Natural Gas Vehicles for cleaner mobility

UNECE - 6th Session of the Group of Experts on Gas

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Genève, Suisse
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CNH Industrial - Group of Experts on Gas
« Sustainable Mobility »

Produce the vehicle in a sustainable way
Which you can refuel
Fits the mission
Recycle entirely the vehicle
With sustainable fuel
Pay back as a business
Which energy transition?

We provide advice about technical maturity:

- Comparing Performance vs. Diesel
  - Fits the mission
  - TCO
  - Safety / reliability

- Environmental benefits
  - Less CO2, renewable energy
  - Less NOx & Particles
  - Less noise

- Energy / Fuel Distribution
  - Safety, legal frame
  - How / where to refuel
Natural Gas fits the mission: from Urban to Long Haul

Natural Gas Concrete mixer

LNG Long Haul with 1600 km range

Natural Gas Bus Rapid Transit

CNG Coach with same height
More Trucks = More Filling Stations

STRALIS NP SALES IN EUROPE

300 Gas stations
Heavy-Duty

140 LNG

200

300
New NG Stations business models

- **Municipality**
  - Authority
  - Proprietary of CNG Station
  - Maintenance
  - Proprietary of Rolling Stock
  - Public Operator
  - Historic
  - Long commitment
  - Long amortization
  - Large qty gas = low price

- **Integrated Concession**
  - Authority
  - Proprietary of CNG Station
  - Maintenance
  - Proprietary of Rolling Stock
  - Private Operator
  - Patrimonial investment
  - Growing fleet
  - Intermediate gas price
  - Requires long concession

- **Private Sector**
  - Authority
  - Public CNG Station
  - Maintenance Contract Iveco
  - Proprietary of Rolling Stock
  - Private Operator
  - Similar to Truck business
  - Good for a start
  - Smaller fleet / no CNG infra
  - Higher gas price
What is the E.U. regulatory framework?

**Emissions:**

Euro VI:

In-Service-Conformity:
OEM to prove the vehicle reaches Euro VI after 700,000 km / 7 years

**TTW CO2 Declaration & targets for OEM:**

Trucks from 2019
Buses from 2021

-15% CO2 Trucks from 2025
-15% CO2 Bus from 202X

**Life Cycle Analysis:**

CO2 emissions
From “cradle-to-grave”
EN14040 / EN14044

**Public Procurement for M.S.:**

2009/33 revision:

- Abandon “monetization”
- Replaced by Clean Vehicle Definition + mandatory % by country by 2025

More severe than cars
E.U. Clean Vehicle Directive: mandatory procurement of clean buses
With % targets in each E.U. countries - Applicable to M3 Class I = Low Floor & Low Entry

- Procurement Targets for countries:

<table>
<thead>
<tr>
<th>Dates / Min. Targets of Clean Vehicles</th>
<th>from 2 years after application of CVD Latest 2025</th>
<th>from 2026 till 2030</th>
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</thead>
<tbody>
<tr>
<td>F, I, E, D, A, BeNeLux, S, Fi, CZ, UK</td>
<td>41 to 45%</td>
<td>60 to 65%</td>
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<tr>
<td>Other E.U. Countries</td>
<td>27 to 34%</td>
<td>33 to 47%</td>
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- Clean Vehicle definition is following the Directive of Alternative Fuel Infrastructure 2014/94:
  - Half of the mandate to be Zero-Emission vehicles:
    - Electric
    - H2 Fuel Cell
    - Trolleybuses, provided they have ZE autonomy (= IMC)
  - Gas, CNG, LNG, LPG
  - Alternative fuels: Biofuels, synthetic and paraffinic Fuels
    - but cannot be blended with fossil diesel (=B30)
    - Member-States can decide to limit some biofuels in competition to food land-use
    - to be confirmed: ban of palm oil, that is for instance used in HVO
  - Reporting of the procurement to be under the Tender Electronic Daily Database
  - Reference to Well-to-Wheel and Life Cycle Analysis is made, for 2030 targets (such as batteries)
  - CVD comes on top of CO2 declaration and targets
Low-Emission Zones + Vehicle Categories

20 Million citizen concerned

« Vignette Crit’Air »

Electric / CNG
Comparing TCO & Environmental footprint

PwC – Landshut University
February 2019
## Which low carbon solution?

<table>
<thead>
<tr>
<th></th>
<th>Natural Gas + Biomethane</th>
<th>Renewable liquid fuels</th>
<th>Battery EV</th>
<th>H2 Fuel Cell</th>
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<tbody>
<tr>
<td>Life Cycle Analysis</td>
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<tr>
<td>Fits the mission</td>
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<td>Economical growth of local community</td>
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<td>Affordable price</td>
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Natural Gas: the natural choice

- Emission reduction
- Fits the missions
- Best TCO of all alternative options

- Growing network of CNG / LNG
- Methanisation plants in rural / urban
- Decreasing carbon footprint

- Local jobs
- Mature technology
- Scale effect: Truck / Goods sector
Next international fairs:

- UITP World Summit – Stockholm – June 2019
- BusWorld – Brussels – October 2019

Thanks for attention