GERG Biomethane Injection Best Practices

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1. Introduction

In many European countries biomethane is injected into the natural gas grid. However, there are different levels of development, plant size and organization within the individual countries. Therefore, injection is handled differently. To map the advantages and disadvantages of the different solutions this project has been initiated under the auspices of GERG.

The aim of this project is – via exchange of experience – to investigate and describe how injection of biomethane takes place in practice in different countries, and thereby determine if there is a best practice for biomethane injection.

Data has been collected from ten countries: Belgium, Denmark, France, Germany, Ireland, Italy, Netherlands, Switzerland, Spain, and the United Kingdom

2. Collection of data

The data has been collected by interviews with relevant actors in the 10 countries. In order to get comparable answers a survey was made and used as a starting point for the interviews.

The scope of the survey was defined as shown with the dotted line in Figure 1.

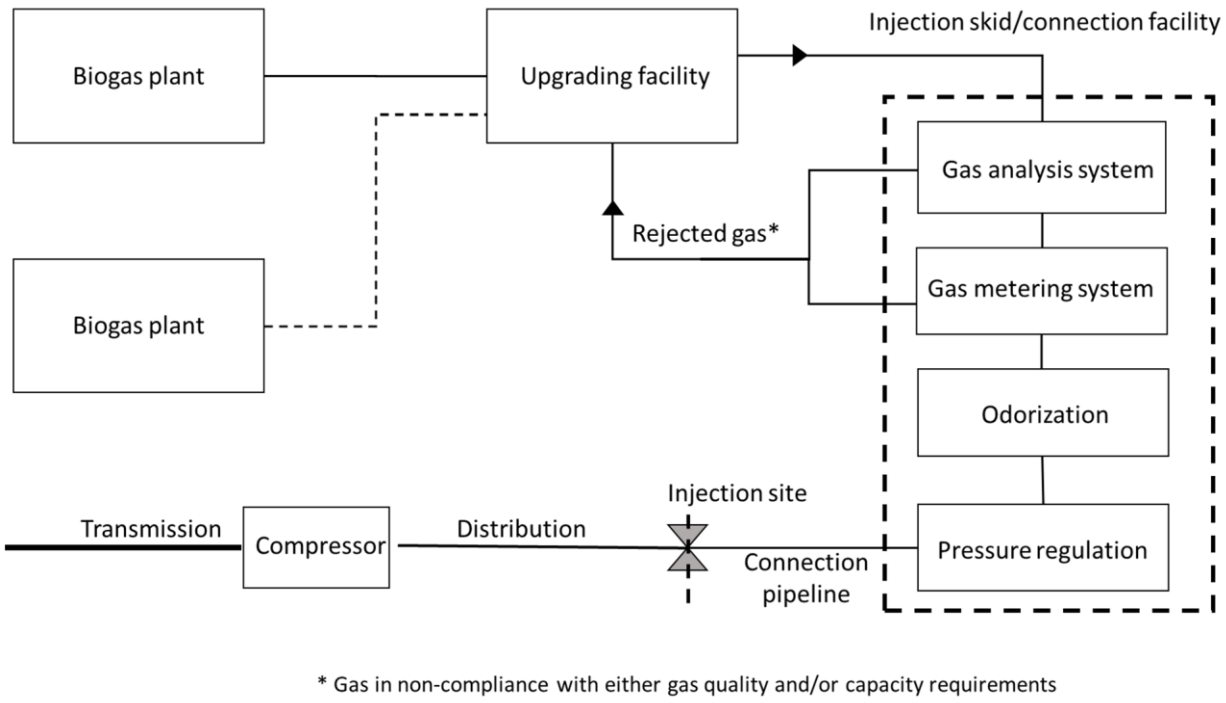

Figure 1 Overview of the pathway of biomethane. The scope of this report is the functionality within the dotted lines.

To better understand Figure 1 some definitions are given below.

Injection site
Physical location where the biomethane enters the natural gas grid.
Gas analysis system
Includes all instrumentation for measurement of relevant gas quality parameters.
Gas metering system
Includes all instrumentation for measurement gas flows and capacity.
Odorization
Includes all equipment used for odorizing the gas.
Pressure regulation
Regulation of gas pressure before entering the gas grid.
Connection pipeline
Any pipeline used to transmit biomethane from the upgrading facility to the connection facility.
Injection skid / connection facility
The overall facility for controlling the biomethane prior to injection to the grid.
Connection pipeline
Any pipeline used to transmit biomethane from the upgrading facility to the connection facility or from the connection facility to the grid.
Quality conversion
Includes all equipment used for addition of additives such as propane.

3. Conclusion

Several parameters are in play to determine the best practices for biomethane injection, and it is therefore necessary to take all of these into account when choosing a best practice. There are several similarities in the setup of injection skids in all the participating countries, however, it is not possible to have an approach that is the best practice for all the participating countries.

The injection skid is in most cases divided into three zones, one for odorization, one for gas and one non-ATEX. In most installations, the gas quality measurement is using a gas chromatograph.

The national legislation and general practices do however vary and often the injection skid is made to meet the existing standards used for natural gas metering and transportation. This study has high-lighted that this might not be the best solution; for instance, a novel approach might give a better solution. E.g., in Switzerland the gas quality is not measured at the entry point but at the first exit point.

Of course, there is legislation that is very specific for the measurement of biomethane, e.g., several additional parameters need to be measured compared to natural gas. Also, the composition can vary a great deal more since the feedstock used for the production is changing with availability.

The practice for odorant measurement varies and has been adapted to meet specific country requirements. The challenge of other components in the gas is important when it comes to the safety of the end users, some components (e.g., terpenes) can mask the odorant whereby the end user will not be able to smell a possible gas leakage. In the countries where odorization is controlled by olfactometric measurement this should not be a problem. However, olfactometric control is more expensive and time-consuming than a concentration measurement. Also, for safety issues olfactometric control could be necessary, as part of legislative compliance.

The grid capacity aspect has not been covered in this report, although maximum injection quantity was a common non-compliant criterion. With an increasing amount of biomethane injection it might be necessary to do more extensive capacity planning in order for all the biomethane to be injected in the grid.

One of the key findings is there is a need for standardization in the Biomethane Injection market. Standardization can play a crucial role in ensuring consistency, interoperability, and efficiency in the production and distribution of biomethane. With standardized practices and criteria, various stakeholders including producers, grid operators, regulators, and consumers can have a common framework to work with.