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Natural gas quality fluctuations – surveys and statistics on the situation in Germany

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Abstract

In recent years, natural gas quality has become a contested topic for market partners along the gas value chain, especially in the context of the European gas quality harmonization process. While a consensus could be achieved on many aspects of gas quality regulation, leading to a first European standard for H-gas quality (EN 16726), this standard lacks any regulation of combustion-related properties except for a minimum Methane Number.

There is also significant uncertainty to what extent gas quality variations actually occur in German gas grids today and how they may affect gas-fired applications. This was the focus of two surveys carried out by a group of German gas-related research organizations in which gas quality measurements over long periods of time were compiled for various regions in Germany to highlight frequency and severity of local gas quality and composition changes. While one of these studies concentrated on the glass industry and also looked at possible measures to compensate for gas quality fluctuations, the other took a broader view, investigating common adjustment practices, awareness of gas quality issues among operators of gas-fired equipment and typical countermeasures by a statistical analysis of all sectors of German gas utilization (domestic, chemical and thermal processing industries, power generation). It appears likely that these findings can be transferred to other countries to a certain extent.

The results of these studies as well as background information on the European gas quality harmonization process will be the focus of this contribution.

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1. Introduction

The European gas markets have been in a state of flux for a number of reasons for the last few years. The supply situation is changing (for example, the Netherlands are expected to cease their gas exports by 2030) while at the same time, the markets were liberalized. Integrated gas suppliers had to split up into different companies dealing with different aspects of the gas market such as trading, transport and distribution grid operation or the operation of underground storage facilities. Feed-in of renewable gases such as biomethane or possibly even hydrogen from power-to-gas applications in the future is on the rise, and on the political level, the European Union strongly supports the development of a common European standard for the quality of H-Gas within the internal market. The national gas quality standards currently in place are considered to be an obstacle to the free trade of the commodity “natural gas” in the internal market since they differ greatly [1]. A first European gas quality standard, EN 16726:2016-04, was published at the beginning of 2016. While there are still many open questions with regards to this document (e. g., at the moment the only combustion-related criterion given is a minimum Methane Number of 65), it is certainly a major step towards a unified European treatment of the issue of natural gas quality in the internal market.

There are opposing views how future permissible gas qualities in the EU should be defined: gas suppliers and grid operators propose a wide quality range in order to reduce costs and ensure security of supply by being able to access a wide range of different sources, including regenerative gases (biogas, possibly hydrogen) and liquefied natural gas (LNG). Operators and manufacturers of industrial combustion equipment as well as the chemical industry, on the other hand, voice concerns that a wider gas quality range would result in strongly fluctuating local gas qualities and compositions, with negative impacts on gas-fired processes in the thermal processing and power plant sectors, especially with regards to efficiency, pollutant emissions and product qualities. Manufacturers of domestic gas appliances are concerned how their products react when confronted with gas qualities they were never designed for.

One consequence of the developments on the European markets is that fluctuations of local natural gas qualities and compositions are likely to increase both in amplitude and frequency within the European grids [2]. For many regions, this may be a new experience and it is difficult to predict how a very diverse market such as the market for natural gas (cf. Figure 1) with its very heterogeneous end use applications will respond to increasing gas quality fluctuations.

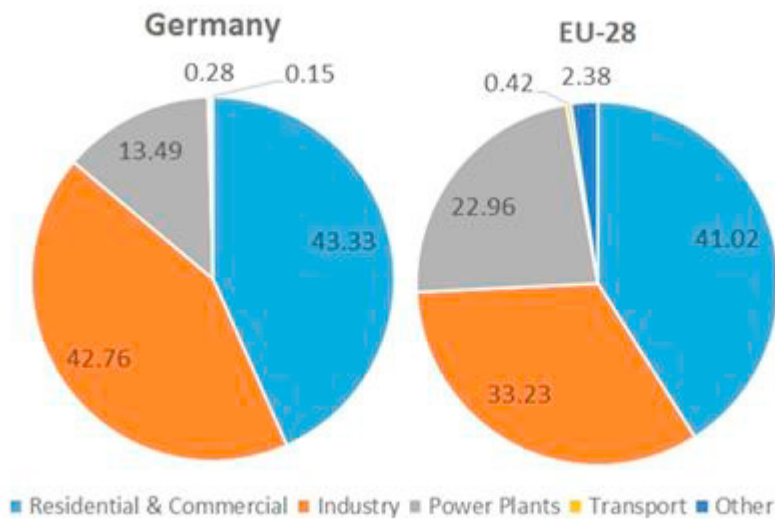


Figure 1: Natural Gas Consumption by Sector [%] in Germany and the EU in the Year 2014 [3]

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