Route to Green transport
Boundless travelling on CNG from Northern to Southern Europe: fiction or reality?
Lessons learnt from the GHW project – main findings and policy recommendations
Introduction – project context

- European Directive 2009/28/EC aiming at a 20% target for the overall share of energy from renewable sources and **10% target for energy from renewable sources in transport (biofuels)**
- Member State will face at least 20% gap to reach the RES target
- **A reduction of at least 60% of GHG by 2050** respect to 1990 is required from the transport sector (by 2030 the goal is to reduce GHG emissions to around 20% below their level in 2008)

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THE WHITE PAPER ON TRANSPORT (March 2011)

**Objective**

*Halve the use of conventionally fuelled cars in urban transport by 2030 and phase them out in cities by 2050*

<table>
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<tr>
<th>Measures</th>
<th>Sustainable alternative fuels strategy including appropriate infrastructure</th>
<th>Measures to promote replacement of inefficient and polluting vehicles</th>
<th>Public procurement strategies to ensure uptake of new technologies</th>
<th>Guidelines and standards for refuelling infrastructures</th>
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</table>
The GasHighWay project (2009-2012)

CNG/biomethane Refuelling Stations

Upgrading plants for biomethane production

NGVs
Objectives and methodology

**Best practice exchange**

**Technical support to potential investors**

**Know-how transfer to key-decision makers**

**Information dissemination**

| Supporting the uptake of NGVs | Boosting investments, expansion of gas refuelling infrastructures | Promoting the development of upgrading plants for biomethane production |

**Long term objective**

Promoting the realization of a **comprehensive network** of CNG/biomethane spanning from **Finland** to **Italy**.
CNG refuelling stations

evolution in the involved
countries

2009

835
33
10
28
700

2012

900
50
175
44
840

+15%
NGVs evolution in the involved countries

2009:
- 77,000
- 23,124
- 612,000

2012:
- 92,000
- 40,000
- 760,000

+25%
NGVs evolution in the involved countries

- +25% increase from 2009 to 2012

- Italy: 612,000 NGVs in 2012
- 1,000 gas stations in 2012
- 40,000 NGVs in 2012
- 343 NGVs in 2012
- 2,150 NGVs in 2012
- 3,000 NGVs in 2012
- 6,300 NGVs in 2012

Supported by INTELLIGENT ENERGY EUROPE
Biomethane prod. plants evolution in the involved countries

2009

2012

+125%
In 2030, natural gas should reach a market share of 5% for passenger transport and 13% for freight (28 bcm).

Between 2030 and 2050, natural gas market share should increase reaching 13% for passenger transport and 33% for freight (33 bcm).
Biomethane potential in Europe

Les chiffres en vert indiquent la production totale en ktoe. Green figures show total production in ktoe.

* Estimation.
1 - DOM non inclus. French overseas departments excluded.
Source: EuroObserv’ER 2010.
Biomethane potential in Europe

8 bcm biomethane production in EU-25 by 2020 ...

... out of which 5 bcm could come from GHW countries
Poland: Early beginning of the CNG/biomethane market

**Actual CNG stations and NGVs situation**
- Well developed gas grid and wide selection of NGVs
- "Chicken-egg" problem still to be solved
- 50% of investments in refueling stations based on partnership between bus/fleet operators and gas supplier as the only actual possibility for expanding the CNG infrastructure (i.e., Municipal Bus operator of Rzeszow, 20% of the fleet converted to CNG)

**Biogas/Biomethane**
- From 125 to 149 biogas plants in 2 years (2009-2011), mainly from WWTP and landfill. Dynamic growth in agricultural biogas expected
- Injection of biomethane allowed only for agricultural biogas plants

**Recent legislative development**
- Amendment of Energy Law enabling the injection of agricultural biomethane into the grid (August, 2011) and establishing support system with electric energy produced from biogas in CHP
- Public procurement decrees favouring CNG vehicles
- Amendment to the Biocomponents and Biofuels Act enabling financial support for biofuel investments
- Decree of Ministry of Infrastructure prohibiting self-refuelling for NGVs
Czech Republic: Growing CNG and initiating biomethane production

Actual CNG stations and NGVs situation

- CNG usage increased annually by 30% in the last 2 years
- 20 new public stations foreseen in the coming 2 years
- Increasing interest from private investors

Biogas/Biomethane

- 326 Biogas Plants, mainly agricultural biogas production plants
- E.ON has started to sell a 20% mix of biomethane/NG at CNG stations
- Biomethane can be injected into the grid but no feed-in-tariff!

Recent legislative development

- Government regulation n. 563, programme of support for alternative fuels in transport
- Government regulation n. 1952, establishing that by 2012, 25% of public bodies’ fleets has to be switched to “ecology-friendly vehicles”
- Bill n.23/2008, allowing NGVs parking in all garages (underground)
- Official recognition of biomethane as an official source of energy
**Austria: Sustainable biomethane for NGVs in Austria**

**Actual CNG stations and NGVs situation**
- Lack of interest of car dealers to sell NGVs
- More interest for gas filling stations owners to increase the gas sales rather than to expand the gas filling station network
- Most of the CNG stations integrated in existing petrol stations

**Biogas/Biomethane**
- 341 biogas plants (50% agricultural plants)
- Stop and go system of incentives negatively effecting the biogas market
- 7 upgrading units connected to the natural gas grid

**Recent legislative development**
- Government regulation OVGW G31 and G33 regulating the quality standards for biomethane
- Program “Klima:aktiv” from Ministry of Agriculture-Forestry-Environment-Water, foreseeing a support for the purchase of NGVs
- No clear incentives established for biomethane injected into the gas grid
Germany: Biomethane market booming, NGV market ready to boom

Actual CNG stations and NGVs situation

- Well developed gas infrastructure
- Low number of NGVs if compared to the number of stations (many filling stations operated in the red)
- Most gas filling stations owned by local public utilities companies

Biogas/Biomethane

- More than 7,100 biogas plants and 107 biogas upgrading plants estimated in operation
- 180 stations offer CNG-CBG mixture; 38 stations offer 100% biomethane
- Price of the biomethane not guaranteed
- 75% of the cost for connection to the grid to be paid by grid operator

Recent legislative development

- Declaration of intent (Initiative Erdgasmobilität –CNG und Biomethan als Kraftstoffe”) to support Federal Government in the achievement of 4% share of natural gas with an average admixture of 20% of biomethane by 2020
- Renewable Energy Act (EEG) foreseeing a decrease in the number of new biogas plants by 2012 (no fixed remuneration for biogas plants > 750kW_{el} starting their operation after 2013) and an increase in the number of new biogas upgrading plants
Italy: Opening the door to biomethane

Actual CNG stations and NGVs situation

- Highest number of NGVs in Europe
- Low number but still increasing of filling stations if compared to the number of NGVs
- Consistent reduction of incentives for the purchase of NGVs by 2011 negatively effecting the market-

Biogas/Biomethane

- 521 biogas plants mainly co-digesting livestock effluents/ energy crops and/or agro-industrial wastes and strongly supported by the feed-in-tariff system
- Biomethane injection into the grid still to be regulated (services of the Authority of Energy on duty but in progress)

Recent legislative development

- Saglia Law supporting the rationalization of the gas network on highways and in urban areas
- Law Decree n.28 (March, 2011) supporting the production and use of biomethane in transport (future implementing sub-decrees will fix incentives for biomethane, new incentives for biogas, terms and conditions for connection to the gas grid)
- New decree defining new rules for CNG self-services
Sweden: Forerunner country with good NGV market growth lacks long-term policies

Actual CNG stations and NGVs situation

- 13-27% yearly market growth and 60% share of renewables in the NGV market last three years
- Half the market is public transport buses (1 bus = 20-30 LDVs); essential niche for the emerging NGV market
- New development: LNG/LBG refuelling, LNG propelled HDVs

Biogas/Biomethane

- Biomethane largest type of biogas utilisation from 2010
- Doubled production (2,5TWh) forecasted by 2013
- Waste AD potential (10-15TWh) augmented by forest residuals potential (thermal gasification, 59TWh; production from 2013)

Recent legislative development

- Increase in biogas from agriculture due to investment grant programs; hopes for 2 EURcent/kWh benefit for methane reduction (manure)
- Government goals: Fossil free transport sector 2030, but only 10% reduction by 2020
- Energy tax revision will take away carbon tax deduction for natural gas as vehicle fuel in three steps from 2011 to 2015
- Lack of long-term policy commitment; fringe benefit tax deduction ends 2012, biomethane tax exemption uncertain after 2013

Finland: Bright future expected for a biomethane propelled NGV market

Actual CNG stations and NGVs situation
- Restricted gas grid coverage promotes interest in biomethane
- Barriers: Unawareness of using methane as fuel and a lack of incentives
- Positive outlook regarding NGV market growth!

Biogas/Biomethane
- 64 facilities produced 635GWh biogas in 2008, only minor share is upgraded
- From 1 to 3 upgrading facilities in only 2 years; several new projects regarding waste to biomethane
- Almost all refuelling stations now have biomethane for sale – principle similar to green electricity

Recent legislative development
- Tax exemption for biomethane has not been touched
- New measure in Finnish government program: “Use of biogas in transport will be promoted”
- Energy tax revision has increased the excise tax of natural gas
- The tax on the propelling force has been set for NGV’s to be taken in force earliest in 2013
Baltic countries: Lack of knowledge and policies main barrier

- Emerging market situation (declining in Latvia)
- Barriers: Unawareness of using methane as fuel and a lack of incentives and tax exemptions, chicken-egg situation
- The way forward: Baseload of CNG buses supporting the erection of new public refuelling stations

Actual CNG stations and NGVs situation

- Large potential in the agricultural sector – right now electricity generation strongly promoted in all three countries
- Formation and work of Estonian biogas association important contributor to new biometane incentives

Biogas/Biomethane

- Tax exemption for biomethane, but only in Estonia
- New program under development in Estonia regarding investment support for farmers for the conversion of their agricultural machines to be suitable for biomethane consumption.
- Excise tax for natural gas in all three countries

Recent legislative development

Successful stories of GasHighWay project

- **5 filling stations** projects are active and potential to be led to investment
- Commitment to promote the uptake of biomethane as vehicle fuel was included in the new government programme of Finland

- **2 fleets** have partially **switched to CNG**
- Commitment for one new gas station in Pamů city

- **One company buying new NGVs**; municipal company started to consider CNG station and partially switching to CNGs.
- First steps towards development of Polish upgrading technology

- Initiation of **Czech Post fleet conversion to CNG - 400 vehicles** (open tender in process)
- Other several fleet conversions - **18 NGV cars** purchased by different fleet operators

- Increase of interest in natural gas as a fuel
- Good **cooperation with DPD**

- **One company is** very interested in building the biogas plant with **upgrading unit and CNG filling station** and in switching the cars to NGVs

- **One company** for **waste management** will realize a **pilot plant for the upgrading of part of the produced biogas into biomethane** and is interested in partially **convert 28 trucks fleet** to NGVs and realizing a **CNG station**
- A large **wastewater treatment plant** now evaluating the **production of biomethane** out of sewage sludge
### SWOT analysis – factors identified influencing European NGV markets

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
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<tbody>
<tr>
<td>Being the most cost effective fuel in many countries attracts strong interest</td>
<td>Shorter range of NGVs</td>
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<td>NGVs = Proven clean vehicle technology</td>
<td>Incomplete gas grid coverage</td>
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<td>Excise tax reductions and exemptions</td>
<td>Higher investment costs (NGVs, stations)</td>
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<tr>
<td>Wide selection of NGVs on the market</td>
<td>Ignorance of CNG/NGV advantages</td>
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<tr>
<td>Financial support for NGVs</td>
<td>CNG/biomethane synergy not supported</td>
</tr>
<tr>
<td>Best practice examples</td>
<td>Lack of governmental support</td>
</tr>
<tr>
<td></td>
<td>Unclear legislative situation</td>
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<table>
<thead>
<tr>
<th>Opportunities</th>
<th>Threats</th>
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<tbody>
<tr>
<td>Better price prospects than petroleum</td>
<td>Increase in international and national natural gas prices, fuel excise taxes</td>
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<td>Growing ecological awareness</td>
<td>Lack of long-term policy commitment for NGV/biomethane market promotion</td>
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<tr>
<td>Reduction of energy dependency</td>
<td>Legislative measures effecting NGVs and biomethane</td>
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<tr>
<td>Energy + climate policies favour biofuels</td>
<td>Focus on future transport solutions (fuel cells/H2, electricity, liquid biofuels)</td>
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<tr>
<td>Creation of new jobs (biomethane)</td>
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<tr>
<td>New EU investment subsidies, new projects promoting CNG/biomethane</td>
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Conclusions – essentials of CNG/biomethane success

- Essential to lay down and **keep market policies for the long-term**, in order to create stable conditions in the high capital investment business of CNG/biomethane

- **The key role of regional and local authorities in public-private partnerships** as prime movers regarding conversion of captive fleets, waste to biomethane projects and overcoming market barriers by communicating needed policy changes

- The public needs to be informed in order to **overcome the emerging market challenge of ignorance and misconceptions** regarding CNG/biomethane

- The **price prospects of CNG/biomethane are better than for conventional fossil fuels**, and the NGV technology is commercially available (EV is not)

- **Methane diesel engine and LNG technology is commercially available** and may significantly broaden the NGV market, if supported properly

- **Biomethane projects require a partnership along the whole value-chain**, from producer to the final user
Suggested measures: NGVs, refuelling and biomethane

- **Top priorities (short-term)**
  - Make sure legislative and regulative market barriers are removed
  - Match make formation of public private partnerships, directed information campaigns to target key actors, e.g. farmers
  - Implement benefit schemes for investments, e.g. waste to methane
  - Promote environmental and economic benefits of CNG/biomethane

- **Mid-term priorities**
  - Promote standardization on national and international level
  - Implement regional and national level support platforms, e.g. triple-helix, clean tech exports, best practice dissemination

- **Long-term priorities**
  - Promote and finance research and technology development
  - Upgrade existing facilities and installations to increase performance
  - Commit to CNG/biomethane for the long haul, e.g. promise of tax exemptions and benefits up to a certain market size (5-10%)
Thank you for your attention!

Fabio Sagnelli, Environment Park, Project Partner
fabio.sagnelli@envipark.com

Mattias Svensson, Swedish Gas Centre, Project Partner
mattias.svensson@sgc.se