Triple Helix Summit 2020
Designing globally connected regional innovation ecosystems

09 - Circular Economy, Industrial symbiosis and ecosystem services for the sustainable development of regions, cities and industrial districts 02 - Building and growing regional innovation ecosystems through industrial specialization and collaborations

Abstract 36

BIOMETHANE EMILIA-ROMAGNA REGIONAL SYSTEM

Pratical case

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Abstract text:
Purpose
This case study is a practical example of collaboration of science, industry and government for overcoming barriers and opening patway in the specific bioenergy sector (biomethane).
Public authority, waste management companies, research institution and technology provider collaborated together for a common objective: boost the innovation in the biogas industry and overcoming technology and legislative barriers.
The case study has been particularly challenging due to: the lack of EU and National biomethane regulation; lack of specific policy framework and incentive scheme; lack of ad-hoc technical experience; site complexity in terms of technical and environmental legislation (wastewater treatment plant and landfill plant).

Originality
Biomethane is a gas consisting of mostly methane and generated by renewable sources by anaerobic digestion or gasification. It can be obtained from organic biomass of different origins and from landfill.
Biomethane can be used in natural gas transport and distribution networks for heating, domestic and industrial uses, or as a fuel for transport. This "green methane" can significantly contribute to the reduction of greenhouse gases emissions and to the achievement of the European 2030 energy targets: 32% of gross final consumption covered by renewable energy sources, and a minimum share of at least 14% of fuel for transport purposes from renewable sources.

Design
On 2009 the national and local strategic agendas bet on biomethane as one of the biomass based energy vector that could play a fundamental role in reaching the 2020 target for the share of biofuel in the transport sector . The second triennial action program (2011-2013) of the Regional Energy Plan of Emilia-Romagna repeatedly recalled the importance of biomethane, well aware that the regional production potential is relevant and still far to be exploited at its full extent. At that date there were positive policy framework, scientific references and technology availability but not practical examples in Italy. It was clear that separate and individual initiatives to tackle this complex issue was not sufficient. A joint collaboration, involving policy maker, technical expert and scientific know-how, was needed instead.
The idea of practically demonstrate the feasibility of biomethane in the regional context thanks to a triple helix collaboration approach was born within the Emilia-Romagna Technology Network (Energy and Environment platform). In this framework main starting references were: the scientific work done by CRPA on biogas; the ASTER's experience on triple helix collaboration projects (MHYBUS project 2007: https://www.mhybus.eu/en/mhybus_en.htm).
Considering the full commitment of the Emilia-Romagna Region (available to include biomethane strategy in its policy and co-finance the triple helix collaboration) ASTER in charge of coordinating the Energy and Environment platform identified the EC programme "LIFE" as a suitable financial scheme.

The process to generate a practical project proposal and form the consortium was long and not ease (first project idea was rejected by EC, difficulties on involving industries) but finally on October 2013 the project “Biomethane Emilia-Romagna Regional system – BioMethER” officially started.

The triple helix actors:
• ART-ER –coordinator
• EMILIA-ROMAGNA REGION (DG Agriculture – DG Directorate General, Knowledge, Labour and Enterprises) co-financer.
• CRPA Research Center - scientific coordinator.
• Herambiente Landfill Ravenna plant.
• Iren Smart Solutions technical design and layout of the Reggio Emilia plant
• IRENSPA responsible for biomethane final use test in CNG cars.
• IRETI authorization and management of the Reggio Emilia Wastewater plant.
• SOL design and installation of the two prototypes.

Actions:
• Autorisation procedure: Permitting and technical preparatory actions for the prototypes installation
• Design and construction of the two upgrading plants
• Biomethane production from landfill biogas for direct use in public transport (CNG buses)
• Biomethane production from wastewater treatment sludge for transport (CNG cars fleet)
• Regional guidelines for biomethane implementation at regional level. Analysis of regional context and scenario evaluation
• Monitoring of biogas, produced biomethane and final biomethane uses
BioMethER reached project’s objective the 30th of September 2019 and terminated its financial obligation with the European Commission - LIFE programme. However being part of a regional policy strategy the triple helix collaboration is still on-going and continuing to pursue its demonstrative and experimental objectives. In particular the collaboration has been enlarged to: car manufactures (Volkswagen Group Italy), public transport company (START Ravenna) and ENEA for the evaluation of the final use of biomethane in vehicles. At European level several attemps have been made to launch a new intiative on Bio-LNG: “BioLNG blue corridor”.

Results
BioMethER can be seen as best practice example because it contributed to over pass the regulatory barrier and open the door to biomethane diffusion. Nevertheless it is the first Italian experience that empirically demonstrated the technical feasibility of the biomethane final use . In particular it proved that the biomethane from landfill and from sewage sludge biogas has the same quality and assure same public safety of the others biomethane. It was possible to tackle this challenge only thanks to a triple helix collaboration and within the context of a LIFE programme which is targeted to overcome barriers and improve and harmonize the EU legislative framework.

Impact
Demonstrative plants have been thought to operate in real environment for a long duration:
-Ravenna demo plant until the end of October 2021 with an estimated total biomethane production of around 84.000 m3;
-Reggio Emilia demo plant until the end of August 2021 with an estimated total biomethane production of around 115.000 m3.
The quality of the biomethane produced will be continuously monitored and tests on CNG vehicles fuelled with biomethane will continue in collaboration with ENEA, Volkswagen Group Italy. Test on vehicles performances have been done on July 2019 and other are planned on 2020 and on 2021.

Transferability

The transferability of this case study, apart from the financial triggering element, mainly depends on the innovation ecosystem ground that should count on the presence of the following specific conditions:

- Positive Policy framework and awareness from the public opinion on environmental issues and sustainability of waste management and transport sector.
- Industry knowledge and expertise in the operation field of innovation.
- Industrial research laboratories.
- Waste management companies with industrial mindset

Owner:
ART-ER Attractiveness Research Territory is the Emilia-Romagna Joint Stock Consortium that was born from the merger of ASTER and ERVET, with the purpose of fostering the region's sustainable growth by developing innovation and knowledge, attractiveness and internationalization of the region system. Its shareholders are: Emilia-Romagna Regional Government, 6 Universities and the National Research Centres located in the region (the National Research Council-CNR, the Italian National Agency for New Technologies, Energy and Sustainable Economic Development-ENEA, the National Institute for Nuclear Physics-INFN), Regional Union of Chambers of Commerce.
ART-ER works in collaboration with enterprises, universities, research centres and institutions for the development of the innovation ecosystem of the territory.

Geographical origin:
Emilia-Romagna Region
References (Harvard style):
Linee Guida BioMethER, Linee Guida per lo sviluppo della filiera del biometano in Emilia-Romagna, www.biomether.it