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Why do we need sustainable mobility?

- Climate change – emissions
- Smog and noise in megacities
- The finite nature of fossil fuels
**Statutory CO₂ targets for the entire automotive industry**

<table>
<thead>
<tr>
<th>Country</th>
<th>Year</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>2025</td>
<td>101 g CO₂/km</td>
</tr>
<tr>
<td>Europe</td>
<td>2020</td>
<td>95 g CO₂/km</td>
</tr>
<tr>
<td>China</td>
<td>2020</td>
<td>5 l/100km</td>
</tr>
</tbody>
</table>

CO₂ legislation is market-specific and therefore varies greatly from market to market.

> CO₂ is a key issue in all markets.
From Europe to the world
Adoption of legislation
Growth markets 2020
Growth in the car industry in 2020

Europe
Above average growth

+5%
+7%
+9%
Why do we need to reduce CO$_2$ emissions?
Fleet regulations 2008
Why do we need to reduce CO$_2$ emissions?
Fleet regulations 2013

Over 80% of the Group's vehicles worldwide are affected by CO$_2$ fleet regulations.

Source of Group sales figures: Volkswagen AG Annual Report 2012
How do you determine CO₂ emission targets?
Example: Europe

**Group fleet**
- Average weight: 1,395kg

**Group target**
- EU target for 2012-19: 130 [g/km] (-9%)
- Geneva target for 2015: 120 [g/km] (-19%)
- EU target for 2020: 95 [g/km]

EU fleet weight: 1,395 [kg]
Target for 2020: 95 g/km in Europe
Geneva is just an interim target

Drive-train measures
- Optimizing SI/diesel
- Gearbox
- Regenerative braking

CO₂-efficiency measures in the vehicle
- Improving aerodynamics
- Lightweight design
- Reducing rolling resistance

Alternative drive systems
- Electrification
- Compressed natural gas
Volkswagen Group 2013: 12 brands, 280 models

<table>
<thead>
<tr>
<th>Brand</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>VW</td>
<td><img src="VWLogo.png" alt="VW Logo" /></td>
</tr>
<tr>
<td>Audi</td>
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</tr>
<tr>
<td>Porsche</td>
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<tr>
<td>Škoda</td>
<td><img src="SkodaLogo.png" alt="Škoda Logo" /></td>
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<tr>
<td>SEAT</td>
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<tr>
<td>Ducati</td>
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<tr>
<td>Bentley</td>
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</tr>
<tr>
<td>Bugatti</td>
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</tr>
<tr>
<td>Commercial Vehicles</td>
<td><img src="MANLogo.png" alt="MAN Logo" /></td>
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</tbody>
</table>
Driving innovation –
40,000 engineers in the Group worldwide

<table>
<thead>
<tr>
<th>Region</th>
<th>Engineers</th>
</tr>
</thead>
<tbody>
<tr>
<td>North/South America</td>
<td>(\Sigma = 2,500)</td>
</tr>
<tr>
<td>Europe</td>
<td>(\Sigma = 35,000)</td>
</tr>
<tr>
<td>Asia</td>
<td>(\Sigma = 2,500)</td>
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</tbody>
</table>
Our brands are setting innovation benchmarks

<table>
<thead>
<tr>
<th>Reducing consumption: Natural-gas engines</th>
<th>Lightweight design: Audi Space Frame</th>
<th>Efficient sports cars: High-performance hybrids</th>
</tr>
</thead>
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<tr>
<td>79 g of CO₂/km</td>
<td></td>
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</tr>
</tbody>
</table>
The evolution of the modular assembly kit

Platform strategy

- Synergies only within one vehicle class

Modular strategy

- Synergies between some vehicle classes

Assembly kit strategy

- Synergies between all vehicle classes

Volkswagen has developed the modular assembly strategy from a platform strategy.
**Standardized assembly kits and modules in the Group**

<table>
<thead>
<tr>
<th>Assembly kits</th>
<th>MQB</th>
<th>MLB</th>
<th>MSB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engines</td>
<td></td>
<td></td>
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<td>Body and trim</td>
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<td>Chassis</td>
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**Modules**

- MQB
- MLB
- MSB
### Standardized assembly kits and modules in the Group

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<tr>
<td><img src="logo.png" alt="Volkswagen" /></td>
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<td><img src="logo.png" alt="Porsche" /></td>
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#### Modules

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Carbon dioxide: Conventional drive technologies are not enough

- Technologies to improve CO₂ efficiency
- Optimizing conventional drive-trains
- CO₂-efficiency measures in the vehicle
- Using alternative drive technologies
- e-hybrid TWIN DRIVE e-tron e.Motion
- Fuel cell

Fleet CO₂ emissions

- TDI
- DSG
- TSI
- TGI
- BLUEMOTION g-tron

Technologies and energy sources

- EU27 Fleet figure in 2006: 166 g CO₂/km
- EU27 Fleet figure in 2012: 134 g CO₂/km
- EU27 Fleet figure in 2020: 95 g CO₂/km
The modular transverse kit (MQB) enables us to provide CO₂-neutral, sustainable mobility through the use of different types of drive systems.
Standardizing manufacturing processes using the MQB

- Modular assembly kits
- Standard design principles

- Identical joining and assembly sequences

- Modular production equipment
- Standardized factories

The MQB enables us to standardize our production processes and production equipment.