Achieving Net Zero: The Role of Gas

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Secretary General

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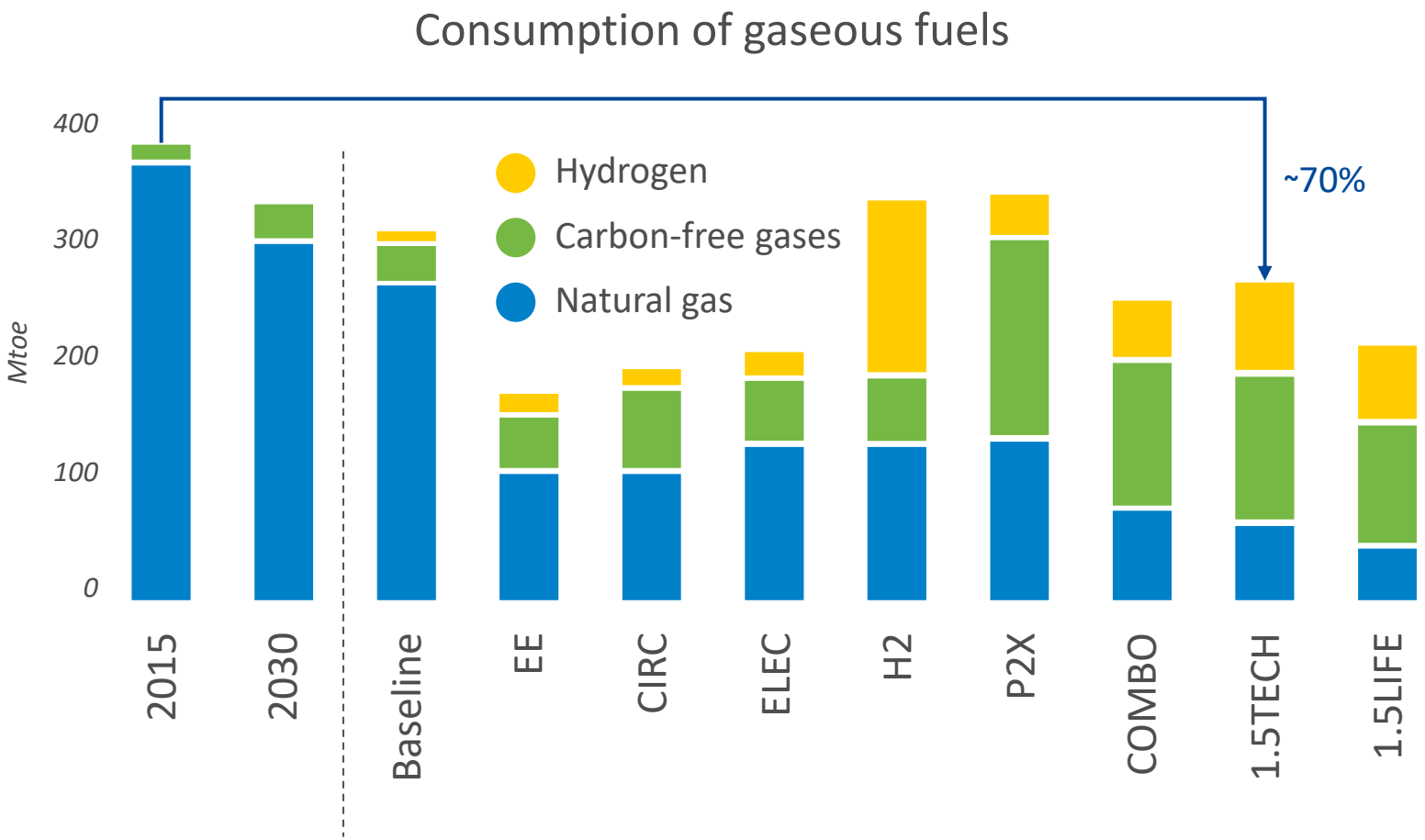
European Commission Vision for Gas to 2050



European Commission Long-Term Strategy confirms role of gas in the energy transition

CCS a necessity in the 1,5 Scenarios

Source: European Commission Long-Term Strategy

Launched today!

Eurogas' 2050 pathway study

To assess a pathway to a carbon neutral future, **comparing it to the European Commission's 1.5TECH scenario**

Commissioned DNV GL to carry out the study

To provide **estimates of cost savings** associated with a transition utilising a multi-vector approach

To outline at what point, and under which conditions, renewable and decarbonised gases will be available in Europe

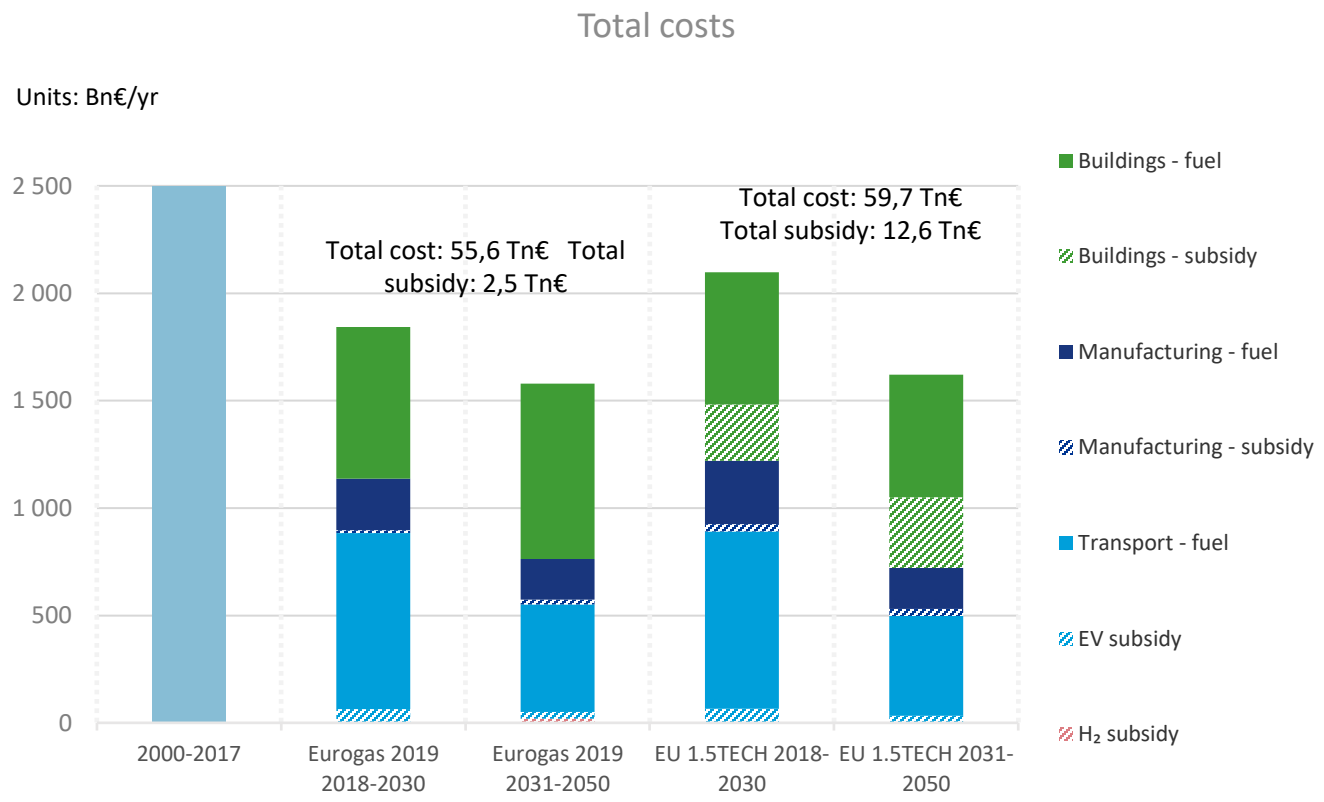
The energy transition in Europe requires trillion+ Euro Investments every year

A holistic energy system approach to the transition is the most cost-effective saving over 4 trillion Euros in the period

Rolling out gaseous solutions across all sectors, **using existing infrastructure, saves €130 billion per year until 2050**

Main cost driver of the European Commission's scenario is the electrification of heating

- Over €10 trillion in subsidies needed to retrofit buildings
- Over €1 trillion needed to match electricity infrastructure to meet peak demand



Fuel costs are after taxes and subsidies

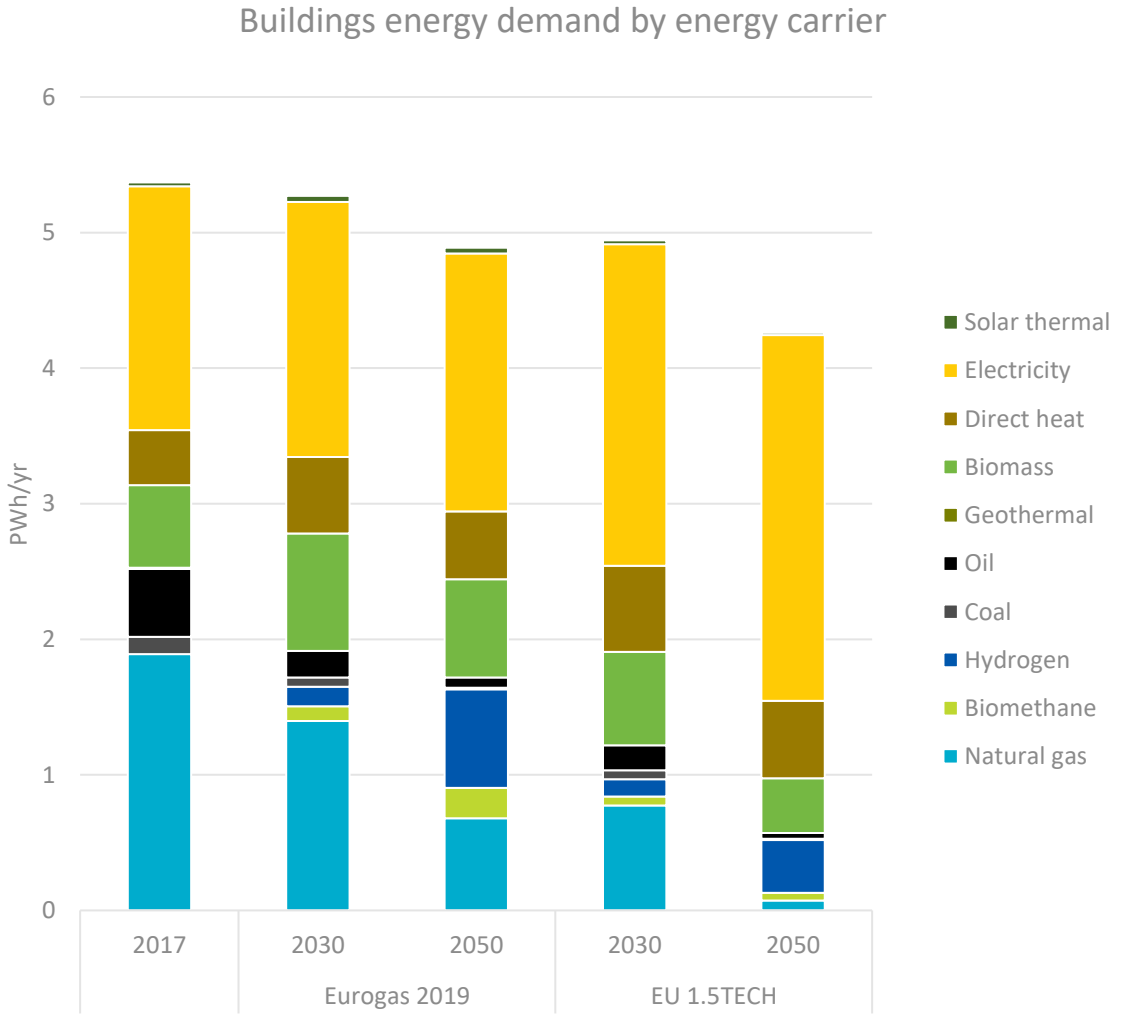
Cost-efficient decarbonisation solutions matter most in the building sector

Gaseous energy, delivers a more cost-effective pathway

True: Electrification of heating can reduce energy demand compared to gaseous solutions

Also true: **over €10 trillion in subsidies needed to transform Europe's buildings stock** and replace appliances in 1,5 TECH

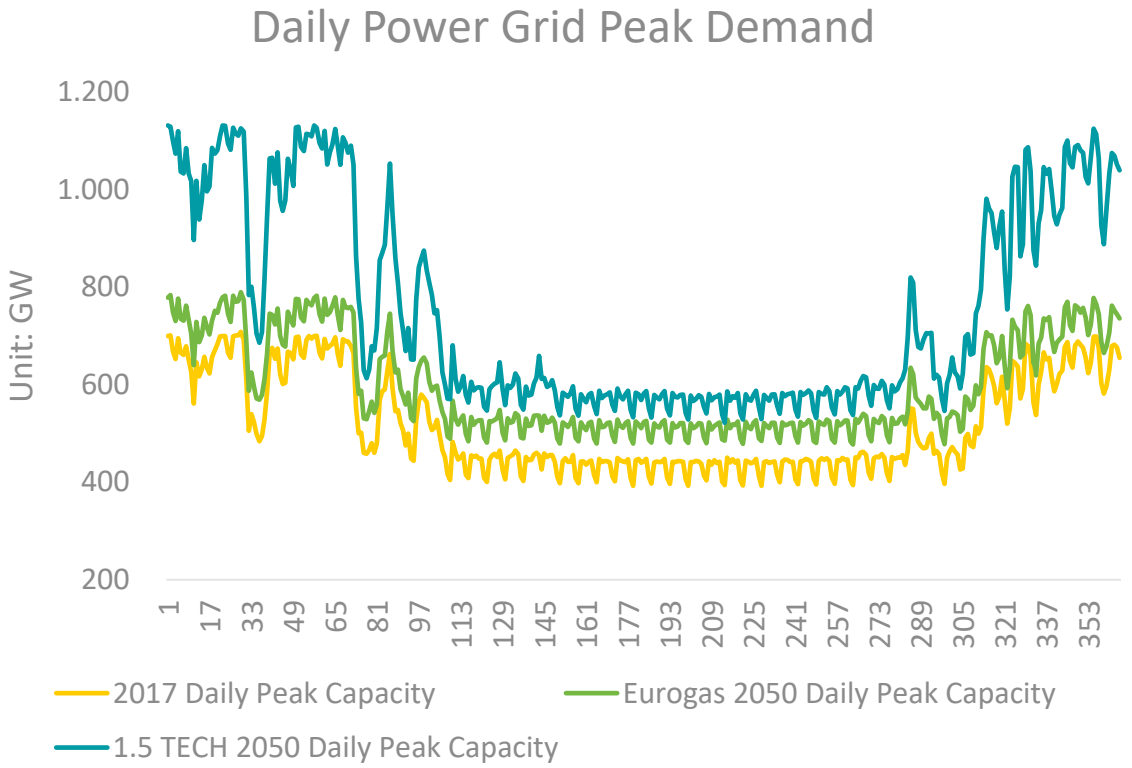
Social acceptance is a barrier that should not be underestimated – gaseous solutions are easy to implement and affordable for households across Europe

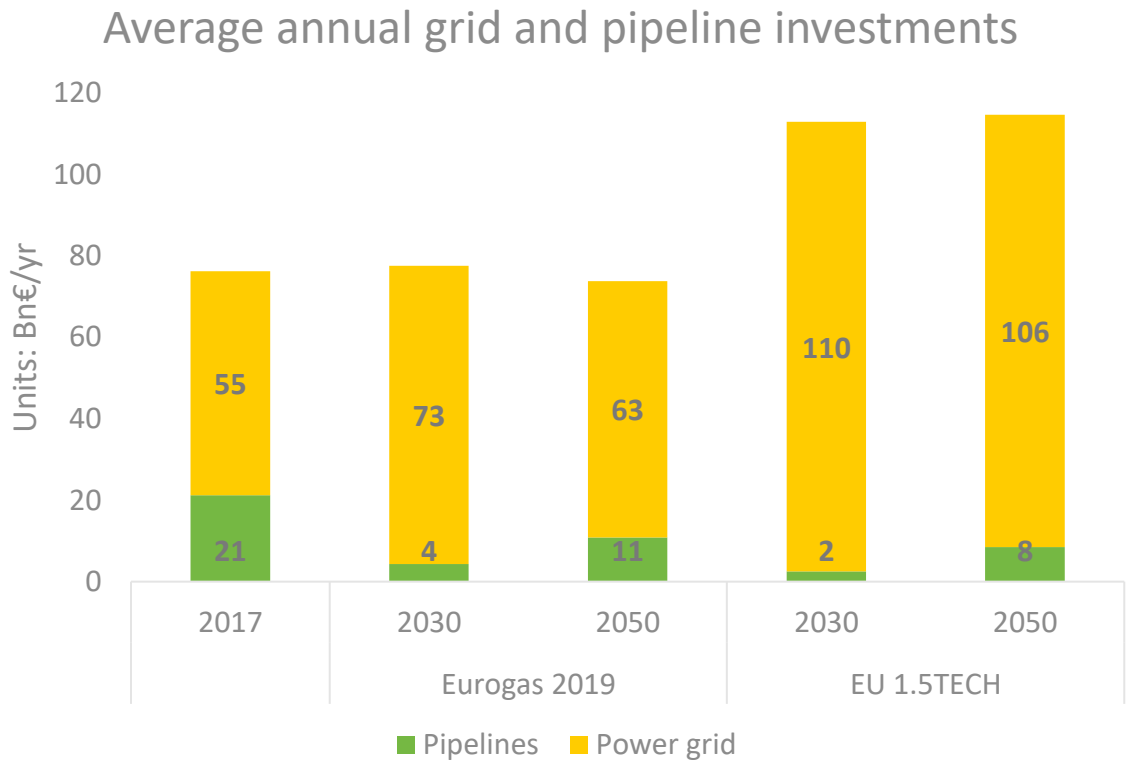


Public acceptance for gaseous fuels can and will grow

Electrifying heat drives peak power demand

Decarbonising heating with gas saves €1.3 trillion - otherwise needed to expand power networks that would be underutilised most of the time while increasing the risks of blackouts





Other views on EU wide hydrogen and biogas in 2050

Ecofys (Navigant) in 2019

"Optimised gas" scenario allocates to buildings, industry, transport, and power sectors

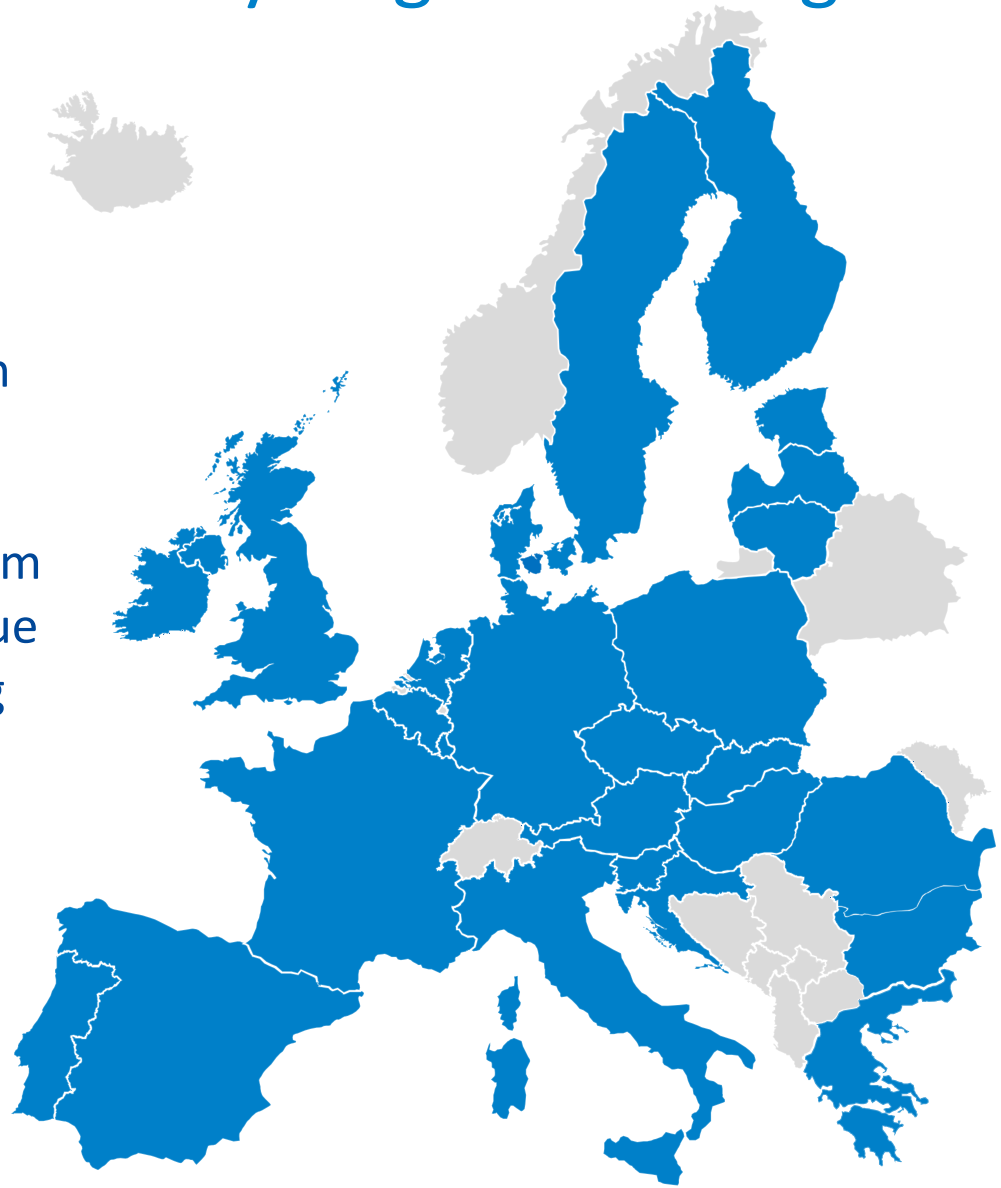
- Predicts 1,710 TWh of green hydrogen.

+

- about 1,500 TWh, or 142 bcm natural gas equivalent of blue hydrogen based on applying CCS

- About 1,200 TWh of biomethane in 2050

- 2017 gas use around 4500 TWh



Trinomics 2019

Strong hydrogen end-use scenario posits end user preferences to be hydrogen-based applications

- Predicts 2,138 TWh/a hydrogen.

Several countries already leading the way in promoting renewable and decarbonised gas

Industry led initiatives

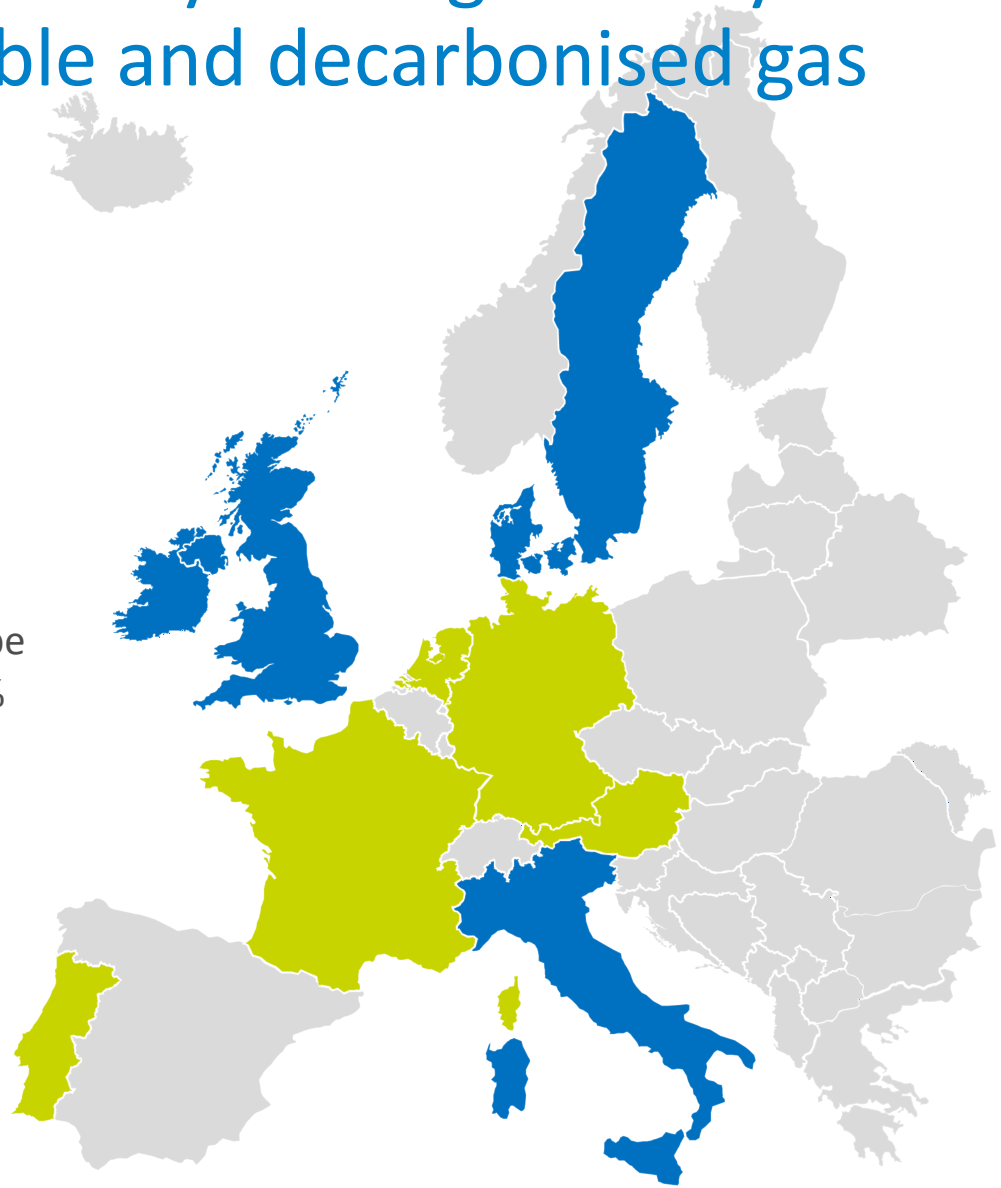
Denmark: 12% of gas consumption renewable in early 2020 - 100% by 2035

United Kingdom: hydrogen to cover 70% of UK heat demand by 2050

Ireland: 20% of gas consumption to be renewable in 2030, potential for 100% in 2050 (50 TWh)

Italy: 10 bcm in 2030 = 13% of 2017 gas demand. 35 bcm in 2050 = 47% of 2017 gas demand. 10% H_2 blending trial in 2019

Sweden: 15 TWh of biogas by 2030



Government led initiatives

France: 10% of all gas in the grid to be renewable by 2030 and 100%+ potential by 2050 (400+ TWh)

Austria: 5 TWh by 2030 of renewable gas injected, equivalent to 6% of its natural gas consumption in 2018

Germany: 3-5 GW electrolyser capacity and 20% of all H_2 production to be renewable by 2030

Portugal: plans a dedicated 1-5 GW solar power plant to produce H_2

Netherlands: discussions over a renewable/decarbonised gas target ongoing

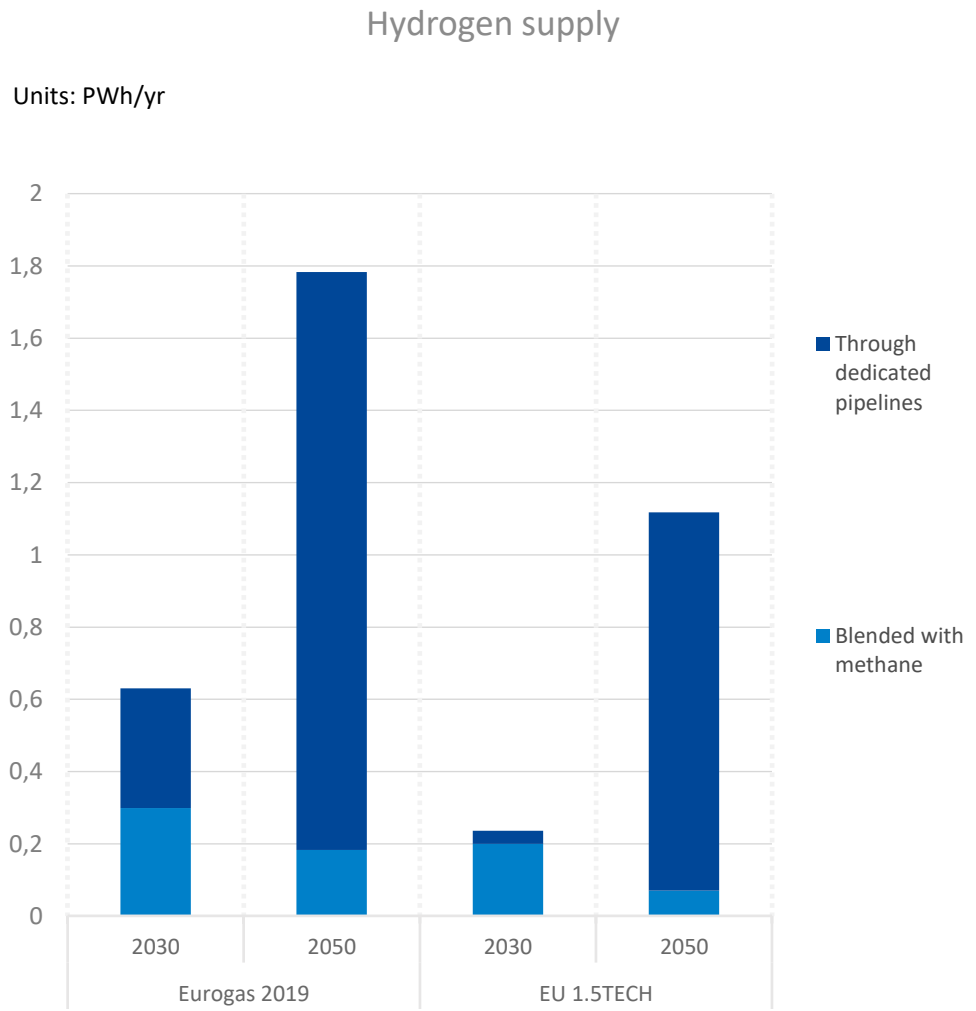
Eurogas Study: Hydrogen will be supplied blended and unblended

Pure hydrogen networks develop in specific demand sectors (e.g. manufacturing) already in the 2020s and become the norm by 2050

Initially blending will play an important role to start scaling the hydrogen market and optimise the use of existing infrastructure

The share of dedicated infrastructure jumps to 90% by 2050

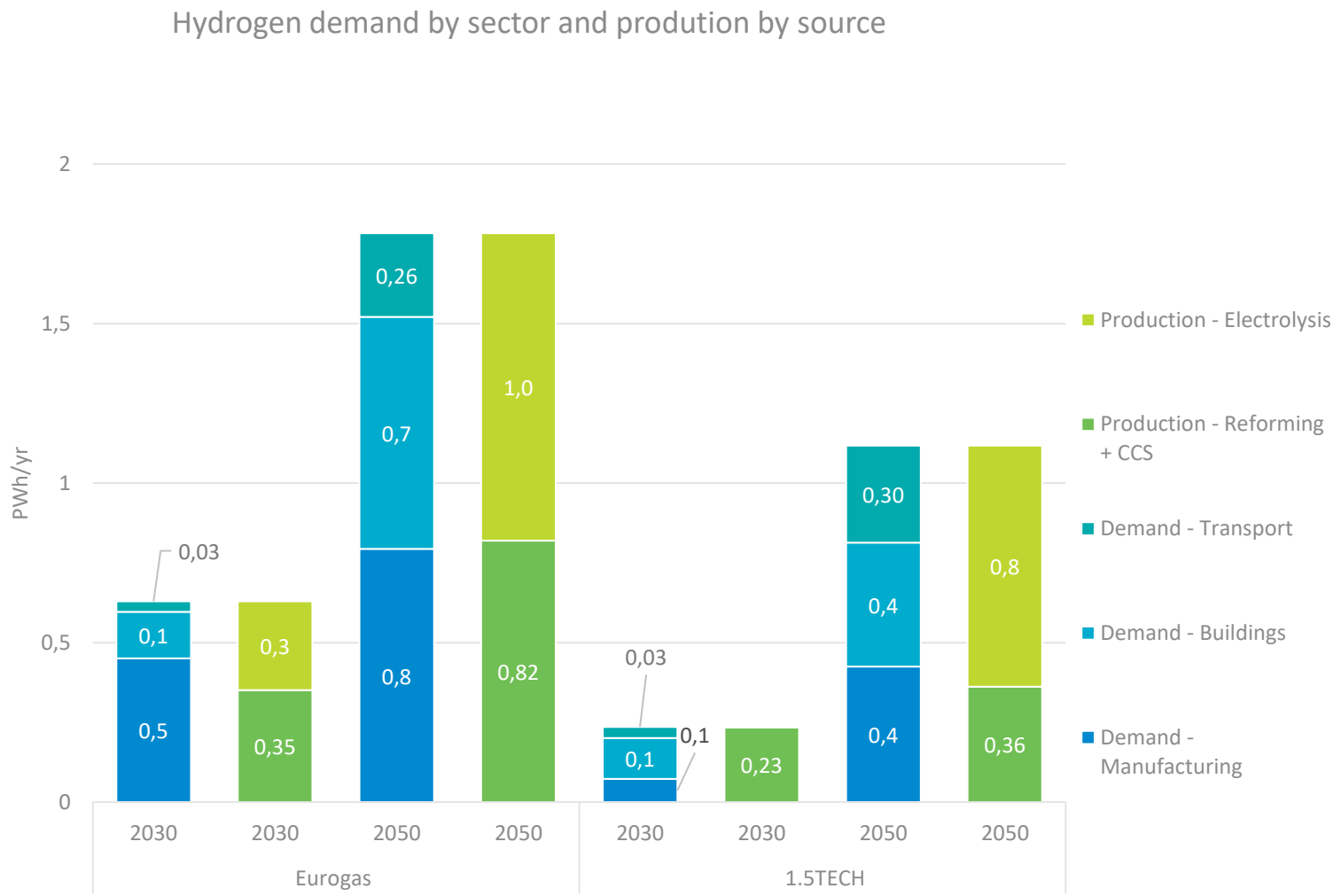
CAPEX in gas infrastructure to 2050 mainly required for decarbonised hydrogen supply



Eurogas Study: Demand for hydrogen *as an energy carrier* critical in both scenarios

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

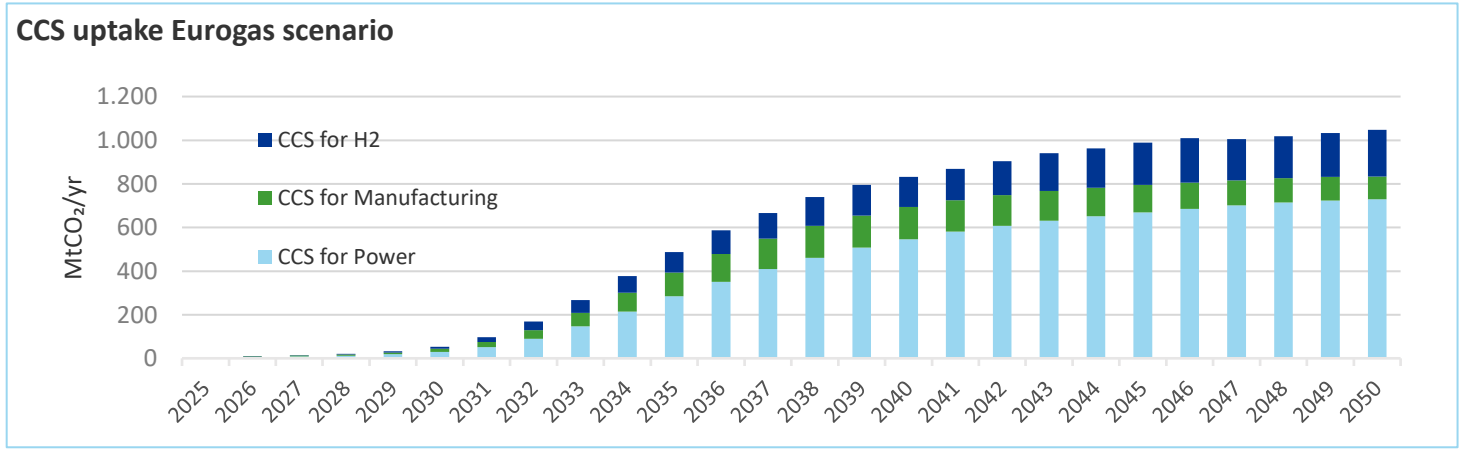


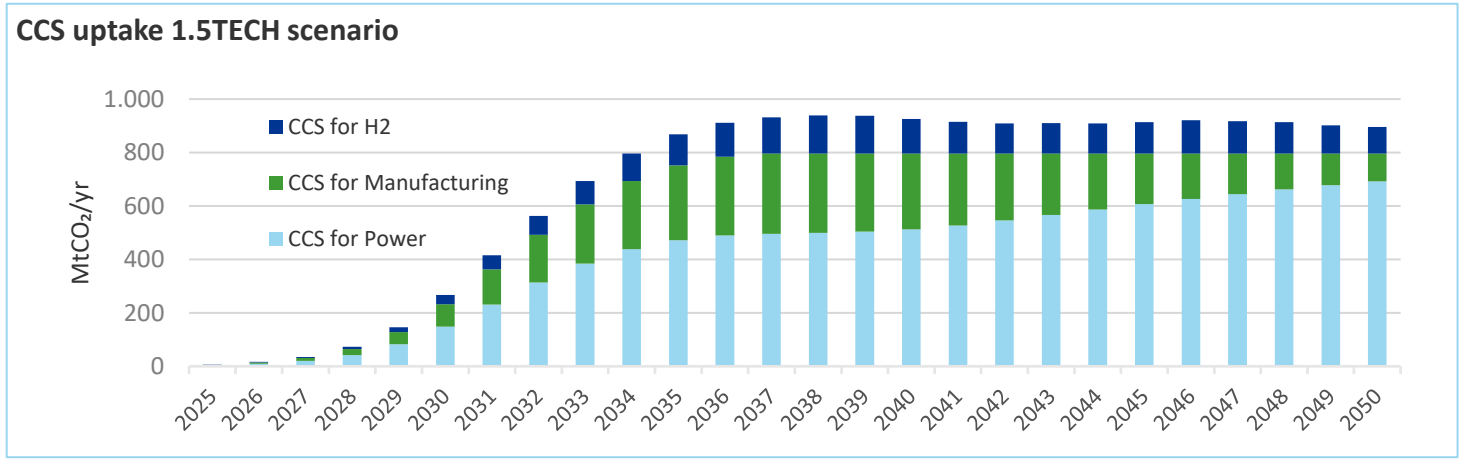
CCS is not an option. It’s a necessity.

Eurogas and the European Commission rely on CCS, especially to decarbonize the power and manufacturing sector

Although the Eurogas scenario has a higher share of natural gas, it decarbonizes the energy system with 15% lower cumulative CCS deployment towards 2050 than the European Commission

Under conservative assumptions and restrictive policies, both scenario’s use 11-13% of available storage capacity, and have between 114-130 years of storage left in 2050





Utilising an electricity & gas approach can save 130 billion Euro a year

Total costs for the Eurogas scenario are 4.1 trillion euro lower - equivalent to the annual GDP of Germany

Subsidies to incentivise consumers to opt for decarbonised energy solutions are 80% lower

Eurogas shows that climate objectives can be met more cost-effectively, using existing assets, limiting subsidy schemes and leaving market fundamentals in place

CO_2 reduction (excl. intern'l aviation & maritime, land use changes)