The Role of Hydrogen to 2030 and Beyond in Europe

Plenary Session – IV: Hydrogen and Green Energy Transition

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Key questions

- What role for gas in the energy transition?
- How to make the energy transition cost-effective?
- What can the gas industry deliver?
- How will costs of renewable and low-carbon gases develop?
- Where will hydrogen be used?

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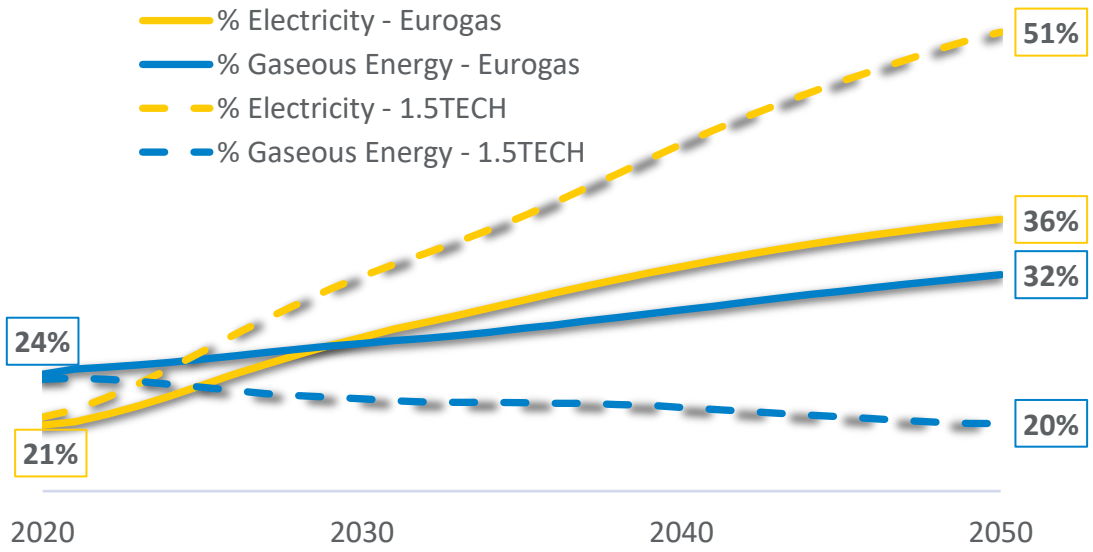
A balanced approach

What role for gas in the energy transition?

One objective. Two distinct pathways.

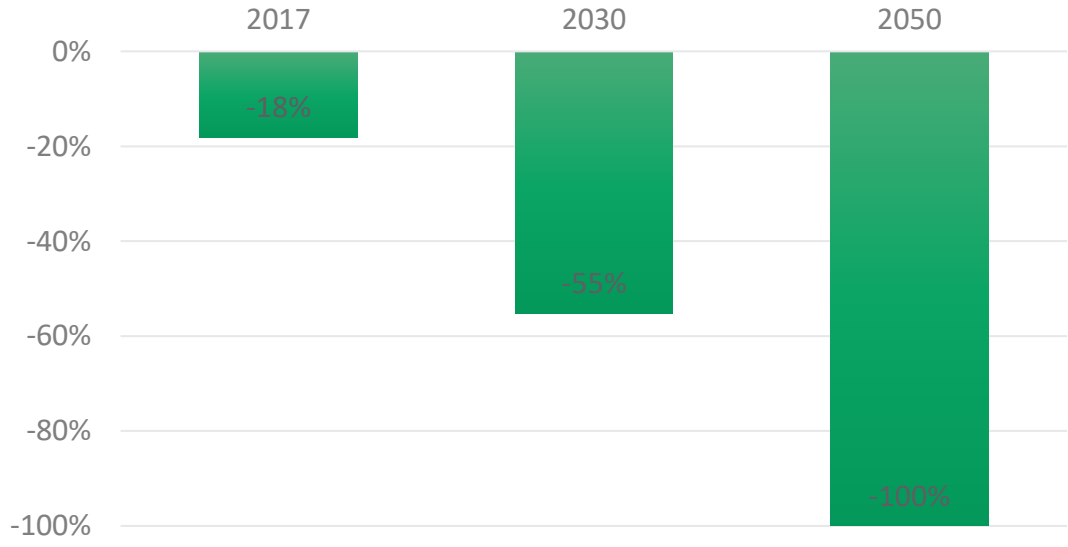
A balanced approach to the energy transition

Share in final energy demand



Delivers on EU 2030 climate objectives and carbon neutrality by 2050

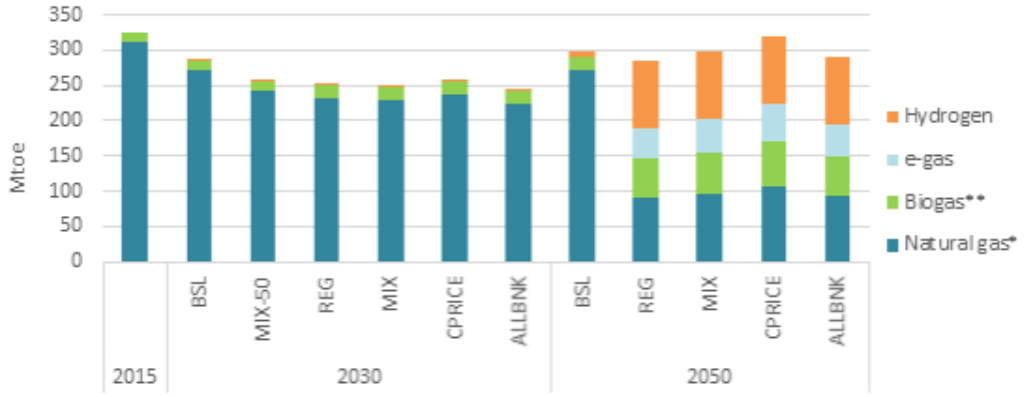
CO_2 reduction - Eurogas



European Commission confirms role of gas

- Current annual EU gas consumption 350-400 bcm, of which 95% is natural gas
- 25% of total energy consumption: accounts for 20% of electricity production, and 39% of heat production
- Biomethane, renewable and low-carbon hydrogen will gradually replace natural gas
- The share of natural gas will decline and be coupled with CCUS
- Energy carried by gaseous fuels would stay at about 85% of the current level by 2050

Figure 49: Consumption of gaseous fuels per gas type.

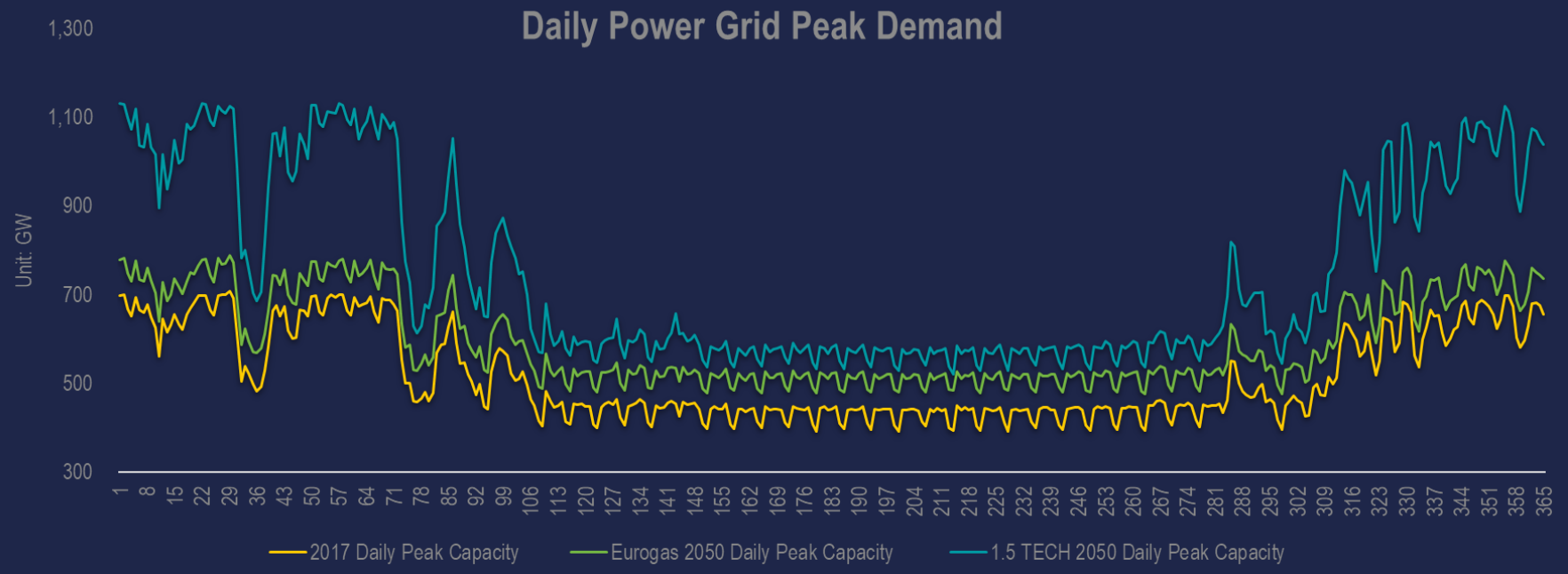


*Note: * includes manufactured gases, ** includes waste gas*

How to make the energy transition cost-effective?

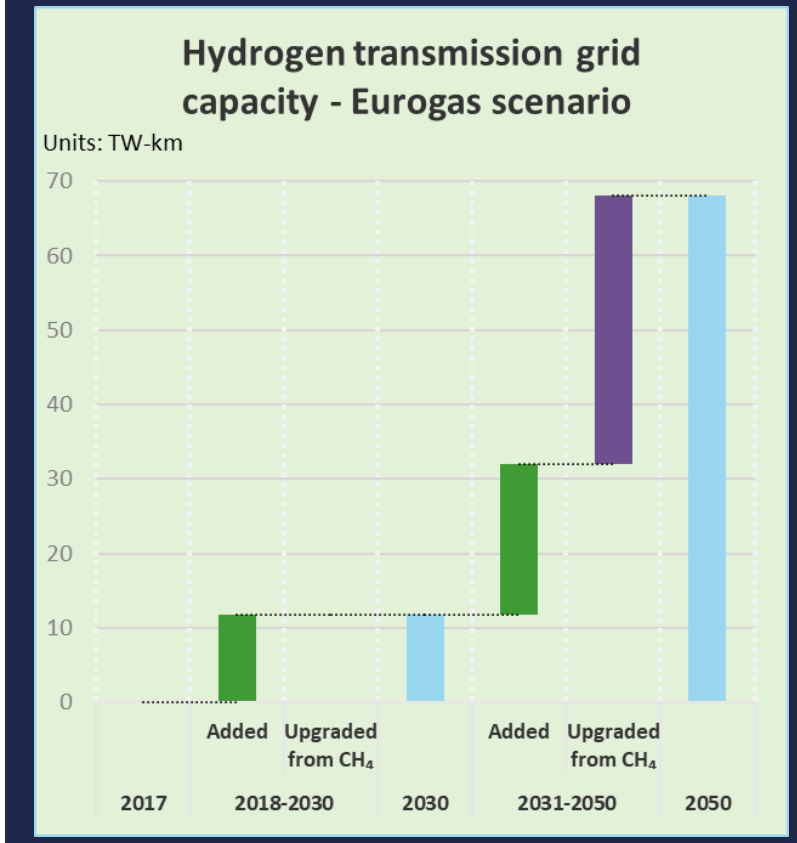
A balanced approach to decarbonise the heating sector

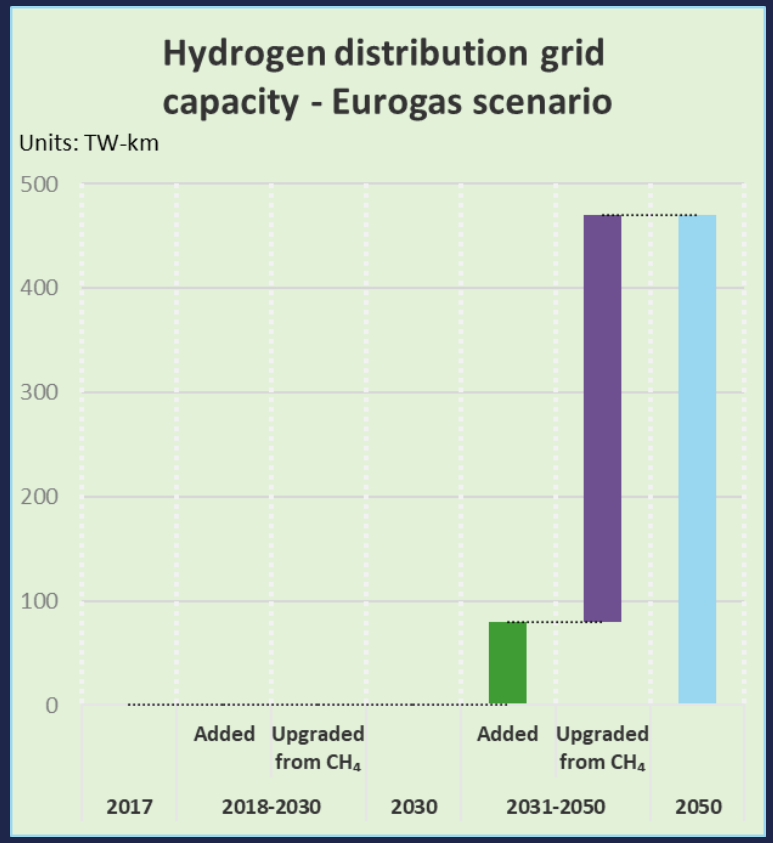
- Decarbonising heating with gas saves €1.3 trillion otherwise needed to expand power networks underutilised most of the time



Making use of existing gas infrastructure

- Blending is an essential and cost-effective market development tool in the short/medium term
- Most of the gas infrastructure needed is already available
- Retrofitting and repurposing essential and more cost effective than new built



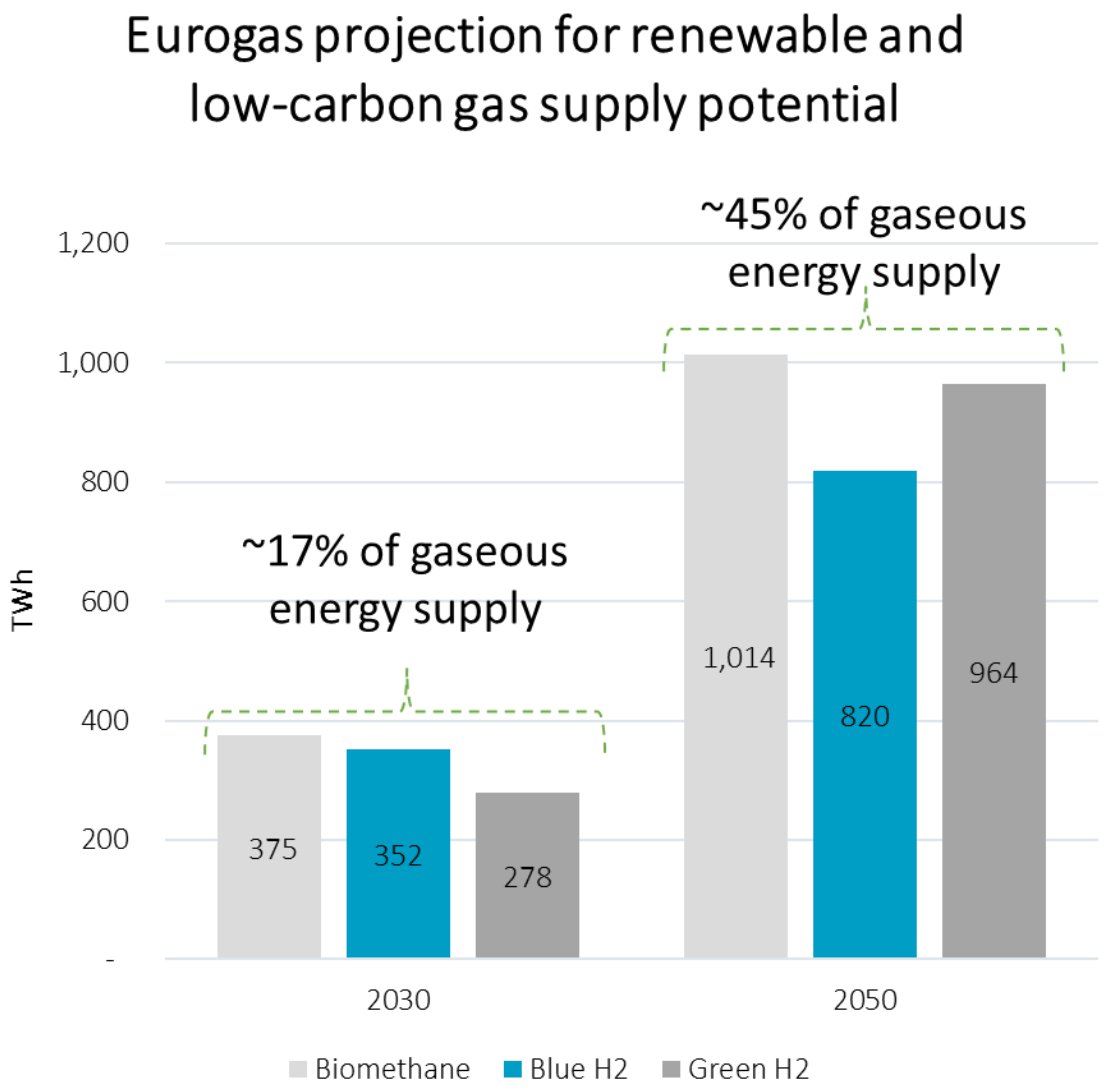


Volumes, costs and end-uses

What can the gas industry deliver?

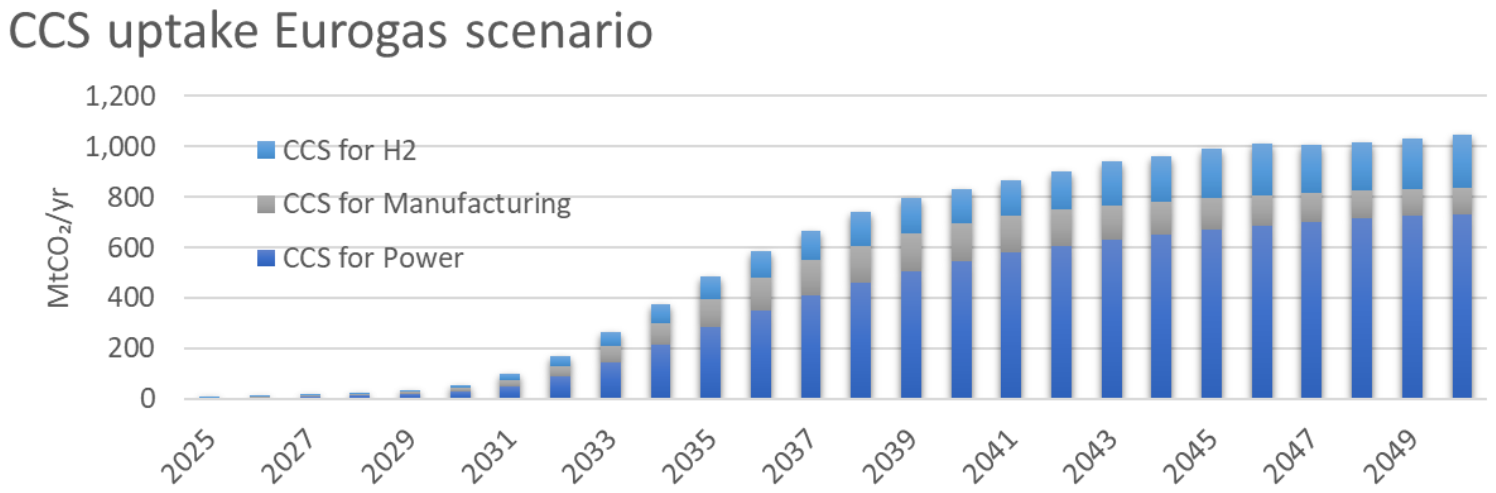
What do we need to meet net zero?

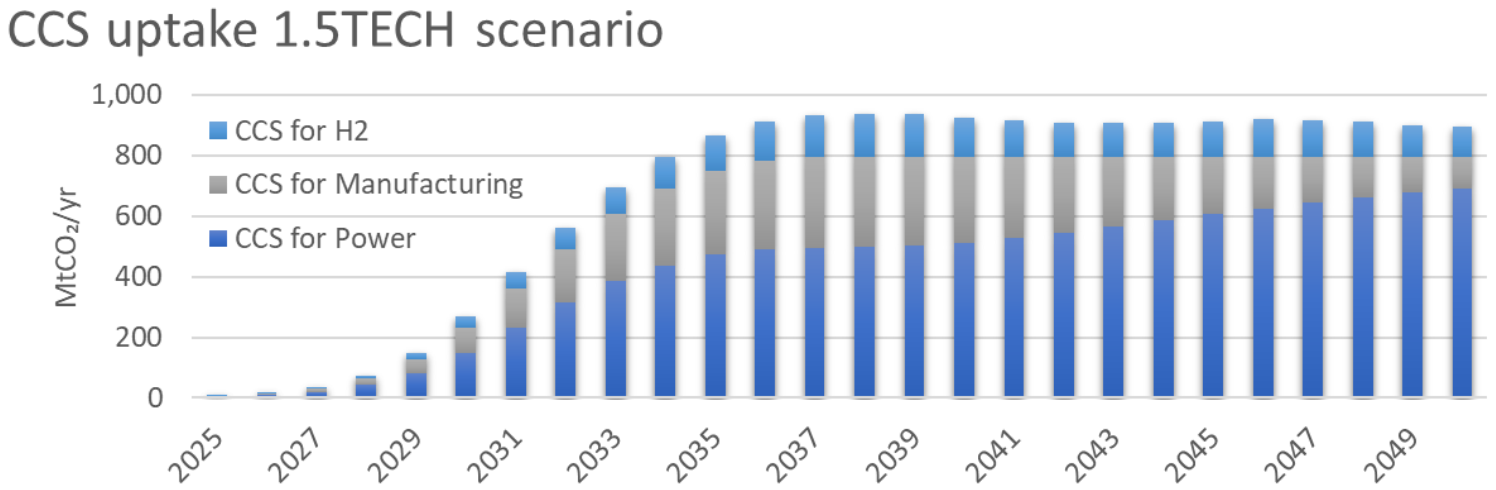
- Gaseous energy supply in 2050 in the Eurogas scenario increases by 18% over 2017 levels natural gas supply declines by 35%
- Both scenarios show an important role for hydrogen from reformed natural gas as an early driver to provide scale by 2030
- The share of hydrogen from electrolysis overtakes hydrogen from reformed natural gas by 2050



Whatever the scenario we choose. CCS is not an option. It is a necessity.

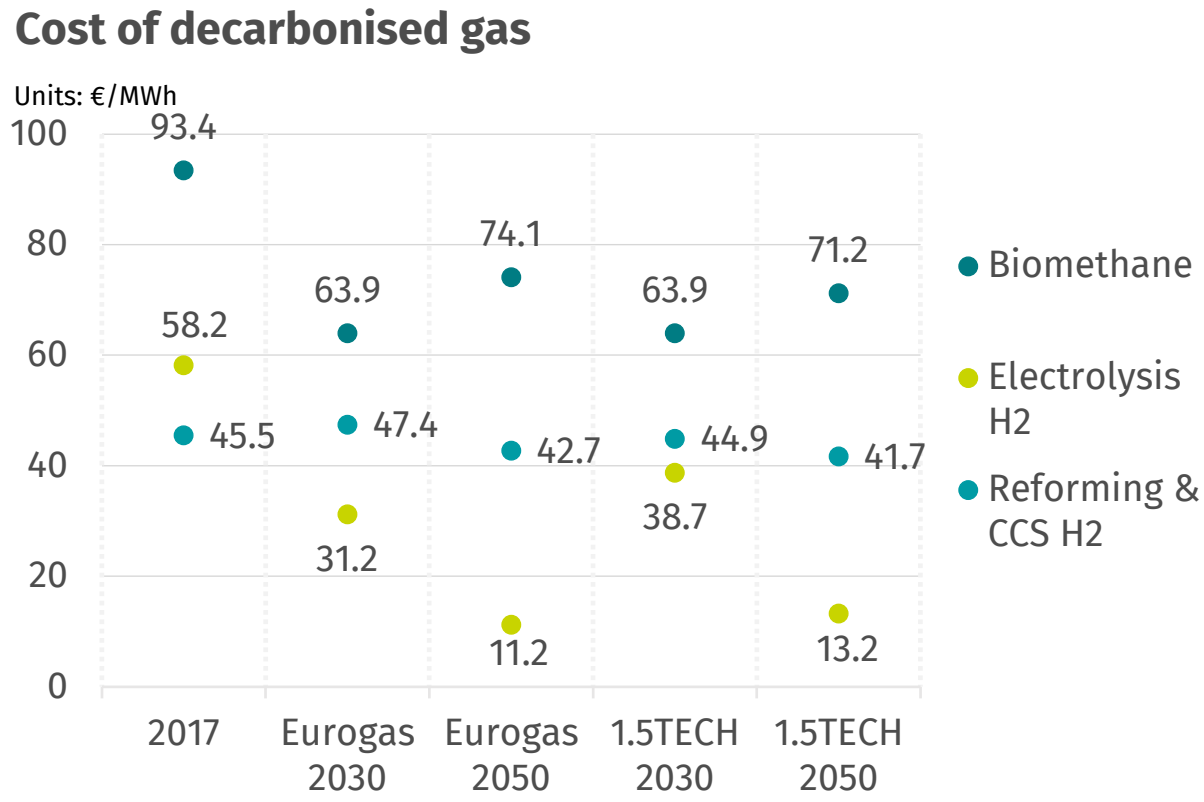
- Both scenarios rely on CCS, especially to decarbonize the power and manufacturing sector to fully decarbonise gas consumption
- Eurogas decarbonizes the energy system with 15% lower cumulative CCS deployment towards 2050 than 1.5TECH
- Both scenario's use 11%-13% of available storage capacity, and have 114-130 years of storage left in 2050





What will it cost to produce renewable and low-carbon gases?

- Second generation biomethane production faces a sustained disadvantage in cost competitiveness
- Costs of reforming with CSS are relatively stable – limited cost learning rate
- Cost of renewable hydrogen decreases faster in Eurogas scenario than in 1.5 TECH - More cost learning due to higher installed capacity

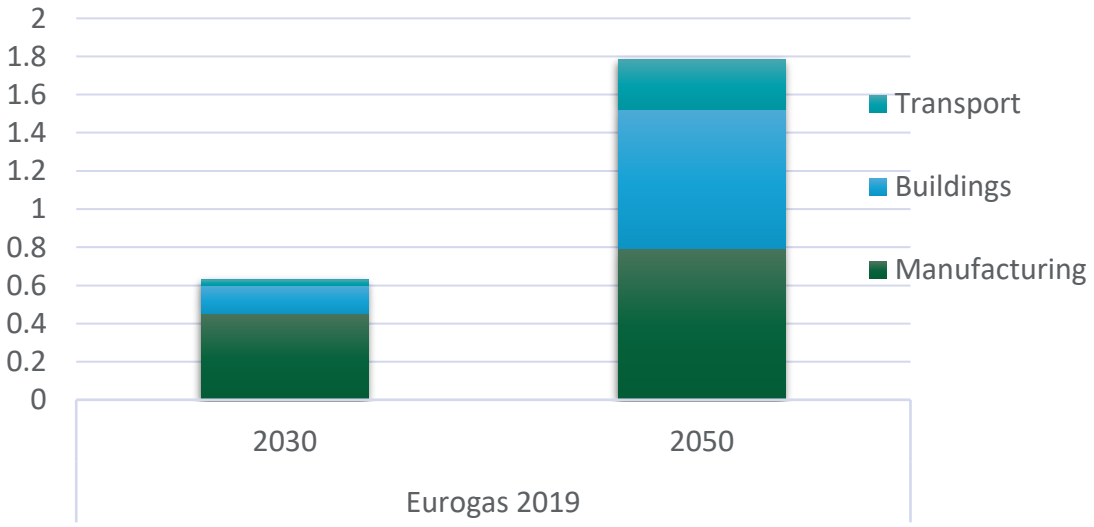


Where will hydrogen be used?

Manufacturing leads dedicated hydrogen uptake until 2030 and together with the heating sector are the main demand centers towards 2050

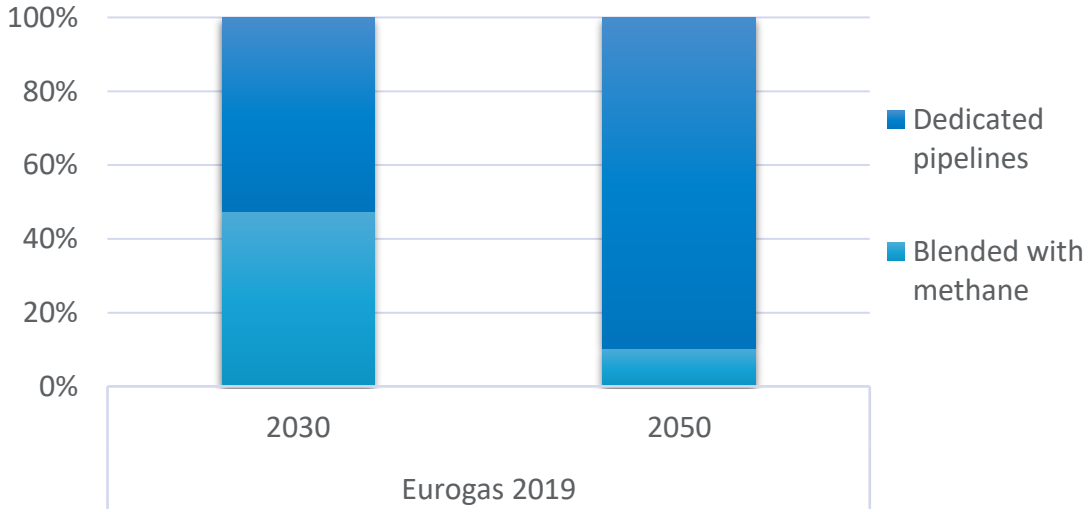
Hydrogen demand by sector

Units: PWh/yr



Blending hydrogen into the existing gas network is a market development tool but pure hydrogen eventually takes over

Hydrogen supply - blended or dedicated?



Key takeaways

- Continued gaseous energy use to 2050 and beyond is necessary to ensure a successful and cost-effective energy transition
- A balanced decarbonisation pathway can save Europe 130 billion per year.
  A total of 4.1 trillion by 2050.
- Renewable hydrogen alone will not be enough
- Renewable hydrogen will become cost-competitive compared to other renewable or low-carbon gases
- Hydrogen will be used in industry, transport and in buildings

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