

Innovative Halbleiter-Lösungen für mehr **Energieeffizienz, Mobilität und Sicherheit**



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Infineon auf einen Blick

Energieeffizienz



Mobilität



Sicherheit



- Umsatz im Geschäftsjahr 2013: € 3,843 Mrd.
- Rund 27.600 Mitarbeiter weltweit (Stand: Dezember 2013)
- Starkes Technologieportfolio mit mehr als 18.650 Patenten und Patentanmeldungen (Stand: September 2013)
- 21 F&E- und 12 Fertigungsstandorte
- Deutschlands größtes und Europas zweitgrößtes Halbleiterunternehmen

Fokussierung auf drei Bereiche mit hervorragenden Zukunftsperspektiven



Energieeffizienz



Bildquelle: Facebook

Mobilität



Bildquelle: Tesla

Sicherheit



Leistungshalbleiter

#1



Automobilelektronik

#2



Chipkarten

#1

Worldwide Automotive Semiconductor Vendor Ranking 2013



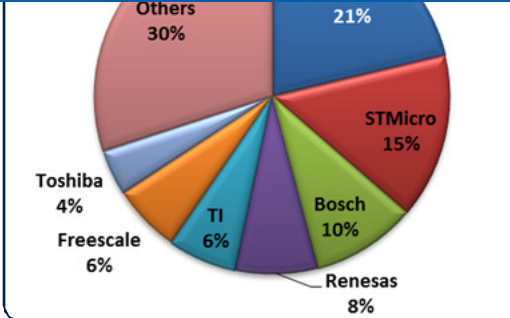
Global Market Shares (market: 25.1 Bn \$US, +5.1%)

2013 Delta 2012

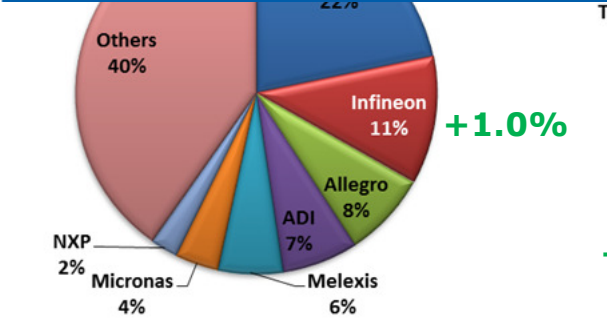
Infineon Automotive – We make cars ...



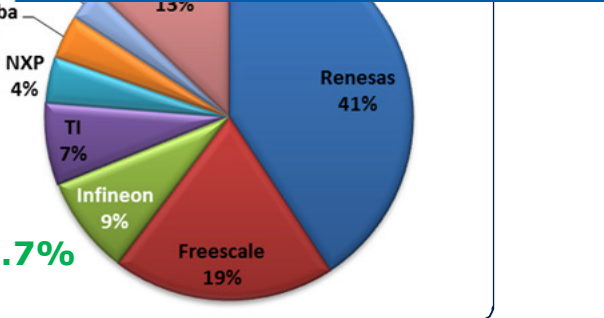
Clean



Safe



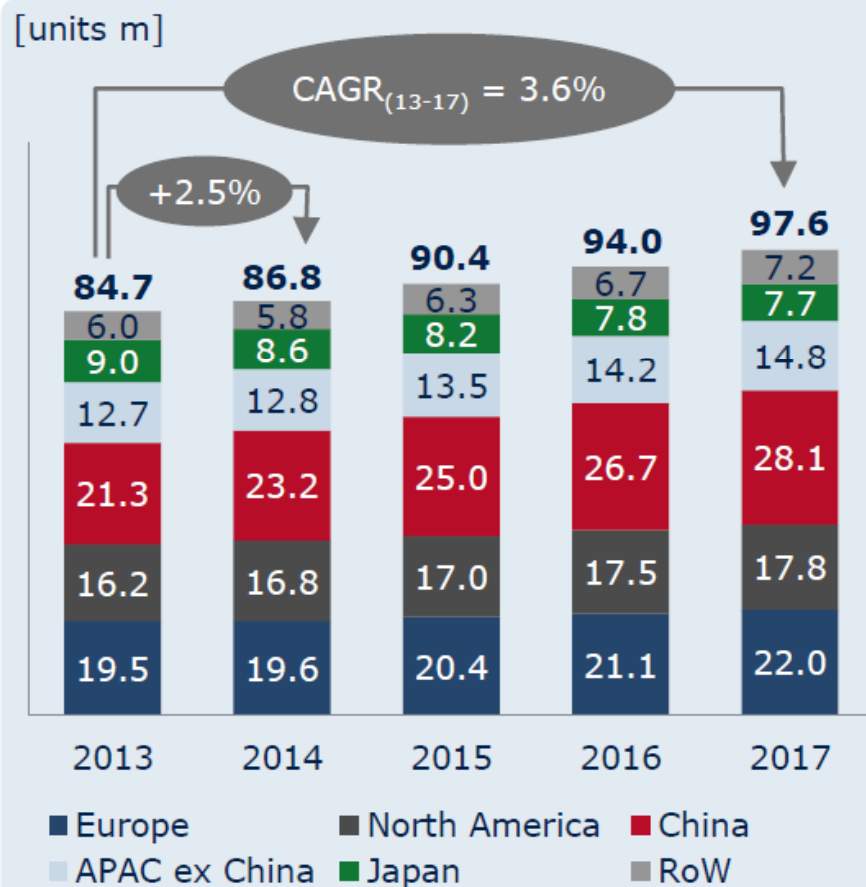
Affordable



Growth in Car Production and Content-per-Car Continues Unabated

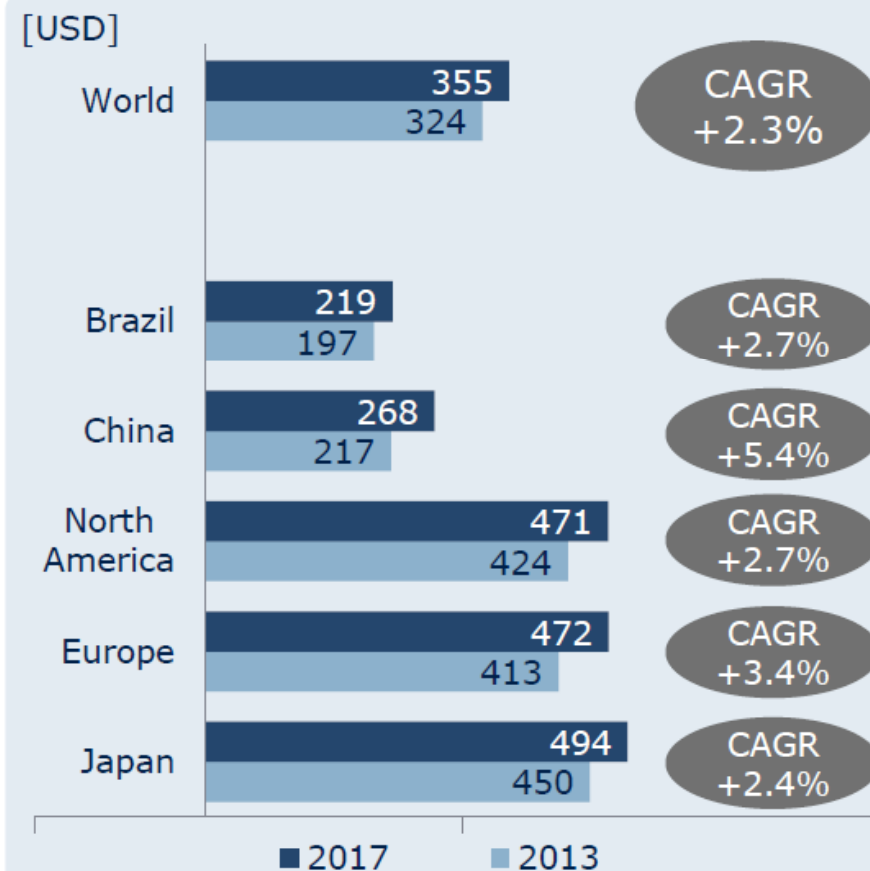


Global car production (cars ≤ 6t)



Source: IHS, "Annual Light Vehicle Production and Sales 2007 - 2019", April 2014 update.

Semiconductor value per car

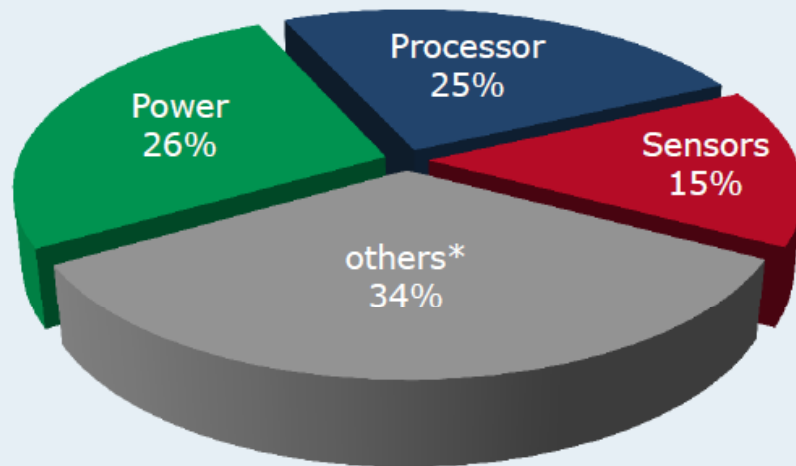


Source: Strategy Analytics, "Automotive Semiconductor Demand Forecast 2012 - 2021", incl. semiconductor sensors, May 2014.

In 2013, Infineon Gained Market Share in All Addressed Product Categories



2013 automotive semiconductor market by product category (\$25.1bn)

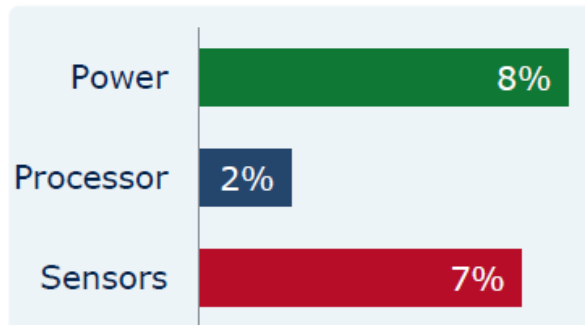


- "Power" and "Sensors" were the fastest growing product categories with 8% and 7% growth y-y, respectively.
- Infineon remained market leader in "Power" with 21.3% market share.
- Strong product portfolio in pressure and Hall sensors led to significant market share gain in "Sensors" of 1.0%-point.

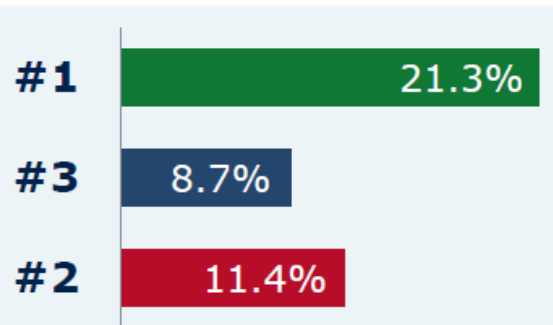
Source: Strategy Analytics, April 2014.

* "others" include: opto, small-signal discretes, logic ICs, non-power analog, memory, and other.

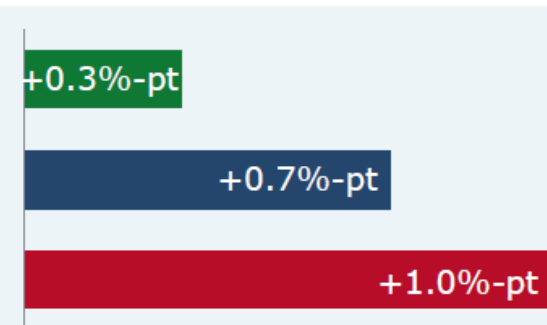
Market growth y-y



Infineon's position 2013



Infineon's change y-y



Leistungshalbleiter sind die Schlüsselemente für gesellschaftliche Veränderungen



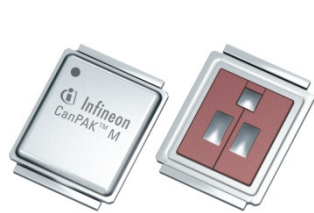
Low-voltage MOSFET

High-voltage MOSFET

Discrete IGBT

Low-power IGBT module

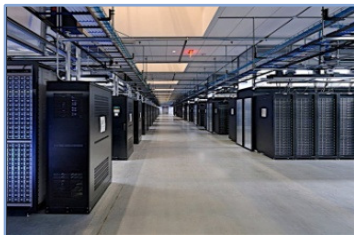
High-power IGBT module



Energieeffizienz

Erneuerbare Energie

Mobilität



Infineon Automotive – We make cars ...



Clean



Safe



Affordable

Infineon Automotive – We make cars ...



Safe

an example ...

Advanced Safety Systems to Drive Growth for Infineon's HF Radar Products

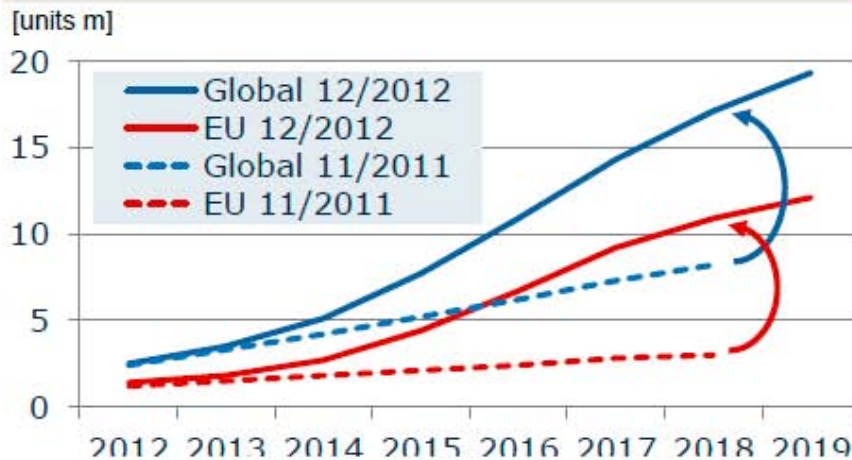


Market trends



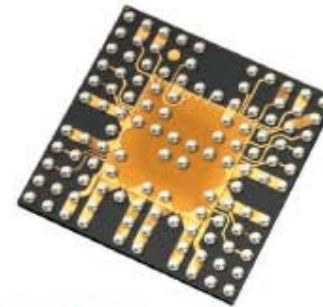
Euro NCAP 5-star rating will require **Autonomous Emergency Braking** for pedestrian, city and inter-urban safety systems.

Forecast for distance warning systems



Source: Strategy Analytics * Includes 24/77 GHz radar, camera, and LIDAR

Infineon's offering



First 77 GHz radar solution in a high-performance package

eWLB

(Embedded Wafer Level Ball Grid Array)

Comments

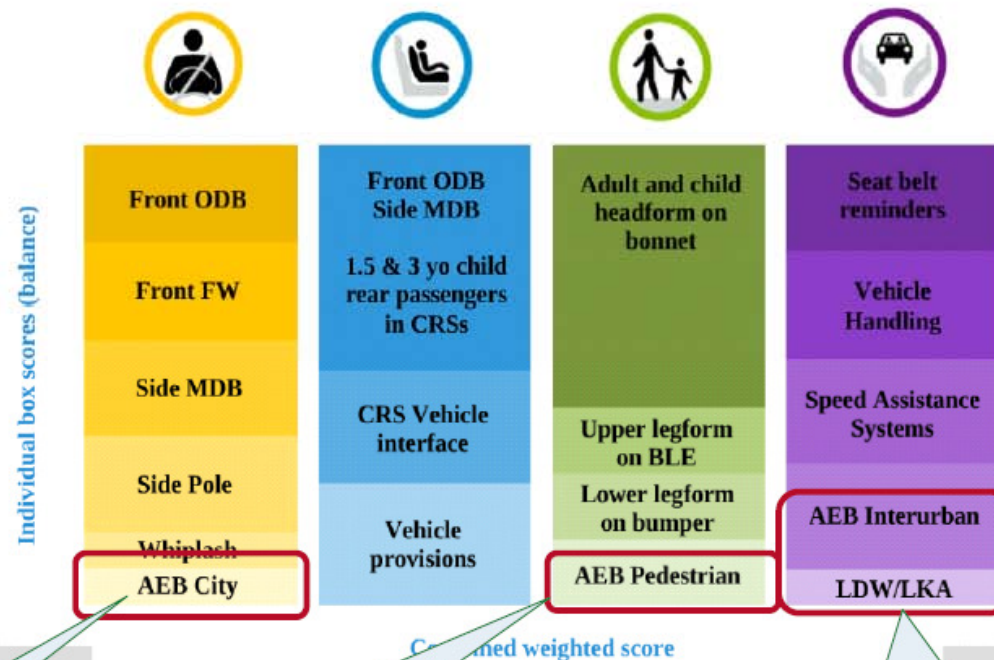
- Infineon confirmed its market leading position with the release of a "77 GHz radar-in-package".
- Multiple design-wins have been recorded at automotive suppliers in the USA, Europe and Asia.

Euro-NCAP 5-Star Rating Requires Radar and/or Camera Technology



- NCAP will drive ADAS.
- RADAR, camera are the key distance sensors enabling Advanced Emergency Braking (AEB).
- RADAR is the sensor of choice to cover critical conditions, e.g. rain, fog, night, bright sunlight.
- Camera is needed for lane assistance (LDW, LKA).

The future overall rating scheme will contain many new items along with smaller and bigger content updates. The overhaul is expected to be completed by 2016.



Starting 2014

Today: LIDAR, but range is too short to get all points.
 Future: 2x range required.
 Only RADAR or Camera enable all points.

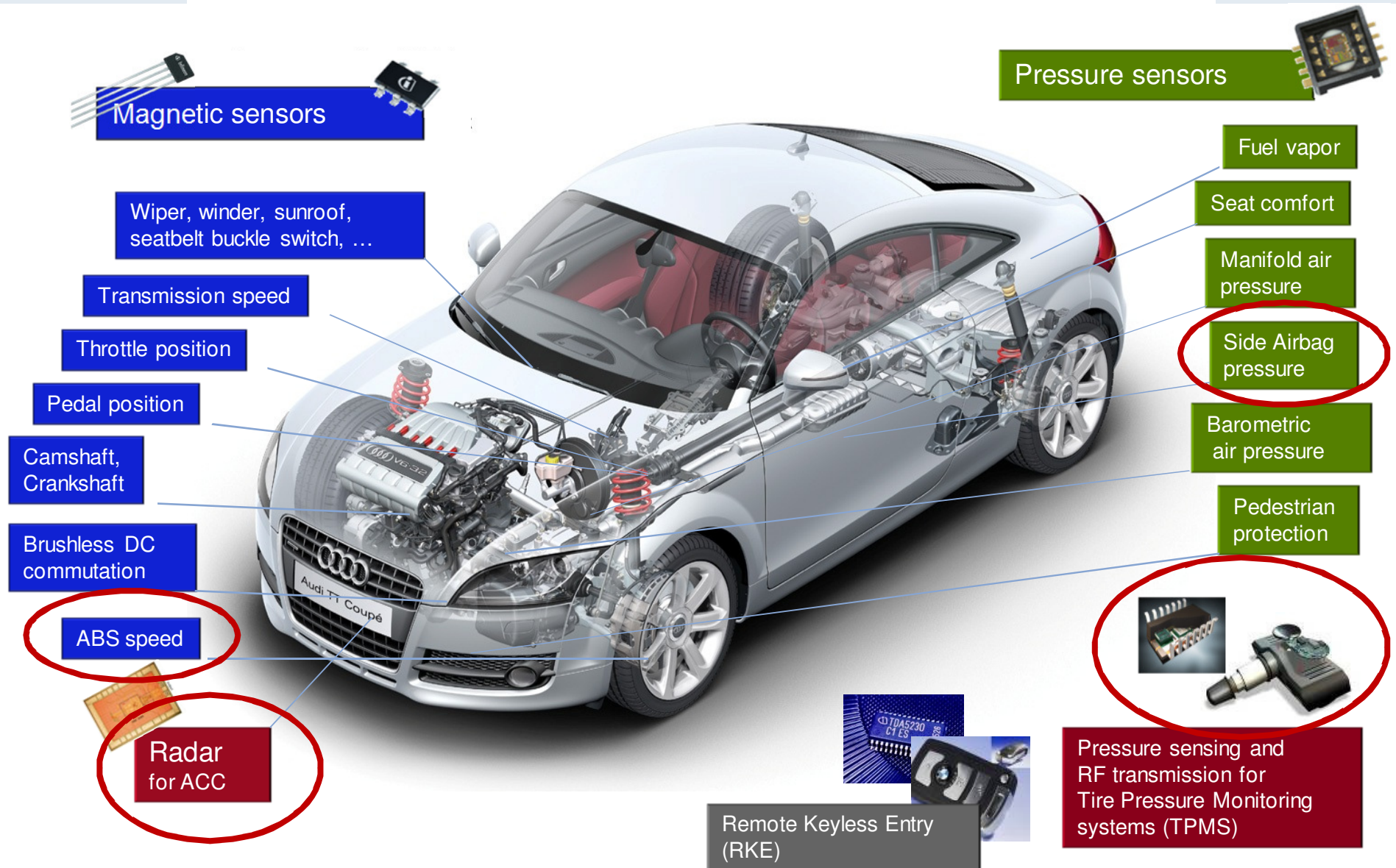
Starting 2016

Today: LIDAR, but range is too short to get all points.
 Only RADAR + Camera enable all points.

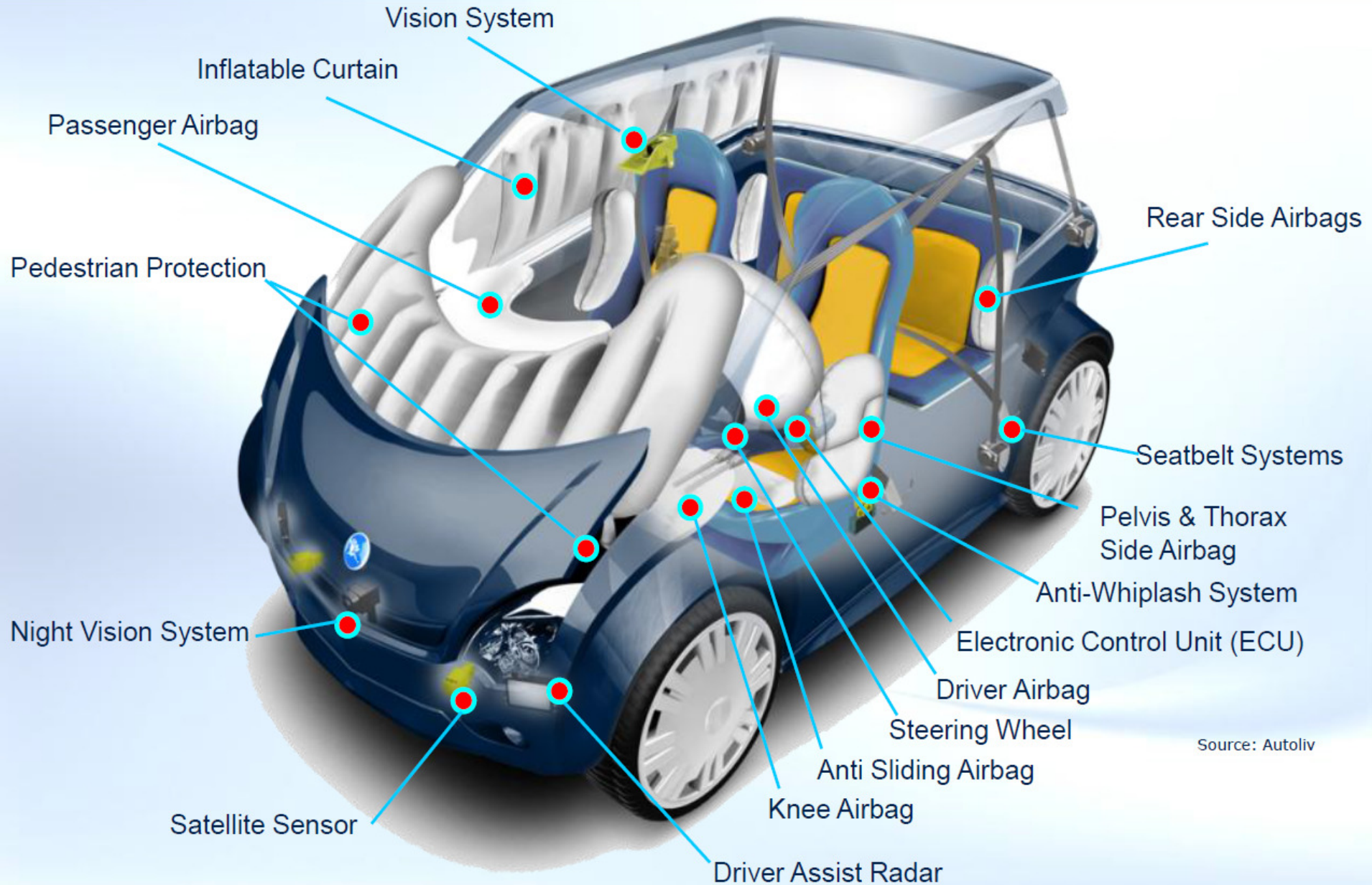
Starting 2014-2017

Long Range RADAR needed (>=70m).
 Camera needed for lane assist (LDW, LKA).

Infineon hat das größte Portfolio an magnetischen Sensoren und Drucksensoren im Automobilmarkt



Active and passive Safety



Source: Autoliv

Infineon Automotive – We make cars ...



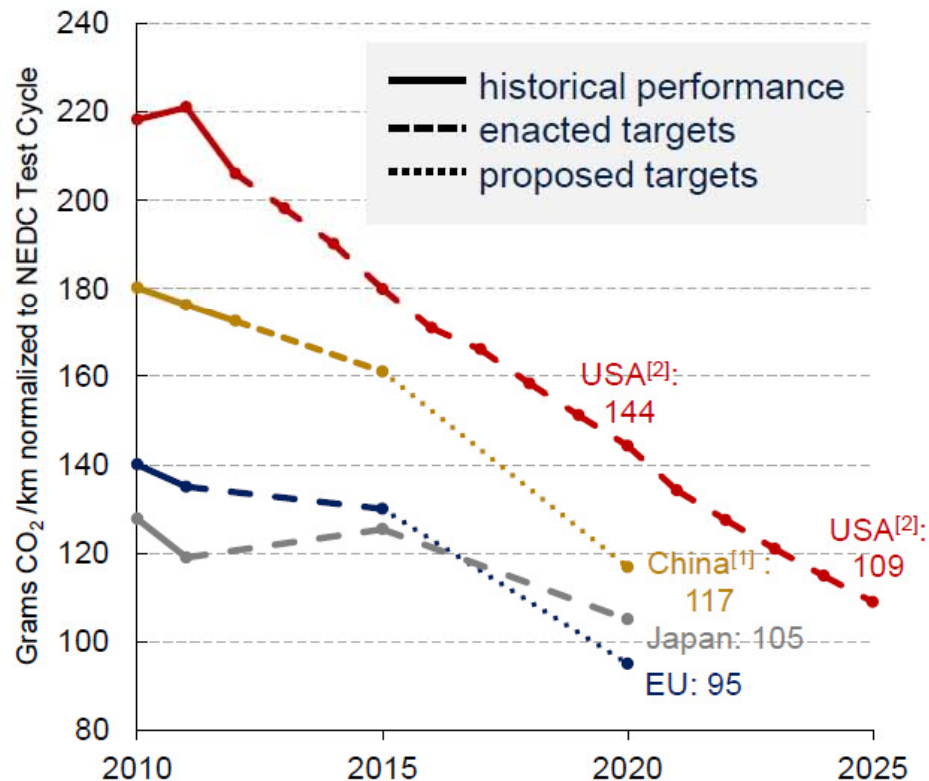
Clean

an example ...

Semiconductors Are Indispensable in Reaching CO₂ Emissions Targets



Historical national fleet emissions performance and future targets



[1] China's target reflects gasoline vehicles only. The target may be higher after new energy vehicles are considered.

[2] US light-duty vehicles include light-commercial vehicles.

Source: The International Council for Clean Transportation

Penetration rate, semi content and CO₂ savings of various applications in European cars



Penetration rate in EU: 2015 81%
2010 70%

Semi content per system: \$17
CO₂ savings: 6 g/km



Penetration rate in EU: 2015 32%
2010 18%

Semi content per system: \$11
CO₂ savings: 1.5 g/km



Penetration rate in EU: 2015 57%
2010 15%

Semi content per system: \$17
CO₂ savings: 5 g/km

Sources: Infineon estimates, Strategy Analytics (SA): "Automotive Semiconductor Demand Forecast 2011 – 2020", July 2013; including semiconductor sensors. All figures based on European production.

Further CO₂ Reduction Possible Through Smart Electrification of Pumps and Motors



CO₂ reduction potential



**Water pump
(cooling)**

Saves ~4g CO₂/km

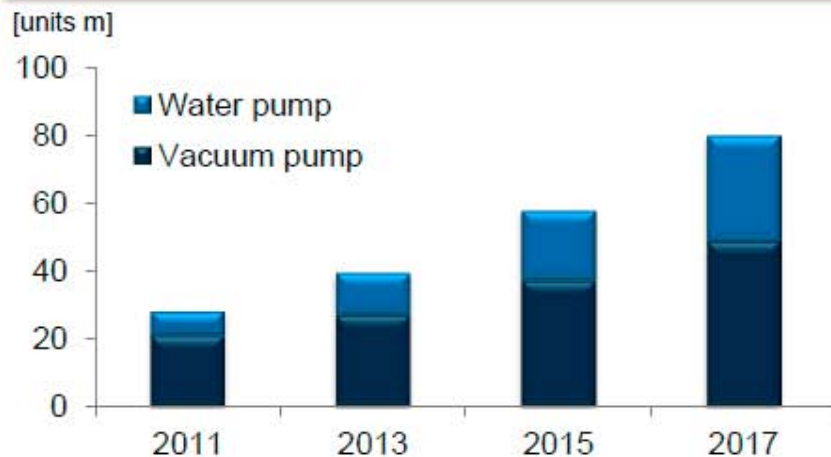


**Vacuum pump
(braking)**

Saves ~1.5g CO₂/km

Source: Infineon estimates

Forecast for motor electrification



Source: Strategy Analytics.

Infineon's system offering

Estimated water pump semi content: ~EUR 5-6



Microcontrollers



Bridge Drivers



MOSFETs



Voltage Regulators



Transceivers

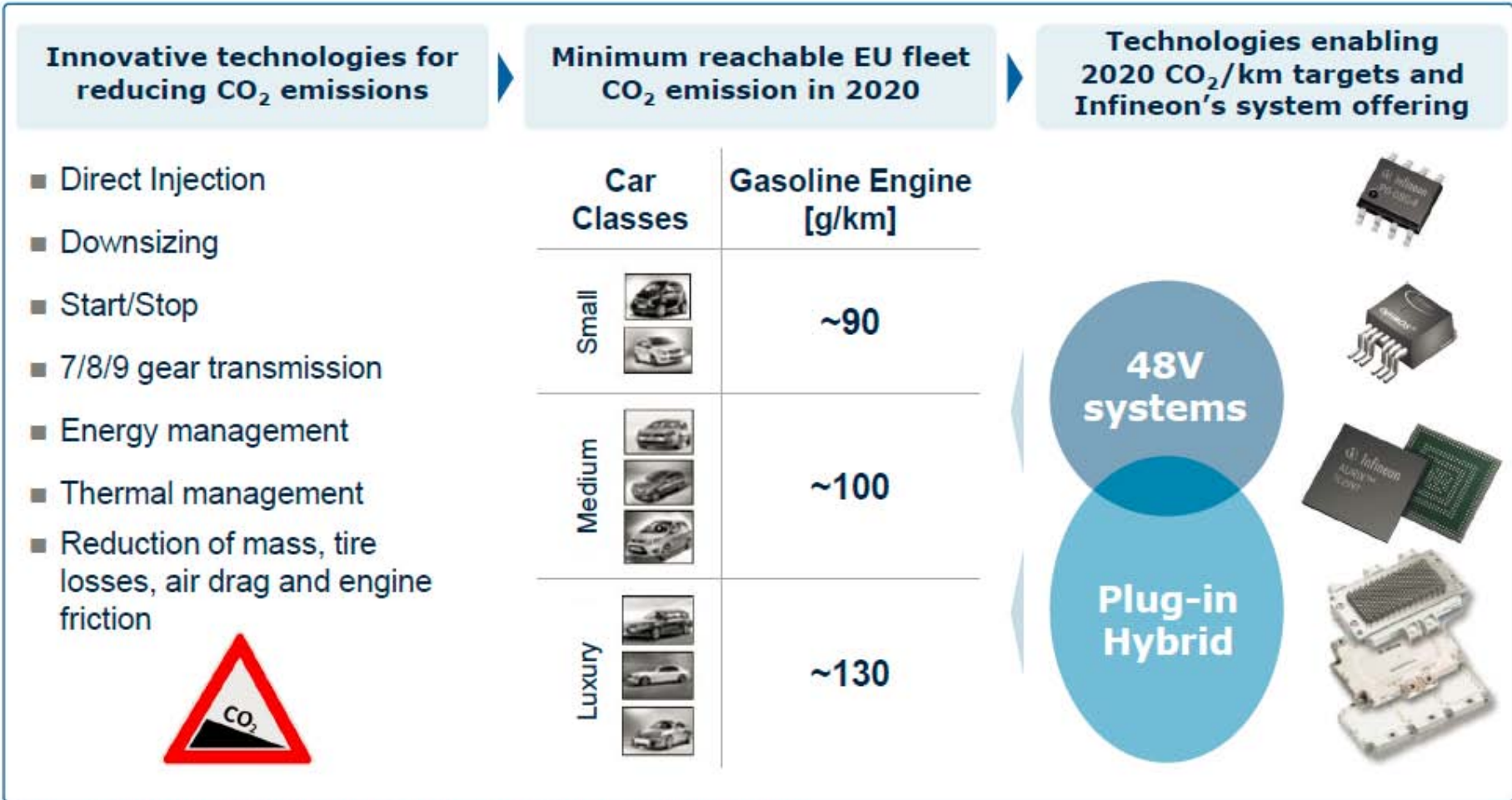
Comments

Many motors are still on-off state driven while pumps are still belt-driven, thus always on. **Smart electrification** means pumps and motors are only activated on demand.

Hybridization or 48V Are Enablers to Reach European CO₂ Targets for 2020



Forecasted CO₂ reduction potential for EU cars



Sources: Institut für Kraftfahrzeuge - RWTH Aachen, December 2012, Infineon estimates

BMW und Infineon: gemeinsam die Zukunft der Elektromobilität gestalten



Leistungselektronik-Modul

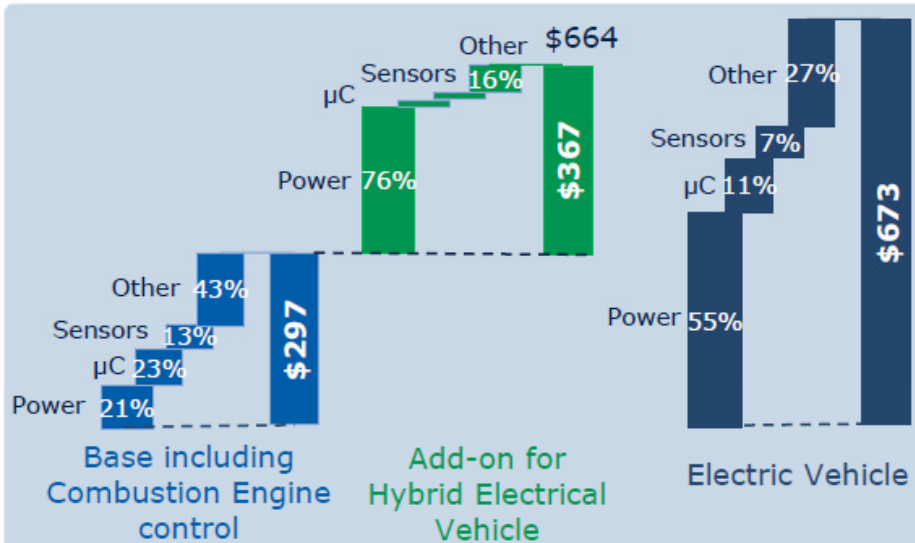


- 75 Halbleiter sorgen für einen hocheffizienten Elektroantrieb im BMW i3, z.B. Mikrocontroller AUDO Future, IGBT Leistungsmodul HybridPACK™ 2, Treiber-Bausteine EiceDRIVER™, CoolMOS™ Hochvolt-MOSFETs.
- Weitere Komponenten: Steuerung von Airbags, LED-Lichtmodul, Lenkungsverriegelung, Scheibenwischer und Gurtaufroller.

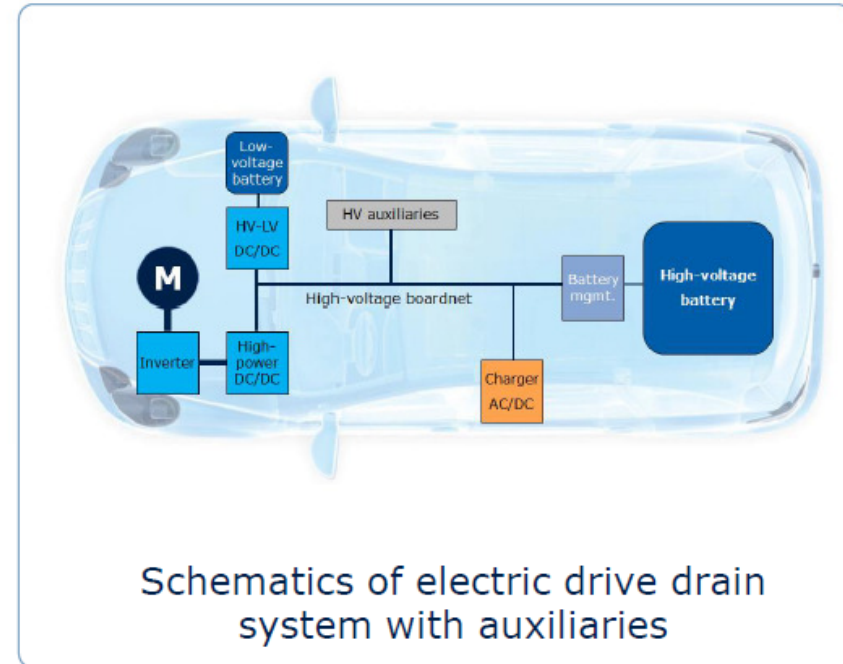
Semiconductors are the Major Enabler of Electric and Hybrid Vehicles



Average bill of material per car



Source: Strategy Analytics, April 2013, January 2012.



- Up to 80% of innovation in automotive is enabled by semiconductors, even more when it comes to Hybrid and EV
- Power Semiconductors are essential for the electrified powertrain and power conversion
- Efficiency of power semiconductor is a direct lever for range and lower system costs

Unsere CO₂-Bilanz: Reduzierte Emissionen durch unsere Produkte und Lösungen



**1,2
Millionen
Tonnen**



**mehr als
15,8
Millionen
Tonnen**

CO₂-Belastung¹⁾

Verhältnis
1:13

CO₂-Einsparung²⁾

Ökologischer Nettonutzen:
CO₂-Reduktion um mehr als 14,6 Millionen Tonnen

**Das entspricht
oder**

- **6,5 Mio Autos (15.000 km@150g/km)**
- **1,82 Mio Haushalte (@8 to. /Jahr)**

Infineon Is the Right Partner for Addressing Security in Automotive ← emerging request

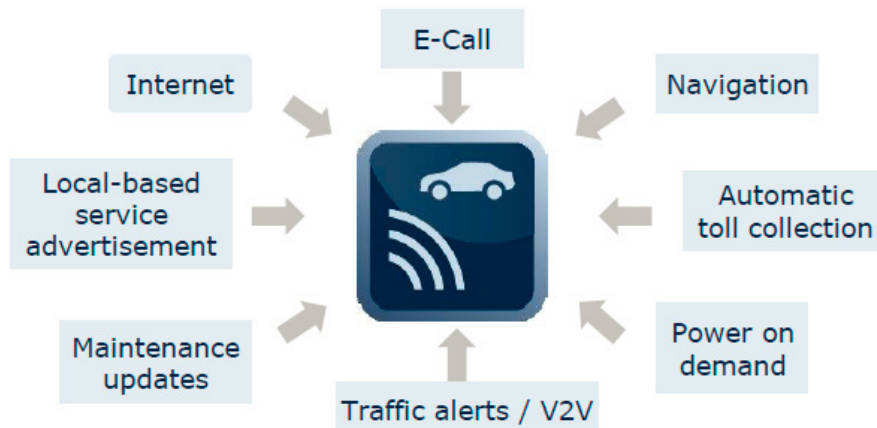


Forecast for cars with embedded telematics



Source: Strategy Analytics; active and inactive systems, cumulative

Applications subject to hacker attacks



Infineon's system offering



Microcontroller with Integrated Security Trust Anchor

AUDOMAX
AURIX™



Secure Elements for Telematics

SLI 76 - AEC-Q100
automotive qualified

Growth Driver Industrial and Off-Road Vehicles



Forklift truck



Hybrid bus



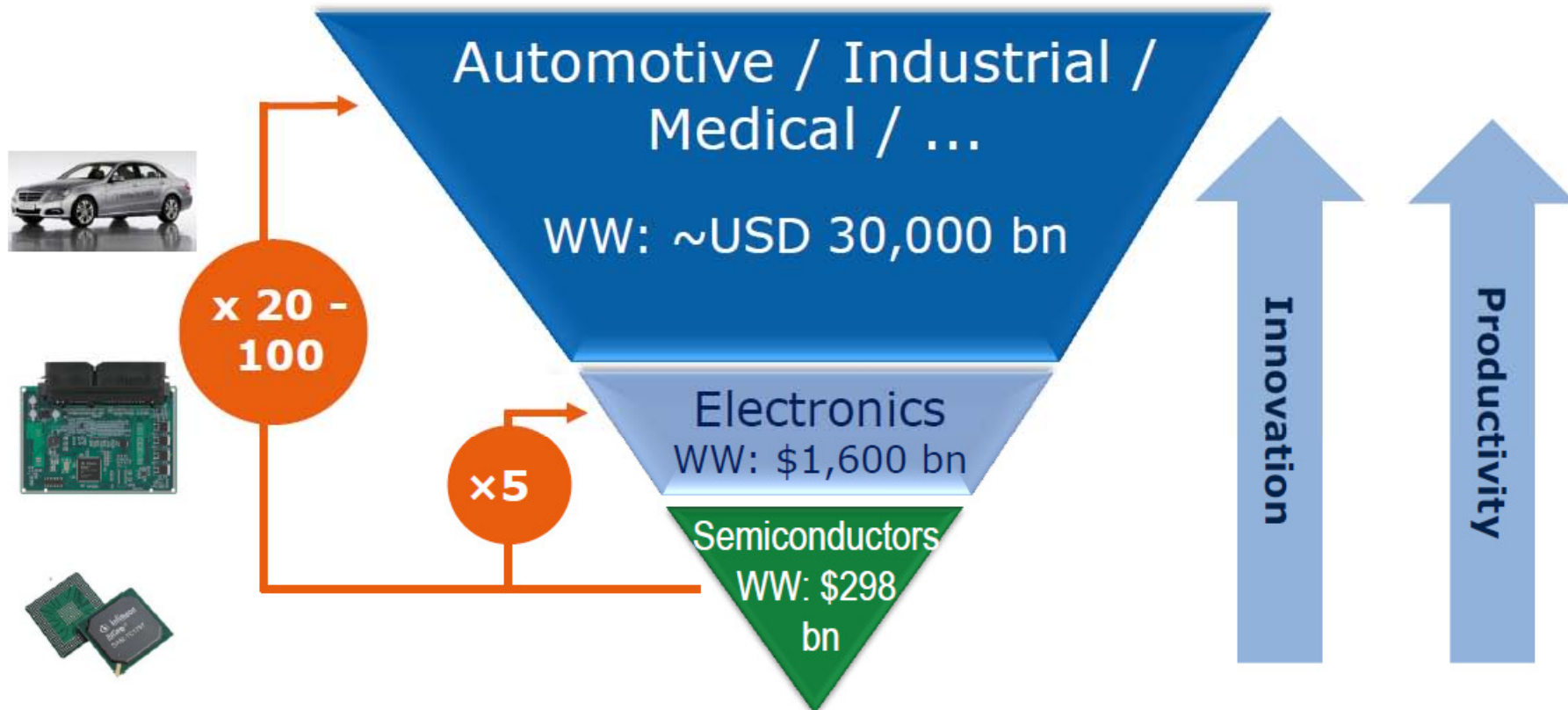
Mining



Trends

- General advantage of pure electric and diesel-electric drives over diesel:
 - less fuel consumption,
 - less CO₂ emission,
 - less noise pollution,
 - less downtime (due to less frequent refueling, less frequent maintenance).
- First industrial vehicles already on the market; hybrid buses and mining vehicles on the rise.

Semiconductors are a Key Enabling Technology and Most Likely the Key Source of Productivity



- About 45% of the OECD Economic growth since 1985 comes from increased productivity, electronics is a key driver for this growth
- Decent system understanding enables semiconductor companies to develop solutions which increase productivity
- Example Automotive: 70-80% of innovations depend on electronics

Quelle: DECISION, ESIA, Future Horizons, IMF, WSTS 2010, AUDI, OECD Factbook 2013

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ENERGY EFFICIENCY MOBILITY SECURITY

Innovative semiconductor solutions for energy efficiency, mobility and security.

