

The BIOMASTER Project: Biomethane Use in Transport

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

Riga 25 October 2012



IN THIS PRESENTATION

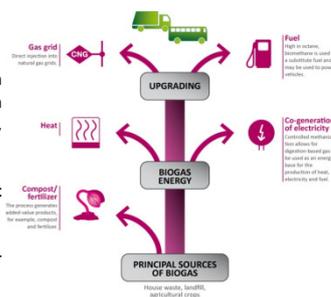
- INTRODUCTION
- WHO WE ARE AND WHAT WE DO
- CHALLENGES TO WORK ON
- CONTACT

INTRODUCTION

Biomethane ...?

What is Biomethane?

- Biomethane is produced through the **digestion process** when bacteria break down organic material into methane, carbon dioxide, water and other impurities (siloxanes, sulphur dioxide, hydrogen nitride)
- The methane can either be used to generate **electricity and heat** or in its upgraded form as **fuel** or injected into **natural gas grids**
- Residual digestion-based products may be used as **fertilizer or compost**

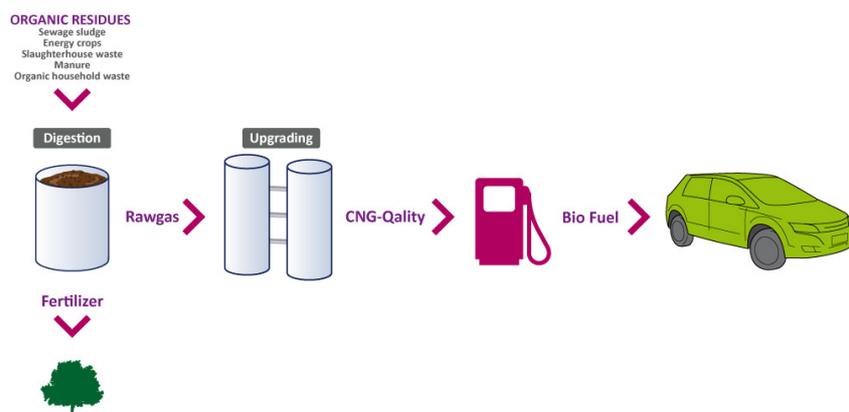


Source: Biogasmax Project - www.biogasmax.eu
Design: FGM-AMOR

Why Biomethane?

- **Diverse, abundant and self-supplying** feedstock: sewage sludge, municipal bio-waste, waste 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 ...



Source: CIVITAS TRENDSETTER Project – www.civitas.eu
Design: FGM-AMOR

www.biomaster-project.eu

BIOMASTER

The project

www.biomaster-project.eu

Project Summary

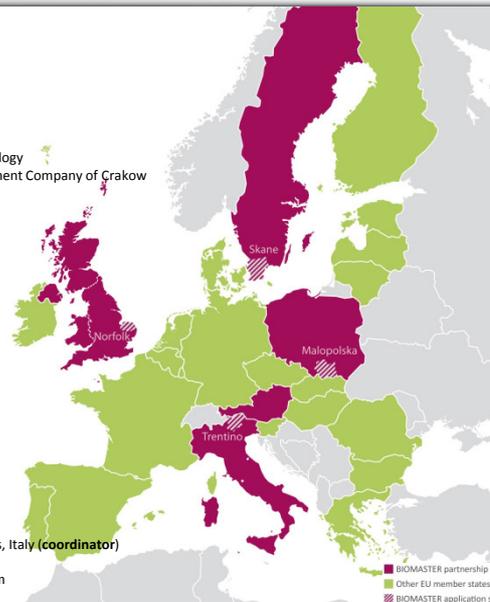


BIOMASTER is a project of the Intelligent Energy Europe Programme

- **17 partners, 5 Country members, 4 application sites**
 - Maloposka 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**
- **“Waste-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 – Kraftringen 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**



Małopolska, Poland



About Małopolska

Małopolska is a region in southern Poland with an area of **15,108 km²** and **3,267,731** inhabitants. The region's economy includes high technology, banking, chemical and metallurgical industries, coal, ore, food processing, and spirit and tobacco industries. The most industrialised city is Kraków, which is also the capital of Małopolska.

Activities within BIOMASTER are ...

- Guidelines on methods and sources of biogas production & upgrading
- Feasibility study analysing the financial, technological economic, environmental and safety conditions to inject biomethane into the gas grid
- Fleet development strategy to reach new vehicles adapted for the use of biomethane and use of biomethane in the vehicles currently powered by CNG
- Set up of regional and national network

Norfolk County, United Kingdom



About Norfolk

Norfolk is a low-lying county in the East of England. The county town is Norwich. Norfolk is the fifth largest ceremonial county in England, with an area of **5,371 km²** and **850,800** inhabitants. Over 20% of employment in the county is in the agriculture and food industries.

Activities within BIOMASTER are ...

- Study on the design, finance, supply, site selection, and planning requirements to include a biogas production plant at waste processing centres
- Guide for farmers/landowners, aimed at preparing them to take advantage of market opportunities that may arise
- Feasibility study on the scope of the grid injection equipment and the connecting pipeline
- Engineering design study of the planned installation.
- Fleet development strategy to reach new vehicles adapted for the use of biomethane and use of biomethane in the vehicles currently powered by CNG
- Set up of regional and national network

Skåne, Sweden

About Skåne

Skåne (Scania) is the southernmost province of Sweden with an area of **10,939 km²** and **1,228,815** inhabitants. Malmö is administrative centre of Skåne County. There **45** biogas plants in operation and about **33%** of biogas is upgraded to biomethane. It is injected to the natural gas grid at **5** injection points and mostly dedicated for transport use. There are **25** public filling stations and some **15** bus depots stations. About **5,000** personal cars and **700** buses run either on pure biomethane or mixed biomethane/natural gas.



Activities within BIOMASTER are ...

- Business models for 6 future biogas plants in the region
- Business plan on modalities to inject biomethane into the regional or national gas grid both on a small versus large scale
- Analysis and suggestion of the potential to develop the gas filling infrastructure and also the developing a strategy on how to build new gas filling stations the coming years
- Suggesting a temporary national legal framework enabling the use of biomethane in dual fuel biomethane vehicles such as heavy trucks and tractors
- Define a public procurement strategy for biomethane vehicles
- Set up of regional and national biogas and biomethane network

Trentino, Italy

About Trentino

Trentino, with its capital Trento, is an autonomous province of Italy with an area of **6,207 km²** and **533,394** inhabitants (year 2012). The province is divided into **217** municipalities. Agriculture and tourism are key activities. Currently there are **5** biogas plants in operation and another one under construction (all for CHP). In Trentino **85%** is covered by the gas grid, there are **7** CNG filling station, **14** CNG buses (in Trento) and **3,000** CNG private vehicles (for Trentino and Alto Adige).



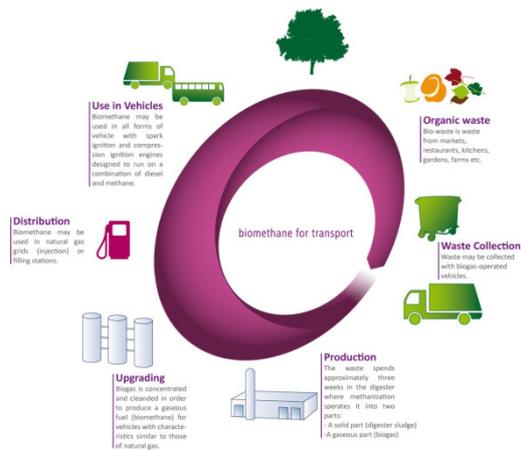
Activities within BIOMASTER are ...

- Feasibility study to evaluate the best technology, planning, financing and location of one anaerobic digestion facility on the local site
- Business plan on modalities to inject biomethane into the regional or national gas grid both on a small versus large scale
- Analysis of the different uses of biomethane that would be produced
- Evaluation of the technological, economical and safety aspects of a local filling station
- Set up of regional and national network

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



www.biomaster-project.eu

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

www.biomaster-project.eu

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**
- **Waste** Framework Directive, **Water** Framework Directive, **Nitrate** Directive (and legislation on bio-waste with possible EU Directive)
- **Digestate** to replace **artificial fertilisers**

Challenges to work on ...

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 “**waste-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 site and **4** other regional networks in each partner 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
 - **30** 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
- **8 other regional networks** in each partner country (1 in Italy, 1 in UK, 4 in Sweden, 2 in Poland)
- **3 rural biogas plants, 1 new public filling station, 652 new CNG personal vehicles** (Skåne)
- **1 feasibility study** for a biogas plant (Trentino)
- **Communication products** (newsletters, factsheets, postcard, website, folder).

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!