

19TH OSCE ECONOMIC AND ENVIRONMENTAL FORUM  
“Promotion of common actions and co-operation in the OSCE area  
in the fields of development of sustainable energy and transport”  
SECOND PREPARATORY MEETING  
(DEVELOPMENT OF SUSTAINABLE TRANSPORT)

Druskininkai, Lithuania, 4-5 April 2011  
Session II

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# **Natural Gas and Biomethane. The Existent Real Alternative to Oil Derived Fuels**

**Development of sustainable transport  
Druskininkai, Lithuania. 4-5 April 2011**

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General Manager**

## Advantages of bio natural gas

- Natural gas is an alternative fuel coming from natural wells. It is mainly methane (CH<sub>4</sub>)
- Biogas is also a methane rich gas, produced by the fermentation of biomass, which makes it a renewable fuel.
- **Methane contents 25% H and 75% C, in weight**

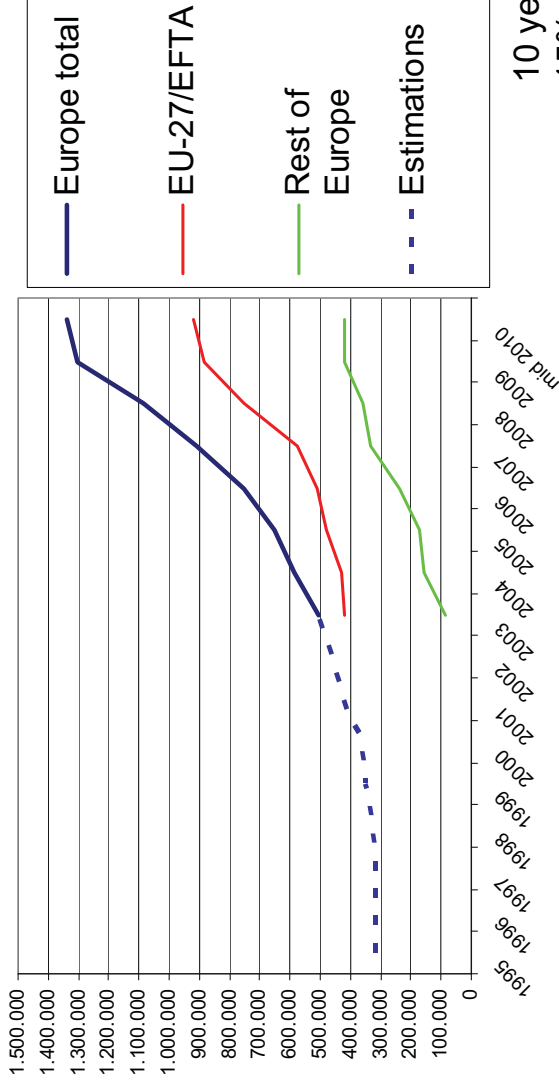
As a comparison,

- Petrol contents 13,5% H and 86,5% C
- Diesel oil contents 13,5% H and 86,5% C
- LPG contents 17,4% H and 82,6% C

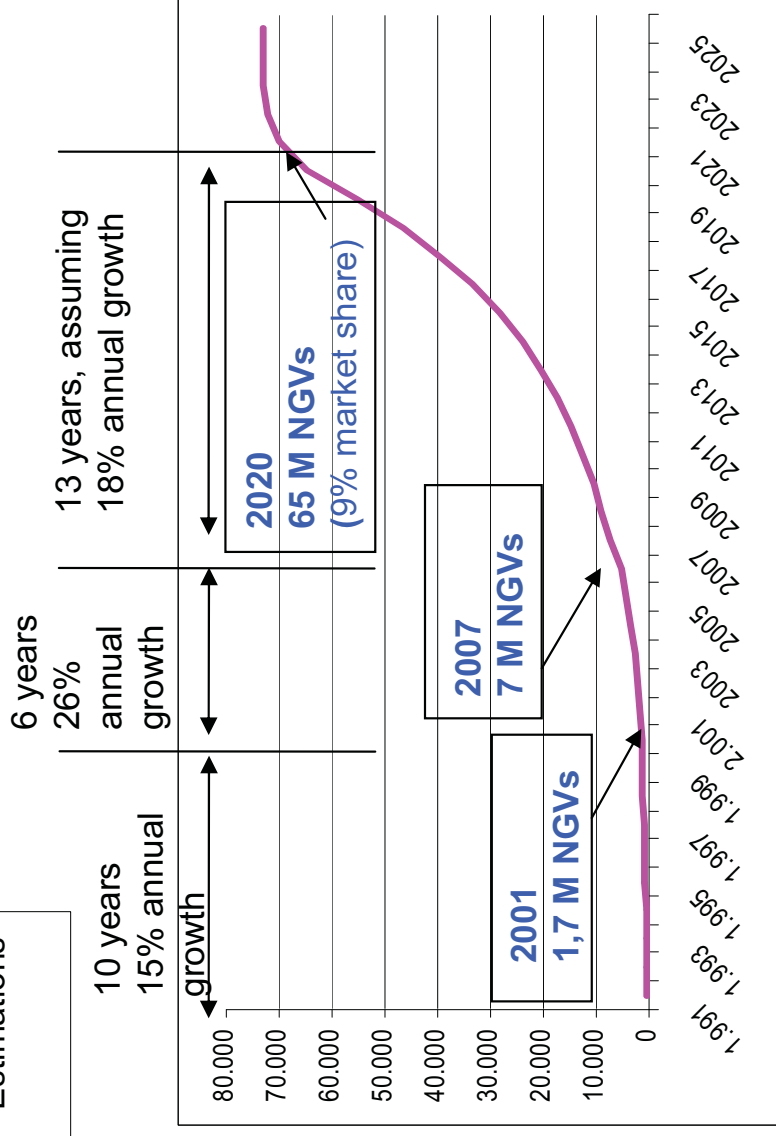


**Due to its molecular advantage, regulated exhaust emissions and CO<sub>2</sub> are particularly favourable in the engines running on natural gas.**

# 1,34 million CNG Vehicles in Europe NGVs World Market growth. 1991 to 2020



**Europe:  
18% growth compared  
with mid 2009!**



Worldwide NGVs (.000)

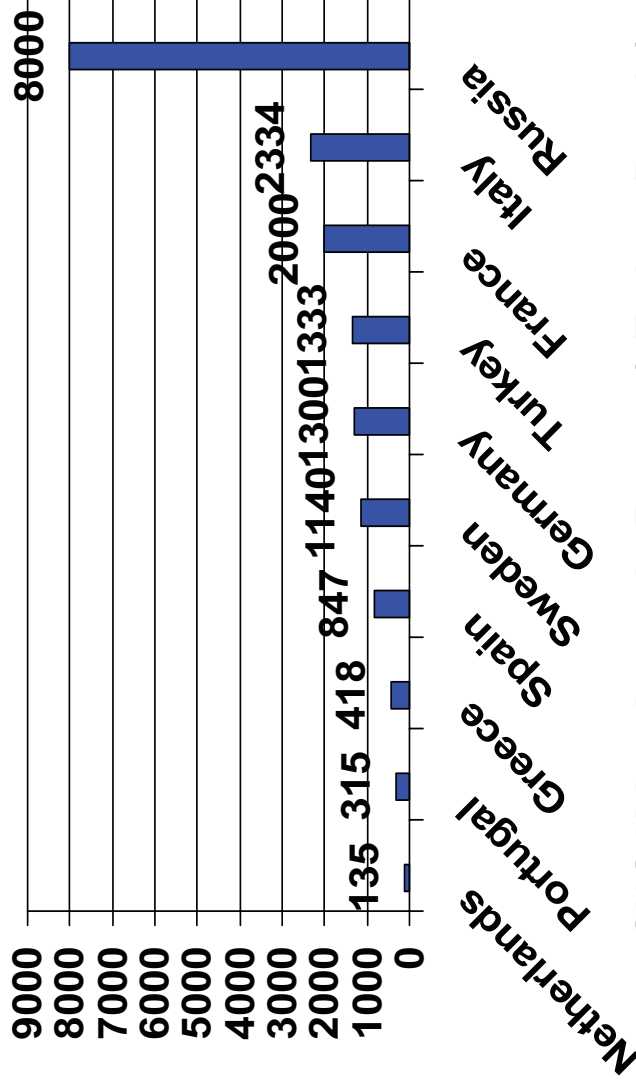
**World:  
65 M NGVs in 2020!**

Source: [www.ngvaeurope.eu](http://www.ngvaeurope.eu)

# Refuse Trucks & Urban buses A European CNG Success Story



In Europe, the number of heavy urban vehicles, buses and garbage collection trucks, using CNG/biomethane is growing continuously.



CNG Urban buses in Europe (+Turkey, Russia)



# The bright future of NGV's Biogas production potential



**Among different options of biofuels, biomethane presents the highest efficiency per hectare of land.**

A global European estimation shows a potential of 2.750 TWh (9,9EJ=238Mtoe), made out of 1.500 TWh (5,4 EJ=130Mtoe) coming from crops, plus another 1.250TWh (4,5EJ=1.108Mtoe) coming from other sources: sewage, manure, landfills, etc.

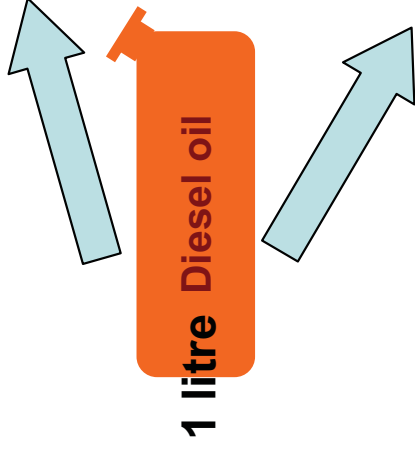
If we choose bioethanol instead of biogas we would lose the potential of the waste, sewages, etc (1.250TWh, 4,5EJ=108Mtoe) and we would also reduce the efficiency of the land by 47%.

**In other words we would obtain 800TWh (2,9EJ=70Mtoe) instead of 2.750TWh (9,9EJ=238Mtoe).**

# The bright future of NGV's LNG/LBG trucks for long distance haulage



Diesel vs CNG & LNG  
Autonomy equivalence



Dual Fuel technology for  
high power engines

Dual fuel systems have been  
developed to substitute most of  
the diesel fuel for natural gas in  
heavy duty engines.



Combining diesel and natural gas for clear cost efficiency



**LNG opens the way for the medium and long distance road transport**



# The bright future of NGV's CNG Hybrid Urban buses



**Avia** Ingeniería y Diseño, S.L.

Castrosua TEMPUS CNG Hybrid.  
New urban bus presented in FIAA Madrid  
(November 2010)

The municipality of Madrid has already passed orders for 23 CNG-Hybrid buses:

- 13 Castrosva
- 10 Tata Hispano.



Tata Starbus CNG Hybrid,  
to be produced in Europe by:  
**Tata Hispano**, Zaragoza, Spain.

# The bright future of NGV's Methane/Hydrogen mixtures

Methane/Hydrogen mixtures (*Hythane, Hydromethane*) offers a number of significant advantages as a bridge solution for a future hydrogen fuelled transport:

- It can be used in the existing NGV engines and vehicles with minor engine resetting
- The inboard fuel storage uses the same type of tanks and fittings, with some specification changes in materials
- The H<sub>2</sub> content considered (up to 30%) does not alter the autonomy of the vehicles
- There is an immediate impact as CO<sub>2</sub> emission reduction (- 11%)
- The use of compressed H<sub>2</sub> in a “large” basis will push ahead the development of the hydrogen production and logistics



## **Project Althytude.**

Bus running on Methane/Hydrogen blend in the city of Dunkerke (France)



## Conclusions

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- Natural gas (methane) is an **excellent energy vector**, with the lowest Carbon to Hydrogen ratio of all the hydrocarbons.
  - Natural gas is used in **existing internal combustion engines**, with minor additional investments, taking advantage of a well known and mature car & commercial vehicle technology.
- Dual Fuel technology offers the possibility of conversion for existing engines**
- The increasing production of **biomethane**, both from urban waste and from agricultural stuff is giving natural gas the new and valuable consideration of a **renewable fuel**
  - Natural gas has been used so far as CNG mainly for urban applications. The availability of **LNG will spread its use for medium and long distances** road transport
  - **Methane/Hydrogen mixtures**, that could be used the existing NGVs will become the bridge to a potential hydrogen fuelled transport
  - NG vehicles are today the **best and most economic alternative to oil derived fuels**, also improving gaseous and acoustic emissions.

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