Alternative Fuels and Drives

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Trend of mileage in Germany - Road -

- gasoline LDV
- gasoline LDV w/o cat.
- diesel LDV
- others: diesel/gasoline
CO₂ emissions of different transport modes
Registration of new passenger cars in Germany
Diesel - gasoline
CO$_2$ emission of new passenger cars in EU-15
ACEA – average CO\textsubscript{2} emission of new vehicles (EU-15)

ACEA Commitment 140 g/km in 2008

EU-Zielwert 120 g/km


CO\textsubscript{2} Emission in g/km
Future EU-exhaust gas limits
diesel-gasoline

**CO**

- Benzin: 3.16, 1.13, 0.56, 0.35, 0.18, 0.135
- Diesel: 3.16, 2.2, 2.3, 1.1, 0.5

**summation HC+NOx**

- Benzin: 0.2, 0.4, 0.6, 0.8, 1.0, 1.2
- Diesel: 0.5, 0.7, 0.85, 1.25, 1.35, 1.5

Euro step
Diesel-Technology

- particulate trap: approximately 90% of new diesel passenger cars are equipped with traps
- from 2008 on, all new passenger cars in Germany will be equipped with traps
- SCR-technology: selective catalytic converter are under development for cars
- EURO V trucks are already equipped with SCR-technology
Proposal for exhaust gas limits
Euro 5 and 6

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<tr>
<th>Kommission</th>
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<th>EP*</th>
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<tr>
<td><strong>Euro 5</strong></td>
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<tr>
<td>NO$_x$ [mg/km]</td>
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<td>180</td>
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<td>Partikel [mg/km]</td>
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<td>5</td>
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<td><strong>Euro 6</strong></td>
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<td>NO$_x$ [mg/km]</td>
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*New proposal MdEP Groote: NO$_x$-Grenzwert von 70 mg/km for both, gasoline and diesel cars in the 2. step*
Oil

- resource base
  - transport
  - heating market
  - chemicals industry

- global oil extraction: 3.8 bn. t/a (status 2004)

- global primary energy consumption
  - today: 10.7 bn. t oil equivalent
  - 2030: 16.3 bn. t crude oil equivalent (IEA)

Quelle: IEA
Peak oil
Post peak oil

coal liquefaction  biomass liquefaction

options
Coal liquefaction (CTL)

- extremely unfavourable life cycle assessment
- UBA study (1980s): loss of around 60% of the raw material energy
- CO₂ emission: per litre petrol additional CO₂ emission of 5.5 kg (in comparison: petrol combustion produces around 2.3 kg CO₂ per litre petrol)
Biofuels quota provision

**Level of quota (based on energy content):**

diesel
- from 2007: 4.4%

petrol
- from 2007: 2.0%
- from 2010: 3.0%

Additionally

total quota
- from 2009: 5.7%
- from 2010: 6.0%

exceeding tax-privileged pure fuels.

Sub-quotas retained also after 2009.
fiscal regulations

- biofuels within the quota subject to full mineral oil and energy taxation from 1 January 2007

- previously: tax privilege for biofuels until 2009

- new regulation: **tax privilege for pure biofuels** above the quota to be **gradually phased out by end 2011**

- **second generation biofuels** and E85 **tax-privileged until 2015**
Second generation biofuels

- broader resource base
- much better CO$_2$ balance
- higher energy yield per area
Biofuels quota regulation

- Contribution to climate protection
  - 2007-2009: annual savings of 5 mil. t CO$_2$, taking upstream processes into account
  - If only second generation biofuels are used the saving would be over 10 mil. t CO$_2$

- Greater security of supply
Revision of Biofuels Directive

- opinion of the Federal Government:
  - 2015: 8 %
  - EU COM should look into 12.5 % for 2020
- binding targets

- certification system at EU level
  - sustainable cultivation of biomass
  - prevent over exploitation of nature (e.g. destruction of rainforests, creation of extensive monocultures)

draft directive of COM expected at end 2006
Revision of Fuel Quality Directive

- increase of blend limits from 5 to 10 vol %.
- greater flexibility for companies in meeting quota
- DIN taskforce

Draft directive of COM expected at end 2006
Outlook

- no alternative to combustion engine in medium term

- coal liquefaction unfavourable scenario
  - trebling of CO$_2$ volume

- further increase in biofuels share
  - quantities cannot be achieved by domestic cultivation
  - globally, sufficient biomass available
Thank you !