



marcogaz

Technical Association of the European Gas Industry

Cost estimation of hydrogen admission into existing natural gas infrastructure and end use

UNECE - 11th Session of the Group of Experts on Gas
ACTIVITIES OF THE HYDROGEN TASK FORCE

Manuel Coxe, Secretary General

Palais des Nations - Geneva, 21 March 2023

SUMMARY



🌿 **About MARCOGAZ**

🌿 **Scope**

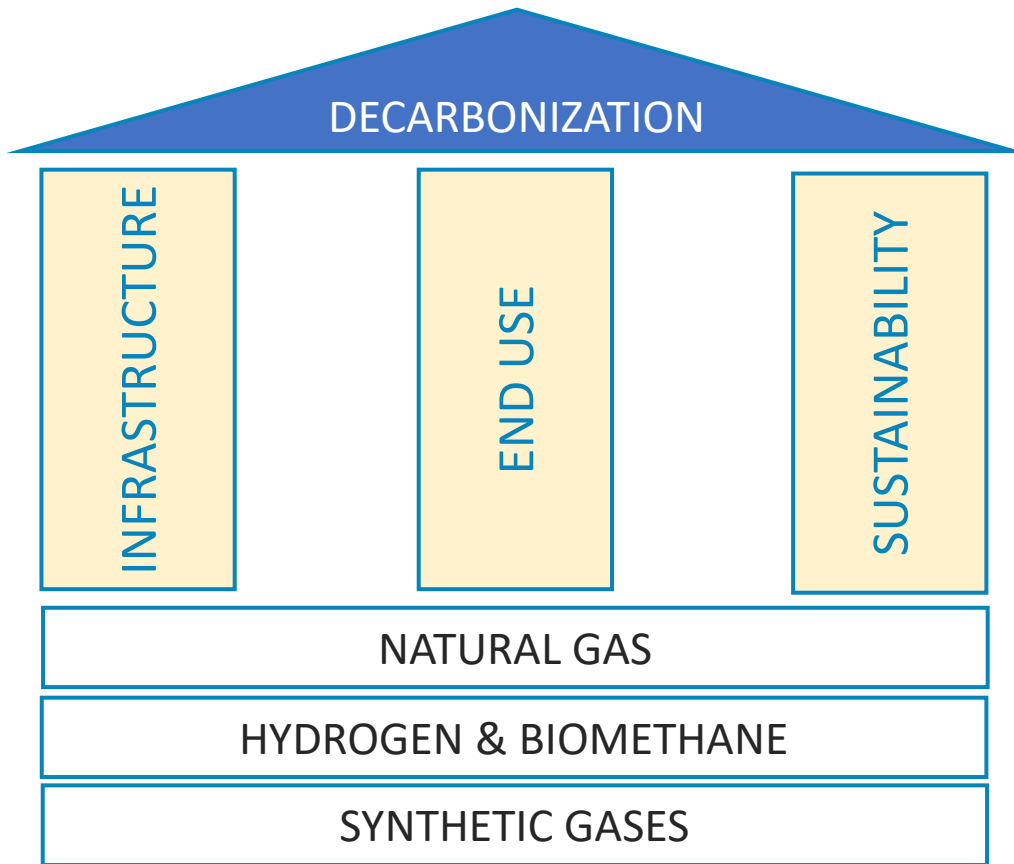
🌿 **Methodology**

🌿 **Key findings**

🌿 **Closing remarks**

About MARCOGAZ

MARCOGAZ is the **technical** association of the European gas industry



56 YEARS

28 MEMBERS

20 COUNTRIES



Scope

Introduction



Source: ENTSOG

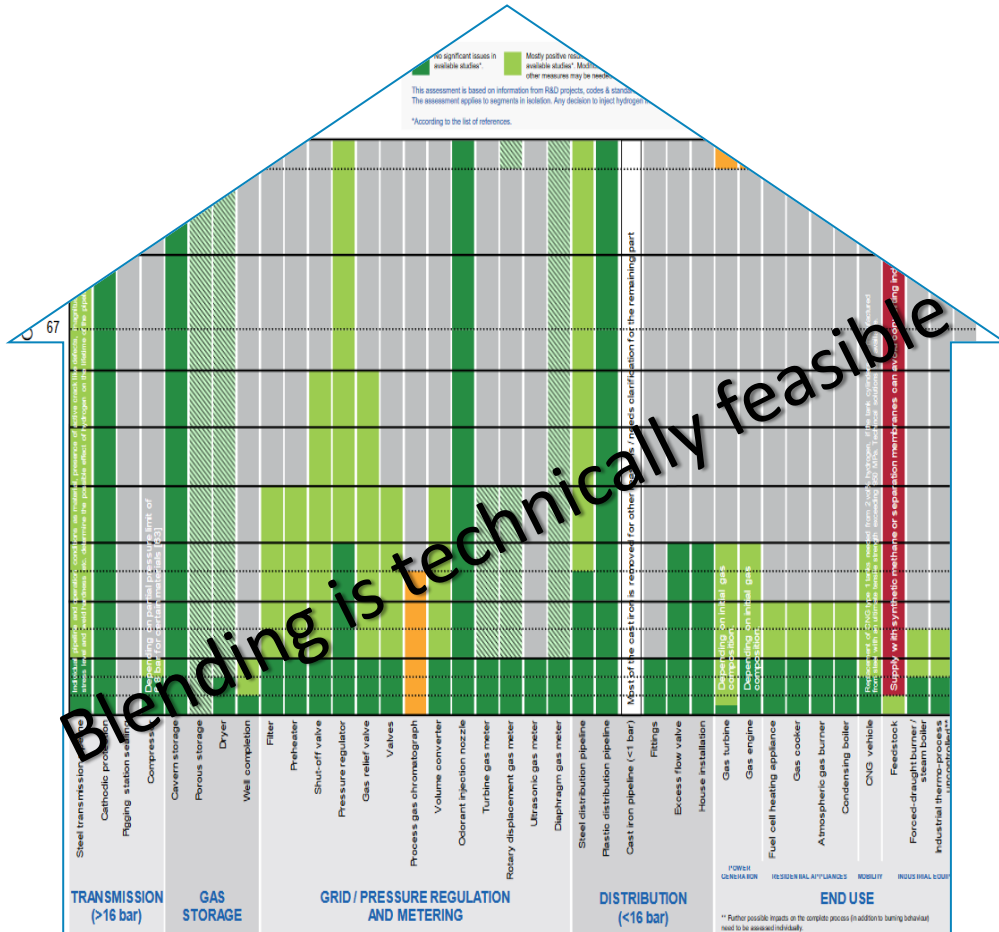
THE VALUE OF
INFRASTRUCTURE ASSETS

RETROFIT
BLEND %VOL H2 WITH CH4

REPURPOSE

NEW H2 DEDICATED
INFRASTRUCTURE

Technical and Cost Implications of H2 Admission



CH4 (98% Vol)

CH4 (95% Vol)

CH4 (90% Vol)

CH4 (80% Vol) H2

CH4 (70% Vol) H2

H2 (10% Vol)

Retrofit or Repurpose at which Cost?

Methodology

Methodology

of transition cost approximation

Transmission
Pipelines

Gas Pressure
regulation and
metering

Underground
Storage

Distribution
Pipelines

Use Appliances

Quantification

Evaluate number/length of gas infrastructure/end use assets in Europe
Find appropriate assumptions if no exact numbers are available

Evaluation

Evaluation of specific assets concerning their suitability for considered hydrogen concentrations

Specific costs

Find specific adaptation measures for considered hydrogen concentration (if necessary) and define specific costs for these

Total costs

Calculate the costs for repurposing European gas infrastructure/end use infrastructure for hydrogen transport

Economic
transformation
model

Asset volumes

Example for approximation of asset volumes for gas transmission



Transmission Infrastructure item

Steel transmission pipelines

Older pipe construction

Younger pipe construction

Valve stations (existing)

Valve stations (needed for pure hydrogen service)

Pigging stations

Compressor station installed power incl. drive and auxiliaries combined

Metering stations

Pressure regulating stations

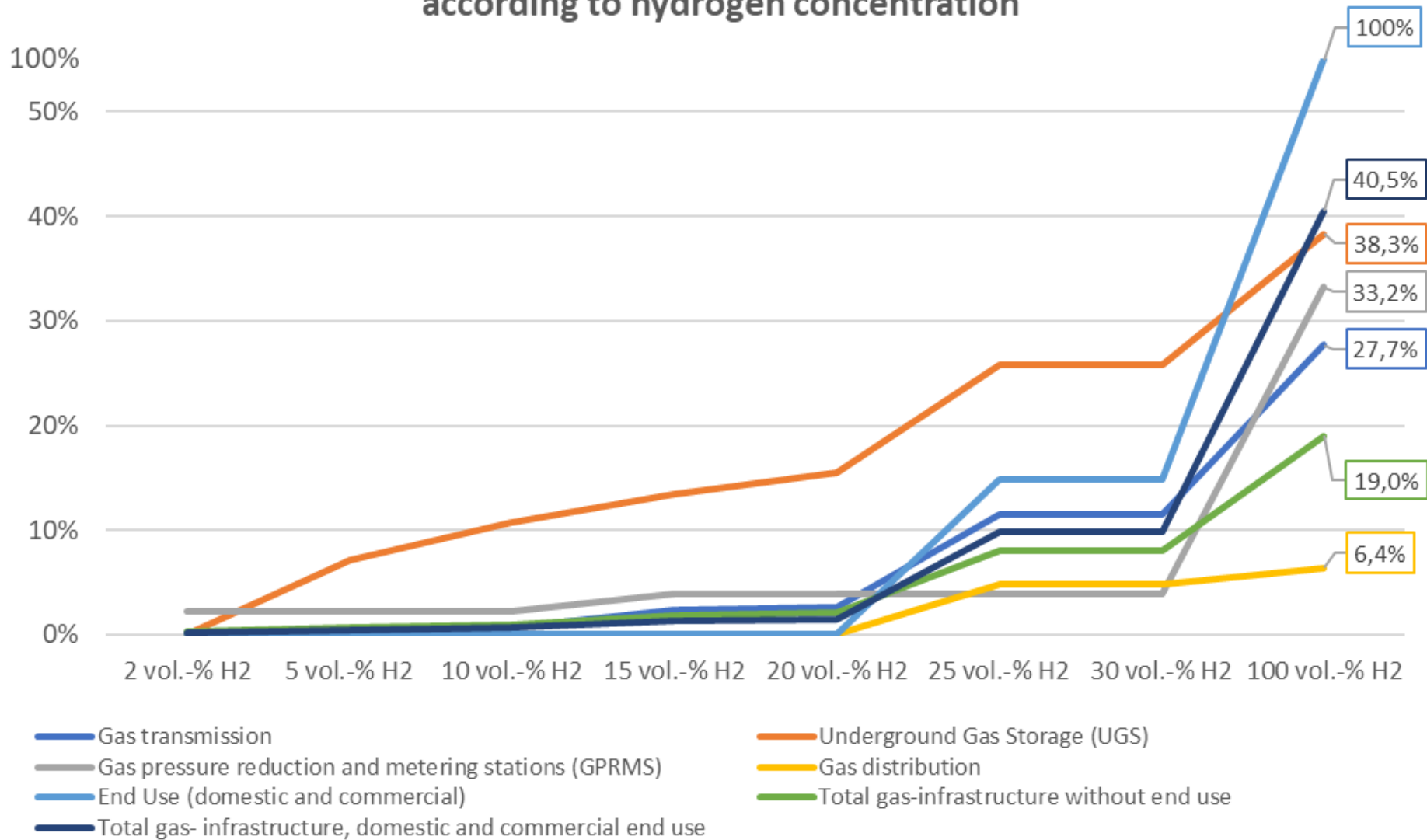
Upstream (LNG, LH2) Not Considered



- Natural gas liquefaction at temperatures below **-161.5°C**.
- Hydrogen liquefaction at temperatures below **-253°C**.
- Retroffiting not feasible.
- Repurposing from LNG carrier to LH2 carrier not considered.

Results of Estimation

Adaption cost (in % compared to new-build infrastructure/end use) according to hydrogen concentration



Final Results

Key findings & conclusions

COST ESTIMATION OF Transformation costs in comparison to a new build infrastructure

The following results are based on average cost approximation on European level. The situation in single countries might be different. In some cases, parts of the infrastructure might have to be modified/replaced also for low hydrogen concentrations, which is not considered in this results.

1. Up to 10 vol.-% H₂ the transformation cost is less than 1% of CAPEX for a new build infrastructure*.
2. Up to 30 vol.-% H₂ the transformation cost is equal to 10% of CAPEX for a new build infrastructure*.
3. For pure hydrogen service the transformation cost is less than 20% of CAPEX for a new build infrastructure.
4. Next to the shown financial advantages of transforming the existing infrastructure* this will also lead to a faster establishing of a H₂ready infrastructure with less negative effects on the environment and lower carbon footprint.

* incl. residential and commercial appliances

Full Report Available Online

MARCOGAZ.ORG



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of hydrogen admission
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Thank you!

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