Hydrogen from natural gas with CCU and CCS

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Over 80 Members around the world

Map shows locations of Member Head Offices. Many operate globally.
EU Policy Framework 2020-2030

2020

- 20% GHG emissions

20% Renewable energy

20% Energy Efficiency

2030

≥ -40% GHG emissions

≥ 32% Renewable energy

≥ 32,5% Energy Efficiency
Various scenarios developed by the Commission, debated by Member States. No decision yet on the way forward.
Oil & Gas Today & Tomorrow

Short- & Mid-Term Uses & Solutions
- Coal-to-Gas Switch
- CNG/LNG in Transport
- Flexibility for Renewables
- Gas in Heating
- Methane emissions
- Energy Efficiency

Long-Term Uses & Solutions
- Gas-to-Hydrogen
- Cleaner Liquid Fuels
- Flexibility for the System
- Aviation
- CCUS
- Petrochems

Coal to Gas Switch
CNG/LNG in Transport
Energy Efficiency
Where does H2 come from today?

The main source of hydrogen production in the world today is natural gas reforming, a process which produces hydrogen and CO2.
How to make H2 from #natgas cleaner?

Gas reforming processes result in highly concentrated CO2 streams. This makes CO2 capture easier and more economic.
Do we have enough CO2 storage in Europe?

Sufficient storage capacity in Europe

- **EU GeoCapacity:**
  - Conservative estimates: 136 GtCO2
  - Optimistic scenario: 380 GtCO2
- **Navigant (2019):**
  - ca. 77 GtCO2, equivalent to 57 years worth of EU emissions from industry and gas-fired power in 2016
  - 134 GtCO2 (including Norway)

Large storage capacity is offshore

- Saline aquifers
- Storing CO2 offshore in the North Sea minimises public acceptance concerns
What’s the way forward?

Reformers to be retrofitted

- Most hydrogen production is concentrated in North-Western Europe
- Nearly all gas reformers could be retrofitted with CO2 capture technology
- Most gas reformers are situated in or around industrial clusters

Cluster approaches

- Previous CCS projects were integrated, single projects → New projects are taking different approach
- For industrial clusters, it is necessary to map regional emission sources & develop a joint approach to infrastructure
Where can we use hydrogen?
Hydrogen and CCUS leads the way

Six new large-scale CCUS projects in Europe!
All are related to the production of hydrogen from natural gas with CCUS.

The UK and Ireland:
- H21 North of England
- HyNet North West
- Ervia Cork CCS
- Acorn Scalable CCS Development

The Netherlands:
- Port of Rotterdam CCUS Backbone Initiative
- Hydrogen 2 Magnum (H2M)

Source: Global CCS Institute: https://co2re.co/FacilityData
Study ‘Hydrogen for Europe’ – Phase I

Highlighting the potential of blue hydrogen

• Costs
• Complementarity with green hydrogen
• Environmental benefits
• Infrastructure needs

Providing Policy Recommendations

• On needed technical investments
• Measures to strengthen the public acceptance of hydrogen & CCUS chains & potential regulatory incentives

Upcoming events in Brussels

• 17-21.06: EU Sustainable Energy Week
• 25.06: IOGP event with Euractiv
• 27.06 (TBC): Workshop devoted to the study ‘Hydrogen for Europe’
Takeaways

An early scale-up of hydrogen can accelerate decarbonisation

Hydrogen can be produced at large scale sustainably from natural gas with CCS

Both hydrogen from renewables and natural gas are needed and must be pursued

Hydrogen is gas for the future as it is versatile
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