The BIOMASTER Project - Biomethane Use in Transport: Challenges and Results

Stefano PROIETTI
ISIS
Istituto di Studi per l’Integrazione dei Sistemi

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Who is ISIS

- Research and consultant Institute founded in 1971
- Consolidated experience in energy efficiency, sustainable mobility, territorial systems, environmental sustainability
- 20 members staff with multidisciplinary background in engineering, statistics, economics, politics and informatics
- Long story of collaboration at national (Ministries, Regions, Provinces and Municipalities) and international level (European Commission, World Bank, European Bank of Investments, foreigner Ministries, Regions e Municipalities, etc.)
- Specialised skills in coordination of projects, analysis of and support to policies, impact assessment, evaluation of policies and technologies energy efficiency, monitoring of participation processes to policies.

INTRODUCTION

Biomethane ...?
Why Biomethane?

- Diverse, abundant and self-supplying feedstock: sewage sludge, municipal bio-waste, residues and crops from the agro-food sector
- Unique combination of low-carbon, low-emissions, low-noise transport
- Biogas production to improve environmental efficiency of waste treatment processes
- High productivity per hectare of biogas from crops, decreasing competition for arable land
- Upgraded biogas similar to natural gas:
  - CNG infrastructures and vehicles can be used
  - Natural gas can be complementary in security of supply
  - Upgraded biogas can be injected in and transported by the natural gas grids

Supplies are unlimited ...
Supplies are unlimited ...

BIOMASTER
The project
Project Summary

BIOMASTER is a project of the Intelligent Energy Europe Programme

• 17 partners, 5 Country members, 4 application sites
  – Malopolska Region (PL)
  – Norfolk County (UK)
  – Skåne Region (SE)
  – Trentino (IT)

• 36 months duration (01 May 2011 – 30 April 2014)

• Around EUR 1,700,000.00 EU co-funding

• Uptake of biomethane production, distribution and use in vehicles

• “Well-to-wheel” partnership, with set-up of local networks

• Studies, analysis, training, seminars, conferences, dissemination, publications, events, meetings

Who we are …

• Malopolska Region, Poland
  – AGH-UST – AGH University of Science and Technology
  – MSWM – Municipal Services and Waste Management Company of Crakow
  – PGNiG – PGNiG Energia S.A.

• Norfolk County, United Kingdom
  – NCC – Norfolk County Council
  – NCS – Norse Commercial Services Ltd
  – NGG – National Grid Gas plc

• Skåne Region, Sweden
  – LUENERG – Kraftningen produktion
  – Regskane – Region of Skåne
  – AB SEA-SE – Kommunförbundet Skåne

• Trentino Region, Italy
  – ACSM – ACSM S.p.A.
  – CRF – FIAT Research Centre SCPA
  – CRPA – Research Centre on Animal Production
  – DE – Group Dolomiti Energia
  – FEM – Edmund Mach Foundation

• ISIS – Institute of Studies for the integration of Systems, Italy (coordinator)
• FGM-AMOR – Austrian Mobility Research, Austria
• TTR – Transport & Travel Research Ltd, United Kingdom
BIOMASTER

Objectives and challenges

The biomethane chain we work on ...
Our ambitions are ...

- To prove biomethane for transport as operational and viable option in spite of the existing regulatory and fiscal barriers
- To overcome the impasse by bringing the key components of the biomethane chain into a joint initiative, stimulating investments, removing non-technological barriers and mobilising actions for biomethane uptake

The targets towards we work ...

- Boost the biomethane economy and identify solutions to the common barriers in the view to implement practical action plans
- Contribute to strategic energy security, renewable energy, environmental and harmonization targets
- Conduct an initial market assessment to identify the current technical, economic and social barriers to the development of biomethane market
- Define a common platform as a basis for widespread market development of biomethane as a renewable transport fuel
- Evaluate environmental and economic processes and impacts to assess the cost-effectiveness of biomethane market
- Disseminate the project findings to the main target groups and the key actors of the biomethane chain and potential multipliers
Challenges to work on ...

EU Level

- Directive 2009/28/EC: 10% of transport fuel from renewable sources
- Need for European biomethane standards
- Promote and facilitate injection of biomethane into natural gas grid
- Digestate to replace artificial fertilisers

Local and National Level

- Avoid market distortion of green certificates system for power and heat
- Legislation to secure investments for production, refuelling infrastructure, etc.
- Simplified permissions for building of biogas plants and connection with the gas grid
- Economic incentives for vehicles and fuels
- Security of energy supply from local resources instead of fossil fuel dependency and import
- Increase and optimise the bio-waste collection, treatment and recycling
- Adapt/build gas grid for injection and increase gas filling stations
Challenges to work on ...

Business Level

- Improve range and energy efficiency of gas vehicles (storage and engine)
- Increase availability of vehicle models
- Investments in driver trainings for gas vehicles
- Higher frequency of vehicle maintenance
- Comprehensive service contract for vehicles

We try to tackle these challenges by ...

- Commitment of a "well-to-wheel" partnership along the biomethane chain within the project
- Set-up of networks by involving additional local and national stakeholders beyond the official partners
- Addressing
  - Potential for total production and use
  - Available distribution modalities (with special focus on biomethane grid injection)
  - Legal, organisational and financial barriers
What we want to achieve …

- 4 detailed feedstock assessments, action plans for biogas production and upgrading, strategies for residual product management and strategies to boost biomethane use in vehicles
- 4 regional networks established, one in each BIOMASTER region
- 16 additional regional networks, 4 in each BIOMASTER country
- Additional networks in 5 countries others than the partners ones
- Quantifiable progress towards a cumulative target of:
  - 12 new biomethane production plants in the partner regions
  - 4 biomethane grid injection points
  - 630 vehicles operating on biomethane
  - 54 new biomethane filling stations

Focus on Regional Networks

- Activities of regional networks in the project sites: regular meetings, regional seminars, national conferences, interaction with other existing networks
- Multiplier effect for the creation of similar networks in other areas of project regional countries (4 X 4 = 16): transfer of information, news and project documents, invitations to events of the project, joint organization of two workshops
- Replication effect with networks in 5 countries others than the partners ones, with organisation of workshops as kick-off step and visible milestone for their development. BIOMASTER will regularly inform the main stakeholders in those countries on the activities and results providing them the main products, such as reports, brochures, newsletters, fact-sheets etc.
Results so far ...

- 4 detailed feedstock assessments in the 4 BIOMASTER sites
- 4 regional networks established, one in each BIOMASTER site
- 9 other regional networks in each partner country (2 in Italy, 1 in UK, 4 in Sweden, 2 in Poland)
- 3 rural biogas plants, 5 injection points, 5 new public filling stations, 65 filling points for CNG buses, 2186 new CNG personal vehicles and 705 CNG buses (Skåne)
- 1 agricultural biogas plant in construction (Małopolska)
- Feasibility work and design of 1 biogas plant, 2 filling stations sites identified (Norfolk)
- 1 biogas plant built and a Feasibility study for 1 biogas plant (Trentino)
- Communication products (newsletters, factsheets, postcard, website, folder).

CRF Survey of Trentino CNG Vehicle Users

- Methane is not considered more dangerous than a standard fuel by almost 70% of people
- The fuel saving is the main reason for which users purchase a CNG car
- The main reasons of not satisfaction for CNG users are refueling procedure and driving range (more than 30%)
- The percentage of people knowing biomethane is really high especially among the web respondents (67%)

www.biomaster-project.eu
Norse Survey of Norfolk CNG Vehicle Users

- Lack of enough filling stations as main problem
- More than 90% in favor of alternative fuels (including biomethane) by bus operators
- Better information on technical aspects needed (fuel costs, vehicle costs, emissions)

SEA-SE Survey of Skane CNG Vehicle Users

- General satisfaction of NGV drivers with their cars and the infrastructure for CNG/biomethane in the Helsingborg region
- Happy with the low environmental impact from their car, especially when using biomethane
- Almost no difference in the driving experience when running on biomethane compared to CNG
- NGV’s drivers relatively happy with the number of filling stations
- For people not using NGV the lack of filling stations is one of the main reasons
• Limited number of filling stations as main problem
• More 80% satisfied/moderately satisfied with the fuel economy (for 60% saving of 20-40% in fuel costs)
• About 60% satisfied with their NGVs: dissatisfaction due to limitations to parking, drive comfort and size of the boot
• More 86% knows biomethane and is interested in buying a biomethane vehicle
• CNG vehicles chosen primarily for economic/incentive reasons

Conclusions
Chicken/Egg Dilemma (1)

- **Gas distributors** and **OEMs** need a certain number of **drivers** to develop fuelling infrastructure and make new vehicles available.

- But **users** need fuelling stations and available methane vehicles…

- First **vehicles** or **stations**?

  How to solve the problem???

Chicken/Egg Dilemma (2)

- The introduction of clean and energy-efficient vehicles in the market should be accompanied by the **parallel** build-up of refuelling infrastructures.

- Intervention of **public authorities**: the purchasing policies for cleaner vehicles in captive fleets (also through **green joint procurements**) and the corresponding build-up of fuelling facilities in order to create the **critical mass** to influence **market prices** and **industry choices** against the limited number of vehicles models and their higher costs.

- Moreover public bodies improve their environmental image by providing the **right example** to citizens.
Whom to contact ...

Stefano PROIETTI
BIOMASTER Project Coordinator
ISIS – Institute of Studies for the integration of Systems
Via Flaminia, 21
00196 Rome, ITALY
Tel: 0039 06 321 265 5
Email: sproietti@isis-it.com
www.biomaster-project.eu

Thank you for your attention!