Automotive Division (ATV) Call

08 October 2019

Peter Schiefer, Division President Automotive

Agenda

1. Automotive division at a glance
2. Contribution by Cypress
3. Electro-mobility
4. Automated Driving
5. Macro-economic situation and short/mid-term outlook

Long-term semi content drivers intact; improved market position in all addressed product categories

Strong drivers for semi content per car

electro-mobility

- driven by legislation
- all kinds of xEV, including 48 V
- today China; tomorrow Europe

automated driving

- near-term L1/L2/L2+
- long-term L3/L4/L5
- need for dependable functionalities* (e.g. sensors, power supplies, computing power)

comfort, premium

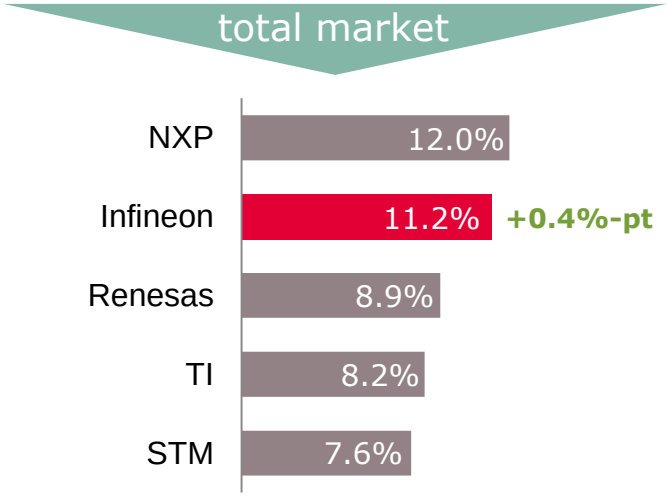
- comfort features trickling down from high- to mid-range
- user experience
- lighting
- replacement of hydraulic and electro-mechanical units

* For more information on “dependable functionalities” please see slide 18.

Automotive semiconductor market

2018 total market size: $37.7bn

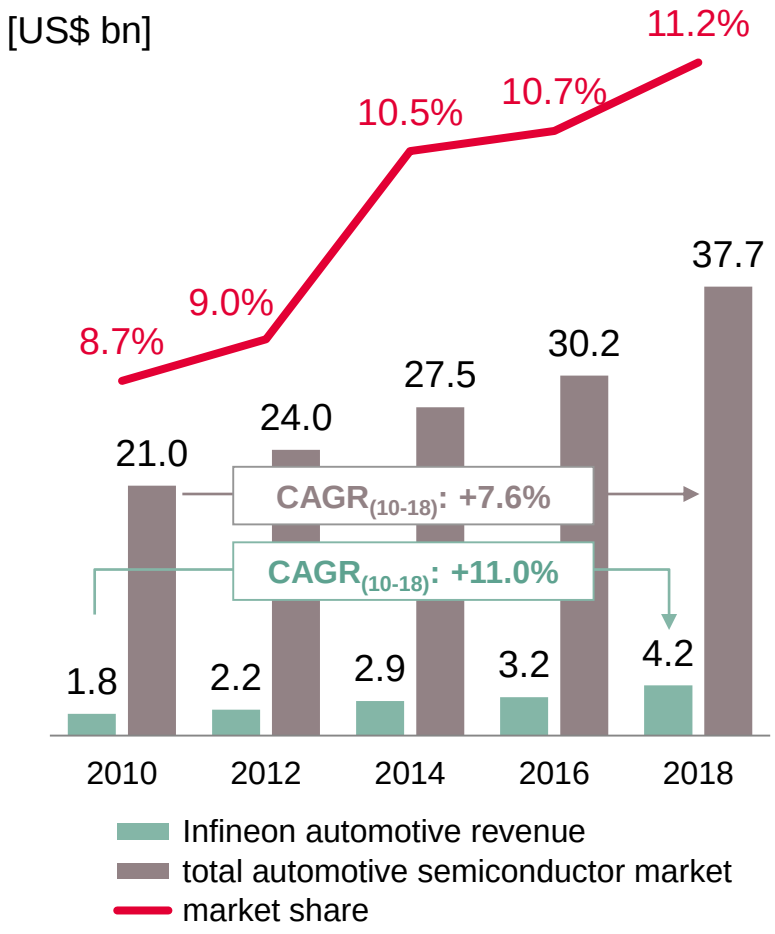
- **#1 in power:** market share of 26.2% (+0.2 %-pt)
- **#2 in sensors:** market share of 13.4% (+0.5 %-pt)
- **#4 in µC:** market share of 9.1% (+0.6 %-pt)



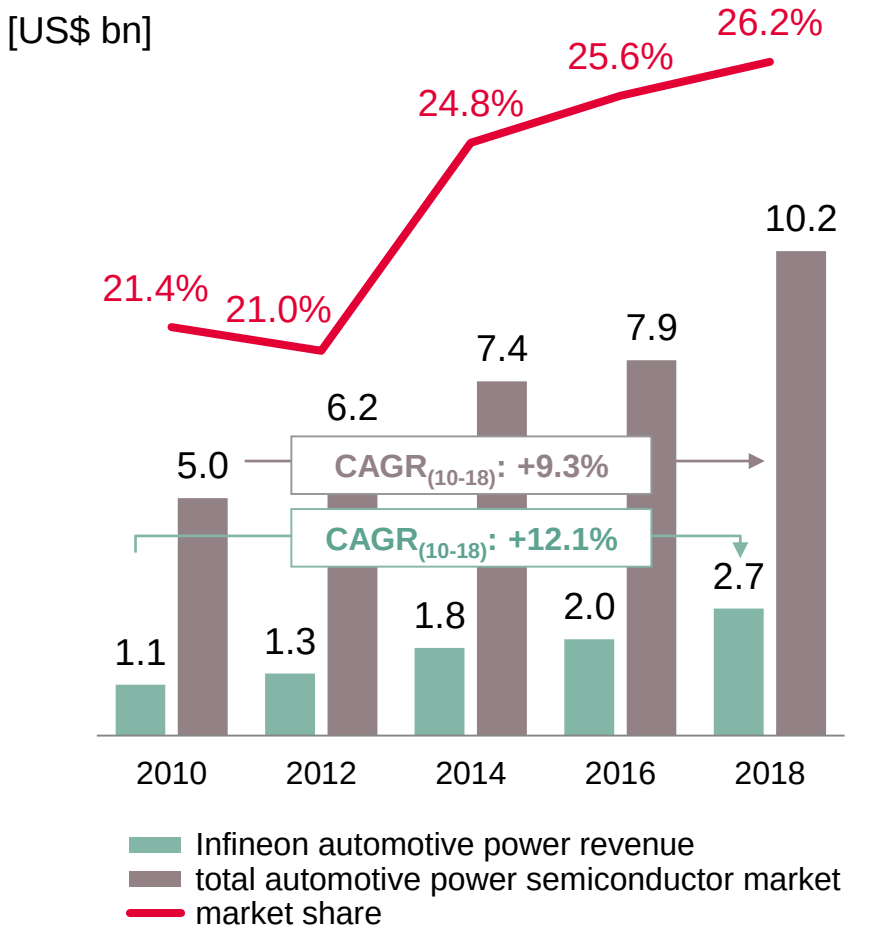
Source: Strategy Analytics, "Automotive Semiconductor Vendor Market Shares", April 2019

Infineon is outgrowing the automotive semiconductor market by ~3%-points

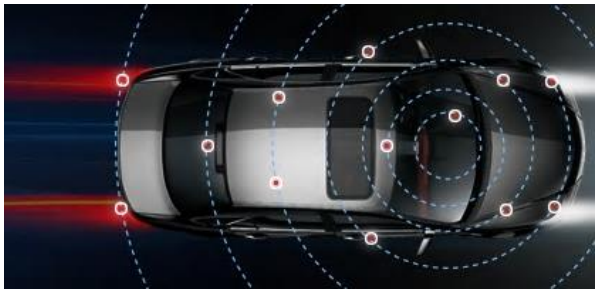
Automotive semi market development*



Automotive power semi market development*



* Infineon automotive revenue as reported to Strategy Analytics incl. revenue from ATV, IPC and PMM. Adjusted to calendar year.
Source: Strategy Analytics, "Automotive Semiconductor Vendor 2018 Market Share", April 2019.

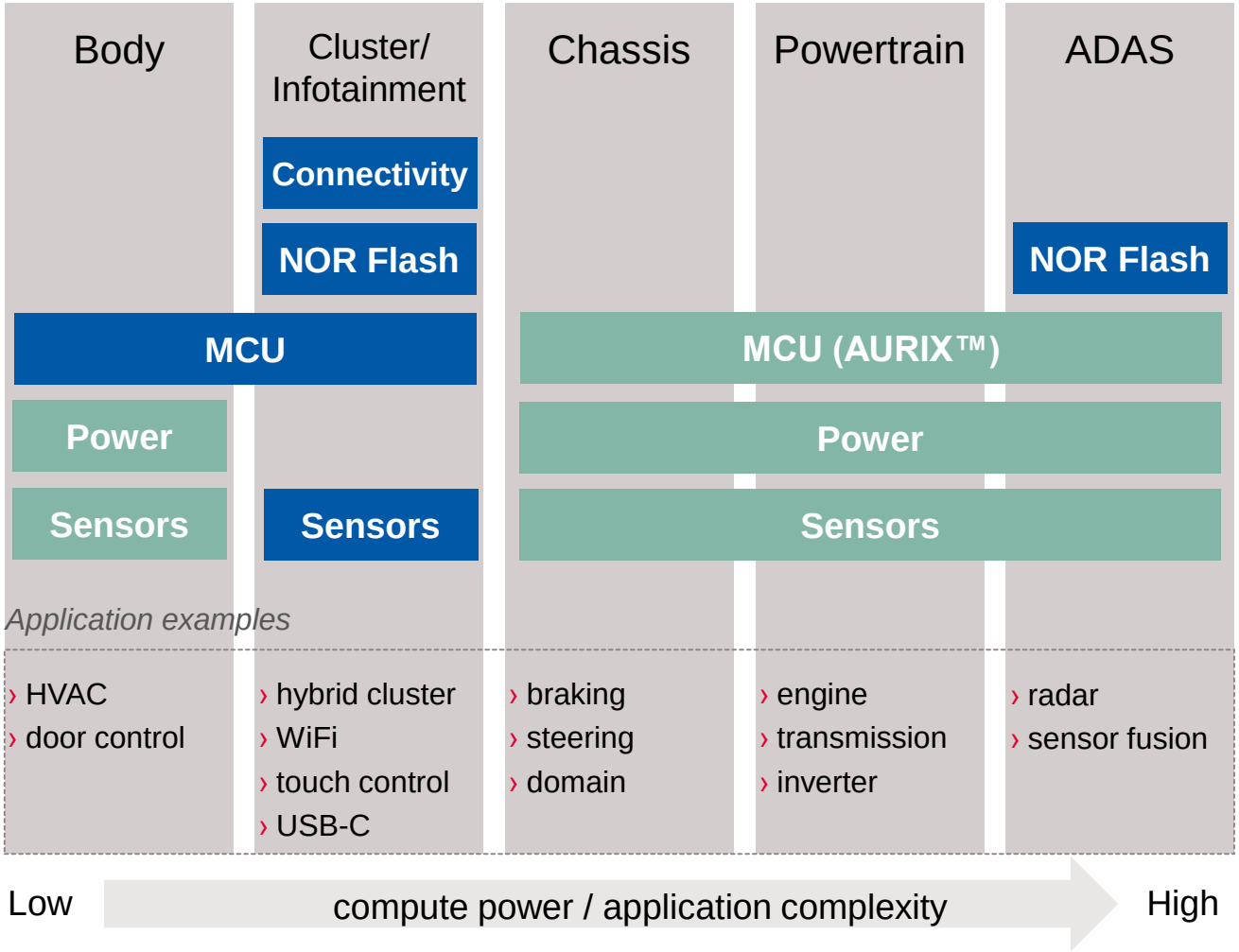


Strengthening the link between the real and the digital world

Contribution by Cypress

Infineon and Cypress portfolios complement each other covering entire range of auto applications

Full coverage of all application fields within automotive



Benefits of combination

Creating the #1 auto semi vendor

Complementary MCU portfolio results in:

› broader customer access

› cross-selling opportunities

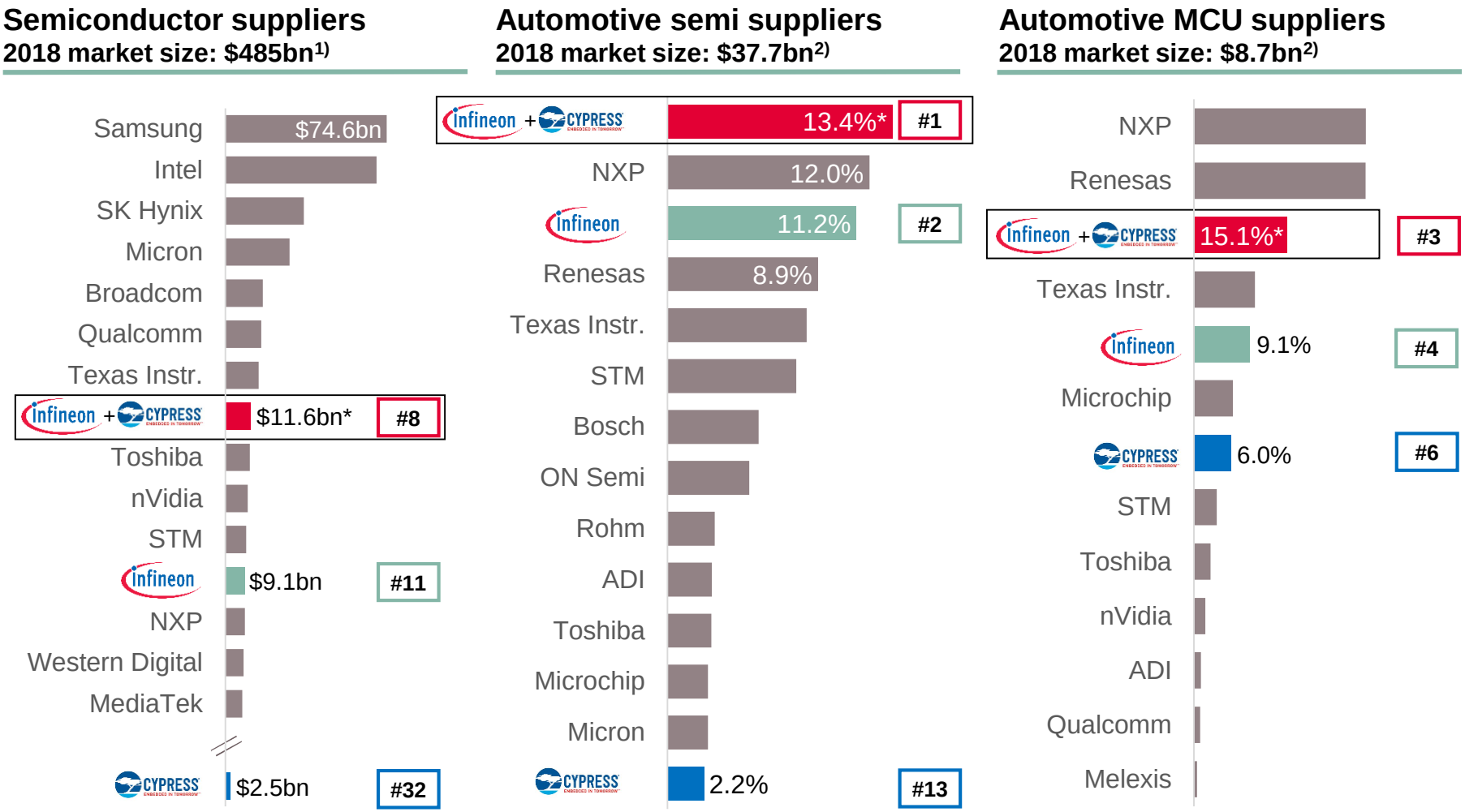
Portfolio expansion through:

› connectivity (WiFi, Bluetooth, USB-C)

› external NOR flash for processors in cars

Legend: Infineon | Cypress

With the acquisition of Cypress Infineon increases scale and strengthens its market position

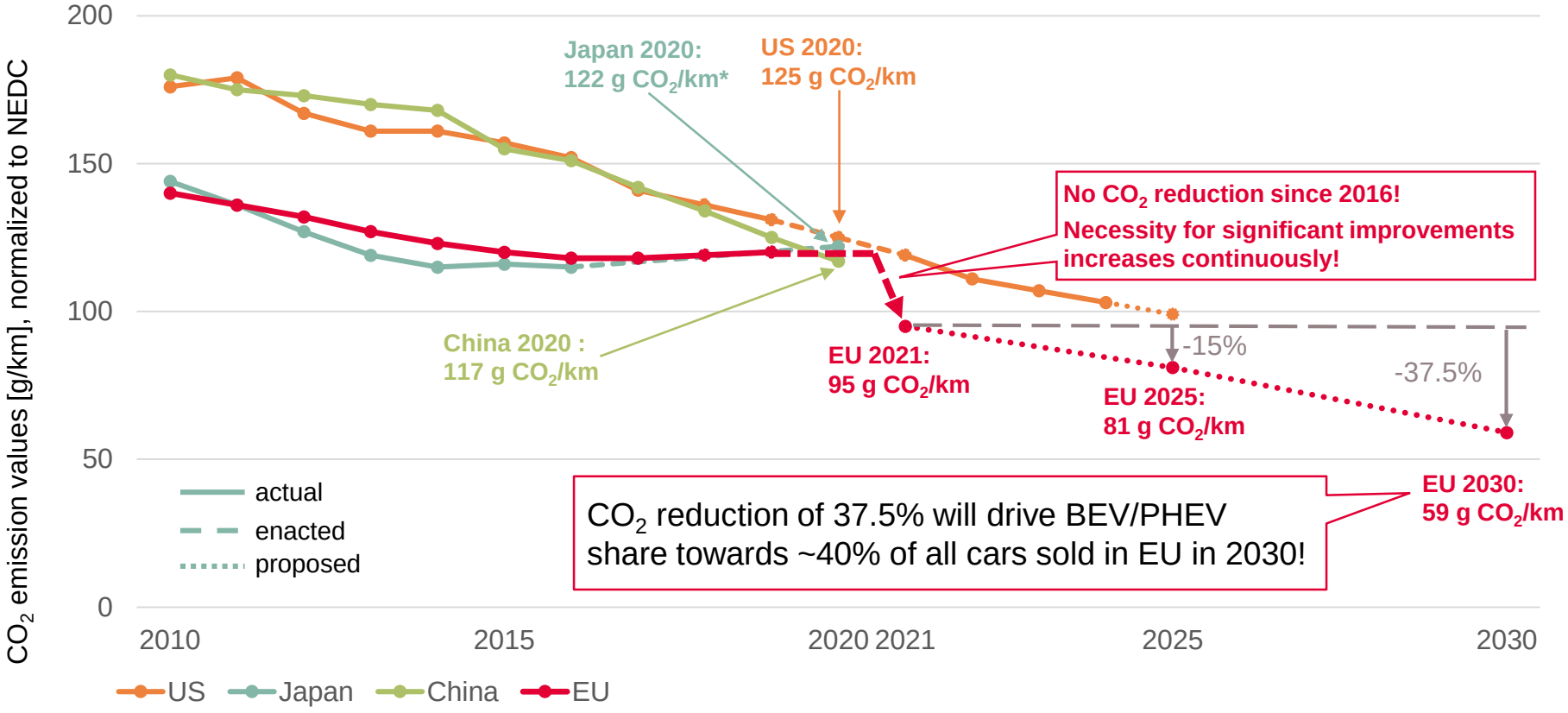


* pro forma figure; rounded.
1) Based on content supplied by IHS Markit, Technology Group, "Annual 2001-2018 Semiconductor Market Share Competitive Landscaping Tool – 2019", August 2019.
2) Strategy Analytics, "Automotive Semiconductor Vendor 2018 Market Shares", April 2019.

Electro-mobility

xEV growth driven by EU emission regulation; CO_2 reduction of 37.5% by 2030 vs 2021

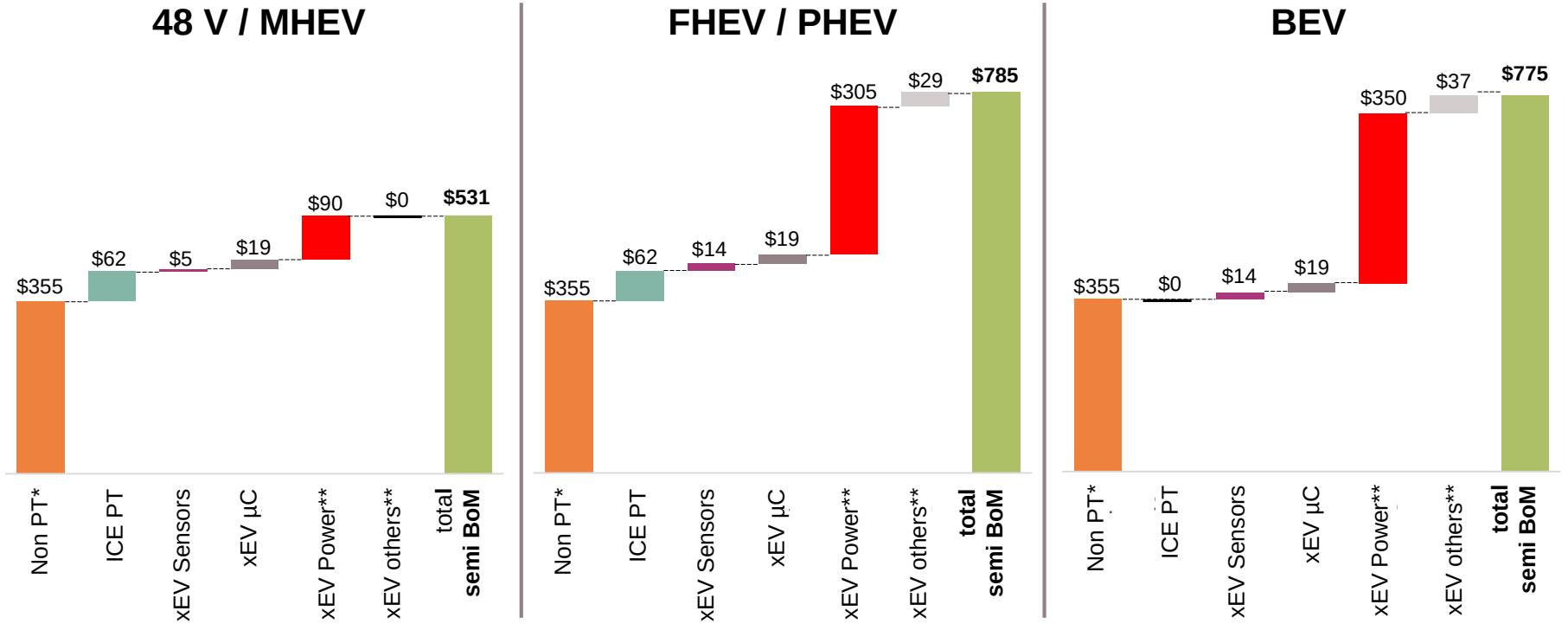
CO_2 emission development and regulations for main regions



* Japan has already met its 2020 statutory target as of 2013
Source: ICCT (www.theicct.org), August 2019

The incremental demand of power semiconductors is a significant opportunity

2019 average xEV semiconductor content by degree of electrification

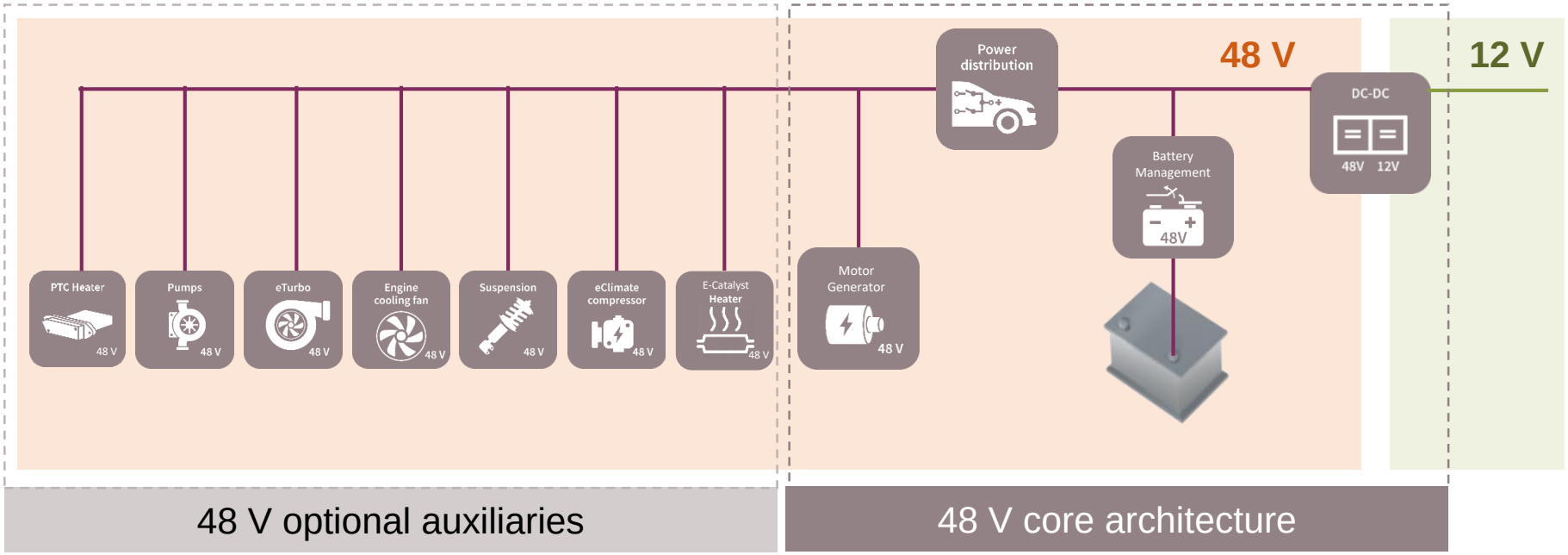


2018	0.3m vehicles	2.9m vehicles	1.7m vehicles
2020	2.3m vehicles	4.8m vehicles	3.2m vehicles
2025	20.6m vehicles	10.5m vehicles	10.2m vehicles
2030	30.0m vehicles	14.1m vehicles	15.8m vehicles

Source: Infineon; IHS Markit, Automotive Group, “Alternative propulsion forecast”, September 2019; Strategy Analytics, "Automotive Semiconductor Content", August 2019.
* Non PT (non powertrain): average semiconductor content in Body, Chassis, Safety & Infotainment application segments.
** "power" includes linear and ASIC; "others" include opto, small signal discrete, memory

48 V mild hybrid propulsion system offers many benefits beyond CO_2 savings for gasoline and diesel

In addition to CO_2 reduction, 48 V improves driving performance, supports lower emission level and enables better comfort



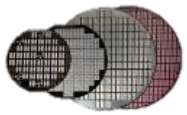
- enables better comfort (heating, suspension)
- supports emission reduction with electrically heated catalyst (e.g. EURO7)
- reduces CO_2 with load electrification

- reduces CO_2 between 5% and 15%
- improves driving performance
- reduces emission with torque boost (e.g. EURO7)

Infineon offers a large product portfolio addressing all key components for the xEV segment

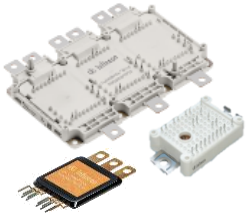
Infineon product portfolio covers high-voltage as well as 48 V solutions

high-voltage



Bare die

discrete IGBTs



HybridPACK™

EiceDRIVER™

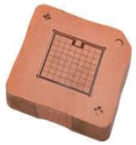
AURIX™

OPTIREG™

48 V

Bare die

OptiMOS™



Chip Embedding

Driver IC

AURIX™

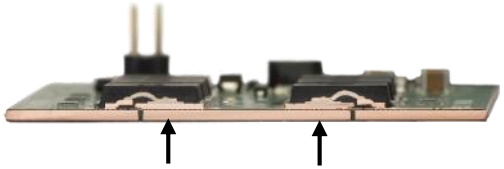
OPTIREG™

Power + Driver + µC + Power Supply

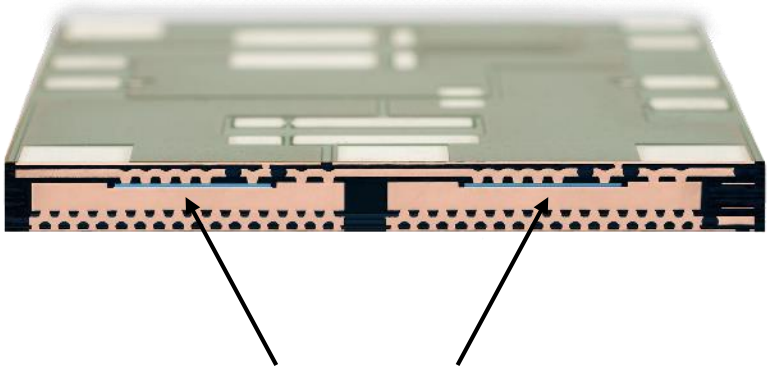
Groundbreaking chip embedding technology boosts system performance of 48 V mild hybrid systems

Technological advantages of chip embedding

- Performance improvement of 48 V systems; up to 60% compared to a traditionally designed system
- Reduction of system complexity and system cost
- Increase of power density, energy efficiency and reliability



traditionally: MOSFET soldered on the PCB; then wire bonded



innovative chip embedding technology:
Infineon OptiMOS™5 integrated within the PCB

Project Features

- Infineon's latest 80 V MOSFET technology is applied: OptiMOS™5
- Infineon's power inlay combines an innovative die attach process with a specially designed Cu substrate for highest system performance
- Infineon's power inlay comes fully tested, ready for chip embedding
- Embedded power PCB technology provided by Schweizer: Smart p² Pack®
- New chip embedding technology will be used first in a 48 V starter generator application by Continental in 2021

Infineon is new partner in Volkswagen's strategic supplier network FAST

- FAST (Future Automotive Supply Tracks) was established in 2015
- Today, FAST includes 66 partners
- FAST intensifies cooperation of Volkswagen with its most important suppliers and partners in central areas of innovation
- Appreciation of Infineon's competence in electro-mobility and its contribution to the Volkswagen modular electric drive platform (MEB), (e.g. power semiconductors, modules)

Dr. Helmut Gassel (left), CMO Infineon, and Michael Bäcker, head of procurement Connectivity, eMobility and Driver Assistance, at the FAST Nomination in Wolfsburg, Germany, on 10 May 2019

- The Volkswagen Group has announced that it intends to launch almost 70 new e-models and build 22m e-vehicles over the next 10 years
- Most of them will be based on MEB, including the new ID. family from the Volkswagen brand, as well as models from Audi, Seat and Škoda

Hyundai has chosen Infineon's CoolSiC™ products for their next generation EVs

General CoolSiC™ value contribution to customers

Higher mileage with same battery capacity

› Trench-based SiC devices increase power efficiency compared to alternative technologies

Easy scalability from IGBT to SiC-based inverters

› HybridPACK™ CoolSiC™ power modules and EiceDRIVER™ high-voltage drivers allow upgrade from IGBT to SiC in the same footprint

Additional value for Infineon's customers

✓ Unique automotive quality and reliability levels

✓ High-volume production track record of dedicated electro-mobility products

Automated Driving

Increased sensor requirements drive the content in the next five years and beyond

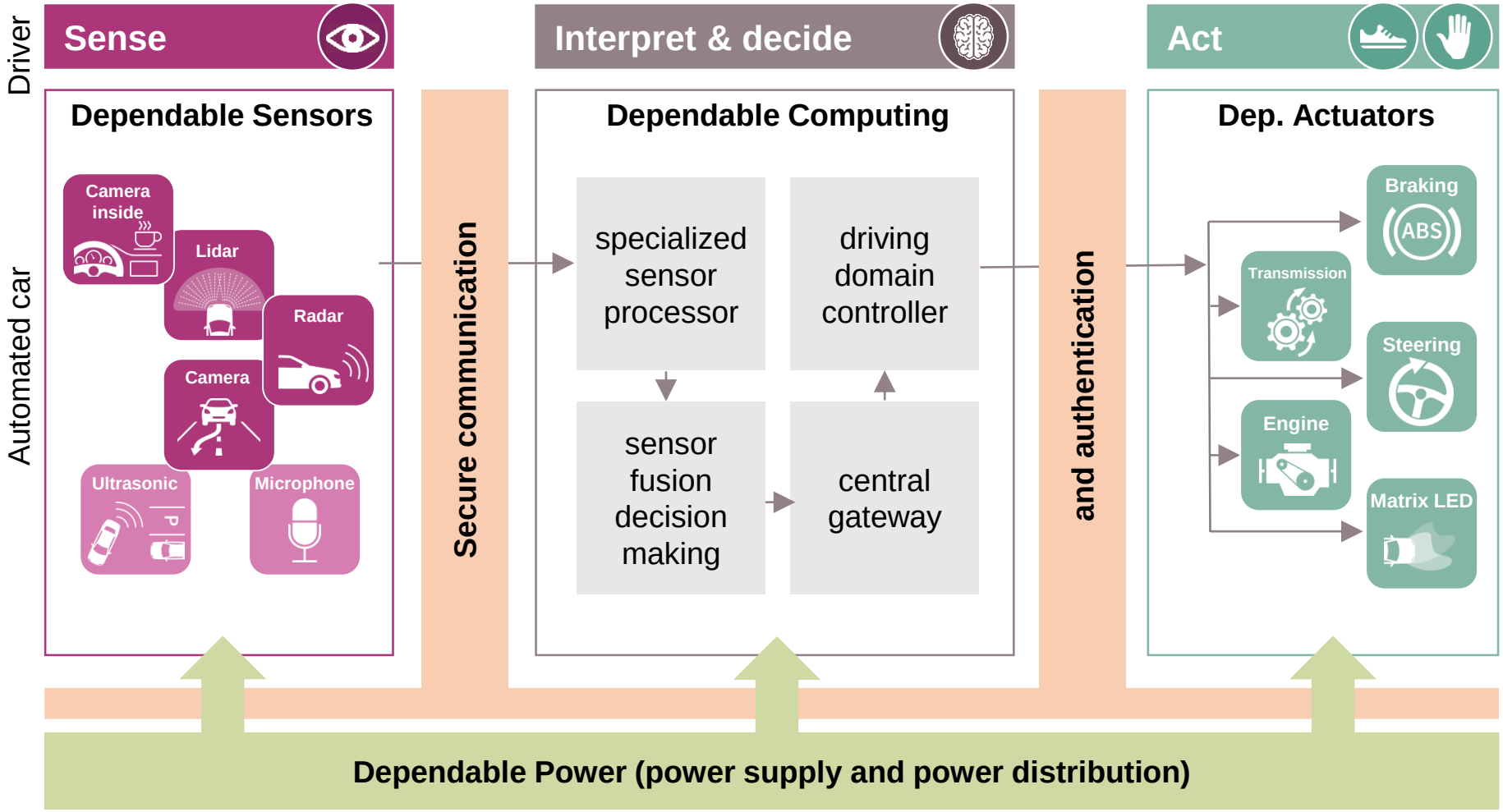
More sensors required for any next level of automation

	NCAP 5 Star, AD L2	AD L2+/L3	AD L4/L5
Application*	Automatic emergency brake/ forward collision warning Parking assist Lane keep assist	Highway assist	Valet parking Highway and urban chauffeur
Radar # of modules**	Corner MRR/LRR ≥ 3 New: Corner; starting 2020	MRR/LRR ≥ 6 Corner	Imaging ≥ 10 Surround
Camera # of modules**	≥ 1	≥ 4	≥ 8
Lidar # of modules**	0	≤ 1	≥ 1
Others	› Ultrasonic	› Ultrasonic › Interior camera	› Ultrasonic › Interior camera › V2X

* Source: VDA (German Association of the Automotive Industry); Society of Automotive Engineers
** market assumption

Vision Zero – AD requires failure-tolerant availability of the system in the environment, “better than a human”

A failure-tolerant system with high availability relies on dependable key functionalities



ADAS/AD semi growth driven by radar and camera sensor modules over the next 5 years

Average semiconductor content per car by level of automation at the given years

NCAP 5 Star/AD L2

L2 vehicles in 2020: ~6m

AD L2+

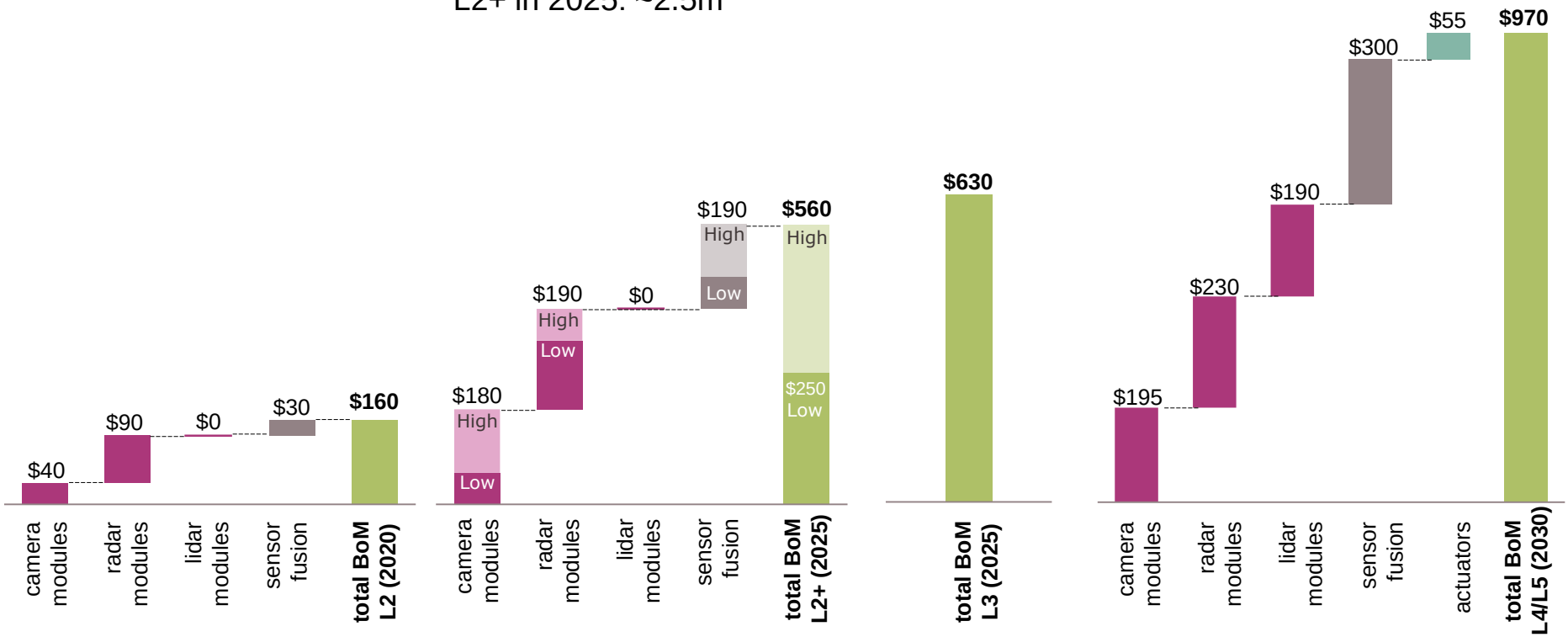
L2+ in 2022: ~1m
L2+ in 2025: ~2.5m

AD L3

L3 in 2025: ~1.5m

AD L4/L5

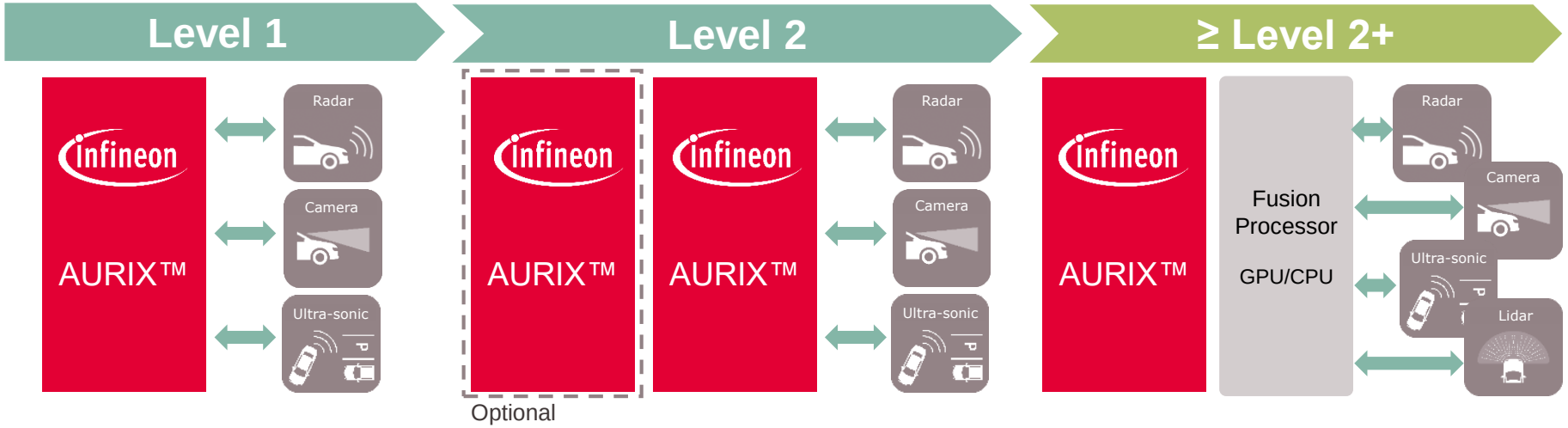
L4/L5 vehicles in 2030: ~4m



Source: Strategy Analytics; Infineon.
BoM contains all type of semiconductors (e.g. radar modules include µC); sensor fusion does not include memory.
BoM are projected figures for the respective time frame.

Outstanding characteristics make AURIX™ first-choice microcontroller for ADAS/AD platforms

- AURIX™ family provides leading technology for sensor fusion either as main fusion computer for L1/L2 or host controller for higher autonomy levels.
- Major OEMs from Europe, Japan, Korea, China, and North America will ramp production in 2021.



AURIX™ functionalities

- fusion and decision-making
- safety management
- security management
- vehicle gateway

AURIX™ functionalities

- parallel usage to enable scalability with compatibility
- safety management
- security management

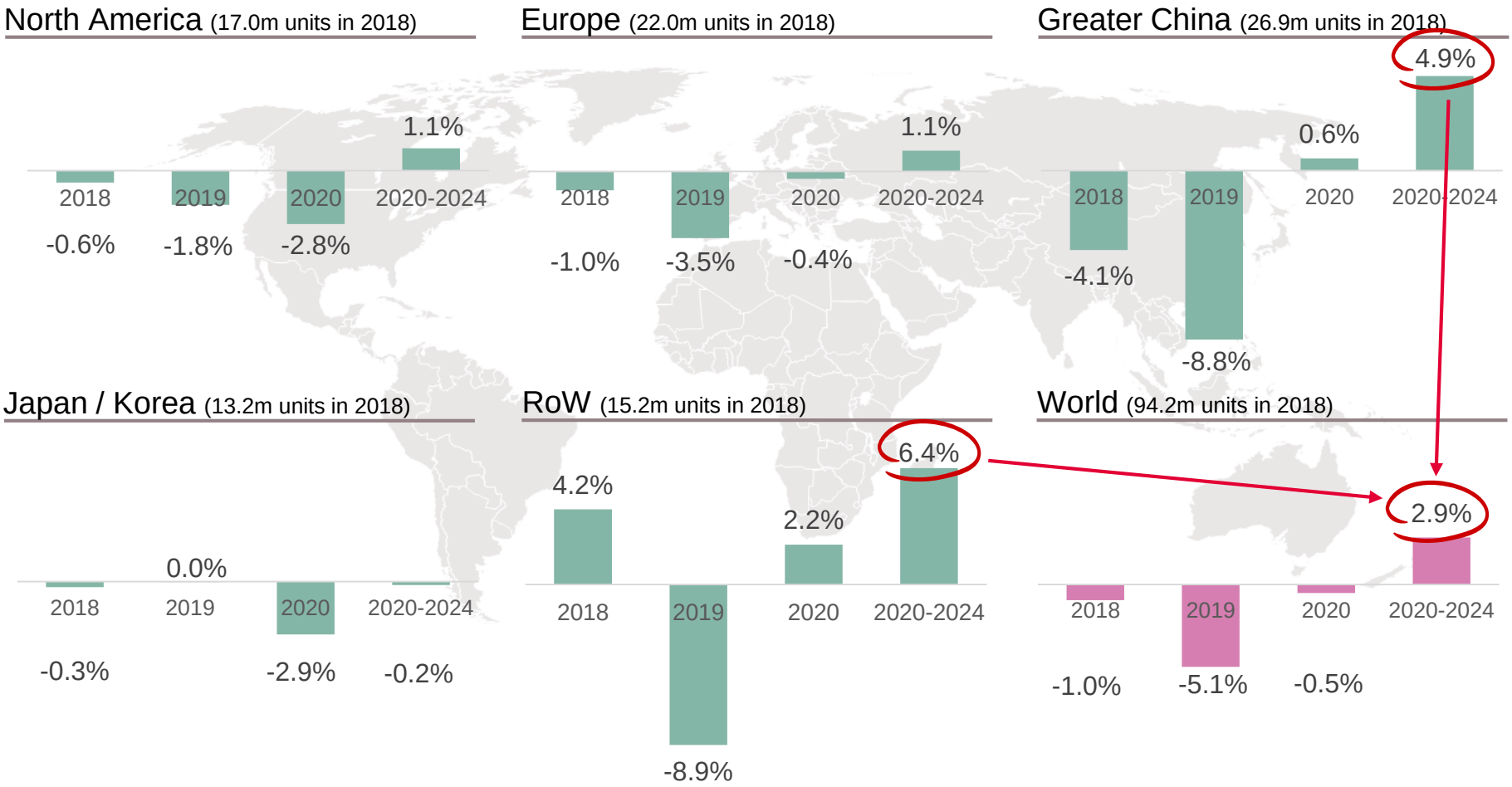
AURIX™ functionalities

- host controller for the data fusion processor
- enables ISO 26262 ASIL-D
- emergency response in case of a GPU/CPU fail

Macro-economic situation and short-term/mid-term outlook

Light vehicle production forecast to drop in 2019 and 2020; recovery in 2021+ driven by China and RoW

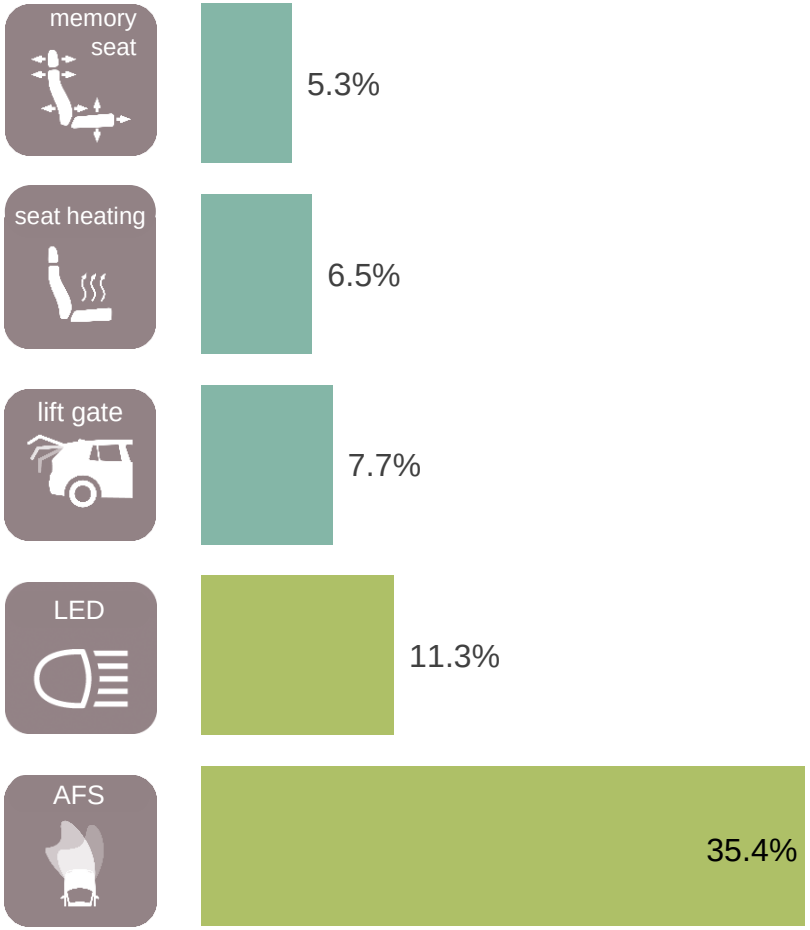
Light vehicle production (y-y growth)



Source: IHS Markit, Automotive Group, “Light Vehicle Production Forecast by Region and OEM Brand”, September 2019

Comfort and design will further drive innovation and growth in ‘classical’ segments

Examples of growing applications in classical segments (market CAGR$_{(19-24)}$)



› Comfort features drive growth within the body & infotainment segments

› Lighting is becoming a key element of OEM brand recognition and design signature

Source: Strategy Analytics, August 2019

Infineon and Nichia to build high-definition micro-LED matrix solution for adaptive driving beams

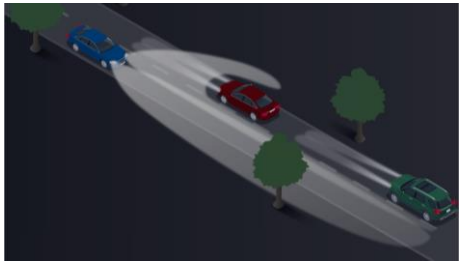
Nichia and Infineon develop a high-definition (HD) light engine

- 16K µLEDs for front light applications
- resolution ~180x as high as that of comparable solutions
- HD light to the entire field of view

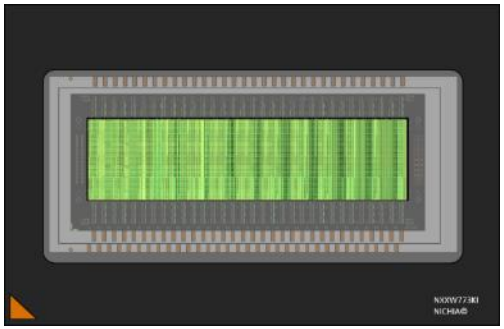
- new driver IC control and diagnose all 16K µLEDs individually
- significantly higher energy efficiency

Examples of applications

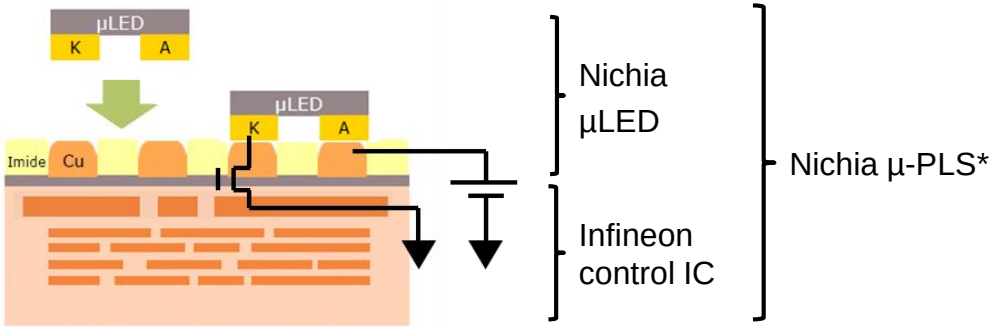
project markings on the road



glare-free high beam



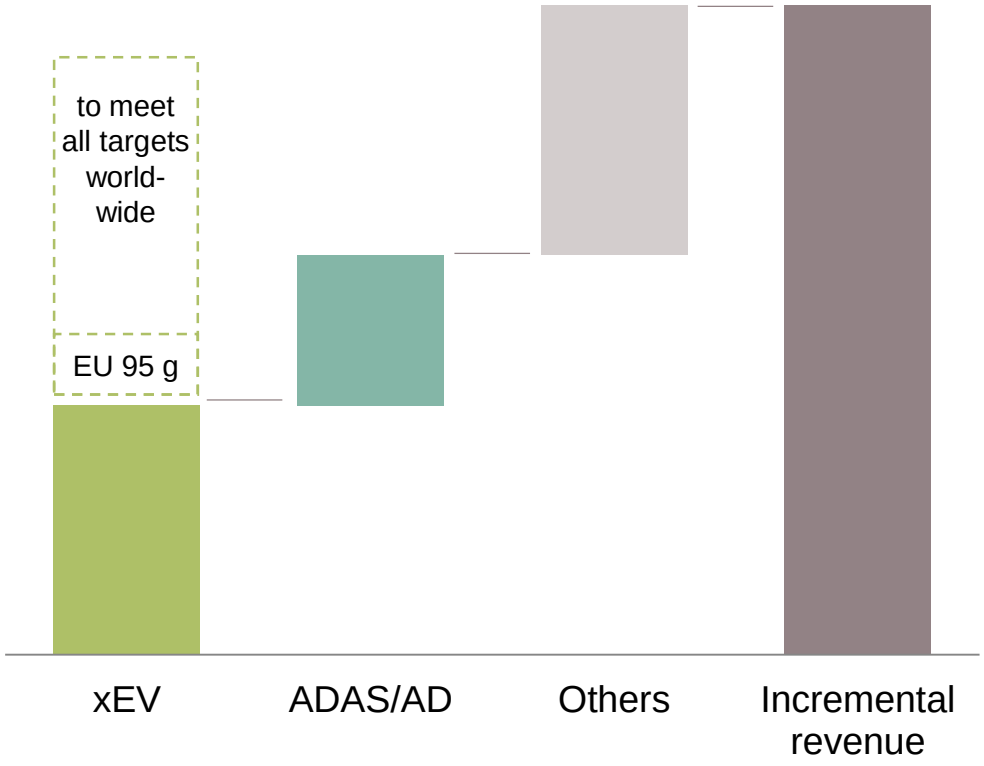
Nichia µ-PLS*



* micro pixelated light source

ATV's long-term growth is driven by xEV, ADAS/AD, and conceptual changes of the car architecture

Composition of incremental € revenue over five year planning horizon by application



xEV

- short-term, growth rate in China more volatile
- EU target (95 down to 59 g/km CO_2) contributes additional growth momentum throughout next decade

ADAS/AD

- mid-term, semi content is driven by NCAP and ADAS L1/L2/L2+
- long-term, AD L3/L4/L5 will create additional structural growth

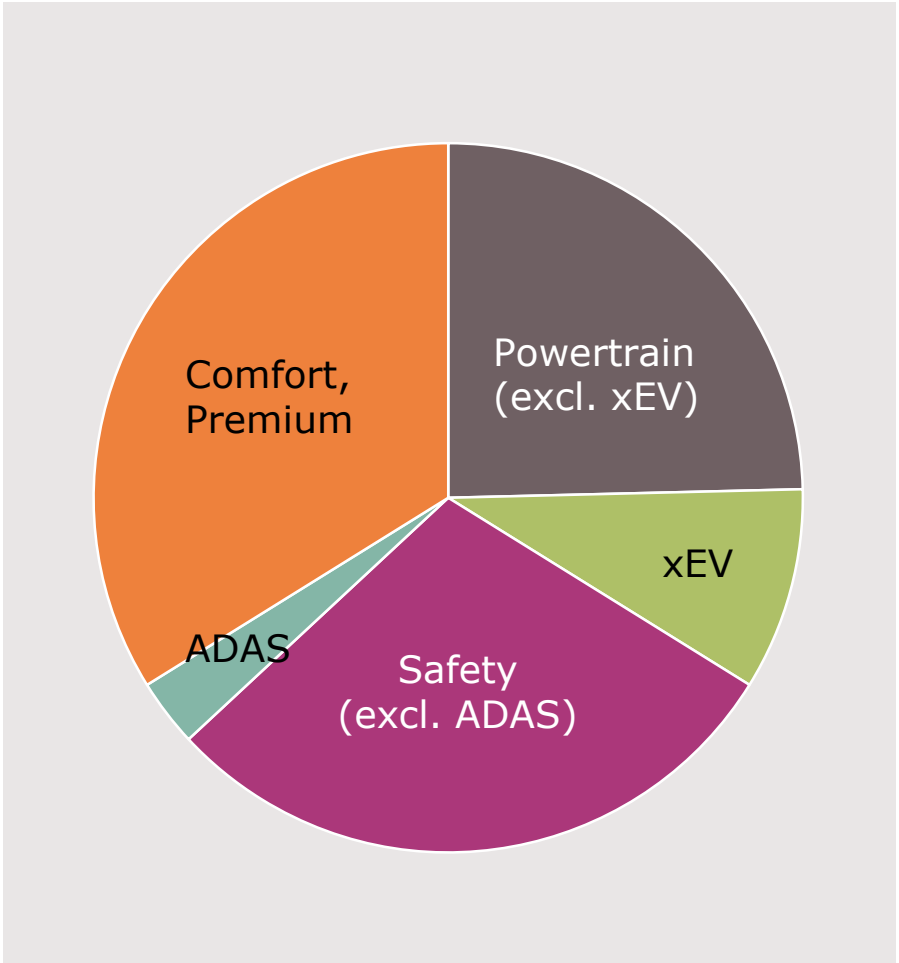
Others

- comfort features
- user experience
- lighting
- replacement of hydraulic and electro-mechanical units

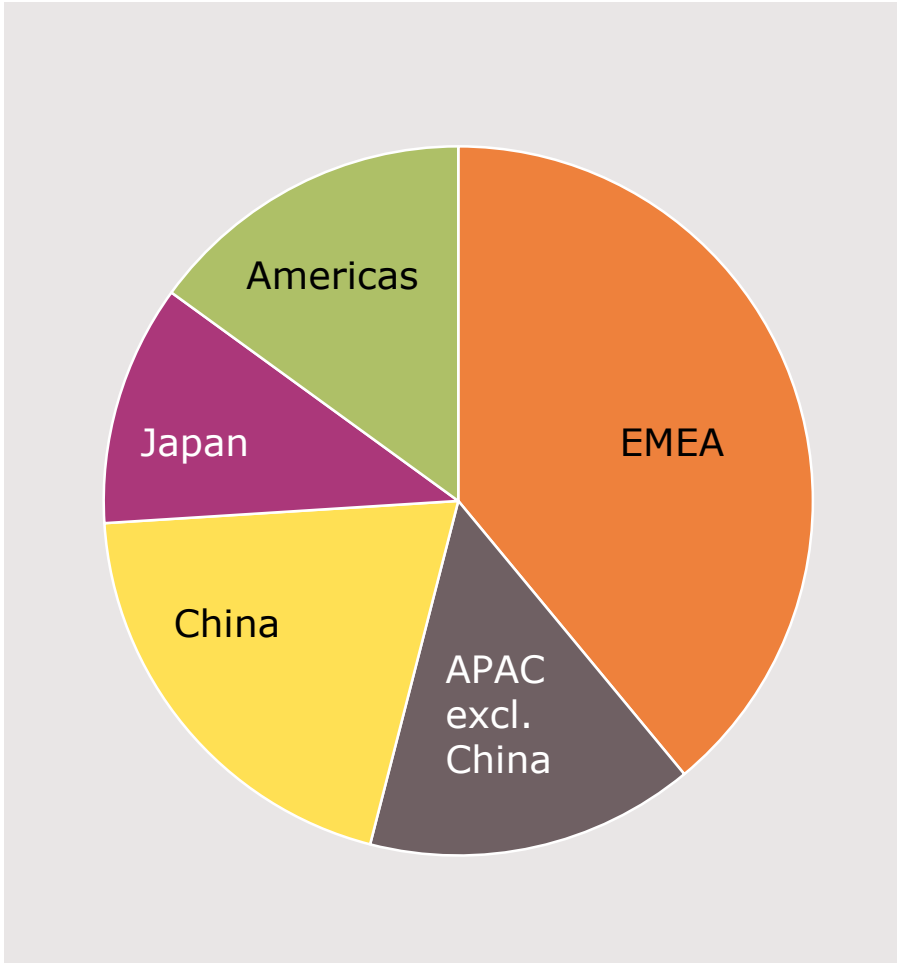
Part of your life. Part of tomorrow.

Dashboard

ATV FY18 revenue by application



ATV FY18 revenue by region



Glossary

AC-DC	alternating current - direct current
AD	automated driving
ADAS	advanced driver assistance system
AEB	automatic emergency braking
AFS	advanced frontlight system
AI	artificial intelligence
BEV	battery electric vehicle
BoM	bill of material
CPU	central processing unit
DC	direct current
DC-DC	direct current - direct current
ECU	electronic control unit
EPS	electric power steering
EV	electric vehicle
FHEV	full-hybrid electric vehicle
GaN	gallium nitride
GPU	graphics processing unit
HEV	mild and full hybrid electric vehicle
HSM	hardware security module
HW	hardware
ICE	internal combustion engine
INV	in-vehicle networking
lidar	light detection and ranging

µC	microcontroller
MHEV, mild-hybrid	mild-hybrid electric vehicle; vehicles using start-stop systems, recuperation, DC-DC conversion, e-motor
micro-hybrid	vehicles using start-stop systems and limited recuperation
mild-hybrid	vehicles using start-stop systems, recuperation, DC-DC conversion, e-motor
MOSFET	metal-oxide silicon field-effect transistor
NEDC	new European drive cycle
OBC	on-board charger
OEM	original equipment manufacturer
PHEV	plug-in hybrid electric vehicle
PT	powertrain
RF	radio frequency
RoW	rest of world
Si	silicon
SiC	silicon carbide
SOTA	software over-the-air
SW	software
ToF	time-of-flight
V2X	vehicle-to-everything communication
xEV	all degrees of vehicle electrification (EV, FHEV, HEV, PHEV)

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Disclaimer

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These statements are based on assumptions and projections resting upon currently available information and present estimates. They are subject to a multitude of uncertainties and risks. Actual business development may therefore differ materially from what has been expected.

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Peter Schiefer
Division President Automotive

- since 2016: Division President Automotive
- Sep 2012: Head of Operations, responsible for Manufacturing, Supply Chain, Purchasing
- Jan 2012: Division President Power Management & Multimarket
- 2013 – 2016: Member of the Supervisory Board of Infineon Technologies Austria
- since 2012: Member of the Supervisory Board of Infineon Technologies Dresden
- since 2018: Member and Vice Chairman of the Board of Directors of the JV SIAPM (SAIC Infineon Automotive Power Modules (Shanghai) Co. Ltd.)

- Peter Schiefer was born in Munich, Germany, in 1965. He holds a Diploma in Electrical Engineering from the University of Applied Sciences in Munich.
- He joined Infineon (Siemens AG until 1999) in 1990.