

MACROTENDENCIAS DA MOBILIDADE

SEMINÁRIO FUTURO DA MATRIZ VEICULAR NO BRASIL – FEV/19

Bosch Group

A global network

 **402 166**

Bosch associates make these solutions possible

 **60**

Countries – 44 regional subsidiaries

 **78.1**

billion euros in sales



Including sales and service partners, Bosch's global manufacturing and sales network covers nearly every country in the world.



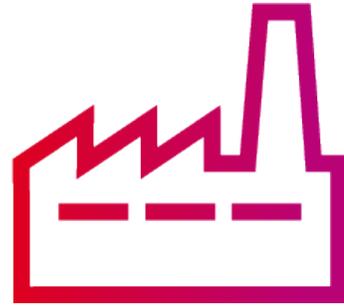
The Bosch Group

Four business sectors



Mobility Solutions

- ▶ One of the world's largest suppliers of mobility solutions



Industrial Technology

- ▶ Leading in drive and control technology, packaging and process technology



Energy and Building Technology

- ▶ One of the leading manufacturers of security and communication technology
- ▶ Leading manufacturer of energy-efficient heating products and hot-water solutions



Consumer Goods

- ▶ Leading supplier of power tools and accessories
- ▶ Leading supplier of household appliances

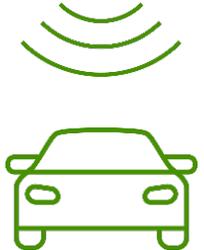
Bosch Mobility Solutions is closely connected with all divisions.
Cooperation across the Bosch Group enables a valuable exchange of knowledge and synergies.

Bosch Group in a nutshell

Facts & Figures

Founded in **1886**
More than **130** years of

Expertise & Innovation



Mobility Solutions
grew 3 times faster than global
automotive production

7.8% more sales

61% share
of total sales Bosch



Worldwide **125**

Engineering locations

62,500
R&D Associates



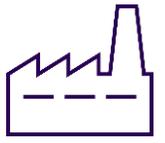
Sales in total

€78bn

€5.3bn

Historical high EBIT
from operations

280 manufacturing
sites



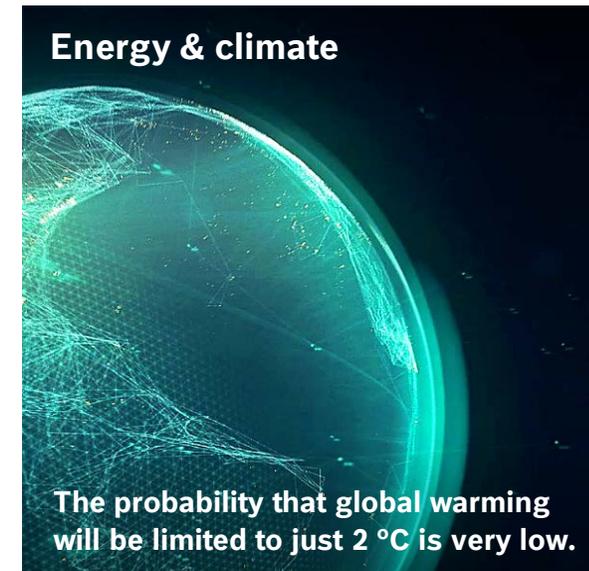
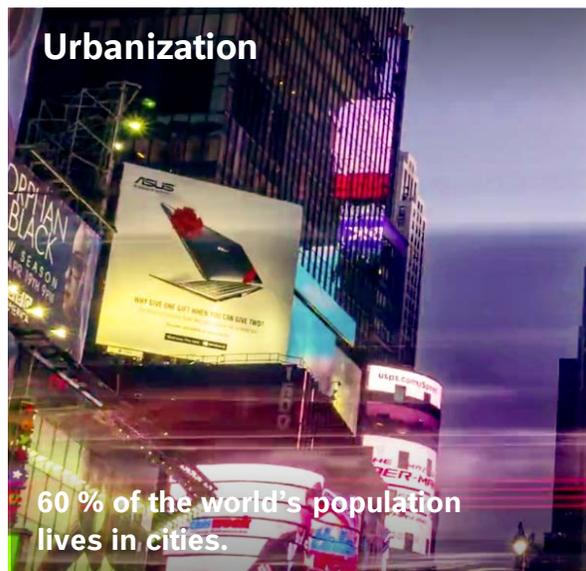
Total headcount

402,166

440 Subsidiaries &
regional companies

Actively shaping global megatrends

With innovations for people, society, and the environment



Urban mobility

Automated mobility

Automated parking

Rental vehicles

Safety on the roads

Efficient powertrains

Connected services

Charging infrastructure

Electromobility

Infotainment in the car

Convenient mobility

Hybrid powertrain systems

Driver assistance systems

Reduction of emissions

HMI systems

Alternative fuels

Internet of things

Connected mobility

Bosch Mobility Solutions

Integrated system solutions for maximum benefit

Connected mobility



Automated mobility



Powertrain systems and electrified mobility



**fun and
fascinating**

**safe and
comfortable**

**efficient and
economical**



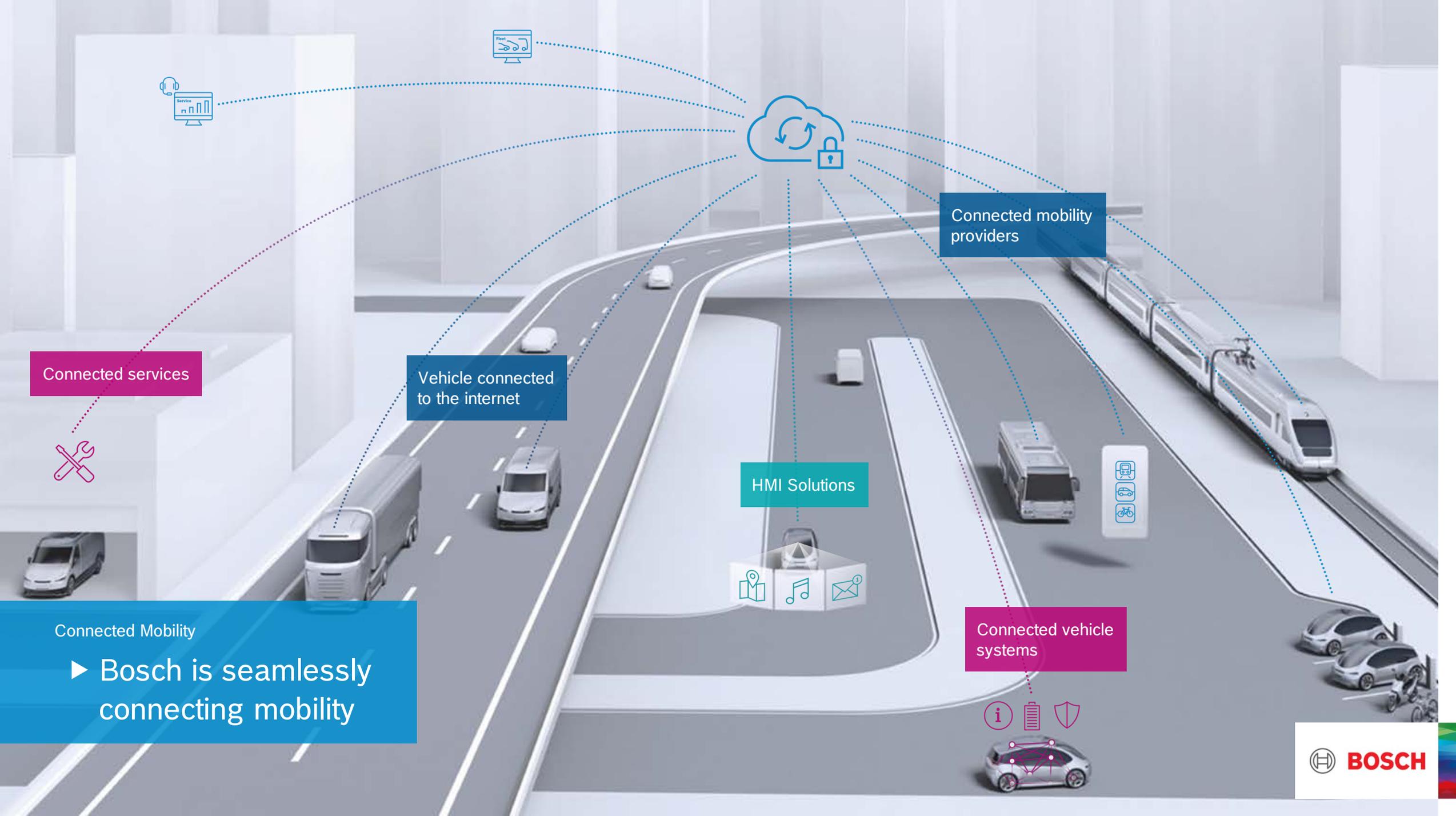
Connected Mobility

► New Offerings, Business Models and Lifestyles will emerge

HERE
RECHARGE
READY

→ SERVICE ENTRY





Connected services



Vehicle connected to the internet

HMI Solutions



Connected mobility providers



Connected vehicle systems



Connected Mobility
▶ Bosch is seamlessly connecting mobility



Connected World

Increasing use of technology & Internet of Things (IoT)



MOORES LAW



Processing Power

Continuous increase of processing power due to new technologies

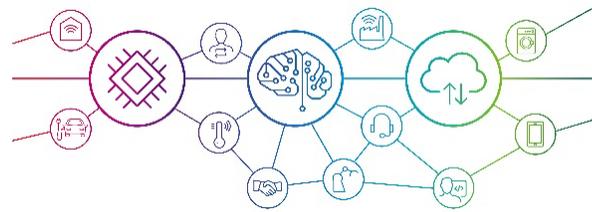


Communication

Tactile internet, latency, reliability, availability, security



NIELSENS LAW



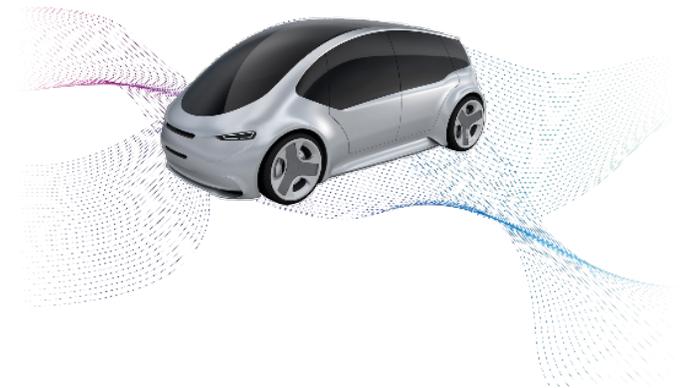
Connected World

50 bn. connected things expected until 2020



Customer

New services and business models



Connected Mobility

The future of mobility



Connected Mobility Solutions Benefits

Enjoy smart mobility

Personalized, seamless and exciting mobility experience

Save lives

Offer the safest mobility – towards a zero death vision

Win time for family & leisure

Allow your users to focus on what is really important in their lives

Manage vehicles efficiently

Optimize the quality of your mobility services: reliable and cost-efficient



Increase user loyalty

Establish a personal relationship with every user

Increase revenue

Exploit new value offerings and increase your user touchpoints

Monetize data

Monetize your existing vehicles data with data-driven services

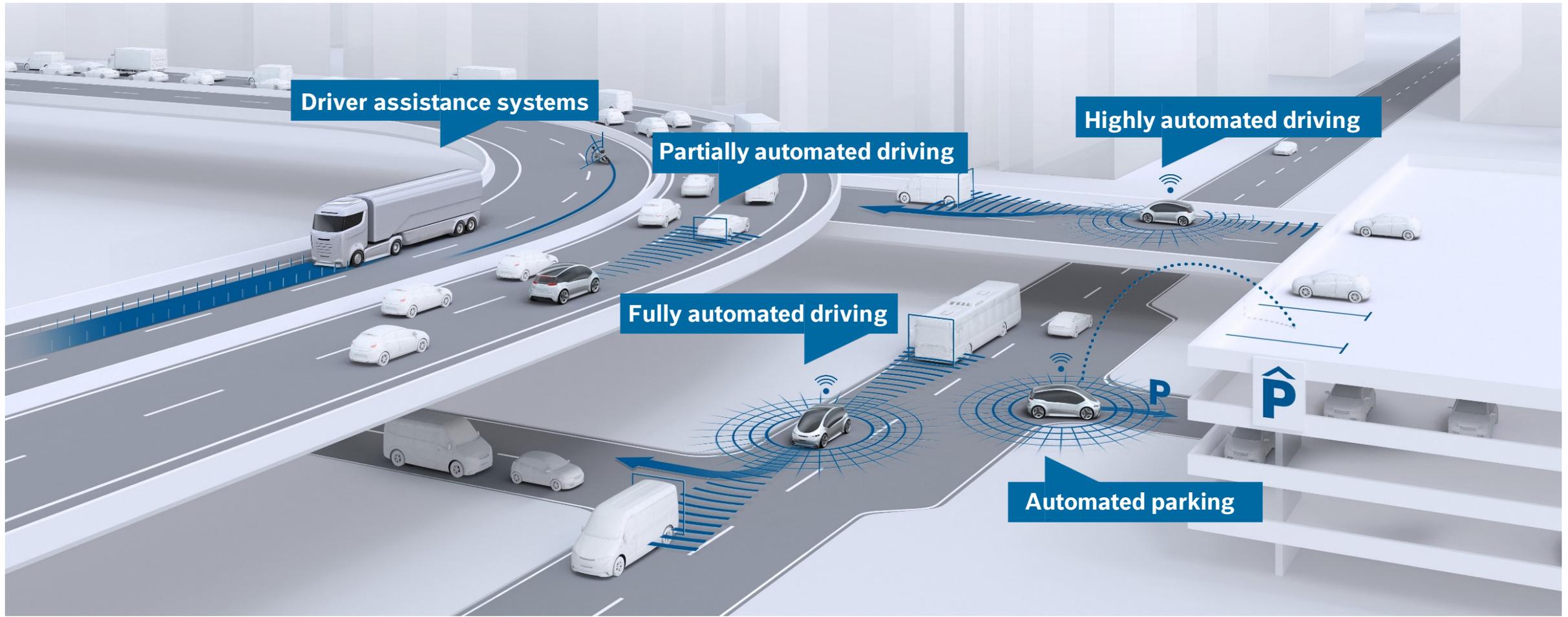
Cost reduction

Reduce development and operation costs for your vehicles and services

AUTOMATED MOBILITY

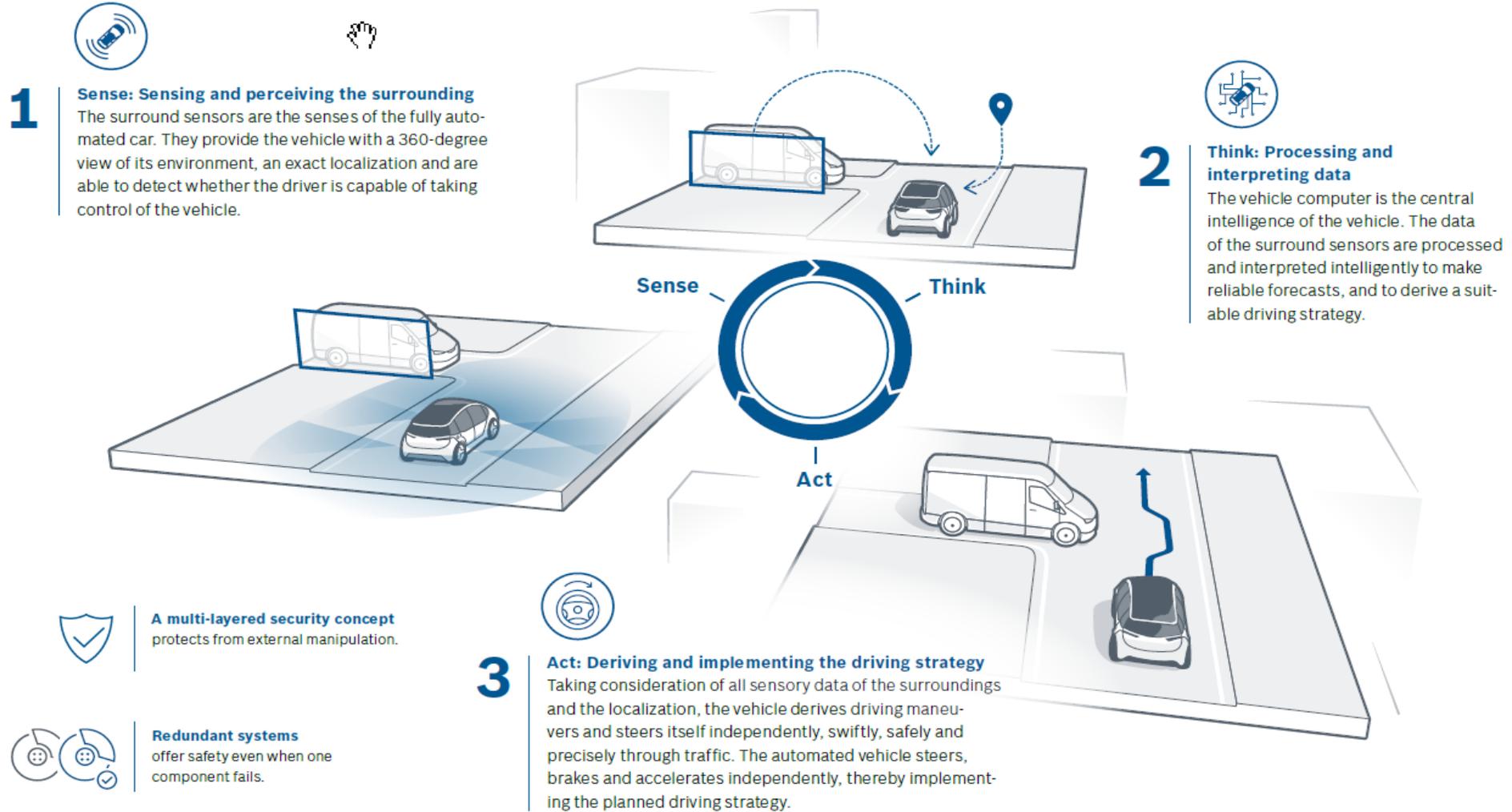
Automated mobility

Bosch is teaching the vehicle how to drive



Automated mobility

Sense, Think, Act: Paving the way for automated driving



Multi-camera system

All-around vision makes parking and maneuvering easier



Fascinating real-time view of one's own vehicle



- ▶ Four near-range cameras capture the vehicle's entire surroundings
- ▶ An ECU combines the camera images with distance information from ultrasonic sensors
- ▶ Different perspectives and modes are available for selection
- ▶ Linking live images to an animated 3D model of the vehicle creates a highly realistic representation
- ▶ Even small obstacles are easy to see

safe

maneuvering

through better orientation and visibility
of the vehicle's entire surroundings

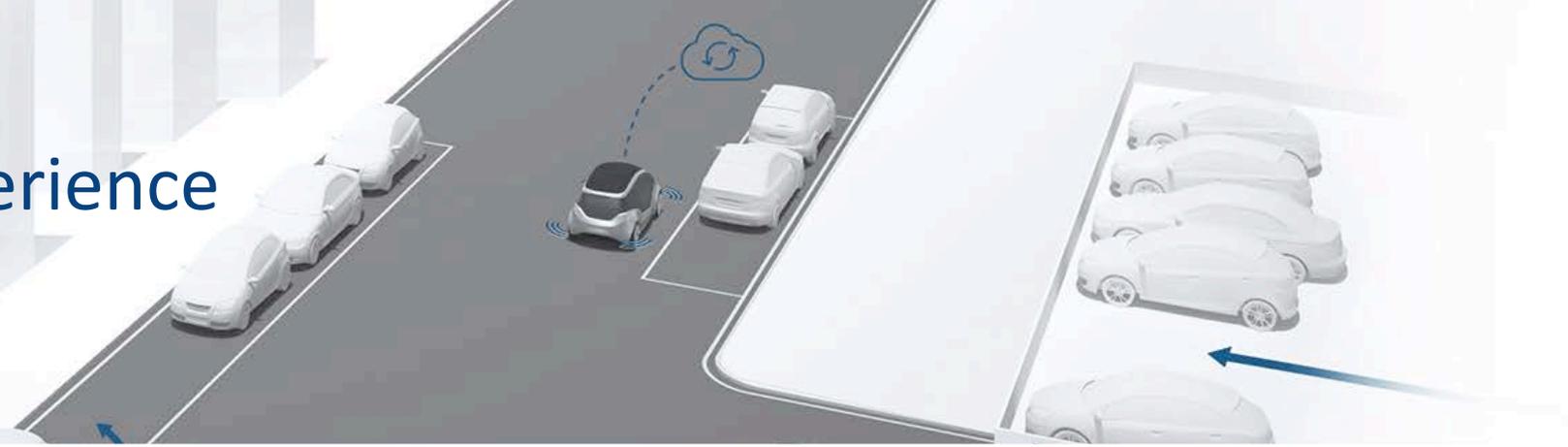
convenient

parking

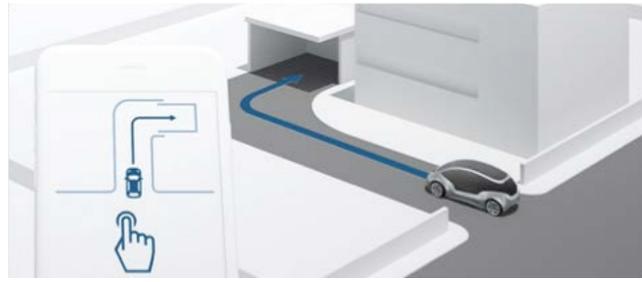
switch back and forth among different perspectives to
line up precisely with lines, curbs, and walls

A new parking experience

with automated and connected parking solutions



For the future of parking, Bosch combines connected and automated technology to form a complete, convenient service that lets vehicles park in parking garages fully automatically.



- ▶ Parking made easy: support when looking for a parking space and when entering and exiting it
- ▶ Bosch parking solutions improve convenience, safety, and efficiency when parking
- ▶ Parking space information from the cloud means that drivers always know where there's an empty space
- ▶ Automated park assists make parking space entry/exit easier

+60 hours

of free time: reduced parking search times can save each driver over 60 hours per year

-CO₂

thanks to reduced parking search traffic with Bosch parking solutions

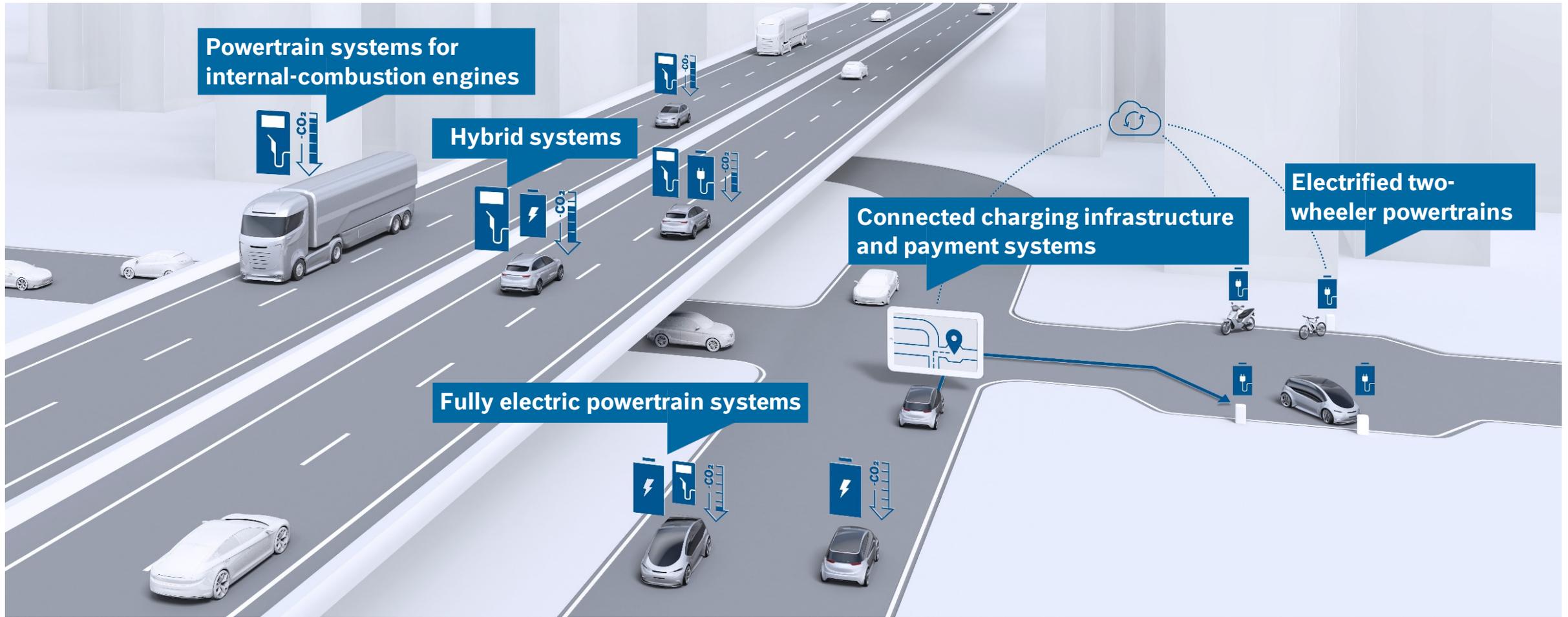


Electrification

► New Technology for eMobility

Powertrain systems and electrified mobility

Bosch is energizing the powertrain



Electrification

Legislation and urban growth are changing mobility



emission reduction

electromobility

smart last mile solutions

charging-infrastructure

automated driving

hybrid-drives

micro mobility

space scarcity

connected mobility

sharing services

fleet targets

traffic volume

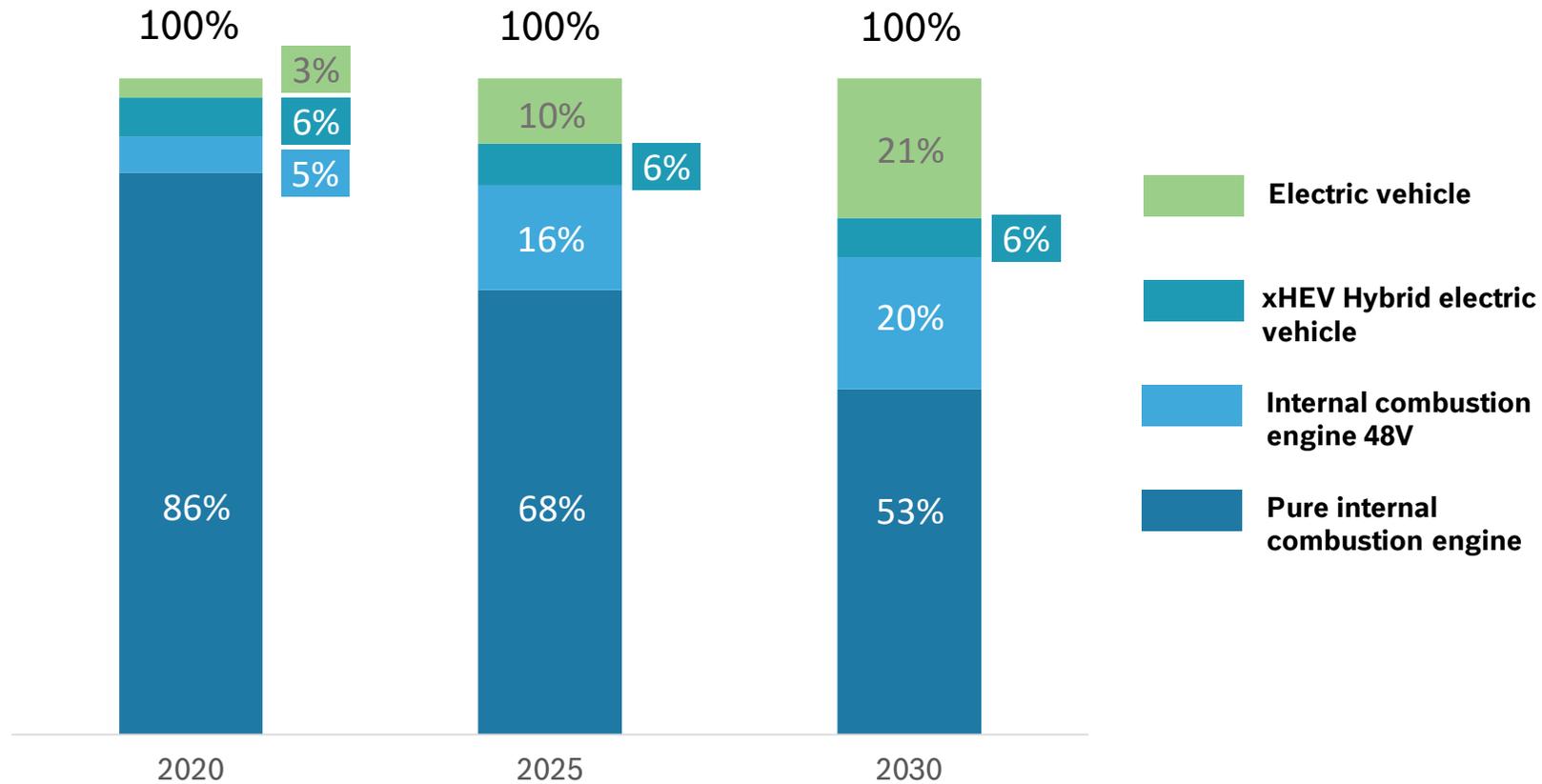
city bans

light e-mobility

Electrification

//By 2030 every 5th new vehicle is a pure electric vehicle

New vehicle sales passenger cars incl. light commercial vehicles < 6t [m vehicles] worldwide



Bosch Electrified Powertrain Europe: Trends and impact



Trends

City restrictions ongoing

Clean air initiatives ongoing

End customers preferences changing

Electric Car Sharing in cities growing

→ Impact on market

Push on electrification

Last mile electrification

Diversification @ electric vehicles between city and long distance electric vehicles

Cities set up e-mobility environment step by step

→ Impact on Bosch

Portfolio extension

Light commercial vehicles e-mobility activities intensified

Broad range of e-mobility systems (48V, strong hybrids, hybrids, plug-in hybrids, electric vehicles)

Bosch Electrified Powertrain China: Trends and impact



Trends

Subsidy and incentive policies, CAFC*
and NEV** credit management

Infrastructure development pushed

Chinese OEM ambitions to become
electrification leader

Reduction of market restrictions



Impact on market

Push on electrification
in all vehicle segments

Competitive and **volatile market**

Focus on **full powertrain**

Focus on **time to market**



Impact on Bosch

Portfolio extension

Focus on **time to market**

More integrated and **system solutions**

Flexible manufacturing concepts

*CAFC: Corporate average fuel consumption

**NEV: new energy vehicle

Bosch Electrified Powertrain

NAFTA: Trends and impact



Trends

Gov Policy / Regulations – CARB* – ZEV** mandate

Growing competition
due to investment growth from China

Customer acceptance and knowledge of electric vehicle/ hybrid electric vehicle



Impact on market

Mix and volume of drivetrain topologies

New alliances,
stronger competition

Push on electrification
in all vehicle segments



Impact on Bosch

Alternative technologies
(fuel cell, 48V, high voltage components)

Portfolio extension

* CARB = California Air Resource Board

** ZEV = Zero energy vehicle

Bosch Powertrain Electrification – future mobility

Types of electrification

	Mild Hybrid	Strong Hybrid	Plug-In Hybrid	EV w/REX	Electric Vehicle
Electric Power*	5 – 20 kW	30 – 100 kW	40 – 140 kW	60 – 160 kW	60 – >300 kW <small>(with 2 machines up to 600 kW)</small>
	No possibility of pure electric drive	Limited electric driving range	Entry into electric driving without restrictions	Enhanced electric driving with “Range Extender” (REX)	Efficient and resource-saving with high potential for CO ₂ -reduction
 Potential for CO ₂ reduction increasing					

Types of electrification differ concerning cost/CO₂-benefit and will penetrate regions differently.

* mainstream assumption, deviations possible

THANK YOU



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