Electrification is taking combustion engines to new heights

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Chairman of the Mobility Solutions business sector
Megatrends are changing the car
Four major trends are shaping the mobility of the future

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

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

Megatrends:
- Urbanization
- Demography
- Connectivity
- Energy & climate
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 CO$_2$, particles, & NOx
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% NOx emissions compared to 1990
- Looking ahead: diesel key to CO$_2$ regulation, real driving emissions now focus of development

Combustion

Exhaust-gas treatment

95% lower NO$_x$ emissions
5% lower fuel consumption accordingly less CO$_2$ output
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

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)
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
Battery cost: driving enjoyment must be affordable

Bosch connects worlds of chemistry and electronics

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

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