A machine tool builder’s role in a dynamic automotive world

CAR-MBS, July 31, 2017
Our technologies enable performance and efficiency in automotive powertrains.

Image source: Bugatti
Corporate Statement

We permanently strive to offer to our customers

• best solutions, delivered world-wide
• highly mature and tailor-made technologies
• ideal cost and resource management
• full extensive service partnerships
Automotive industry in motion – Transformation speed higher than ever before

*Megatrends with impact on car makers and production system suppliers*

**Autonomous driving**

**Digitalization**

... Industry 4.0 – digitalized production systems

**Fleet fuel efficiency**

... increased by innovative machining technologies

*Image source: Bosch*

*Image source: Siemens*

*Image source: Siemens*

Any right of disposal remains with us. The use of the content for the making of corresponding articles is only permitted with our express approval in writing. As the document contains patentable elements, we reserve all rights for the granting of any kind of patent.
Sharing expertise means sharing success in shorter time

Gehring’s partner network for Digital Solutions

Customers
- Production data source
- End-user

IT infrastructure provider
- IT security and safety
- Connectivity
- App deployment

Interface experts
- Ergonomics and usability
- Interaction devices and sensors
- Visualization

Analytic experts
- Artificial intelligence
- Algorithms
- Data exploration

Digital Solutions
- Production Analytics
- Customer Platform
- Maintenance & Repair

Gehring’s partner network for Digital Solutions

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14/08/2017, Management
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CO₂ emission regulations strongly push OEMs towards innovations for combustion engines

**Global situation**

**NEDC**

<table>
<thead>
<tr>
<th>Year</th>
<th>CO₂ emission in g/km</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target 2015</td>
<td>-27%</td>
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<tr>
<td>Target 2021</td>
<td>95</td>
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<tr>
<td>Target 2025</td>
<td>68-78(^1)</td>
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<tr>
<td>Target 2030</td>
<td>60-65(^2)</td>
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</tbody>
</table>

- Passenger cars
- No well-to-wheel

**EPA 2 cycle**

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<tr>
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<tr>
<td>Target 2021</td>
<td>211</td>
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<tr>
<td>Target 2025</td>
<td>163(^1)</td>
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<tr>
<td>Target 2030</td>
<td>140-150(^2)</td>
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</table>

- Passenger cars and light trucks
- Well-to-wheel regulation

**NEDC**

<table>
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<tr>
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<th>CO₂ emission in g/km</th>
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<tbody>
<tr>
<td>Target 2015</td>
<td>-30%</td>
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<tr>
<td>Target 2021</td>
<td>117</td>
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<tr>
<td>Target 2025</td>
<td>80-90(^1)</td>
</tr>
<tr>
<td>Target 2030</td>
<td>60-65(^2)</td>
</tr>
</tbody>
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- Passenger cars
- No well-to-wheel

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1) Proposed target under review
2) Scenario, for EU based on GHG reduction targets for the transport sector by European Commission, for US 2% annual reduction assumed after 2025, China is expected to recover EU targets.

Values for EU and CN are based on NEDC to gain compatibility, for CN figures are converted from l/km.

Source: FEV, using sources ICCT, European Commission, Bosch, ACEA and FEV.

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Form honing – an example for economical engine innovations

Environmental and economic impact of different engine technologies

Source: FEV

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Summary

• Digitalization in automotive industry is a key enabler for both – future products and future production

• Fleet fuel efficiency must be based on a smart powertrain mix – including ICE!

• Innovative production technology is supporting element for reaching emission targets