



Picture courtesy of Gas Connect Austria

# Injection of renewable gases into the gas grid: quality requirements and EU advancements - ENTSOG

Business Forum on bio-methane and green hydrogen – Vienna

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# Outline

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**Contextual framework: Gas quality related discussions in EU**

**Gas quality challenges related to biomethane**

**On-going work on Hydrogen quality for rededicated grids**

# Contextual framework

# Workstreams going-on in EU and followed by ENTSOG



## The new hydrogen and decarbonized gas package

- ❖ Set of legislative proposals to decarbonize the EU gas market
- ❖ Proposals adopted by EC in December 2021, by **Parliament** and **Council** in 2023.
- ❖ Most relevant articles for Gas Quality are Art.19 and Art. 20 on:
  - cross-border issues related to GQ parameters at Interconnection Points (IPs)
  - hydrogen blends at IPs
- ❖ Trialogues currently on-going



**European Commission**

## Gas quality standardization for natural gas and biomethane

- ❖ Two standards exist and they specify Gas Quality parameters and limits for:
  - **natural gas** (EN 16726)
  - **biomethane** (EN16723)
- ❖ Standardization work is carried out by CEN (Comité Européen de Normalisation)
- ❖ EN16726 is currently under revision



# Existing European standards on gas quality

Natural gas and biomethane: many common properties

However, other gas quality parameters are unique to biomethane (amines, ammonia ...)

Gas quality standard for H-gas:

❖ EN16726

Scope: whole gas value chain, from injection to utilization.

1<sup>st</sup> publication  
2015

Amended in  
2018

Currently under  
revision



Combustion properties

Gas quality standard for compounds unique to biomethane:

- ❖ EN16723-1 for injection into the gas grid
- ❖ EN16723-2 as fuel in transport

1<sup>st</sup> publication  
2017

EN16723 refers to EN16726 for common parameters between biomethane and natural gas (O<sub>2</sub>, S, CO<sub>2</sub> ...)

## Revision process of EN16726



Some modifications may be implemented on: Sulphur and Oxygen content.

New parameters are expected to be introduced: Hydrogen content and Wobbe Index.

# Gas quality challenges related to biomethane

# The uptake of biomethane in gas grids

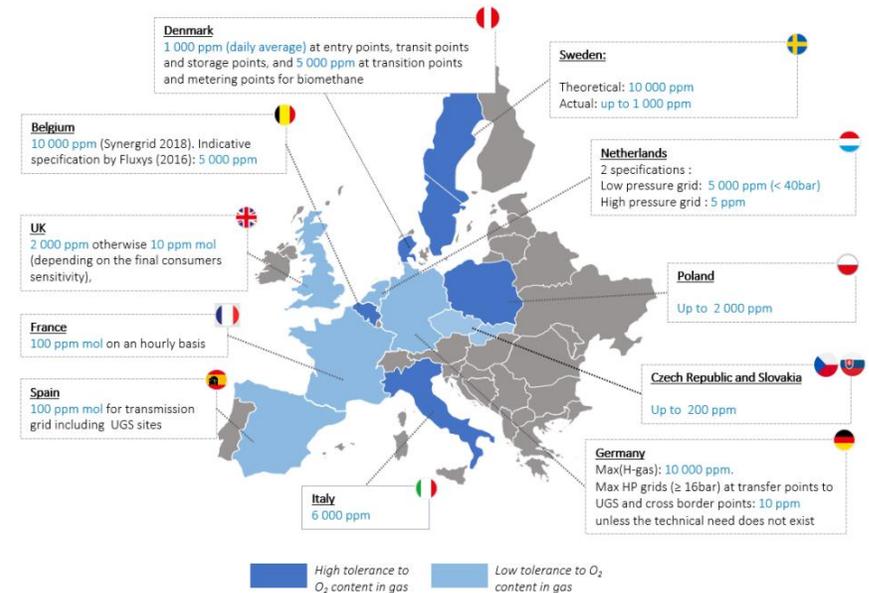
## Some challenges:

- Oxygen
  - Reduction of O2 content may be required if biomethane flows to sensitive installations
  - Different O2 requirements between MSs are in place
- Wobbe Index
  - Typically, biomethane WI is lower than LNG. Potential consequences can be large WI fluctuations in the gas grid.

	Biomethane	Norwegian gas	LNG	WI Entry range (CBP EaseeGas)
<b>Wobbe Index</b> kWh/m <sup>3</sup> (25/0 °C)	13,9 – 14,4*	14,5 – 14,8*	14,7 - 15,2*	13,6 – 15,8

\* The range indicated in the table for Biomethane, Norwegian gas and LNG represents an average in EU (ENTSOG GQO 2020). WI values can fall outside the indicated range.

## The max admissible O2 content in EU gas networks is diverse Source: Marcogaz



## Conclusions and findings

- Some GQ challenges related to biomethane are investigated in a on-going GERG project (Sulphur, Siloxanes and O2) funded by EU
- TSOs have so far been able to manage O2 and WI, and will manage higher levels of renewable gases in the future
- O2 differences should not hamper cross border flows. Options to address O2 cross-border issues will be assessed via CBA
- The security of supply, diversification of sources and decarbonization need to find common solutions with the end-users requirement. The standard revision will take this aspect into consideration

The revision of the gas quality standard is key to achieve the RePower EU ambition of 35bcm of biomethane by 2030

# Hydrogen quality in rededicated grids

# Work being-developed on Hydrogen quality for rededicated grids



## Background

- ❖ No existing standard on H2 quality in gas grids
- ❖ *Technical specification on H2 quality for rededicated gas systems (TS 17977)* approved in July 2023. Publication expected in October 2023.

## Business case

- ❖ In the Netherlands, conversion of NG pipeline to H2



## Next steps

- ❖ EC mandate on H2 quality for dedicated grids expected (conclusions from Madrid Forum 2023)
- ❖ CEN will develop a standard based on the EC mandate

Table 1 — Quality requirements for hydrogen in rededicated gas networks

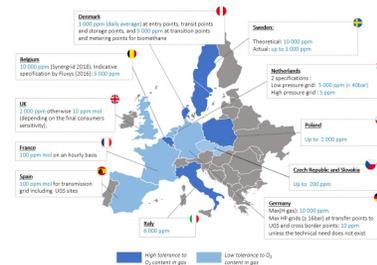
Parameter	unit	value
Hydrogen	mol-%	≥ 98
Wobbe Index	MJ/m <sup>3</sup> (15 °C/15 °C)	42,0 – 46,0
The content and composition of the further quality parameter (e.g. sum of inerts) shall satisfy the Wobbe Index value above.		
Water	µmol/mol	≤ 250 ≤ 60
Hydrocarbon dew point (HCDP)	°C	< -2 °C at 1 < p < 70 bar
Sum of inerts (N <sub>2</sub> , He, Ar)	mol-%	≤ 2
Gaseous hydrocarbons	mol-%	≤ 2
Oxygen (O <sub>2</sub> )	mol-%	≤ 0,1
	µmol/mol	≤ 10
Carbon monoxide	µmol/mol	≤ 20
Carbon dioxide	µmol/mol	≤ 20
Total sulfur	µmol/mol	≤ 7
Ammonia	µmol/mol	≤ 13

# Conclusions

# Conclusions



1. Substantial developments in Europe: new H2 and gas package and Gas quality standards



2. Biomethane can pose challenges that could be accentuated with 35 bcm target

**Table 1 — Quality requirements for hydrogen in rededicated gas networks**

Parameter	unit	value
Hydrogen	mol-%	≥ 90
Wobbe Index	MJ/m <sup>3</sup> (15 °C/15 °C)	42,0 - 46,0

The content and composition of the further quality parameter (e.g. sum of impurities) shall satisfy the Wobbe Index value above.

Water	µmol/mol	≤ 250
		≤ 6,0
Hydrocarbon dew point (HCDP)	°C	< -2 °C at 1 < p < 70 bar
Sum of impurities (N <sub>2</sub> , He, Ar)	mol-%	≤ 2
Gaseous hydrocarbons	mol-%	≤ 2
Oxygen (O <sub>2</sub> )	mol-%	≤ 0,4
	µmol/mol	≤ 10
Carbon monoxide	µmol/mol	≤ 20
Carbon dioxide	µmol/mol	≤ 20
Total sulfur	µmol/mol	≤ 7
Ammonia	µmol/mol	≤ 13

3. Expected soon: H2 quality standard for dedicated grids



## ENTSOG GAS QUALITY WORKSHOP 2023

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# Join us for a deep dive into Gas Quality



**When?** 15 November 2023 from 10 to 16:30

**Where?** Online and at the ENTSOG office, *100 avenue Cortenbergh, 1000 Brussels*



Don't miss out! Register now for in-person or online participation

<https://www.entsog.eu/entsog-gas-quality-workshop-2023#welcome>



Thank you for your attention

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