Biomethane development & Oxygen management

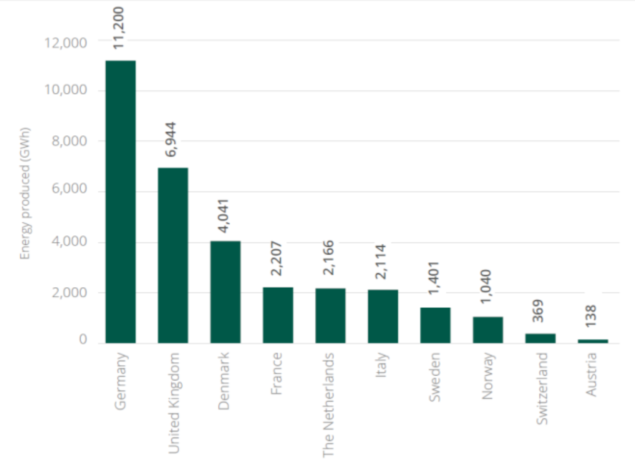
ENTSOG Gas Quality & H2 Workshop

7 November 2022

Biomethane: Significant growth perspective supported by Repower EU

Current production 3 bcm

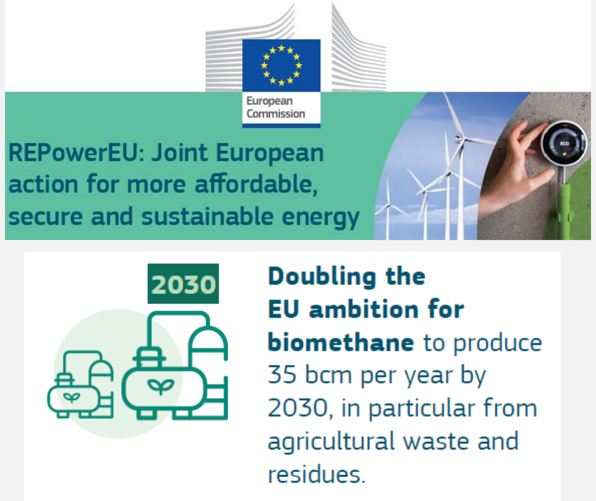
- Biomethane production in European countries



Source: EBA

2030 Repower EU ambition 35 bcm

- Consistent with the **biogas potential** of the EU
- **Supportive market frameworks** are being implemented

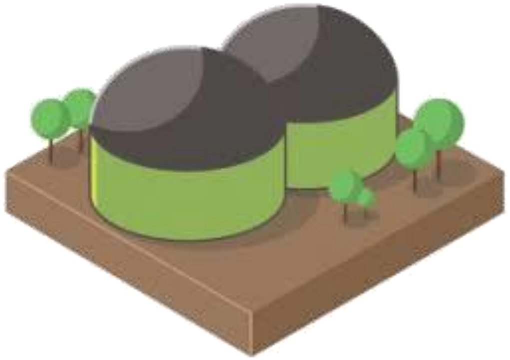


35 bcm ambition

› **Promoting the development of renewable gases towards 35 bcm at European level must be accompanied by strong incentives to move towards a gas system that notably tolerates a reasonable level of oxygen.**

Typical Oxygen content in Biomethane

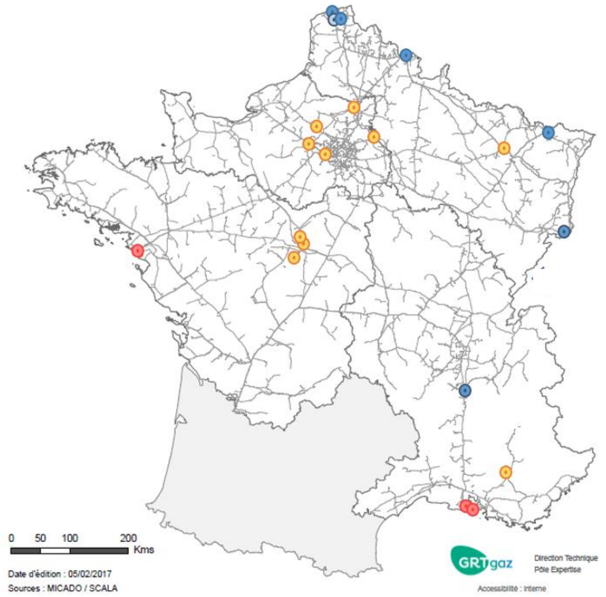
Biomethane production site (with typical treatment technology for small/mid size sites)



H2S treatment requires oxygen injection for an efficient operation of activated carbon. Residual oxygen content generally lies between **1000 and 4000 ppm mol**

Typical x400 factor
Long term development of biomethane will significantly affect gas quality in the long run

Historical natural gas flows



Usual oxygen content in natural gas is around **5 ppm mol**

Current status of normative standards/best practices (voluntary implementation):

- EN 16726: **10 ppm (sliding average 24h).** Can be brought **to 1% when no sensitive customers** are located downstream.
- CBP EASEE GAS: **< 10 ppm daily average**. Daily average levels **up to 100 ppm** *"will be accepted if these are the result of the prudent operation of UGS"*

Two different kinds of potential sensitive sites

Underground gas storages

- Impact on underground reservoir to be assessed (biological and geochemical balance)
- Impact on surface facilities and wells to be assessed (corrosion in wet conditions)

Specific challenges

R&D efforts are required to quantify these impacts for each storage facility

Specific industrial customers

- For industrial sites using gas as a feedstock: Possible impacts on specific steps of the industrial processes (notably SMR).
- Ongoing discussions with this type of clients has enabled a significant progress in tolerating higher oxygen content.

Specific challenges

Specific analysis are required on a case by case basis as we have a **limited feedback** of such processes operating with oxygen content above historical values

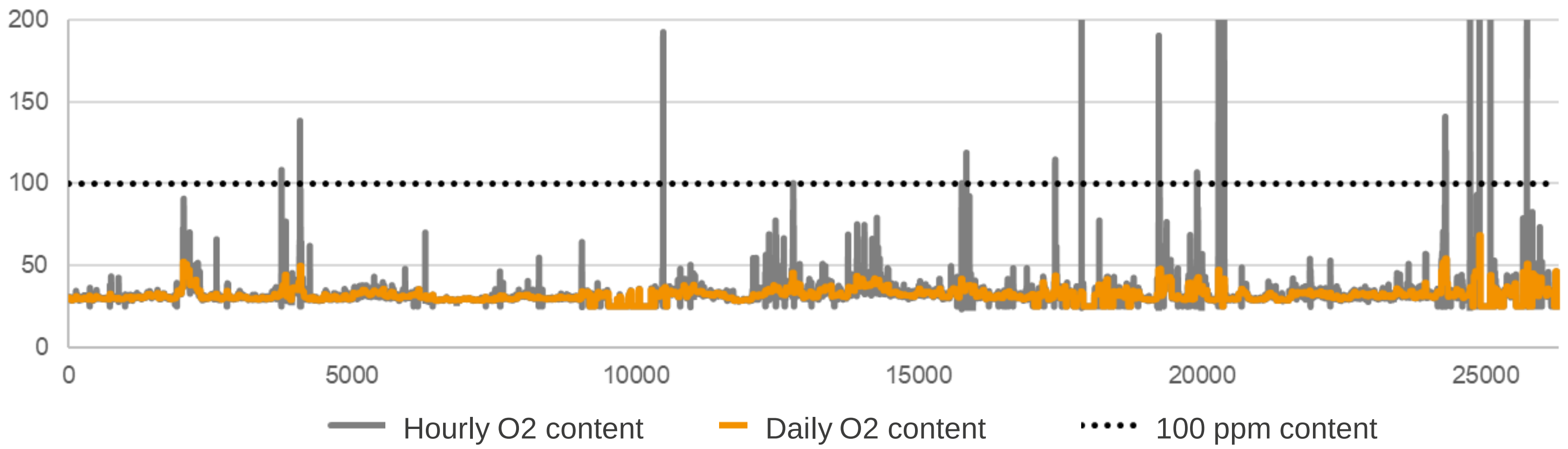
TSO interface

› **In the long run, TSO interface agreements should be determined considering the actual sensitivities and the treatment capabilities of the sensitive sites on each network**

How will biomethane growth affect gas quality?

- **Oxygen content will remain negligible as long as injection occurs in a significant gas flow**
- **First oxygen content can be observed in « no or low flow » situations where biomethane batch can accumulate at injection point and later be transported when the flow resumes**

Simulation of the evolution in time of Oxygen content at a specific network location



- **No significant oxygen impact is to be expected in the coming years as dilution remains high**
- **However, keeping 10 ppm as a reference at TSO interface will inevitably lead to preventing the development of biomethane**

European harmonization is essential to make the European Gas System biomethane friendly.

- 35 bcm is now the reference and this will lead to an evolution of the gas quality
- 10 ppm at TSO interface seems unnecessarily restrictive and could hamper biomethane developement ambition
- Progressive development of the biomethane sector till 2030 allows operators to anticipate this evolution. European harmonization is key.
- The priority is to investigate both following options based on their cost effectiveness:

Update of the gas quality standards

- Based on actual sensitivity thresholds of the sensitive sites. Targeting higher O2 content is a credible option.
- R&D is key to assess the actual sensitivity based on scientific evidences.

Gas treatment solutions

- Promote the emergence of innovative technologies to manage gas quality, either at production or at consumption sites.
- Implement such treatment solutions based on an overall optimum system approach

Thank you