



Smart City Solutions for GBA

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Bosch Building Technologies

Bosch Group

Key Facts and Figures 2020

60

Countries



440

regional subsidiaries



Mobility Solutions



Energy & Building Technologies



Industrial Technologies



Consumer Goods



Global Sales

€71.6

*billion

**CN: € 15 B, largest
single country**



Shareholding

92%

Robert Bosch Stiftung GmbH

7% Bosch family

1% Robert Bosch GmbH



Associates

394,500

R&D Associates

73,000

Software Experts

30,000

Bosch Group

AIoT Strategy implementation



Bosch sensors are serving as the hardware foundation for **IoT solutions**

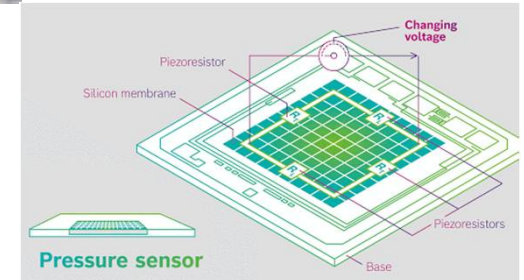


Since 1995, Bosch has sold over
10 billion
MEMS sensors
All devices are IP based

7 AI research centers
established in Germany, U.S., India, Israel, and China



30,000 Bosch **software engineers** are working globally, including over 1,000 **AI experts**



Bosch has implemented more than **250 IoT projects**, covering **connected transportation**, **connected industry**, and **connected life**



Bosch AI Center has conducted over **160** projects



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Some Mega Trends In a Rapidly Changing World



Aging Population

2030

Average life expectancy of human over 80 with higher expectation for well-being

Urbanization

2050

70% of the population will be "Urban citizen"
Challenges in traffic jam and air pollution

Resources

2035

Cities consume 75% of the produced energy
Buildings: Key contributor

New Technology

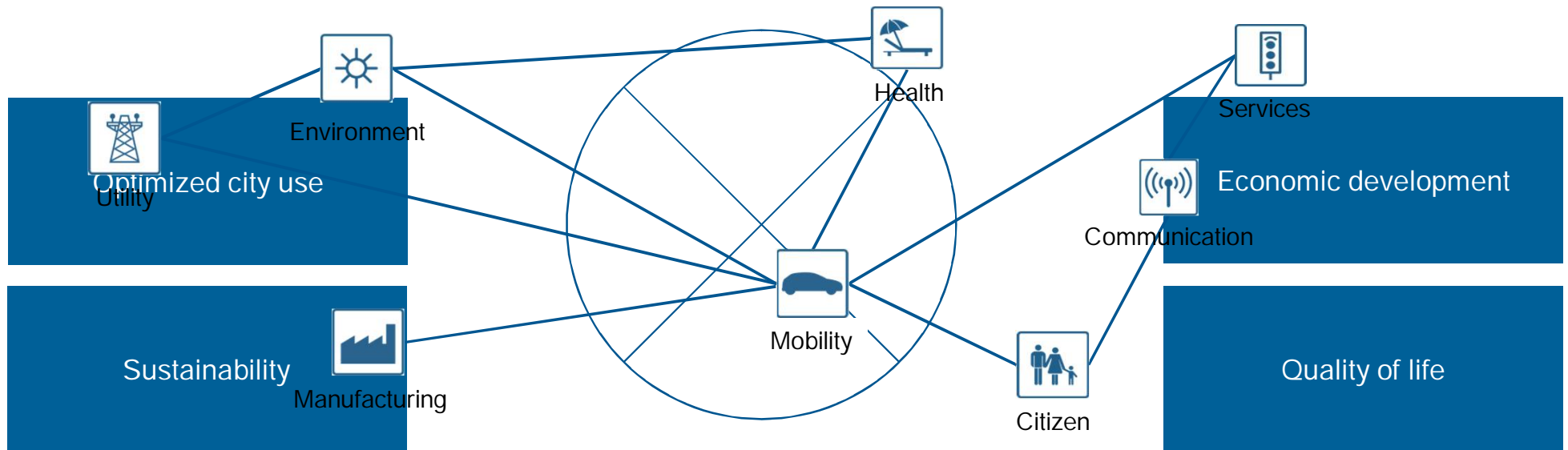
2020

50 billion devices are connected through AIoT

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"Smart City" in the eyes of Bosch

- A smart city breaks down silos therewith creating an informational and operational disparate systems to optimize performance and create new business models through an **integrated technological platform**, which must be **human being centered and perceived/acknowledged by citizen**.
- This requires **holistic view and systematic approach** from very beginning of system design



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Bosch offers comprehensive systems and solutions for smart cities



Safety & Security

AI Camera: Aviotec

SDC: INTEOX

Hybrid Conferencing with
ASR



Connected Mobility

Electrification

Automation

Interconnection



Utility Optimization

Generation

Storage

Carbon neutral



Intelligent Building

Integrated

Software and Hardware

Energy efficiency



Sensor

XDK sensor platform

Evolving

Comprehensive



Energy Storage



Virtual Power Plant



Heating & Cooling
Energy Efficiency
System



Energy

Intelligent Devices



Smart Home



Intelligent Building



Building

Bosch Smart City Solutions

充电桩管理系统



Traffic

Automatic Valet
Parking



Intermodal
Transportation
System



Fleet Management



Environmental
Monitoring System



Shared eBike



E-Government

Data-sharing
Platform



Community App



Safety & Security

Safety & Security
Solution



Flood Warning
System



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Intelligent & Integrated Building Solutions

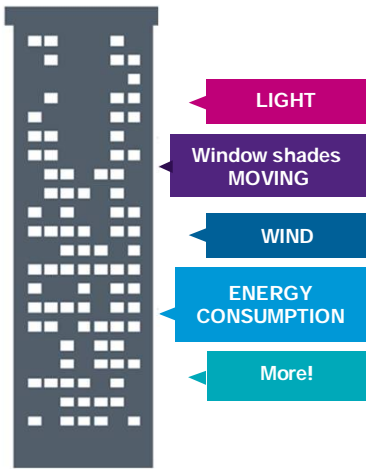


Access Systems
Intelligent Insight
Alarm Systems



AVIOTEC **ACS Facial Reader**

Professional Sound
Ey Electro-Voice **D** DYNACORD



Collecting building data

- Data ingestion
- Time series
- Analytics
- Topology

Bosch IoT Suite

Bosch IoT Cloud

Bosch Cloud backend



Providing building information



Gain essential insights into commercial buildings and building equipment



Enable new services for data-driven business models

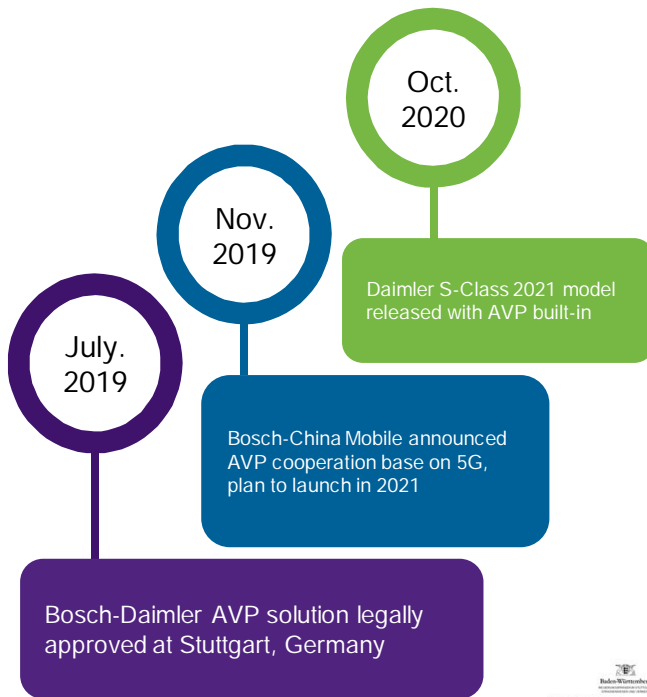


Reduce service costs while increasing service and enhancing performance



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Bosch AVP-World's first legally approved ADS deployment



July. 2019, Bosch successfully get a joint approval between Baden-Württemberg government & TÜV, AVP use in real life.

TÜVRheinland

- 1st time in history government approve liability shift from human beings, instead AVP system responsible for sense, judge & execute



Vehicle Configure

ESP EPB Auto Transmission ECS ASS Connectivity

Garage Configure

Camera & sensors IT & manage system Connectivity



Bosch luxury butler service solution for EV

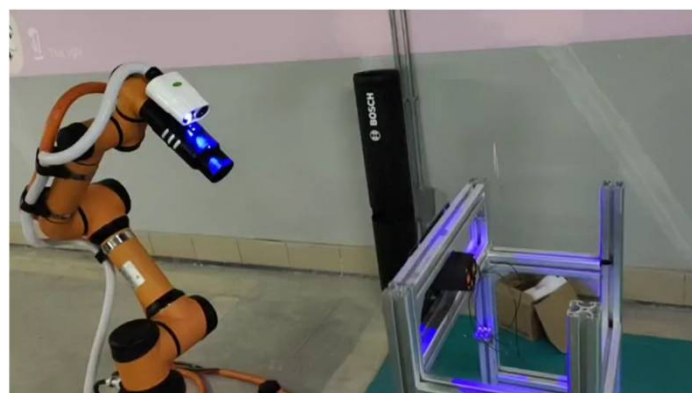
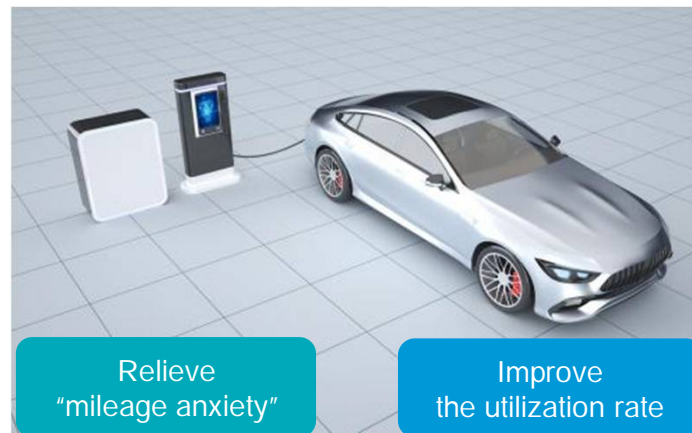
Automatic valet parking + charging robot are hitting the pain points

Effectively improve the user experience of EV charging

- ✓ The combination of automatic charging robot and AVP forms an **end-to-end solution**
- ✓ After full charging, the AVP will automatically replace the charged car with waiting ones, which can **improve the utilization rate of charging piles**
- ✓ The new experience of unmanned parking and charging process
- ✓ Charge a part of the battery through fast charging at the peak of power consumption, and then charge it fully through slow charging when the power is low-it can effectively reduce the charging cost; Or select fast charging or slow charging according to presets to increase efficiency
- ✓ The charging gun can be pulled out / AVP system can be activated after identifying car owner through the app in advance

The perfect combination of technologies

- ✓ The accuracy of AVP can reach the centimeter level, which is suitable for cooperation with robots with limited movement stroke.
- ✓ The automatic charging robot has high requirements for the parking position of the vehicle - the displacement does not exceed 10cm / angle is less than 2°



Commercial Building

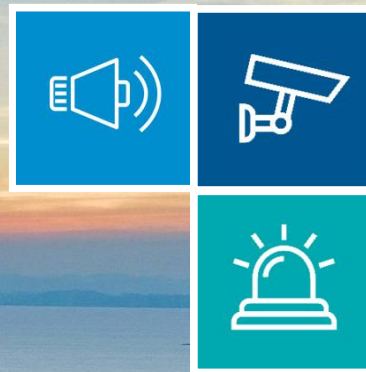
Vehicle assembly line EOL

Car rental fleet

Application scenarios

Successful Reference

Hong Kong-Zhuhai-Macao Bridge



Public Address & evacuation system

- ▶ 8,000 loudspeakers, +260 amplifiers

Video Surveillance

- ▶ Over 2,000 HD cameras

Intrusion Alarm

- ▶ Multiple sets of intrusion alarm systems

Successful References

Bosch's Footprint in Greater Bay Area: a few examples



Continuous investment in GBA: Building technologies, Power tools, Car parts...

Partnership with Tech. giants in GBA in intelligent NEV and AI based hybrid conferencing solutions...



*"When we dream alone
It is only a dream.*

***When we dream together,**
It is the beginning of a new reality."*

*Helder Camara,
1909-1999, Archbishop of Olinda and Recife, Brazil*

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Thank You!