

# Hydrogen, biogas and decarbonized gases: which regulation model?

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# The Green Deal and renewable gases

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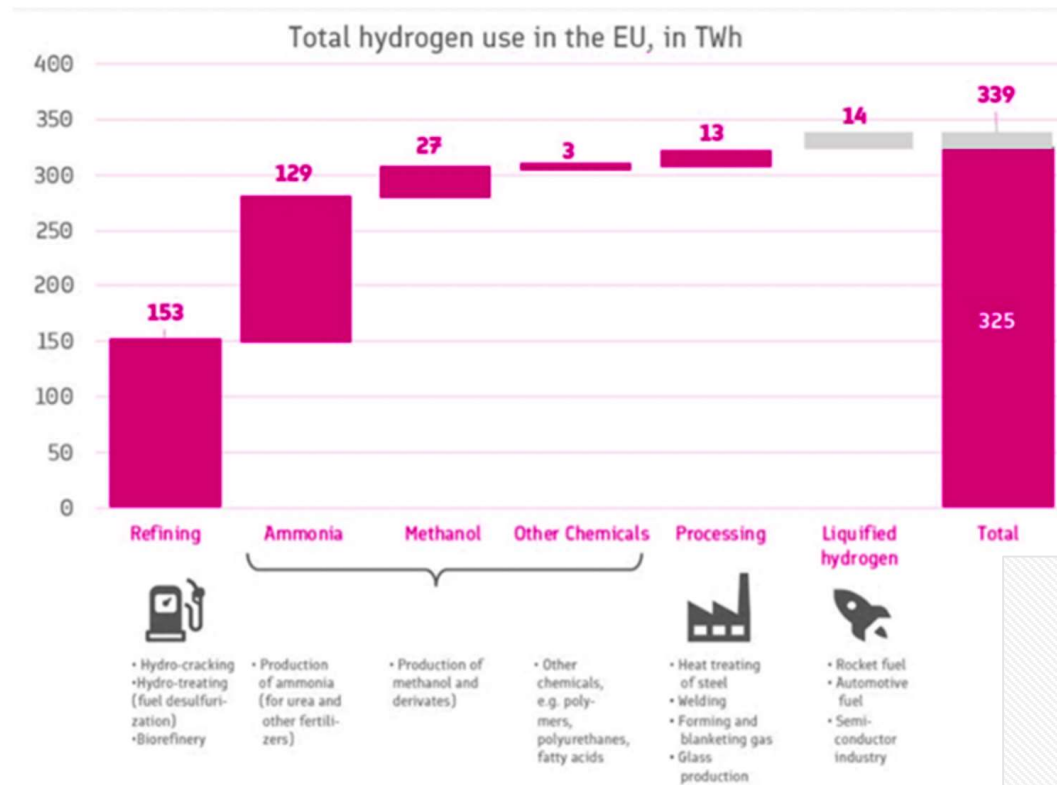
- “Renewable electricity is expected to decarbonise a large share of the EU energy consumption by 2050, but not all of it.”
- “Hydrogen has a strong potential to bridge some of this gap, as a vector for renewable energy storage, alongside batteries, and transport, ensuring back up for seasonal variations and connecting production locations to more distant demand centers.”
- “To implement the ambition of the European Green Deal [...], the EC Hydrogen Strategy sets out a vision of how the EU can turn clean hydrogen into a viable solution to decarbonise different sectors over time.”
- “[...] hydrogen [is] essential to support the EU’s commitment to reach carbon neutrality by 2050”
- “[...] hydrogen can replace fossil fuels in some carbon intensive industrial processes, such as in the steel or chemical sectors”

# The Green Deal and renewable gases

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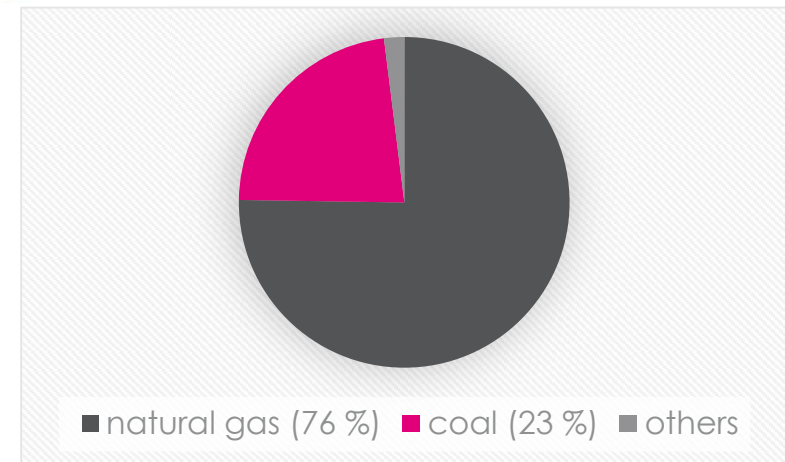
- “A third challenge is linked to the untapped use of wastewater and biological waste and residues for bioenergy production, including biogas.”
- “Biogas can be exploited on-site to reduce fossil fuel consumption, or upgraded to biomethane to allow injection into the natural gas grid or use in transport.”
- Today, biofuels, biogas and biomethane account for only 3.5 % of all gases and fuels consumption and are largely based on food and feed crops.
- “The overall potential for increased biogas production from waste and residues remains high and, if fully exploited, could lead to biogas and biomethane production levels in 2030 of 2.7 – 3.7 % of the EU’s energy consumption in 2030.”

# Hydrogen – state of play



Source: Adapted from FCH JU (2019): Hydrogen Roadmap Europe; E-Control:

- EU total consumption: 340 TWh
- Largest consumption volumes: DE, NL, PL, FR
- Largest sectors:
  - Refinery
  - Chemical Industry
- AT: 5 TWh (1,5% of EU consumption)



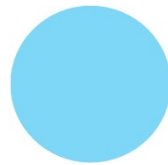
# Biogas and biomethane

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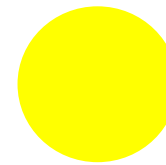
## Biogas

- Most of Europe's current biogas production is utilized in a CHP unit for electricity generation. Electricity produced from biogas amounted to more than 65 TWh in 2017 in Europe.



## Biomethane

- "Upgraded biogas"
- Composition very close to natural gas
- Injection into the gas grid without material limitations



## Decarbonized gases

- No legal definition of "decarbonized gases"
- Practice: Blue hydrogen, CCUS

# Current framework for green gases

## Directive 2009/73 (Gas Directive)

„The rules established by this Directive for natural gas, including LNG, shall also apply in a non-discriminatory way to **biogas and gas from biomass or other types of gas in so far as such gases can technically and safely be injected into, and transported through, the natural gas system.**”

## Directive 2019/944 (Electricity Directive)

‘energy storage’ means, in the electricity system, deferring the final use of electricity to a moment later than when it was generated, or the conversion of electrical energy into a form of energy which can be stored, the storing of such energy, and the subsequent reconversion of such energy into electrical energy or use as another energy carrier.

## Directive 2018/2001 (RED II)

“‘renewable energy’ means energy from renewable non-fossil sources, namely [...] biogas;”  
“‘biogas’ means gaseous fuels produced from biomass;”

“Hydrogen from renewable sources shall be considered only once for the purpose of calculating the share of [...] energy from renewable sources”

# Gaps and deficiencies

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- Mixed gas/H<sub>2</sub>-networks are not explicitly within scope of the Gas Directive. Only by means of interpretation.
- No EU harmonized hydrogen blending limits and quotas – no harmonized regulation to inject H<sub>2</sub> into the existing gas grid
- Lack of regulation with regard to dedicated hydrogen networks
- Unclear situation with regard to permitting and licensing of networks and hydrogen facilities
- No hydrogen network planning / Uncoordinated infrastructure planning between hydrogen and natural gas / electricity

# Need for regulation?

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- Existing and new pipelines may represent natural monopoly justifying network regulation
- Adequate network regulation can contribute to fair competition, energy system optimisation and cost minimization.

# Regulatory options (1)

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Scope of options strongly depends on the hydrogen strategy and pathways of implementation (Blending / dedicated H2-networks).

## **Blending:**

- Create legal certainty by explicitly extending gas regulation to H2 and other renewable gases.
- TPA to the gas network is necessary in order to provide producers with a distribution channel at places where dedicated H2-networks are not feasible.
- Tariff regulation could be means for supporting uptake of the production of H2 and other renewable gases ~ opposed by ACER, which advocates for strictly cost reflective tariffs.
- Harmonized gas quality standards for supporting uptake

# Regulatory options (2)

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## **Dedicated H2-networks:**

- Dynamic / static approach to regulation? ACER favors dynamic approach.
- Mirroring natural gas regulation / cherry picking? → Network access regulation (regulated / negotiated TPA), harmonised principles and tariff structures, unbundling (e.g. from methane sector and/or unbundling between production and transport), access to storage, requirements for (supra-)national network planning, rules for cross-border trading etc.
- Regulatory exemptions to new infrastructure as means to support uptake



„Mixed“  
network

## **Network access.**

TPA going along with harmonized blending limits.

## **Tariff Regulation.**

Harmonized principles and tariff structures for hydrogen. Separation from tariffs from natural gas to ensure cost reflectivity and avoid cross-subsidization

## **Unbundling.**

TSOs unbundled from H<sub>2</sub>-production. Operation of H<sub>2</sub>-storage by producers?

# Dedicated hydrogen network

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„Dedicated“  
hydrogen  
network

## **Network access.**

Necessity for TPA depends on network configuration and supply/demand situation.

## **Tariff regulation.**

Required for connecting / distribution and transmission lines. Local / closed private networks could be exempted.

## **Unbundling.**

Accounting / Legal unbundling

# Conclusions (1)

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- Dedicated hydrogen networks are likely to become natural monopolies in future.
- Natural monopolies require regulation to avoid market distortion.
- Current regulations for natural gas and electricity not appropriate for hydrogen (silo approach + too narrow in scope).
- Hydrogen / renewable gas target model to be defined upfront.
- Regulatory Model will strongly depend on the pathway towards market integration.
- Existing gas regulation could be extended to hydrogen which is blended with natural gas and transported via existing gas pipelines.
- Establishment of a new hydrogen / renewable gas regulatory framework with regard to dedicated hydrogen networks.

## Conclusions (2)

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- Regulation model should provide for an effective TPA regime. Exemptions might be required to ensure infrastructure investments.
- Harmonized tariff structures and principles (cost reflectivity).
- Unbundling from methane sector is a necessity-considering the risk of discrimination.
- With regards to dedicated H2-networks: Depending on market development it might be necessary to unbundle production from network operation.
- Establishment of planning requirements will be important.



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