Natural Power Vehicles
The natural way to sustainable transport

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Context
The way to sustainability
A new chapter in fuel truck history

Today's challenges

Road transport challenges

1770 Wood
1850 Coal
1899 Gasoline
1930 Diesel
2008 Natural Gas
2016 Bio CNG-LNG

Reduce noise and pollutant emissions
Competitive costs
Reduce CO₂ emissions
A new chapter in fuel truck history
Missions versus alternative technologies available today

<table>
<thead>
<tr>
<th>MISSIONS</th>
<th>FULL ELECTRIC</th>
<th>PARALLEL HYBRID</th>
<th>PLUG-IN HYBRID</th>
<th>H2 FUEL CELL</th>
<th>BIO CNG</th>
<th>BIO LNG</th>
</tr>
</thead>
<tbody>
<tr>
<td>URBAN LOGISTICS</td>
<td>+++</td>
<td>+</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
</tr>
<tr>
<td>REGIONAL</td>
<td>limited</td>
<td>No benefit</td>
<td>+</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
</tr>
<tr>
<td>NATIONAL</td>
<td>limited</td>
<td>No benefit</td>
<td>No benefit</td>
<td>limited</td>
<td>+++ rigids only</td>
<td>+++</td>
</tr>
<tr>
<td>LONG HAUL</td>
<td>limited</td>
<td>No benefit</td>
<td>No benefit</td>
<td>limited</td>
<td>limited</td>
<td>+++</td>
</tr>
</tbody>
</table>

+++ Environmental benefits

Many alternative solutions

Mature, Versatile & Profitable Solutions
Electric Vehicles are not a Panacea for Climate Change

• Until disputes continues...

ifo Schnelldienst: Electric Vehicles are not a Panacea for Climate Change

Apr 17, 2019

Electric vehicles will barely help cut CO2 emissions in Germany over the coming years, as the introduction of electric vehicles does not necessarily lead to a reduction in CO2 emissions from road traffic. Natural gas combustion engines are the ideal technology for transitioning to vehicles powered by hydrogen or “green” methane in the long term.

Considering Germany’s current energy mix and the amount of energy used in battery production, the CO2 emissions of battery electric vehicles are, in the best case, slightly higher than those of a diesel engine, and are otherwise much higher. This has been confirmed by a new study by Christoph Buchal, professor of physics at the University of Cologne; Hans-Dieter Karl, long-standing ifo energy expert; and Hans-Werner Sinn, former ifo president and professor emeritus at Ludwig-Maximilians-Universität München. The researchers carried out their detailed calculations using the concrete examples of a modern electric car and a modern diesel vehicle. In addition to CO2 emissions from battery production, they looked at alternative energy sources for electricity in order to calculate the impact electric vehicles have on CO2 emissions. They show that even with today’s technology, total emissions from a combustion engine powered by natural gas are already almost one-third lower than those of a diesel engine. “Over the long term, hydrogen-methane technology offers a further advantage: it allows surplus wind and solar power generated during peaks to be stored, and these surpluses will see a sharp increase as the share of this renewable energy grows,” Professor Buchal explains.
IVECO vehicles Natural Power and Bio Methane
Equivalent CO₂ Emissions Reduction

If…

ELECTRIC CARS 100% CARBON-FREE ELECTRICITY …!!!
Mobility insurance: a future proof technology
Towards a diesel ban in European cities

- 1st LEZ in Sweden
- London LEZ Up to 200€ / day charge for pollution vehicles
- 1st Vignette Crit’Air Adopted in 2018 by 735 French Cities
- German cities have the right to ban the circulation of certain categories of vehicles
- Diesel is banned in Paris, Rome, Grenoble, Madrid, Stuttgart, Düsseldorf, Athens

- 1996: EU Directive on Air Quality
- 1999: 1st EU sanction threats on State Members
- 2008: 1st Vignette Crit’Air Adopted in 2018 by 735 French Cities
- 2011: £ 10 / day Extra toxicity charge In central London for cars & vans < € IV
- 2016: £ 10 / day Extra toxicity charge In central London for cars & vans < € IV
- 2017: £ 12,5 / day for vans £ 100 / day for trucks
- 2018: Traffic limitations North Italy & Po Valley in Winter for Euro3
- 2019: New vehicles registration with Diesel / Petrol engines banned in Norway

Note: different categories if vehicles involved by case to case
https://www.green-zones.eu/
Incentives
A clear European support
A clear European support

EU support the investments in alternative fuels to:
- Reduce the dependency on imported oil
- Reduce the CO\textsubscript{2} emissions of the on-road freight transport
- Improve the air quality

EU support CNG, LNG & Biomethane development:
- Allowing member states to reduce excise duty on gas fuels
- Allowing member states to incentivize gas-powered vehicles
- Co-financing CNG, & LNG stations and biomethane plants

The best energy for transport:
⇒ Has a low carbon intensity
⇒ Do not use fossil resources
⇒ Can be stored and distributed with minimal losses
⇒ Is affordable for the country economy
### Main incentives and fuel spread in EU markets

<table>
<thead>
<tr>
<th>Country</th>
<th>2018</th>
<th>2019</th>
<th>FUEL SPREAD*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GER</strong></td>
<td>8.000€ CNG 12.000€ LNG</td>
<td>8.000€ CNG 12.000€ LNG Toll exemption till 12/2020 6.000€ CEF fund LNG with Iveco Capital (not cumulative)</td>
<td>0.10 – 0.14€</td>
</tr>
<tr>
<td><strong>FRA</strong></td>
<td>Income tax cut: benefit up to 16.000€ Additional local incentives and LEZ access</td>
<td>Income tax cut: benefit up to 16.000€ 6.000€ CEF fund LNG with Iveco Capital (cumulative) Additional local incentives and LEZ access</td>
<td>0.15 – 0.20€</td>
</tr>
<tr>
<td><strong>ITA</strong></td>
<td>8.000€ CNG 20.000€ LNG</td>
<td>2019 incentive plan under discussion -&gt; possible, unknown dates. Decree on Bio-methane if used as Fuel: 4.7B € for new infrastructures in 2018-2022 6.000€ CEF fund LNG with Iveco Capital Additional local incentives and LEZ access</td>
<td>0.25 - 0.33€</td>
</tr>
<tr>
<td><strong>SPA</strong></td>
<td>18.000€ LNG</td>
<td>2019 incentive plan confirmed -&gt; under discussion with local authorities 6.000€ CEF fund LNG with Iveco Capital</td>
<td>0.18 - 0.25€</td>
</tr>
<tr>
<td><strong>POL</strong></td>
<td>Excise duty =0 on Gas. To be approved by EU commission. Obligation to use NG vehicles in public services (10% of fleet by 2020 - 30% by 2025)</td>
<td>Excise duty =0 on Gas. -&gt; EU confirmation expected in Q2-2019 6.000€ CEF fund LNG with Iveco Capital A fund to incentivize alternative fueled vehicles could be created</td>
<td>0.25 - 0.27€ * After excise duty cut</td>
</tr>
<tr>
<td><strong>BEL</strong></td>
<td>Flanders: up to 24.000€ Wallonia: 5.000€</td>
<td>Flanders: up to 24.000€ Wallonia: 5.000€ (to be renewed) 6.000€ CEF fund LNG with Iveco Capital</td>
<td>0.21 - 0.22€</td>
</tr>
<tr>
<td><strong>NL</strong></td>
<td>Income tax cut: benefit up to 8.000€ Quiet truck incentive (Piek)</td>
<td>Income tax cut: benefit up to 4.000€ Quiet truck incentive (Piek) Excise duty increase on NG by 0,12 €/kg – It can still be canceled 6.000€ CEF fund LNG with Iveco Capital (cumulative)</td>
<td>0.20€ * excise duty tbc</td>
</tr>
<tr>
<td><strong>UK</strong></td>
<td>Only excise duty benefit</td>
<td></td>
<td>0.34€</td>
</tr>
</tbody>
</table>

* 1L diesel vs 1Kg Gas (update January 2019)
Gas Stations evolution

C+LNG Stations Development – Plans & good practice
LNG Station development plan
C+LNG Stations and CNHI Plant

Note: update January 2019
Good practice - example

Biomethane Liquefied Natural Gas (BioLNG) has the potential to provide economic and environmental benefits for truck owners and operators. The energy density of BioLNG means that trucks can travel longer distances, better suiting the needs of transport operators now, and in the future. Due to the use of industrial organic waste as a resource, the CO₂ emissions will be much lower than the CO₂ emissions of traditional fuels. BioLNG is essential in achieving the long-term aim of further decarbonisation for 2030. BioLNG virtually eliminates sulphur and offers a reduction in NOx and particulate matter. It can help to reduce well-to-wheel greenhouse gas emissions.

Major European Players

BioLNG EuroNet will help with decarbonising heavy duty road transport across Europe by developing a European Network for LNG covering the key Commercial
Which came first?
GOOD PRACTICE EXAMPLE
Legal acts & Incentives - POLAND

- Directive 2014/94 / EU dated on October 22, 2014
  Accepted by the Council of Ministers in March 2017 - Valid

- National Framework for the Development of Alternative Fuels Infrastructure with objectives as follow:
  - 54k CNG vehicles and 3000 LNG vehicles up to 2025
  - 70 CNG stations in urban agglomerations until 2020
  - 32 CNG stations and 14 LNG stations in the corridors of the TEN-T base network until 2025
  Accepted by the President of Poland in February 2018 - Valid

- The Act on Electro mobility and Alternative Fuels
  - Describes Low-emission zones in city centers
  - Oblige to use natural gas vehicles for public purposes (10% fleet up to 2020 and 30% fleet up to 2025)
GOOD PRACTICE EXAMPLE
Legal acts & Incentives - POLAND

- Act on amending the act on excise tax implementing:
  - NO excise tax on CNG and LNG
  - NO fuel duty

- The Act on bio components and biofuels
  - Describes new duty tax called „Pollution duty“ (80,00 PLN for 1000 litres of diesel or gasoline) ~18 EUR
  - Creates the Low-Carbon Transport Fund that will take 15% of Pollution Duty starting from 01.01.2019 and 0.5% of Fuel excise on diesel in 2020, 1% in 2021 and 1.5% in 2022. The estimated budget of Low-Carbon Transport Fund is 1.6 bln EUR for supporting purchase of electric and methane-powered vehicles and developing infrastructure:
    - ~ 20,000 EUR per truck with limitation of 3000 units registered in Poland by end of 2022
    - ~ 250,000 EUR donation for C/LNG filling station development
LCNG stations - POLAND

Good practice - result

Motaniec Gibas Service Center
Niepruszewo UniRoad
Gorzyczki
Karpin UniTruck
STC Rzeszów

12.2019
Product line up & performances
Daily Natural Power CNG
Daily Hi-Matic Natural Power

Electric
RDE Ready

Daily Natural Power

3.0l Natural Gas Engine
136hp and 350Nm
8 speed automatic
gearbox

Autonomy 250 - 450 km
(according to tanks layout and mission)
+80 km petrol in r.m.

3,5 to 7,2 tons GVW
Eurocargo Natural Power – CNG

Main features

- **6.0l Natural Gas Engine**
  - 210hp and 750 Nm

- **Up to 650 km**
  - (max capacity tank configuration)

- **Alternative layouts dedicated to every mission types**
Eurocargo Natural Power – CNG

Alternative tanks lay-outs (ECE R110 homologation)
Stralis Natural Power

Main features

**Range**
- **CNG** up to 570 km (1000 km on rigid)
- **C-LNG** up to 1035 km
- **2xLNG** up to 1600 km (depending on tanks configuration and mission)

**Natural Gas Engines:**
- C8 from 270 to 330hp
- C9 400hp
- C13 460hp

**Artic kerbweight in line with diesel equivalent**
- Up to 50t GCW
IVECO Stralis Natural Power – The biggest line-up
More products for more missions: ADR / Car transport / Construction / ...
TCO advantage
Best in class in Running Costs
Comparison on running costs
Advantages (sample Stralis NP LNG, value may change country by country)

- Fuel saving vs diesel: - 10%
- Saving on fuel cost: - 20 ÷ 25%
- No fuel theft: - 2%
- No urea cost: - 700€ / year
- Purchasing Incentives (country based): Up to - 20,000€
Comparison on running costs
Example, figures VAT excluded

- Yearly Mileage: 130,000 km/year
- Diesel price for simulation: 0.98€ (VAT excluded)
- Average LNG price for simulation: 0.78€/kg
- Starting point: diesel consumption of the customer: 29l/100km (example)
- Estimation of the consumption ratio on the specific customer mission: gas 26.1kg/100km (-10% vs diesel)

<table>
<thead>
<tr>
<th></th>
<th>Diesel</th>
<th>Gas</th>
<th>Delta</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yearly Mileage</td>
<td>130,000</td>
<td>130,000</td>
<td></td>
</tr>
<tr>
<td>Fuel consumption</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>l/100km or kg/100km</td>
<td>29</td>
<td>26.1</td>
<td></td>
</tr>
<tr>
<td>l/year or kg/year</td>
<td>€ 37.700</td>
<td>€ 33.930</td>
<td></td>
</tr>
<tr>
<td>Fuel price</td>
<td>€/l or €/kg</td>
<td>0.98</td>
<td>0.78</td>
</tr>
<tr>
<td>Fuel expense</td>
<td>€/year</td>
<td>€ 36.946</td>
<td>€ 26.465</td>
</tr>
<tr>
<td>Urea expense</td>
<td>€/year</td>
<td>€ 897</td>
<td>0</td>
</tr>
<tr>
<td>Fuel+Urea cost</td>
<td>€/year</td>
<td>€ 37.843</td>
<td>€ 26.465</td>
</tr>
<tr>
<td>Fuel+Urea cost per KM</td>
<td>€/km</td>
<td>€ 0.2911</td>
<td>€ 0.2036</td>
</tr>
<tr>
<td>German Toll (artic + 3 axle semitrailer)</td>
<td>€/km</td>
<td>€ 0.187</td>
<td>0</td>
</tr>
<tr>
<td>Operating costs (Fuel + Toll)</td>
<td>€/km</td>
<td>€ 0.4781</td>
<td>€ 0.2036</td>
</tr>
<tr>
<td>Saving 10,000km</td>
<td>-€ 2,745</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Saving 100,000km</td>
<td>-€ 27,452</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Saving 130,000km</td>
<td>-€ 35,688</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Saving 150,000km</td>
<td>-€ 41,178</td>
<td></td>
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</tbody>
</table>

Note: All figures are VAT excluded.
More demand in more countries
NG increased availability and bio-NG will further boost the demand

IVECO HD NG TRUCKS
> 7000 Units sold since 2008
> 400 Customers
> 25 Countries
> 400 Millions km p.a.
Stralis Natural Power
Winning partnerships