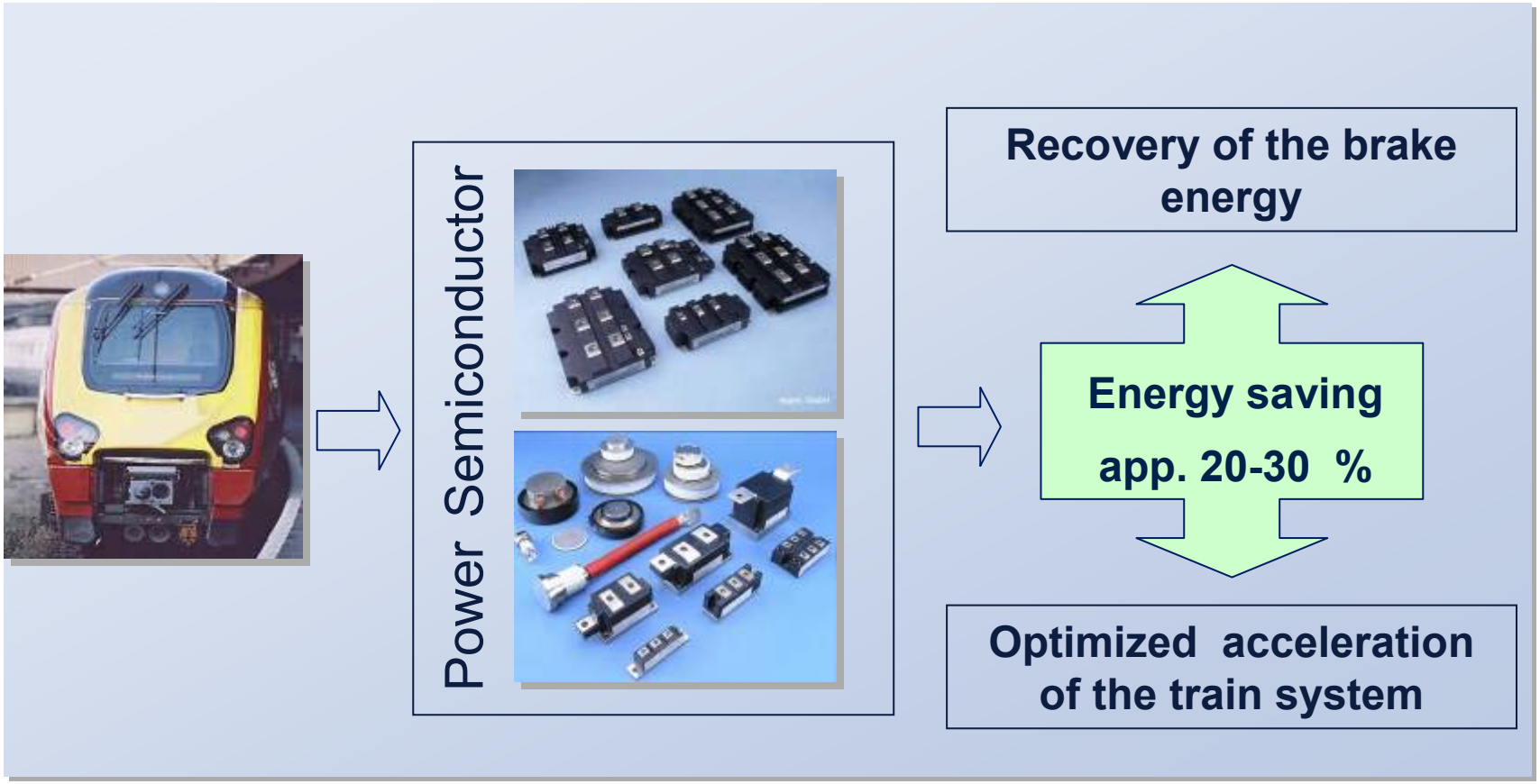
Source: Darnell, Power Factor Correction, 2006; CPES Bing Lu – APEC Proceedings 2002

Lighting Applications- High Energy Saving Potential
Electronic Control of Lighting and Switching Reduces Energy



Source: OSRAM; CLEMA: Lamp Ballast Guide; Infineon 2006

Traction - High Power Application
Variable Engine Control and Re-feeding of Braking Energy



Source: BVG - Berlin

Power semiconductors
Infineon strengthened worldwide market leadership in 2005

Global Power Semiconductor Market Ranking

Rank 2004	Rank 2005	Supplier	2005	2004	Change
(1)	**1**	**Infineon (incl. eupec)**	**9.4%**	**8.4%**	**1.0%**
(3)	2	Fairchild	7.2%	7.6%	-0.4%
(2)	3	IR	7.1%	7.8%	-0.7%
(4)	4	STM	6.9%	7.0%	-0.1%
(5)	5	Toshiba	6.2%	6.5%	-0.3%

Market Size 2005: USD 11,319.2 m
(2004: USD 11,277.8 m)

Source: IMS Research, Global Market for Power Semiconductors, September 2006

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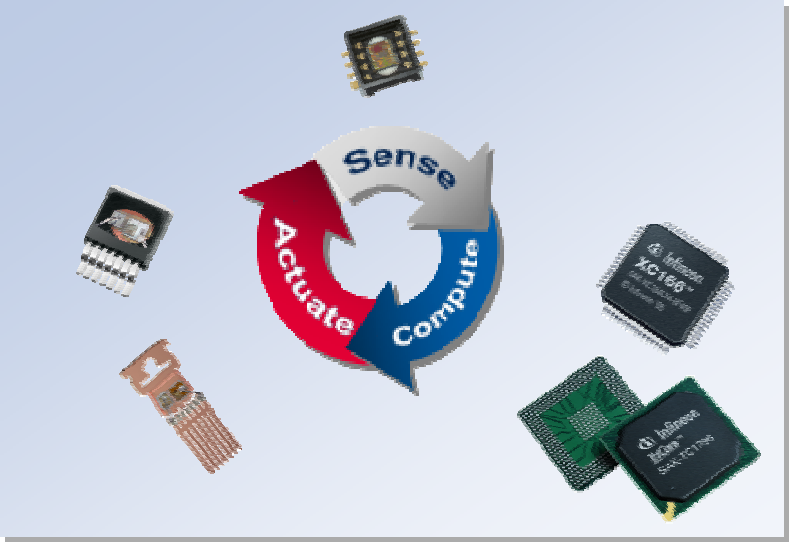
- **Automotive & Hybrid Electric Vehicles**

Automotive Semiconductor Solutions
Combining sensing, computing and actuating



Product range

- **Sensors:** Pressure, temperature, magnetic and inertia; RF ICs
- **Microcontrollers:** 8-bit, 16-bit, 32-bit TriCore®
- **Power:** MOSFETs, IGBTs, voltage regulators, transceivers, smart power, system ICs
- Plastic Optical Fibre MOST transceivers

Core competencies

- Automotive Excellence™: Most comprehensive quality program in the industry
- Own production sites for automotive semiconductors
- Innovative product portfolio, covering the complete control cycle
- 40 years of system expertise with broad application competence

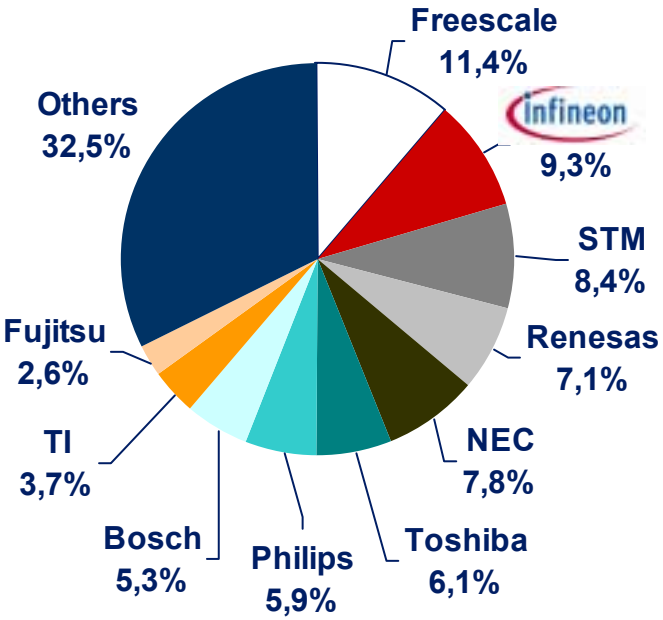
↳ No. 3 in USA, No. 2 ww, No. 1 in Europe

Addressed applications

- Powertrain
- Safety Management
- Body & Convenience
- Infotainment

Infineon Automotive ranks No. 2 worldwide
Continuously outperforming the market

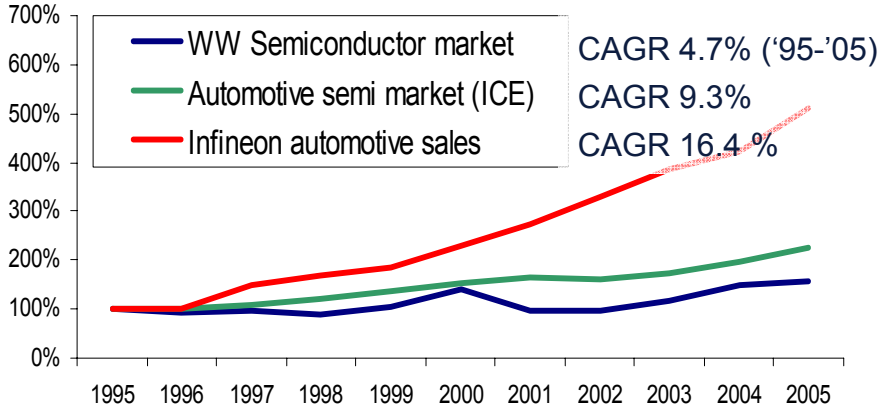
Infineon Automotive 2005*
No. 3 US No. 2 World No. 1 Europe



Market: 16.301 M US$ **

CAGR: 7,8% (2004-09) **

Continuous Outperformance



- Strong European market development compared to rest of world
- Strengthened regional business in NAFTA/Japan
- Improved relationships to major automotive system vendors

Strong market position in Europe secures technological leadership

Sources: * Strategy Analytics 2006/05, **Strategy Analytics 2005/10

Do you know that …

… **every new car** worldwide includes an average number of approximately 25 Chips from Infineon?

… in **every new European car,** on average 5 sensors for ABS or side airbags are from Infineon?

… in **every 3rd new car** worldwide, Infineon's microcontrollers are processing and controlling data real time for engine management?

… in **every new car** worldwide Infineon's power semiconductors are driving half of the loads - from dashboard lighting to the starter and the rear fog light?

The Road to 2010
90% of all Automotive Innovations will be driven by electronics

Production of **73** million light vehicles from 8 OEMs
Electronic content: **35%** (22% Hardware + 13% Software)
Semiconductor content per car: **~300 - 350** Euro

2010

2002

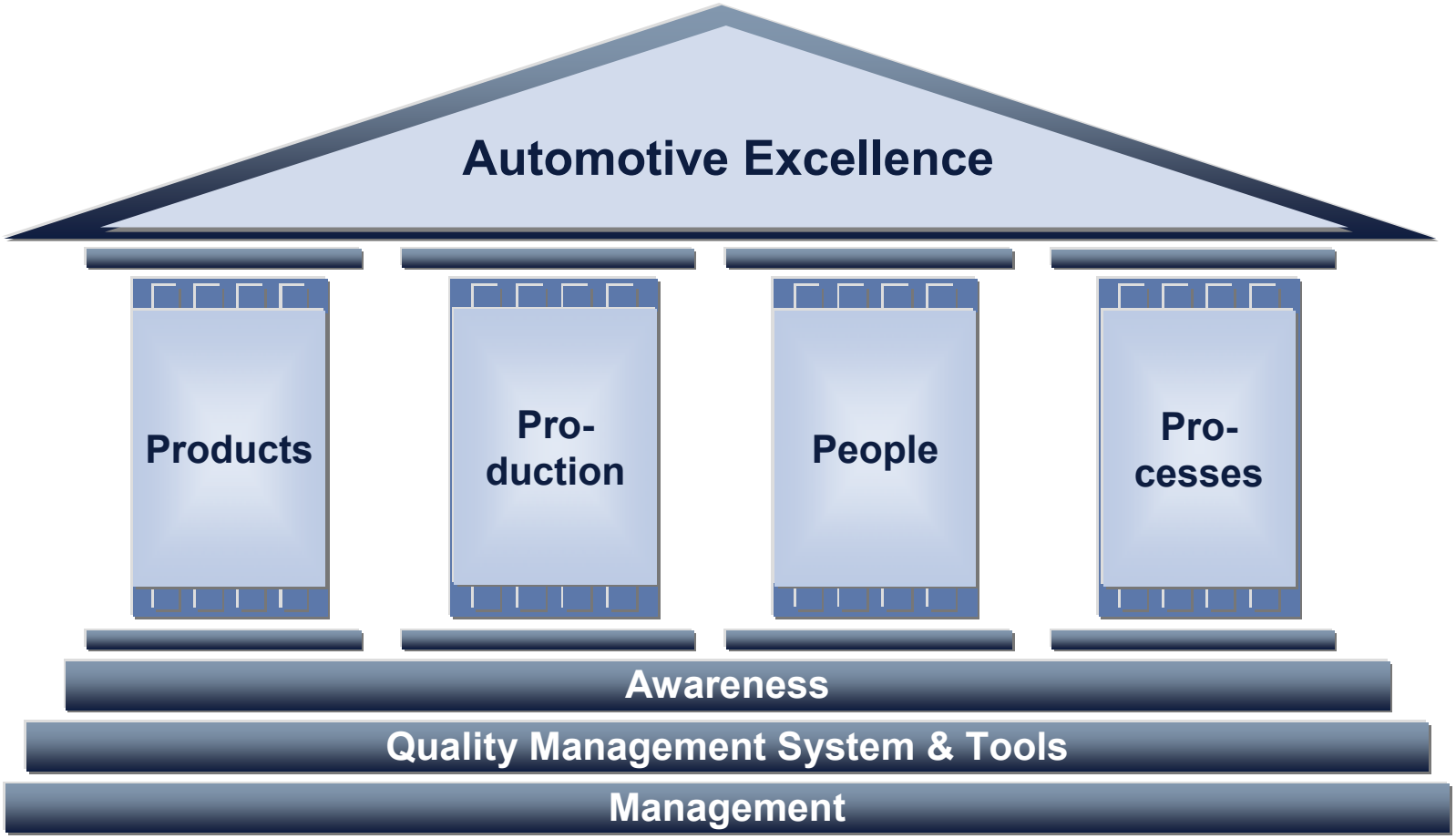
Production of **57** million light vehicles from 20 OEMs
Electronic content: **22%** (18% Hardware + 4% Software)
Semiconductor content per car: **~200** Euro

Sources: Strategy Analytics, FAZ

Automotive Semiconductor Solutions
Combining sensing, computing and actuating

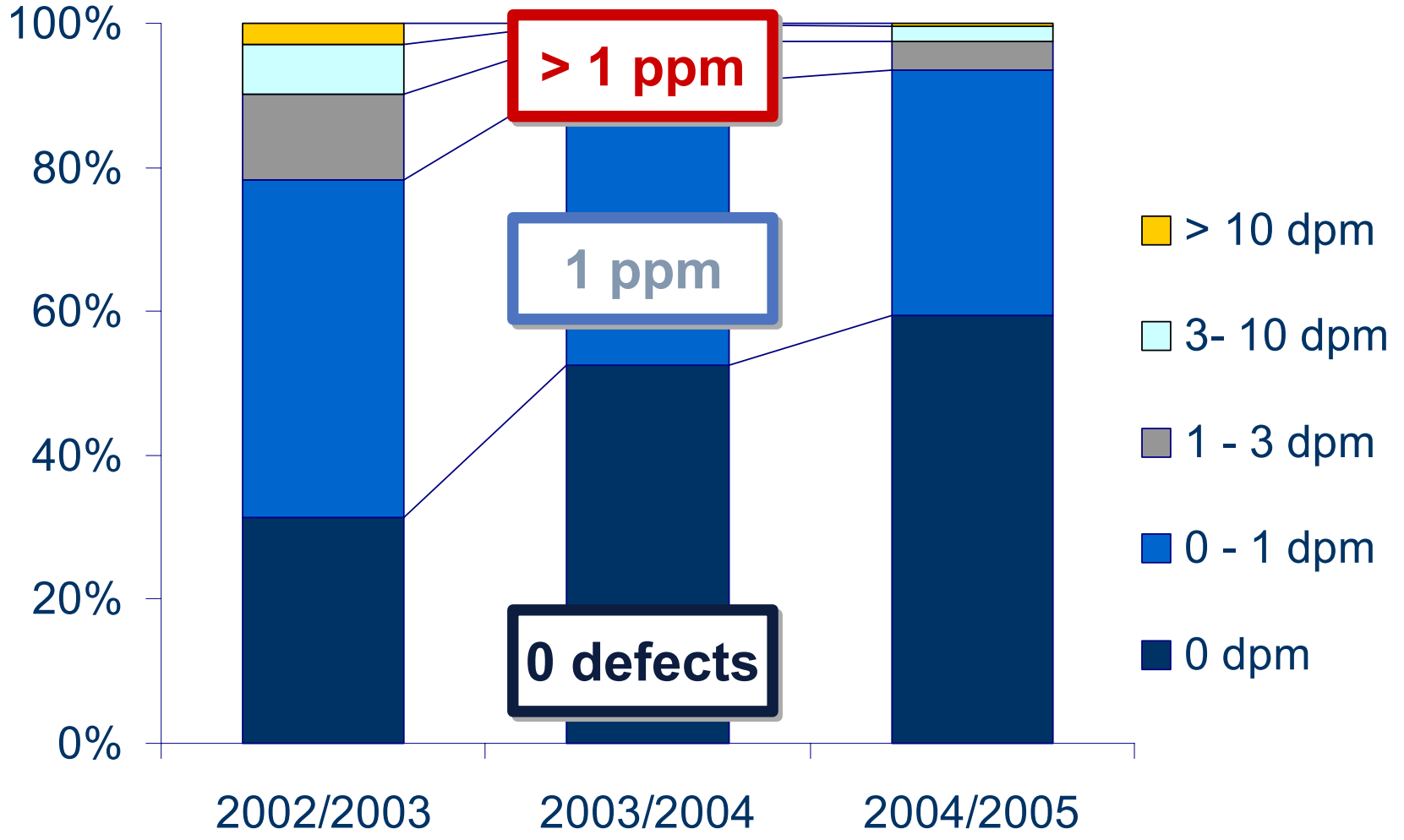
		Sense	Compute	Actuate
Powertrain - Diesel Engine Mgmt. - Gasoline Engine Mgmt. - Transmission Control - Starter / Alternator		▪ Pressure Sensors ▪ Hall Sensors	▪ 16 bit µC ▪ 32 bit TriCore® (µC + DSP)	▪ MOSFETs ▪ IGBTs ▪ Regulators ▪ Transceivers ▪ Smart Power ▪ System ICs
Safety Management - ABS / Traction Control - Suspension - Airbag + Restraint Systems - Power Steering - Tire Pressure Monitoring		▪ Pressure Sensors ▪ Hall Sensors ▪ RF ICs	▪ 8 bit µCs ▪ 16 bit µCs ▪ 32 bit TriCore® (µC + DSP)	▪ Diodes ▪ Transistors ▪ MOSFETs ▪ Regulators ▪ Transceivers ▪ Smart Power ▪ System ICs
Body & Convenience - Light Control - Heating, Ventilation, Air Condition - Door & Seat - Smart Battery Terminal		▪ Hall Sensors ▪ Temp. Sensors ▪ RF ICs	▪ 8 bit µCs ▪ 16 bit µCs	▪ Diodes ▪ Transistors ▪ MOSFETs ▪ Regulators ▪ Transceivers ▪ Smart Power

Automotive Excellence™
The most comprehensive quality program in the industry



Quality and safety of electronics demands a well-balanced co-operation of all involved parties: Early requirement definition, no unrealistic requirements at late notice, Improvement of business processes

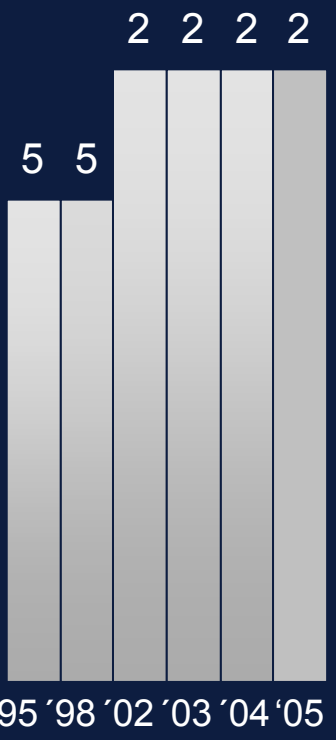
Results of Automotive Excellence™
60% with zero-defects, another third ≤ 1 ppm



Note: Data for Automotive & Industrial products

Lasting Commitment to the Automotive Industry
+ Focus on Power Semiconductor Technologies = Ideal Match for Hybrid

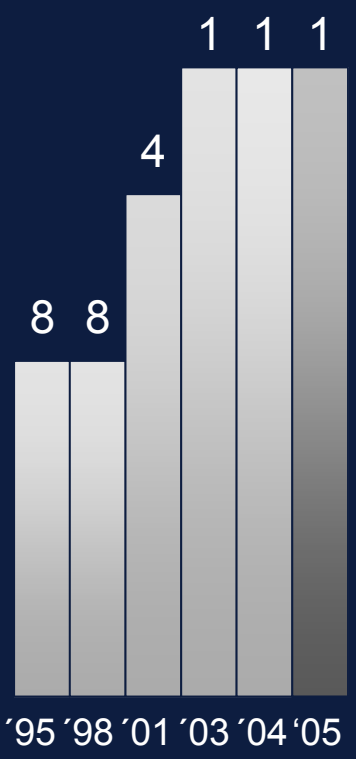
Automotive Semiconductor*



* Application-specific semiconductor
Source: Gartner Dataquest (March 2005); iSuppli (March 2005)

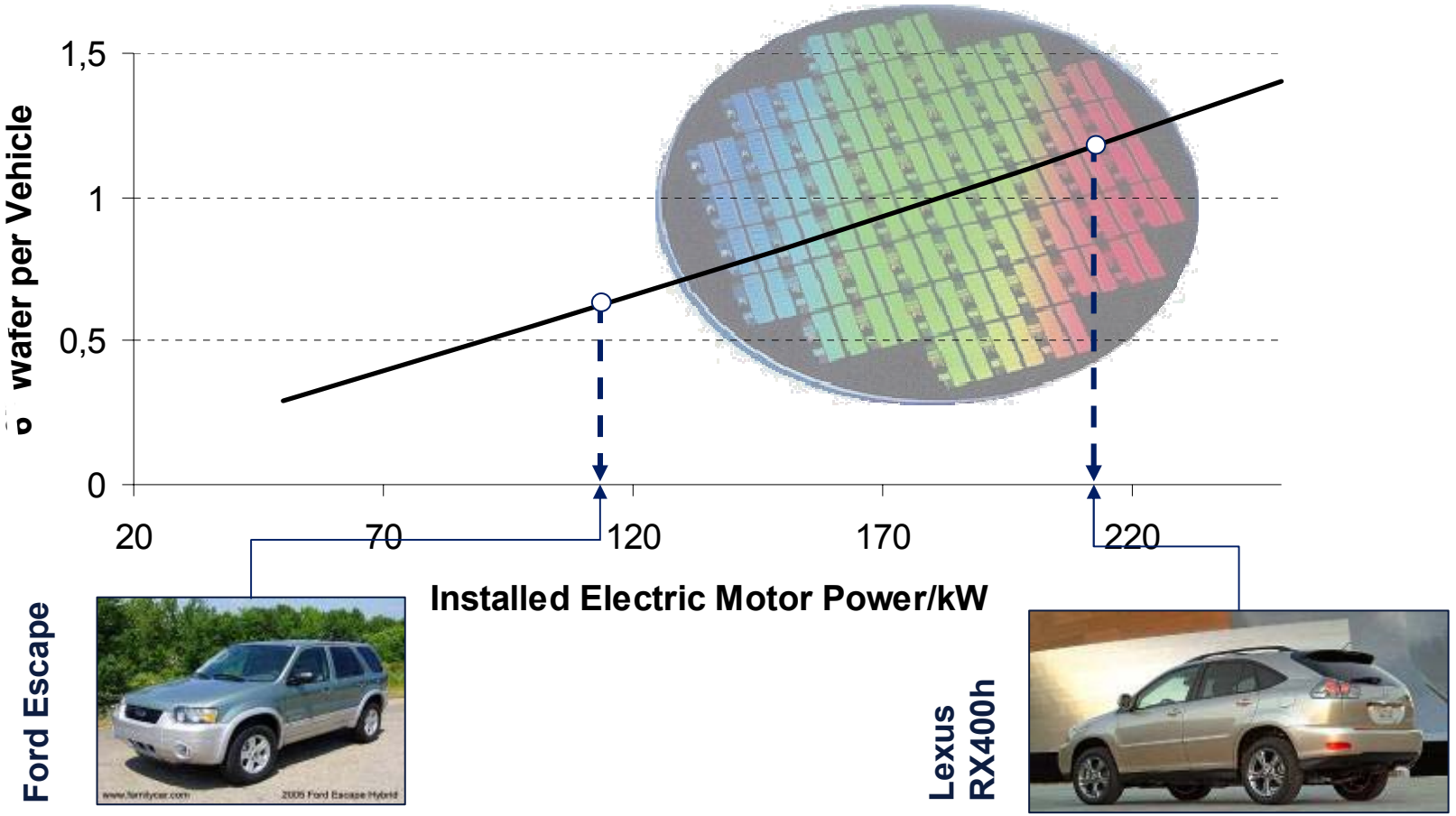
Perfect Match for HEV Application

Power Semiconductors**



** Power Semiconductor
Source: IMS (2005,2004,2003); Including power semis for automotive

Future Hybrid Electric Vehicles Consume Approximately one 6” Wafer



Average Vehicle with Combustion Engine Consumes Approximately 1/3 of one 6” Wafer

Future innovations:

Components for Hybrid Electric Vehicles by Infineon

Hybrid Control Unit:
- Power supply
- Transceivers
- Microcontroller (e.g. TC1766)

Motor Control Unit:
- Power supply
- Transceivers

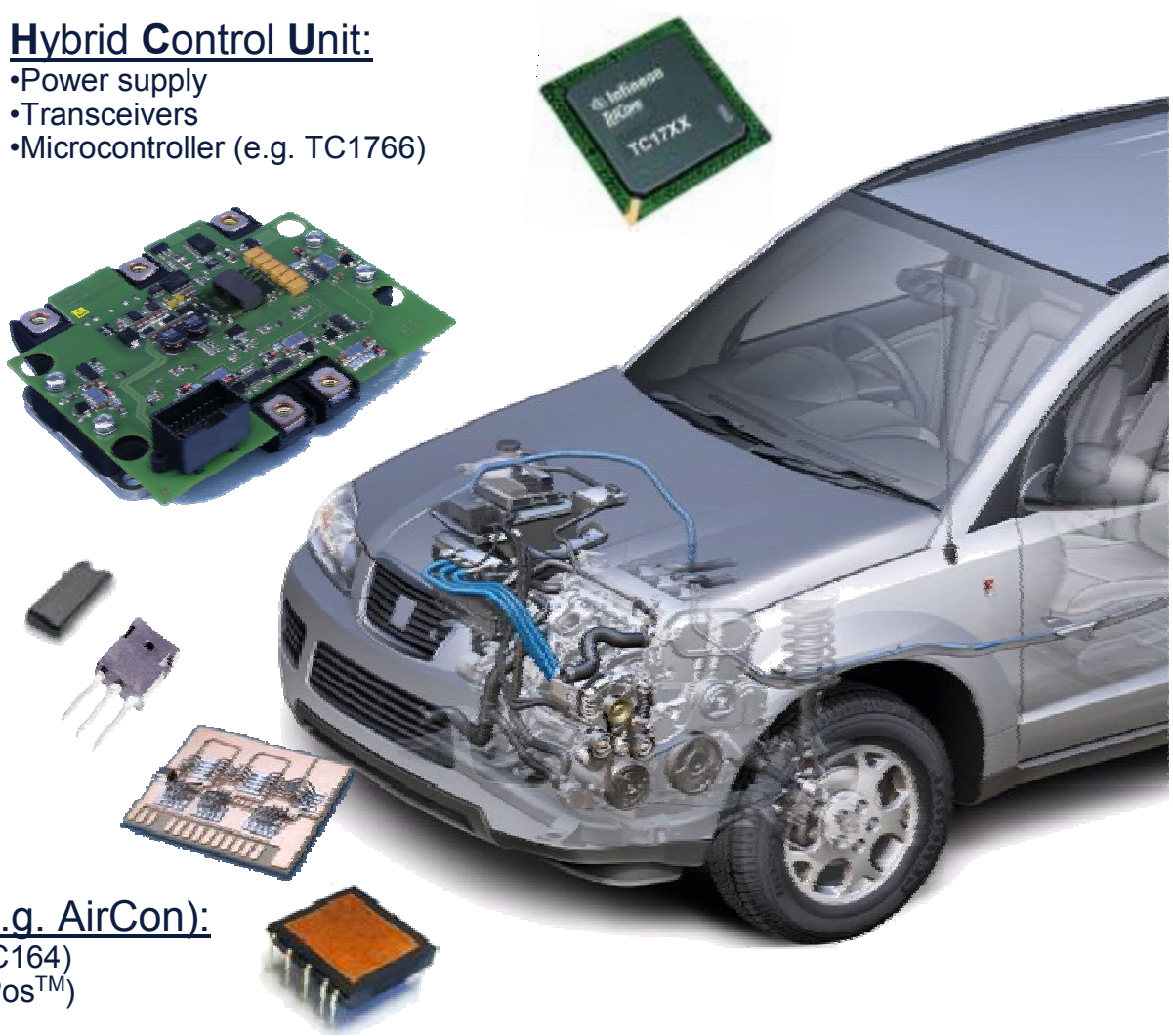
DC/AC Converter
- Driver IC´s
- Power modules - IGBT´s, diodes
- HAL-Sensors (position & current)
  Microcontroller (e.g. TC1766)
- Safety Micro (e.g. XC800)

DC/DC Converter
- Microcontroller (e.g. XC164)
- Discretes - CoolMOS™
- Driver IC´s

Battery Management:
- Power supply
- Transceiver

Microcontroller (e.g. XC164)
- Smart battery switch

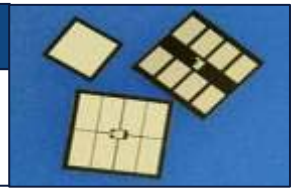
Auxiliary Drives (e.g. AirCon):
- Microcontroller (e.g. XC164)
- Power module (e.g. CiPos™)



Infineon Offers Modular Hybrid Components and In-depth System Expertise

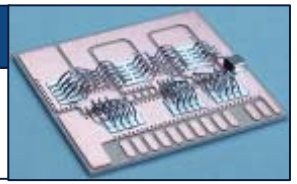
Power semiconductors

- CoolMOS best in class MOSFET
- Leading IGBT technology



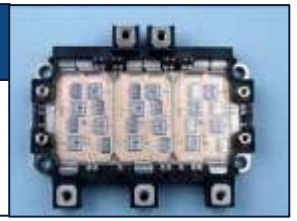
Interconnection technology

- Durable wedge bonding with 30-500µm Al
- Void free large area soldering



Packaging technology

- Green package molding
- High power module experience
- DCB technology

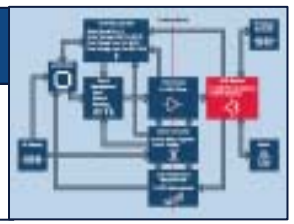


System components

- Dedicated driver IC´s
- Full product range Micro-Controllers
- Sensors, transceivers, power supply

System Know-how

- Experience in automotive industry
- Dedicated hybrid business group
- Wide application know-how



Product Offering

DI-Supp.

"Infineon's proposition along the value chain"

Automotive Semiconductors
Commitment leads to success

Reliability through experience:
High quality products and services for the automotive industry for 35 years

Innovative product portfolio covering the complete control cycle: From sensing over computing to actuating

System expertise with broad application competence:
Powertrain, Safety Management, Body & Convenience

Automotive Excellence™:
Most comprehensive quality program in the industry

Market leader in automotive semiconductors:
No. 3 in USA, No. 2 worldwide, No. 1 in Europe
(Source: Strategy Analytics)

Never stop thinking.