

Removing technical barriers to biomethane injection in the natural gas grid

A GERG initiative to support the development of the biomethane industry in Europe

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BIOMETHANE AND ITS INTRODUCTION INTO THE GAS NETWORK

Renewably derived gases, whether biomethane or hydrogen, have the potential to make an enormous contribution to the long-term development of a low carbon energy system in Europe and beyond. Although volumes injected into our gas networks are currently small, they are showing rapid growth in some European countries.

In the case of biomethane a pan European understanding of the steps needed to remove any technical barriers will greatly support the development of a viable and sustainable growth industry. To approach the removal of these barriers in a consistent and effective manner requires close cooperation with those developing the standards for use of biomethane.

Discussions on biomethane quality standard definition for network injection have been ongoing for several years now. However, a lack of scientific and tangible network data has held back a full understanding of the real impact of biomethane trace compounds on gas infrastructure as well as end-users.

Two European standards on biomethane have been published in 2016 / 2017:

- EN16723-1: Specifications for biomethane for injection in the natural gas network;
- EN16723-2: Automotive fuel specifications

Yet, they are only of voluntary application, and some threshold values are either missing, or were set through stakeholder agreement but are not always based on real technical data, which has been lacking at a European level.

Therefore to ensure and secure the future of the whole biomethane industry, we need to define threshold values which ensure gas infrastructure integrity, and end-users' equipment integrity, without being unnecessarily stringent and therefore imposing unnecessary extra costs on producers. This will allow the gas industry and its vast existing infrastructure to play a major role in meeting Europe's climate goals.

THE GERG BIOMETHANE PROJECT

In 2016, a GERG project was set up and launched at the initiative of several European gas grid and gas storage operators. This project was led by Engie Lab CRIGEN (representing the French gas infrastructure operators GRTgaz, GRDF, STORENGY). Partners included the Danish Gas Technology Centre, DGC (representing Danish gas operators), DNVGL UK (representing the four UK gas distribution companies, National Grid/Cadent, SGN, NGN and Wales and the West), Gasum, Gaz System, Innogy, Snam Rete Gaz, and TIGF. Kiwa and DNVGL Netherlands provided additional technical input and delivery based on existing Dutch industry knowledge and their known expertise in this area.

Since there is no precise knowledge about the choice of trace components

to follow and the definition of threshold values, the aim of the GERG biomethane project is to gather robust technical information regarding the impacts of biomethane trace components on the gas infrastructures and on the end-users' equipment to propose revision of the standards using strong technical arguments.

The first step, completed this year, is a literature and operational data review to identify the gaps of knowledge. It focuses on two aspects:

- Corrosion: impact of the biomethane trace components in terms of corrosion: CO, HCN, H₂S, NH₃, HCl, HF, organo-halides, micro-organisms;
- Siloxanes: impact of silica compounds found in biogas sources both on the gas infrastructure (pipes, compressors, valves) and on end-users (boilers, engines).

A UNIQUE SET OF DATA REGARDING REAL BIOMETHANE QUALITY

The phase 1 of the GERG biomethane project has allowed us to collect a unique set of data regarding real biomethane quality. These data were collected by partners who need to perform biomethane analysis prior to its injection into their gas networks. As there is very little public documentation on trace compounds concentrations in biomethane, this set of data is highly valuable.

These data are very helpful to aid



understanding of the real biomethane composition in the gas networks and in the end-users' appliances.

The data sets also give some clues on the ease with which biomethane producers can meet the current requirements of EN 16723-1 or the thresholds that may be suggested at the end of coming phases of the project.

The extensive review performed highlighted the gaps of knowledge regarding the impact of biomethane trace compounds on gas infrastructure and on gas users: in particular, the study shows that the impact of siloxanes on heavy duty engines and on some boilers needs further understanding, as well as the impact of biomethane on some materials, especially in the presence of water (which is the case in underground gas storage).

NEXT STEPS

Phase 1 of the GERG biomethane project has already helped to clearly identify the gaps of knowledge regarding:

- the impact of biomethane corrosive trace compounds;
- the impact of siloxanes on gas appliances, particularly on boilers and vehicles.

This project has set a unique baseline for real European operational data and will be followed by a second phase project funded under the H2020 framework through CEN. This new project will address the priorities given by CEN Technical Committees working on the standardisation programme:

- tests regarding the impact of siloxanes on heavy duty engines;
- tests regarding the impact of siloxanes on boilers and other stationary appliances;
- review on the impact of oxygen on underground gas storages;
- review on the impact of Sulphur on vehicles;
- Impact on health (which is to be studied through the expert group EG4 of CeN TC408).

The next phase will consist in performing tests to complete the existing knowledge.

This project will help to obtain threshold values in agreement with the interests of all the stakeholders needed to develop a successful biomethane industry in Europe:

- Biomethane producers: need to

have limited treatment / upgrading costs to guarantee the economic viability of the projects, and thus the development of the biomethane sector;

- Grid operators: need to protect the grid infrastructure while including renewable gases in the grid;
- End-users: need to protect their equipment (boilers, engines, etc).

This next phase, which is to be launched in Autumn 2017, will gather as many stakeholders (biomethane producers, boilers manufacturers, engines manufacturers, gas grid or storage operators, etc.) as possible in its supervisory board in order to obtain a consensus on values that should be used as thresholds in the future European standards. This project is just one of the many ways that the European gas industry looks to support an increasingly low carbon and renewable energy based future.

ACKNOWLEDGMENTS

GERG and the authors acknowledge the strong support of all project member companies, CEN and its Technical Committees, EBA, Marcogaz and the European Commission in helping to define and deliver the work programmes discussed here. ●



Low pressure 30 mbar(g)



High pressure 8 bar(g)

