

Electrification is taking combustion engines to new heights

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Megatrends are changing the car

Four major trends are shaping the mobility of the future



Demography

Mobility needs are growing globally – for older people as well

Urbanization

Growing importance of multi-modal mobility

Energy & climate

Stricter CO₂ legislation

Connectivity

Car as active part of the internet

Innovative powertrains use resources more efficiently, reduce emissions, and enhance driving enjoyment.

Changing expectations

Legislators demanding fewer emissions, customers more features



CO₂ emissions
Stricter emissions legislation



Performance, comfort
Rising consumer expectations



95g CO₂/km
in 2021



54.5 mpg (~102 g CO₂/km)
in 2025



5L/100 km (~119g CO₂/km)
in 2020



From combustion engine to electric driving

Drivers' choice: more powertrain options in the future



Combustion

*“Basis for
efficient mobility”*



Hybrid

*“The best
of both worlds”*



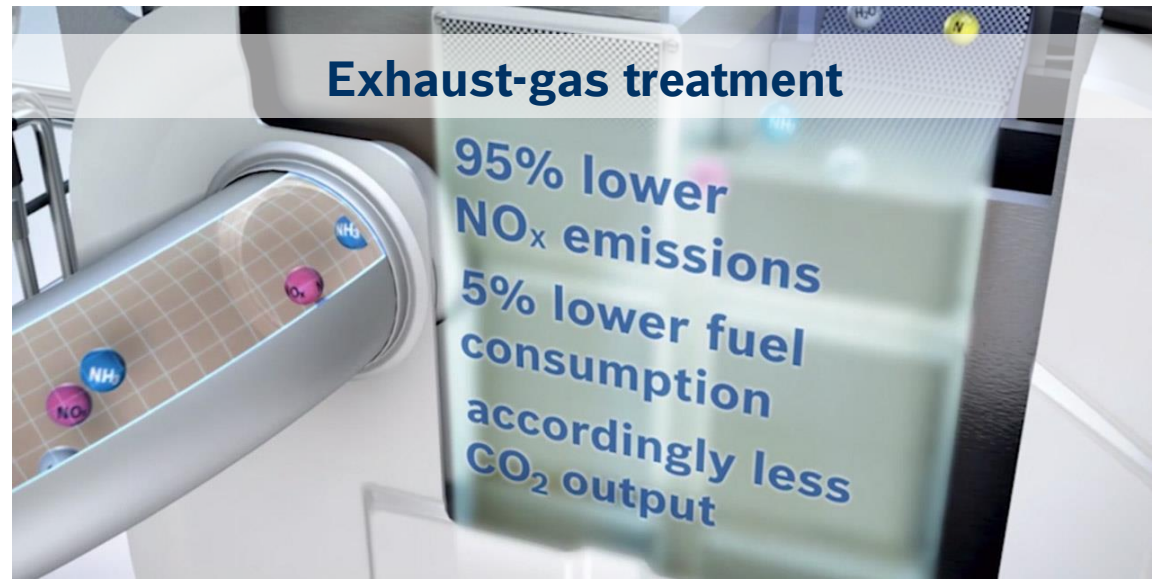
Electric

*“Electrifying
driving experience”*



Clean diesel: less CO₂, particles, & NO_x

Euro6 delivered, now real driving emissions in focus



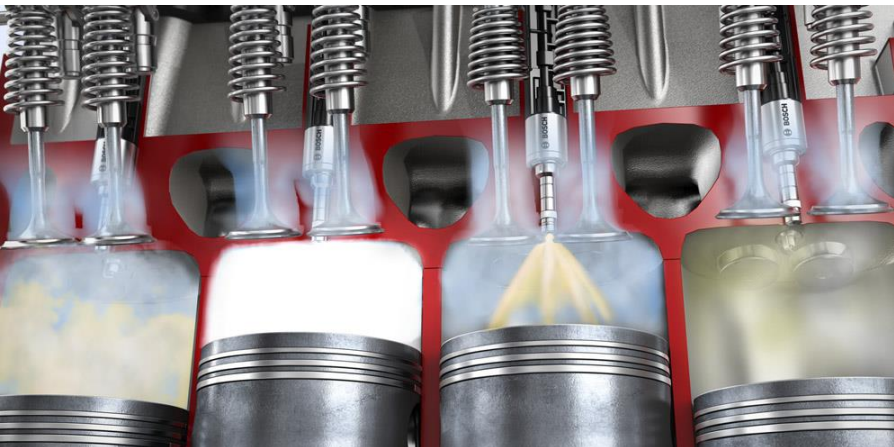
- ✓ **Efficient:** consumption already as low as 3.6 liters in compact class
- ✓ **Clean:** -99% PN and -95% NO_x emissions compared to 1990
- ➔ **Looking ahead:** diesel key to CO₂ regulation, real driving emissions now focus of development





Gasoline: direct injection on the rise

Bosch innovation combines efficiency and driving enjoyment



Success story in Europe, U.S., China

- Reduces consumption by up to 15%
- Higher torque at low speeds



Clean combustion

- Laser-drilled holes enable a significantly finer spray
- With **new 350-bar injection**, particulate emissions are reduced even when accelerating and at top speed





Two-wheeler: high-tech at low cost

Bosch brings digital intelligence to small engines

Sensors



Electronics



Injection



Mass-market solution for daily mobility in Asia

- Electronically controlled injection system can reduce fuel consumption by -16%
- Digitally controlled combustion can enable connectivity functions (e.g. immobilizer via smartphone)





Electrification: hybrids gaining momentum

Electrification is taking combustion engine to new heights

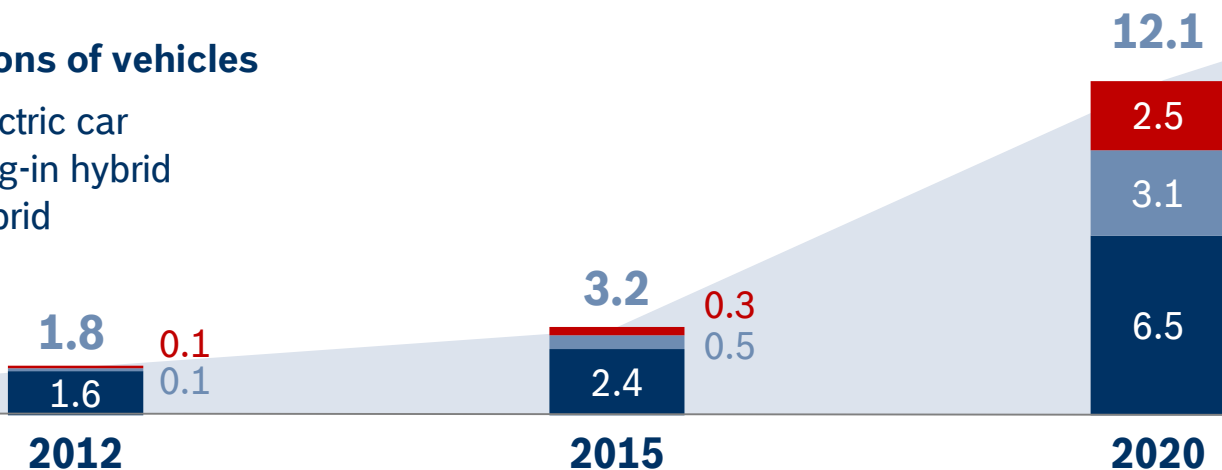


E-mobility with  **BOSCH**

Electrified vehicles worldwide

Millions of vehicles

- Electric car
- Plug-in hybrid
- Hybrid



15%
of all new vehicles
worldwide electrified

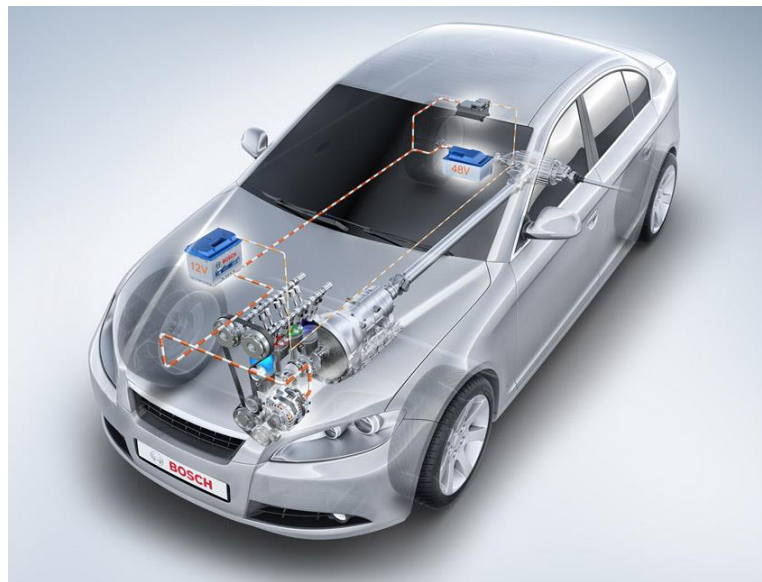


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New 48V hybrid: boost recuperation system

Cost-effective electrification offers tangible customer benefits



Fuel savings

48V hybrid system can reduce consumption by up to 15%

Relaxed driving

Coasting – engine not needed in up to 30% of all driving situations

Dynamic acceleration

Additional torque delivered – up to 150 Nm more power



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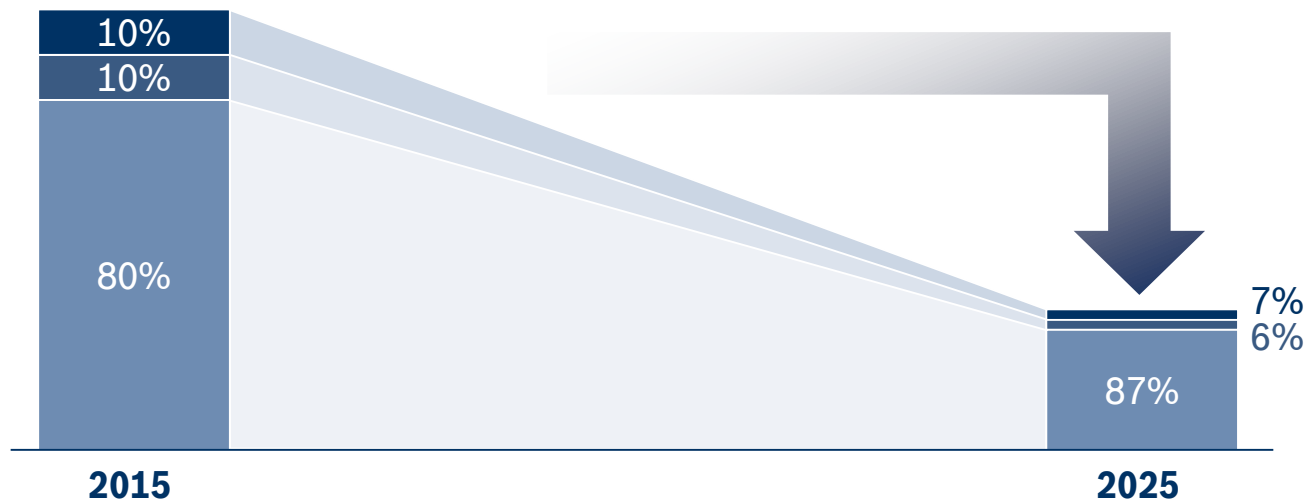


Battery cost: driving enjoyment must be affordable

Bosch connects worlds of chemistry and electronics

Electric motor
Power electronics

Battery



With Bosch battery management: 10% increase in range

→ Bosch competence: battery management system connects the worlds of chemistry and electronics





Electromobility...

starts with the car – but it's much more than that

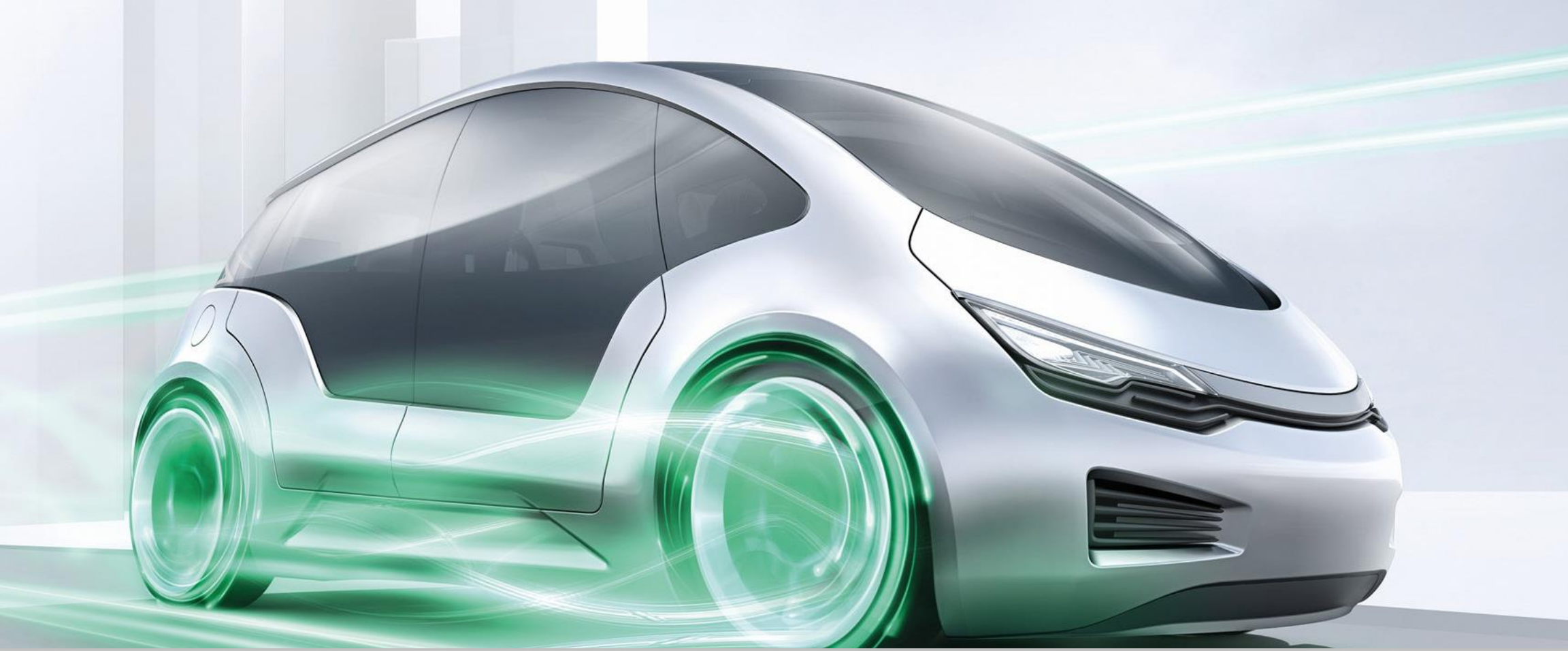
Electric car	20% of new vehicles in Japan are hybrids
e-scooter, e-bike	120m e-scooters already on China's roads
Smart city services	connected city: Monaco 3.0
Charging infrastructure	80% of charge spots in Germany are networked by Bosch
Intermodal transport	23 project partners on Stuttgart services



Electrification is getting off the ground – connectivity is the boost it needs



- The combustion engine is the basis of efficient mobility.
- Electrification and connectivity will take combustion engines to new heights.
- The connected electric vehicle is the best electric vehicle.



Electrification is taking combustion engines to new heights.

