Natural gas – the sustainable transport fuel

Blue Corridor Rally: Hansa 2013
European emissions reduction agenda drives development of alternative fuels

- EU-6 (2013/2014) with limits for CO2 and NOx driving development of CNG and LNG in light, medium and heavy-duty road transport
- Automotive industry seeking solutions to achieve EU-imposed average CO2-fleet targets (120g CO2/km by 2015 and 95g CO2/km by 2020) → natural gas engines development
- Sulphur Emission Control Areas (SECA from 2015 in Baltic & North Sea) drive development of LNG as alternative to MGO and scrubber-technology due to SOx
- European agenda appreciates the potential of natural gas to accommodate renewables (power-to-gas, bio-methane)
Available (or not?) fuel alternatives

<table>
<thead>
<tr>
<th>Available (or not?) fuel alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Available</td>
</tr>
<tr>
<td>- Subject to technical, commercial or operational challenges</td>
</tr>
</tbody>
</table>

Natural gas is suitable for all transport sectors
Compressed or liquid?

**CNG – Natural gas compressed to 200 bar**

- **Established and growing ✔**
  - Passenger cars, light duty vehicles and medium duty transport (buses, MD-trucks)
  - Driving range PC+LDVs: 300-550 km
  - Attractive OEM-vehicle choice available
  - European infrastructure available/growing
  - Zero or reduced excise duty

**LNG – Natural gas liquefied by cooling down to -162°C**

- **New ★**
  - Heavy duty and municipal transport (buses + trucks)
  - Driving range HDVs: 500-1.000 km
  - 2.5 x more energy in the same space as CNG
  - Lower weight of vehicles, diesel-like refueling times and vehicle performance
  - Independence from pipeline network

CNG and LNG are both natural gas and meet EU-6 at lower cost than competitive technologies
Gazprom provides Russian natural gas to Europe: CNG + LNG as fuel for transport

- OAO Gazprom with 200+ CNG stations in Russia
- Legislative changes to promote natural gas as motor fuel just introduced and extension of CNG refuelling infrastructure now started
- Development of LNG production and retail infrastructure in progress

- GAZPROM Germania Group extending CNG presence in Germany and the Czech Republic from 28 to >40 CNG stations by end 2014
- Gazprom export & GAZPROM Germania developing LNG for European road transport together with automotive OEMs
- Active communication, education and stakeholder management at national, European and international level
Cluster approach to CNG and LNG market development

- Light duty vehicles and personal cars with continuing growth in CNG
- Buses and local distribution will continue to facilitate CNG growth, with LNG entering the picture
- LNG growth facilitated by international heavy duty transport and bunkering
2012: Proof of feasibility of LNG-fuelled buses in 6 Polish cities together with Solbus

- 2 Solbus Solcity LNG buses in operation on regular lines of public transport in
  - Torun (18.04.-22.04.)
  - Gdynia (23.04.-29.04.)
  - Olsztyn (30.04.– 06.05.)
  - Warsaw (07.05.-20.05.)
  - Katowice (21.05.-27.05.)
  - Krakow (28.05.-02.06.)

- GAZPROM Germania provided the mobile LNG refuelling station

- Step from theory to practice: customers see, feel and experience the benefits of LNG-fuelled buses
2013: 4-weeks field test with Volvo FM460 Methane-Diesel with ALBA (Berlin)

- Cooperation with erdgas mobil and Berlin waste management service ALBA
- Trial of Volvo FM460 Methane-Diesel under real-live conditions
- Medium distances with 40t trailer
- Market development Germany currently in progress
2013: First 11 LNG buses in Europe running since October in Poland

- First ever OEM produced LNG buses operational in Europe since 01 October 2013 in the city of Olsztyn (Poland)
- Cooperation of GAZPROM Germania and Solbus
- Buses run 7 days per week from 04.30 a.m. until 23.45 p.m.
- Ca. 65,000 km per bus p.a.
- Solbus Solcity LNG 12m with Cummins ISGL natural gas engine and Chart Ferox LNG onboard-equipment
- Extension to further cities in progress
The first feedback is positive!
Our value proposition

Customer

Sustainable savings & environmental compliance

Reliable refuelling where and when needed

Professional vehicles and service

Bundled offer and guaranteed savings in Total Cost of Ownership compared to Diesel
Thank you! Any questions?

GAZPROM Germania GmbH
Email: ngv@gazprom-germania.de