

A photograph of a forest with tall, thin trees and sunlight filtering through the leaves, located in the top-left corner of the slide.

GFC PATHWAY STUDY

EXTERNAL CONSULTATION

23 JANUARY 2020



AGENDA

- 10.00 Coffee
- 10.30 Welcome
- 10.45 Introduction Gas for Climate
- 11.30 Presentation of pathway results
- 12.00 Questions & Feedback
- 12.30 Lunch
- 13.15 Break-outs
- 14.45 Recap & Closure
- 15.00 Drinks & Bites





INTRODUCTION GAS FOR CLIMATE

MAINTAINING A ROLE FOR GAS AND GAS INFRASTRUCTURE IN THE 2050 ENERGY SYSTEM HAS IMPORTANT BENEFITS



The Paris Agreement increases the sense of urgency and raises the bar on climate action



The debate on the energy transition focuses on **electrification, gas seen as transition fuel**



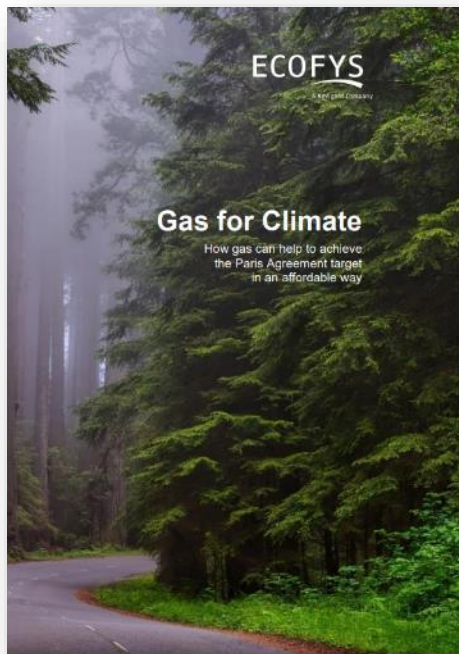
However, **renewable gas and gas infrastructure have important benefits**



The **Gas for Climate** group was established to develop and communicate a vision on the benefits of using renewable gas and gas infrastructure in meeting the Paris Agreement climate change target and supporting a net zero carbon EU energy system by 2050. The group consists of nine major gas TSOs plus two biogas associations

GAS FOR CLIMATE: ANALYSIS, VISION, ACTION

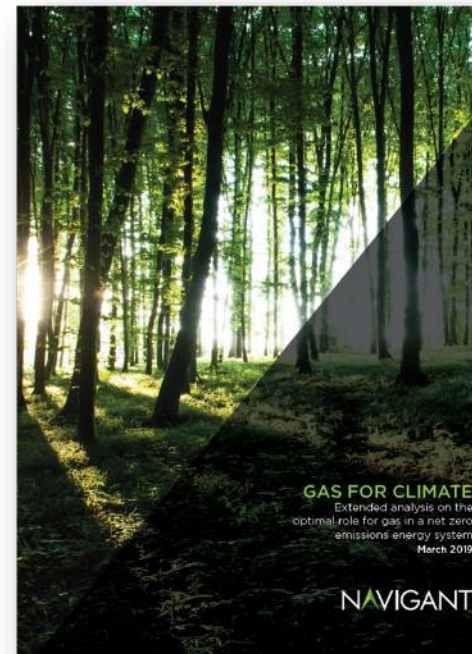
Since 2017, Gas for Climate has analysed the role of gas and gas infrastructure in a net zero emissions EU energy system by 2050. Gas for Climate also outlined what needs to happen before 2030 to scale-up renewable gas production.



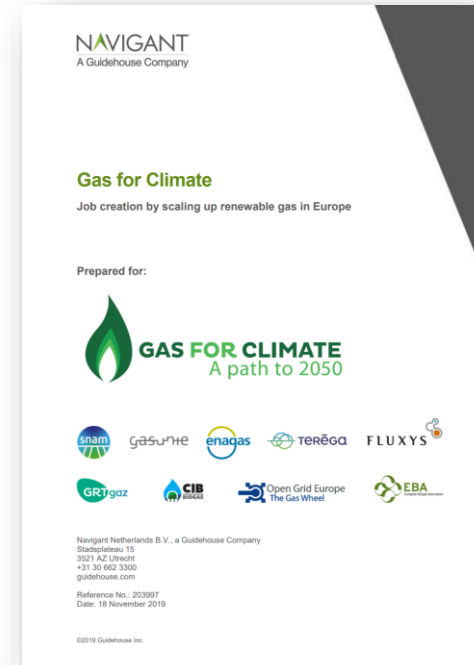
Gas for Climate 2018 study



Gas for Climate Action Plan

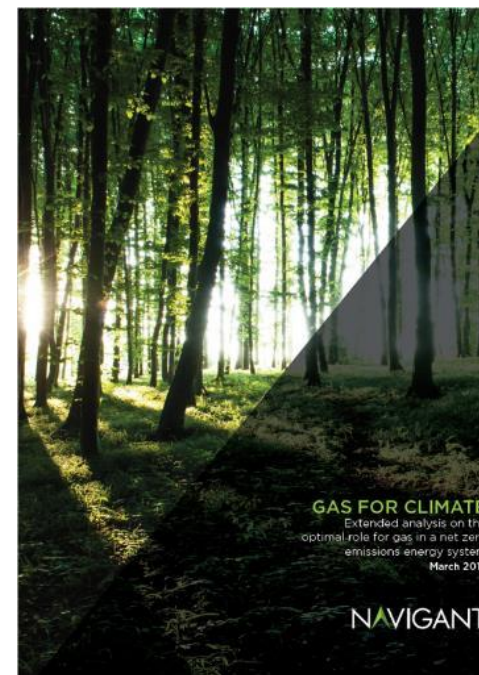


Gas for Climate 2019 study



Employment study

CURRENTLY UNDER DEVELOPMENT: 2020 – 2050 PATHWAY

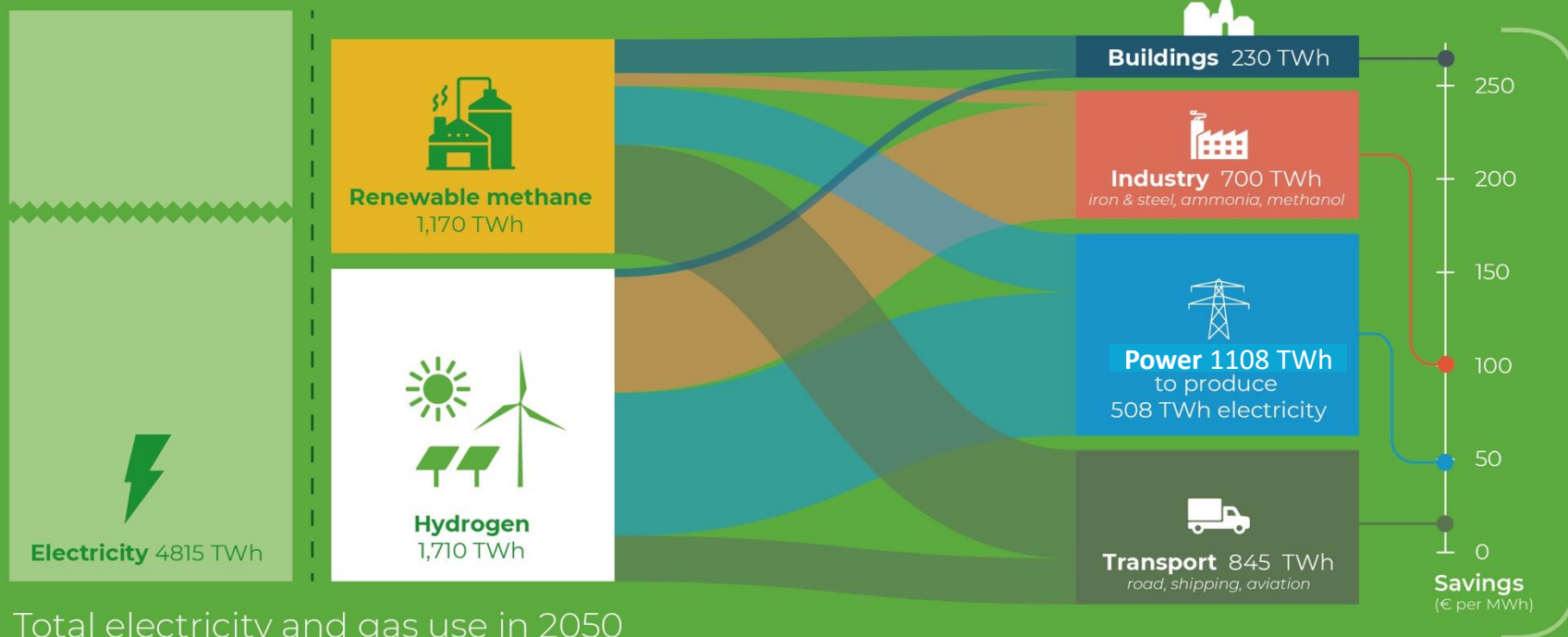


Currently under development: “Pathway 2020 to 2050”

This study explores how to achieve the net zero emissions energy system as described in the Optimised Gas Scenario (explained on next slides), developed in the 2019 Gas for Climate study.



A smart **combination of renewable gas and electricity**, together with **existing gas grids**, will be the optimal way to **decarbonise** the EU energy system, with the system becoming **fully renewable**



Total electricity and gas use in 2050
in optimised gas scenario

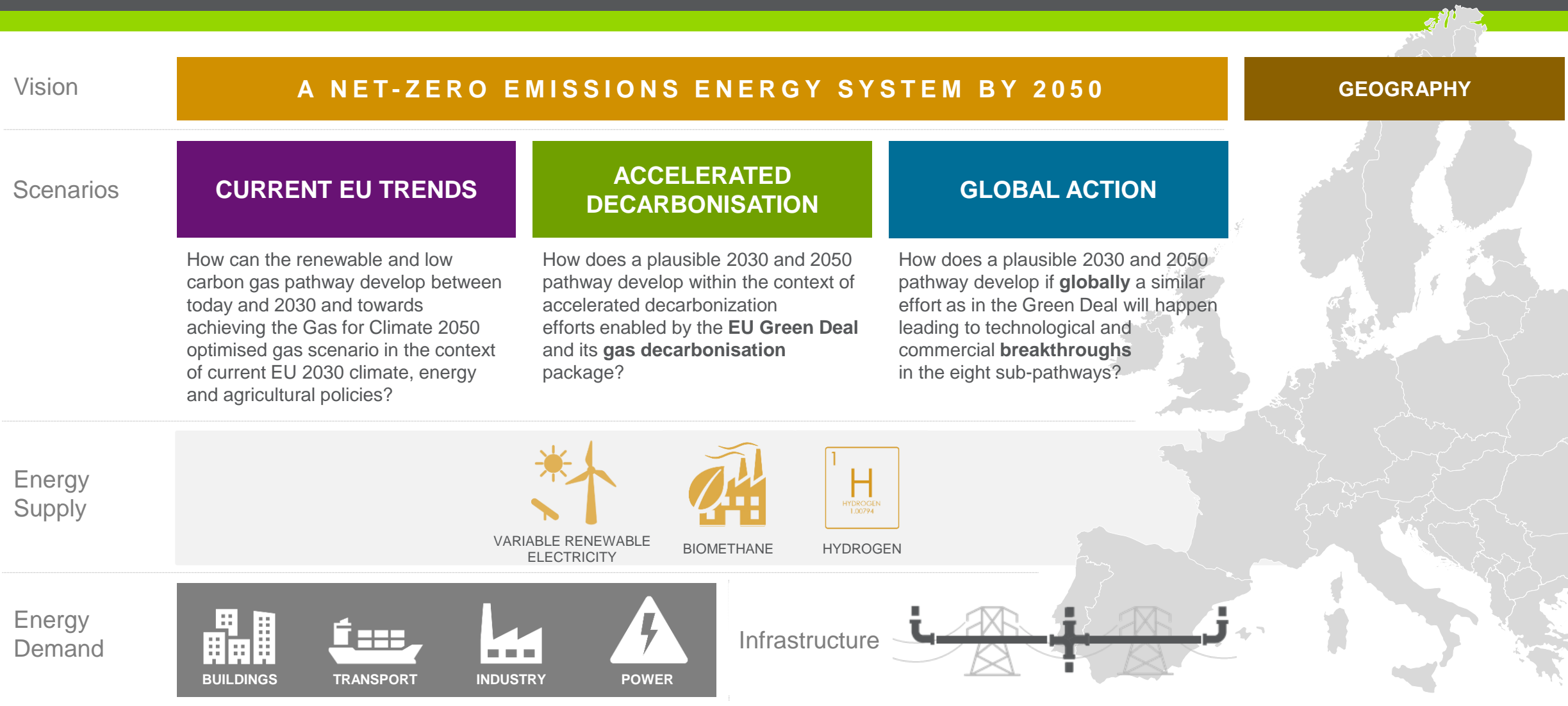
This quantity of renewable and low carbon gas equals
272 bcm of natural gas equivalent (energy density).

Total annual
savings
€217
billion
in **optimised**
gas scenario
compared to
minimal gas
scenario

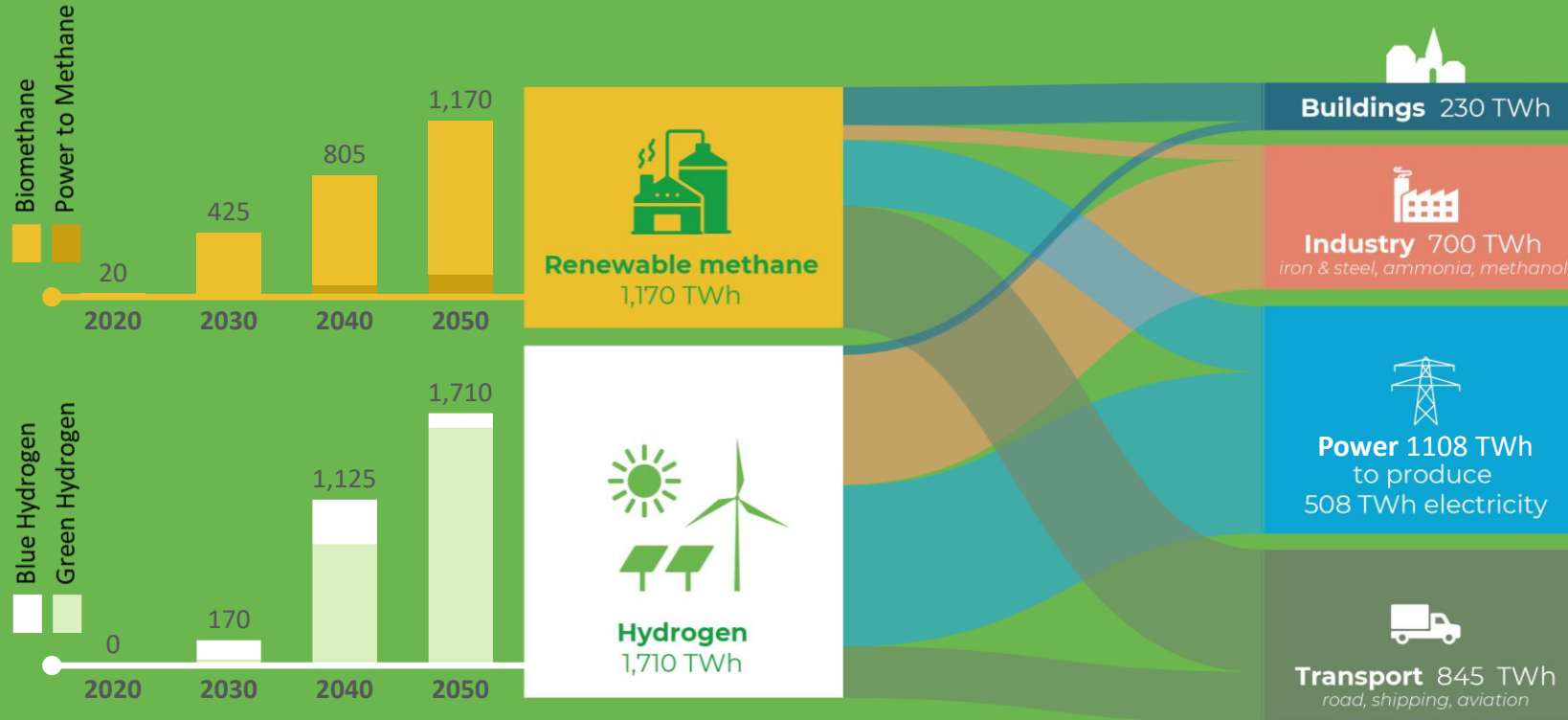


RESULTS PATHWAY ANALYSIS

THREE PATHWAY SCENARIOS 2020 - 2050

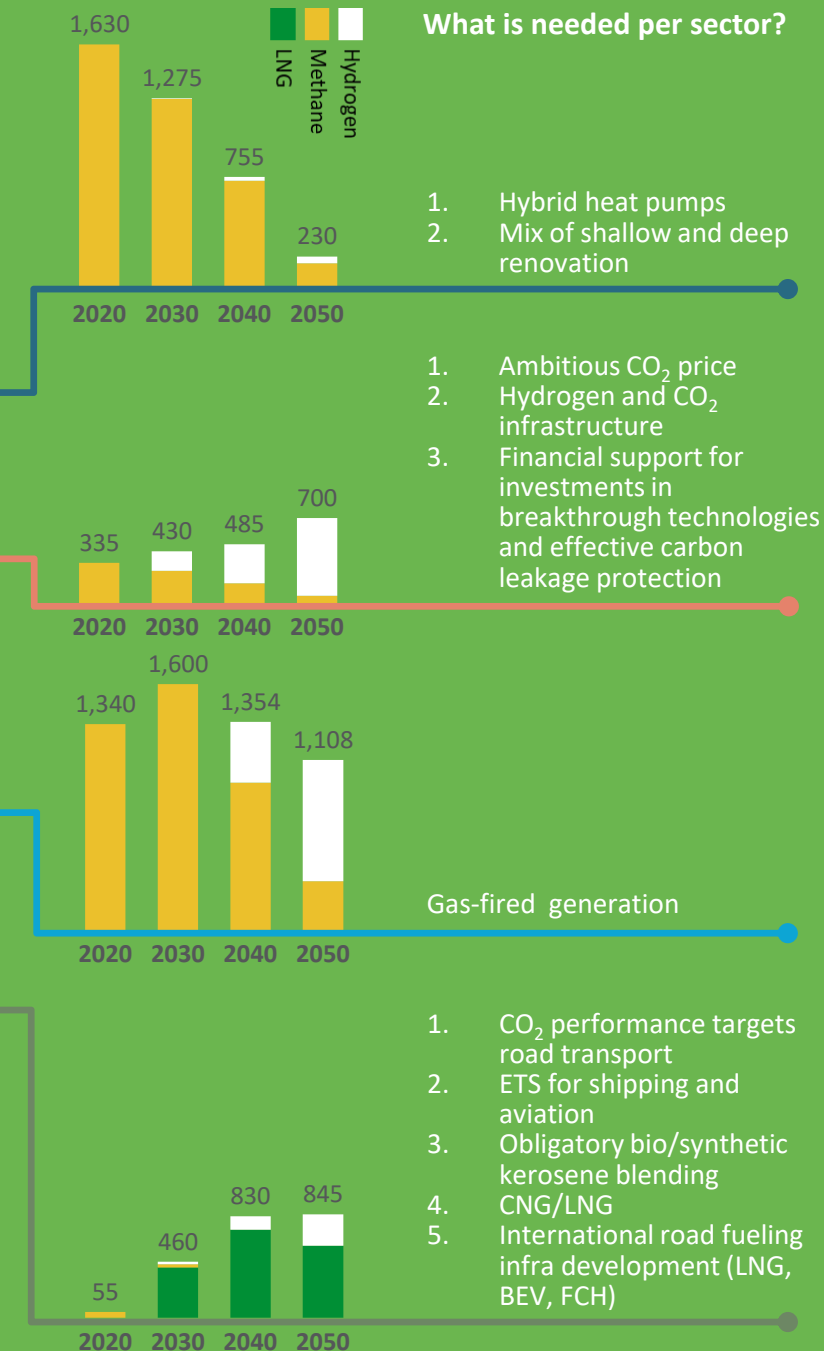


Accelerated Decarbonisation Pathway towards an optimal role for gas in a net-zero emissions energy system

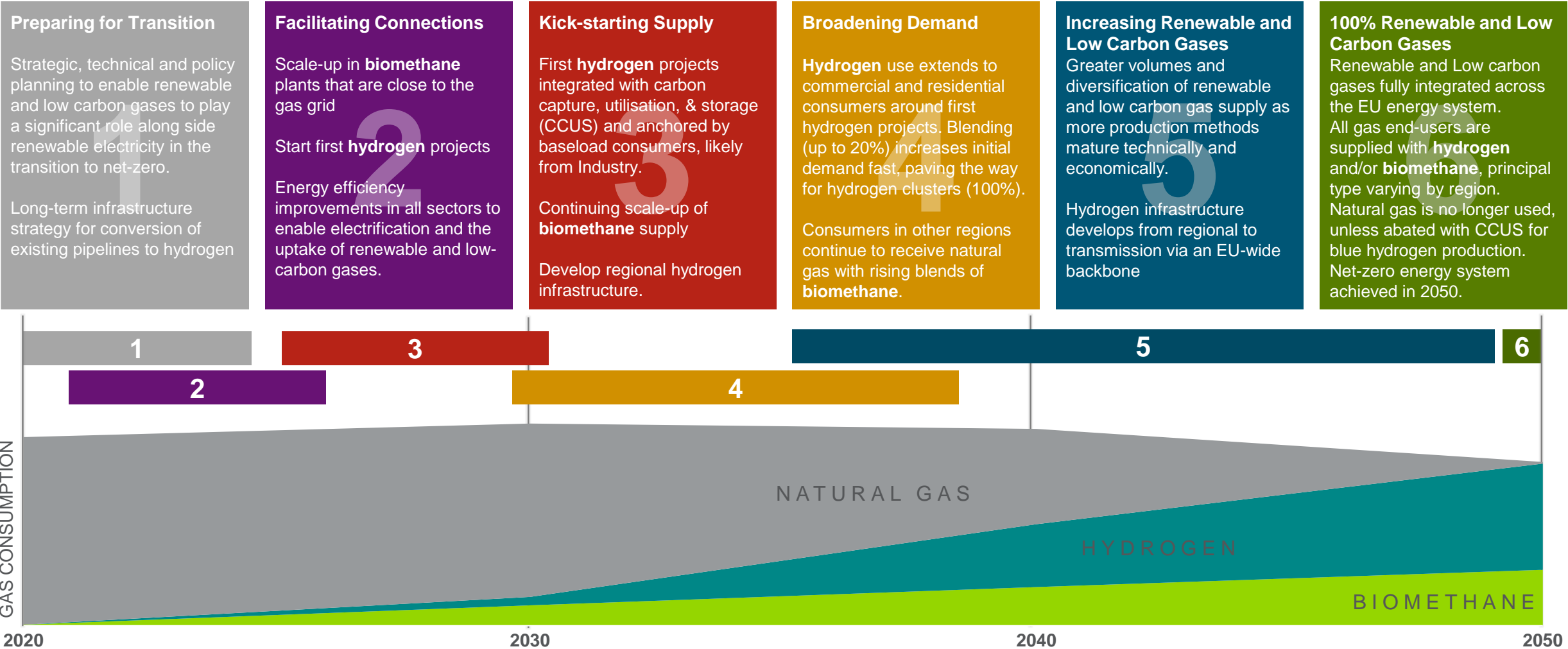


Policy Recommendations

1. Binding target for 10% renewable gas by 2030
2. Facilitate the creation of a European hydrogen backbone infrastructure
3. Standards, regulation and/or policies that enable the reuse of natural gas assets for hydrogen
4. Facilitate increased cross-border trade
5. Increased reduction of the EU ETS emissions ceiling to ensure an increase of the carbon price combined with carbon border adjustment



AN ACCELERATED DECARBONISATION PATHWAY TOWARDS A NET-ZERO EMISSIONS ENERGY SYSTEM BY 2050



GAS FOR CLIMATE'S GREEN DEAL PROPOSAL

MASSIVE CLIMATE ACTION SUPPORTED BY TARGETED POLICIES

To reach a cost-effective net-carbon energy system, policies are needed that enable the private sector to scale-up the deployment of renewable and low carbon gas while driving down cost levels. Both changes and extensions of existing policies (e.g. strengthening the EU ETS, allow imported renewable gas to count towards the RED II target), as well as new policies (e.g. binding target for the greening of the gas grid) are needed.



Cross-sectoral policies

1. Binding target for 10% renewable gas by 2030
2. Facilitate the creation of a European hydrogen backbone infrastructure
3. Standards, regulation and/or policies that enable the reuse of natural gas assets for hydrogen
4. Facilitate increased cross-border trade
5. Increased reduction of the EU ETS emissions ceiling to ensure an increase of the carbon price combined with carbon border adjustment



Policy measures to enable full decarbonisation of buildings

6. Binding targets for energy renovations of buildings enabling the uptake of renewable and low-carbon gas in buildings
7. Propagate the installation of hybrid heat pumps in older buildings with gas connections



Policy measures to enable full decarbonisation of transport

8. Increase the transport renewables target, introduce a specific blending targets for renewable aviation fuels and for renewable shipping fuels.
9. International coordination of fuelling infrastructures
10. Increase the ambition level of the Alternative Fuels Infrastructure Directive
11. Inclusion of the shipping sector and the entire EU aviation sector in the EU ETS
12. Stimulate the use of rail transport for intra-EU destinations
13. Considering the long lifetime of ships, a shift to bio-LNG and electric ships should be made as soon as possible.

CURRENT SITUATION

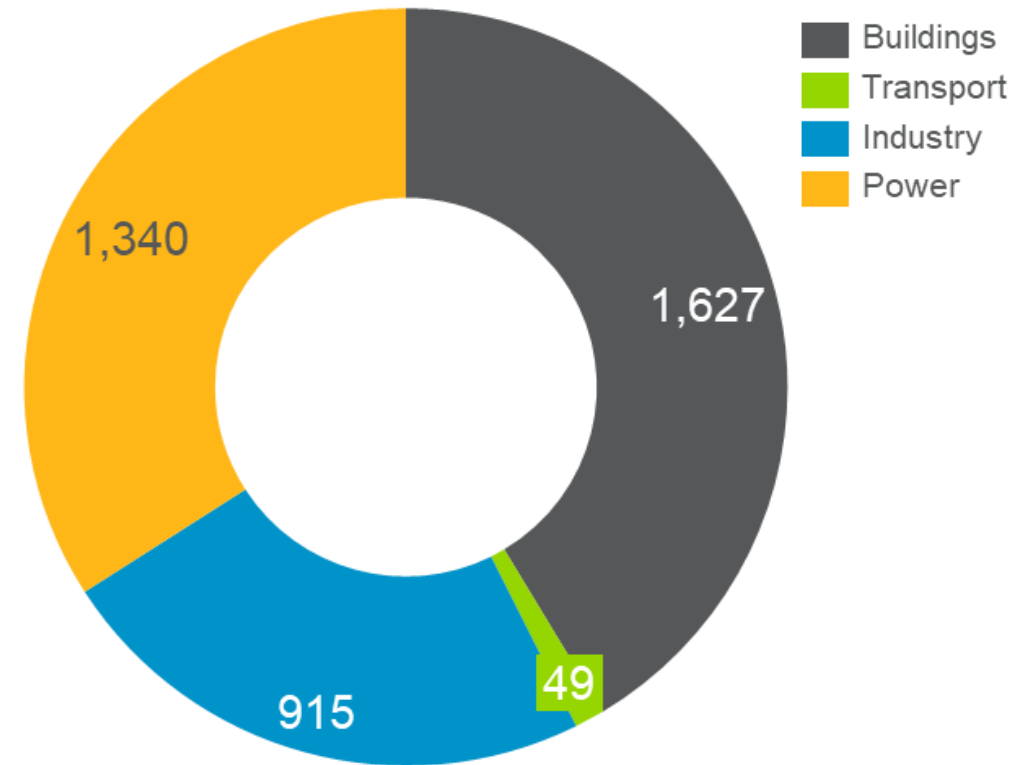
RENEWABLE AND LOW CARBON GAS ARE STILL IN THEIR INFANCY

Current situation of the energy demand & supply

KEY FINDINGS

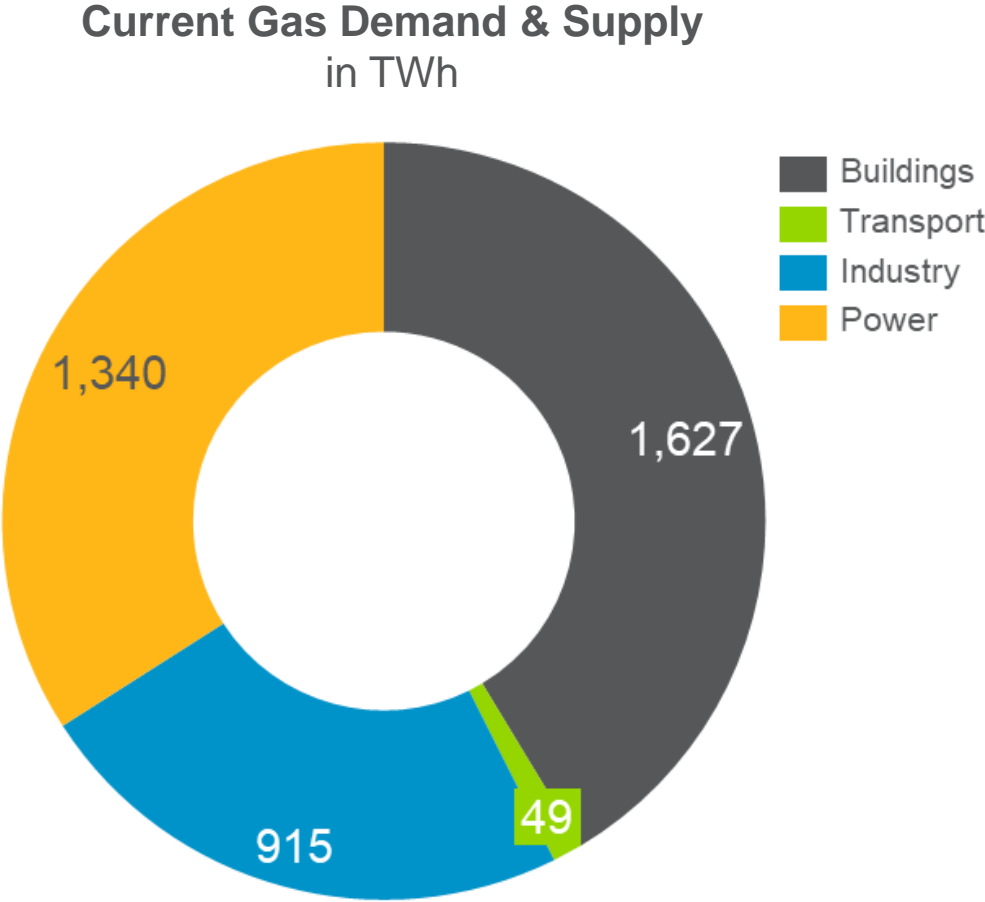
- Significant biogas production today, mostly not (yet) upgraded to biomethane
- First green and blue hydrogen investments have been announced
- Almost no hydrogen or biomethane used in buildings, industry, and transport today, most biogas used for local electricity production

Current Gas Demand & Supply
in TWh



CURRENT SITUATION

RENEWABLE AND LOW CARBON GAS ARE STILL IN THEIR INFANCY



CURRENT EU TRENDS SCENARIO

ONLY MODEST DRIVERS EXIST TO INCREASE PRODUCTION AND USE OF RENEWABLE AND LOW-CARBON GASES

SCENARIO DESCRIPTION

The Current EU Trends scenario describes how a renewable and low carbon gas pathway develops between today and 2050 in the context of current EU 2030 climate, energy and agricultural policies. This scenario is not a business-as-usual scenario since not all EU policies and targets have already been transposed into national policies; with current developments the EU 2030 targets might not be reached. It assumes similar efforts in the period 2030-2050 as in the period 2020-2030, covered by existing policies.

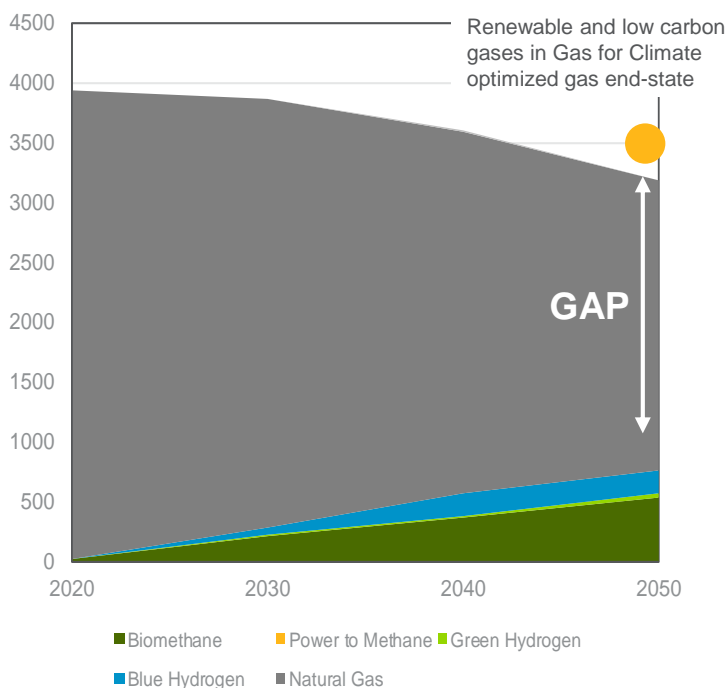
KEY FINDINGS

- Current energy and climate policies are insufficient to reach a net-zero emissions energy system, such as the Gas for Climate 2050 Optimised Gas end state.
- Under current policies, we expect around 280 TWh renewable and low carbon gas production in 2030 (210 TWh biomethane, 4 TWh green hydrogen, 60 TWh blue hydrogen).
- If we extrapolate the deployment of renewable and low carbon gas by 2030 resulting from current policies, around 750 TWh of renewable and low carbon gas can be deployed by mid-century. This would be around 25% of the amount needed in a cost-efficient net-zero carbon energy system.

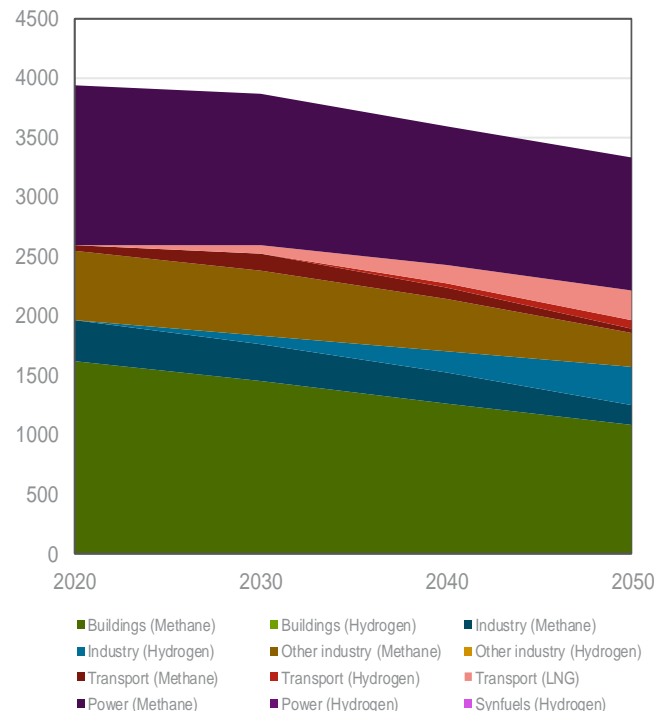
KEY ASSUMPTIONS

- The Current EU Trends scenario includes all EU policy in 2030 including EU policies that still need to be transposed into national policies.
- Full implementation of the EU Climate and Energy Package for 2030
- Biomethane costs 2050: 57 €/MWh (AD) and 47 €/MWh (thermal gasification)
- Hydrogen costs 2050: 50-60 €/MWh
- EU electricity production remains stable around 3,450 TWh with increasing share of renewable electricity towards 2030
- ETS price in 2030: 35 €/tonne CO₂

Gas supply in the Current EU Trends Scenario (TWh)



Gas demand in the Current EU Trends Scenario (TWh)



ACCELERATED DECARBONISATION SCENARIO

HOW TO SPEED UP THE ENERGY TRANSITION TO KEEP THE EU ON COURSE FOR COST-EFFICIENT DECARBONISATION

SCENARIO DESCRIPTION

The Accelerated Decarbonisation scenario describes a pathway that is in line with the ambition of the Paris Agreement to limit global temperature increase to well below 2°C.

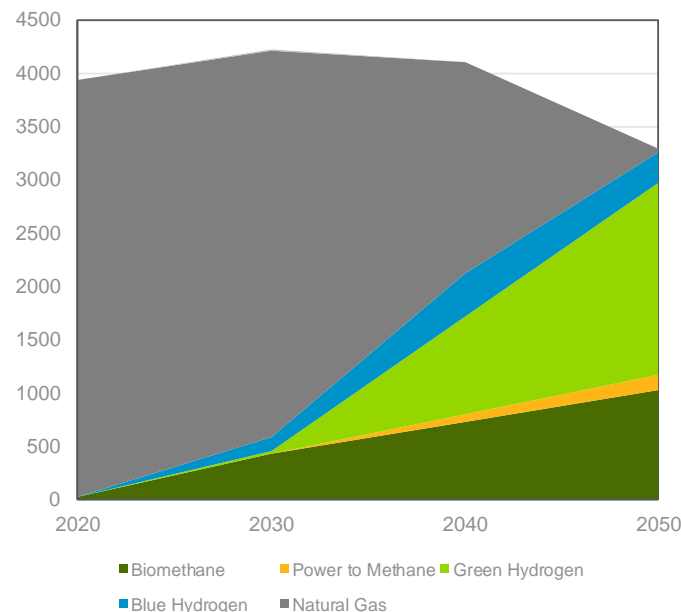
KEY FINDINGS

- If we reach a 55% emission reduction compared to 1990 levels by 2030 with the measures proposed, the Gas for Climate cost-effective net-zero carbon energy systems will be within reach.
- To reach a cost-effective net-carbon energy system, policies are needed that enable the private sector to scale-up the deployment of renewable and low carbon gas while driving down cost levels.
- Both changes and extensions of existing policies as well as new policies are needed.

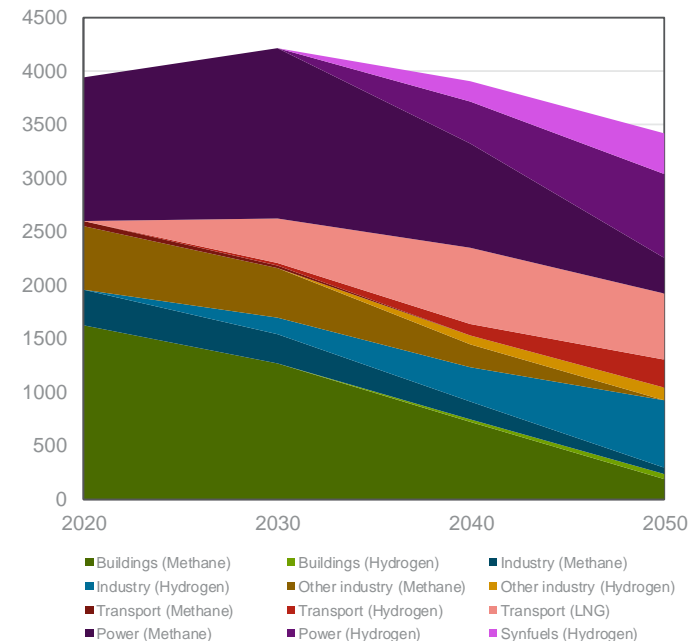
KEY ASSUMPTIONS

- 55% emission reduction compared to 1990 levels by 2030
- Rapid decarbonisation of the power sector (60-65% renewable electricity in 2030) that enables the production of green hydrogen
- Biomethane: 35-55 €/MWh (AD) and 47 €/MWh (thermal gasification) by 2050
- Hydrogen: 44-61 €/MWh by 2040
- ETS price in 2030: 55 €/tonne CO₂

Gas supply in the Accelerated Decarbonisation Scenario (TWh)



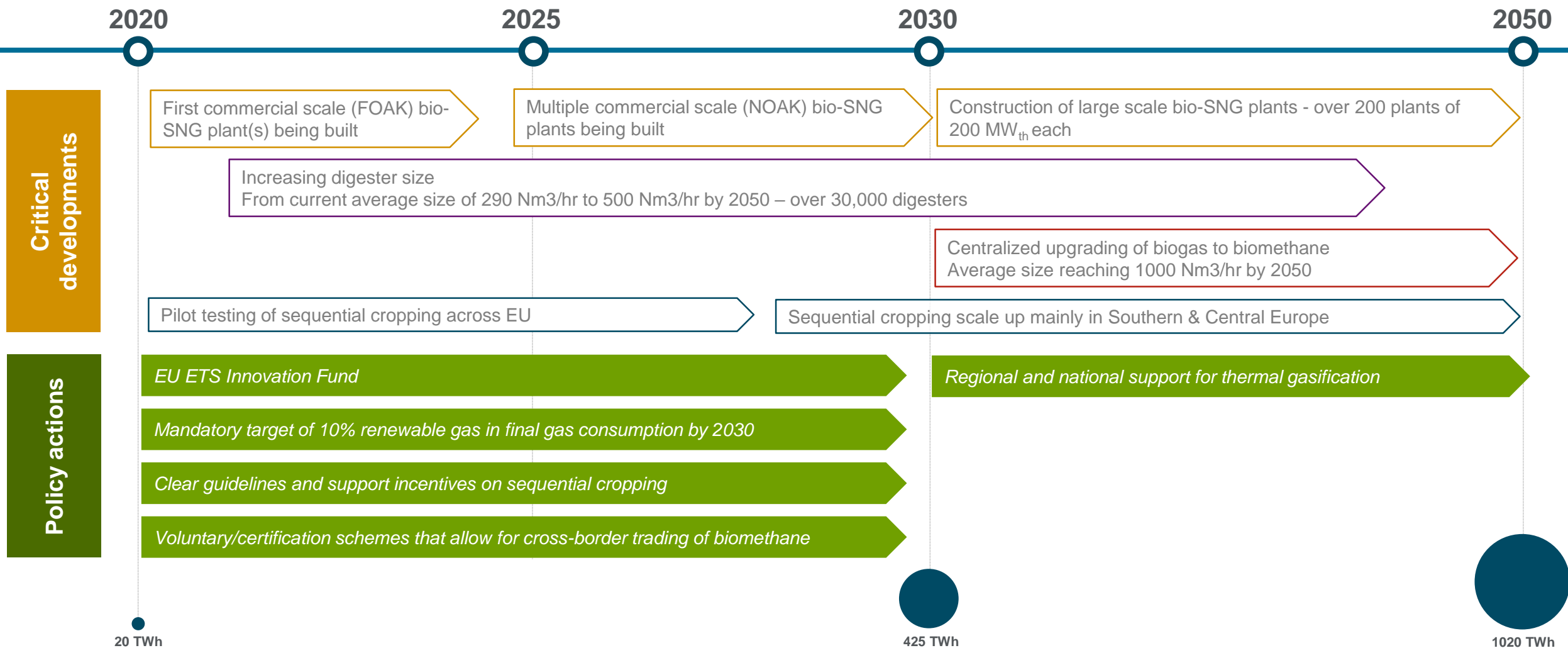
Gas demand in the Accelerated Decarbonisation Scenario (TWh)



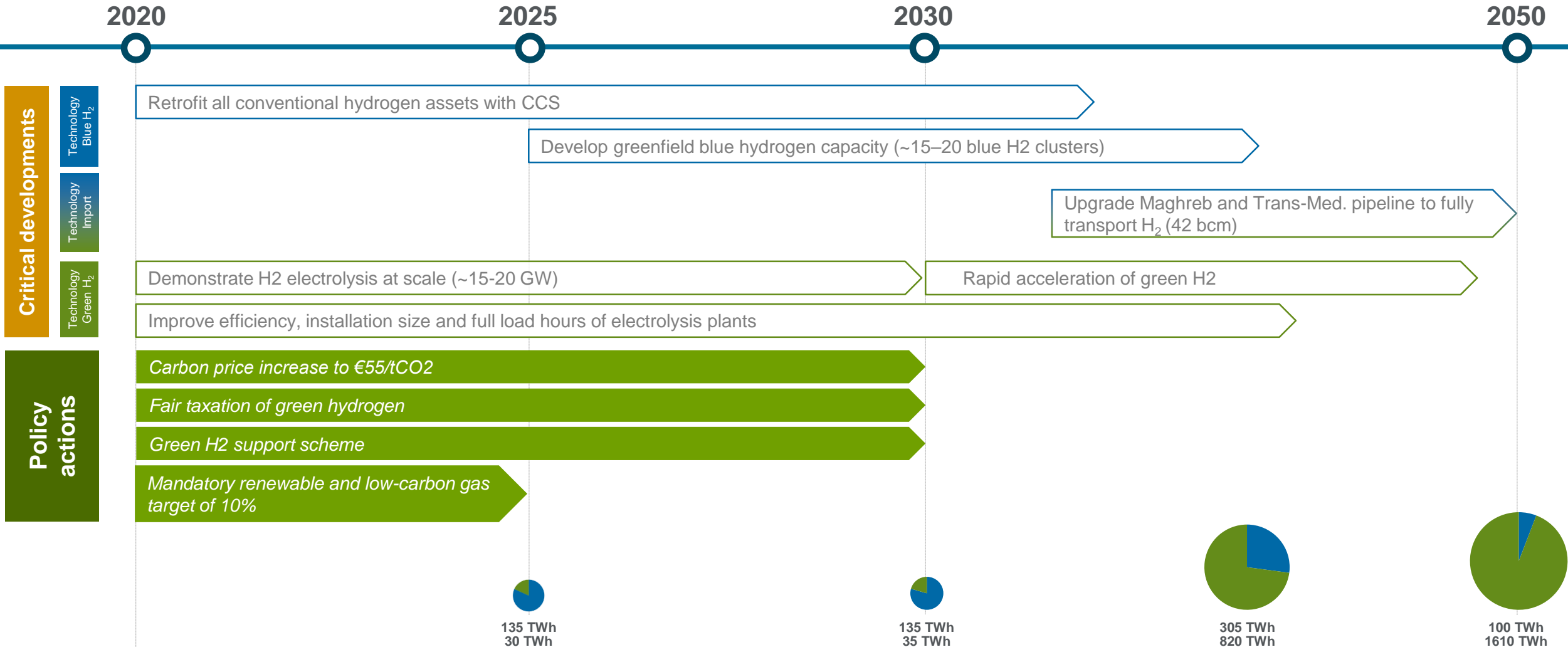


ACCELERATED DECARBONISATION SCENARIO

TIMELINE BIOMETHANE

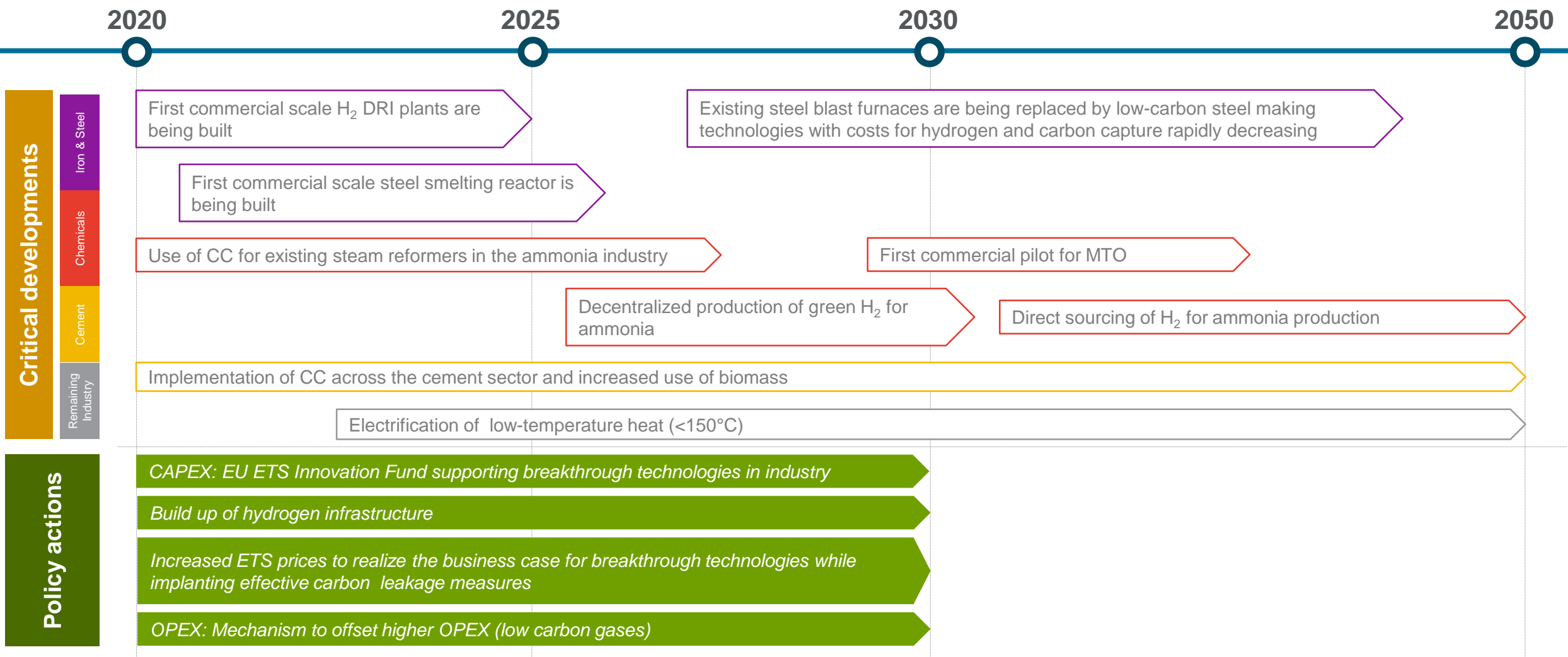


ACCELERATED DECARBONISATION SCENARIO TIMELINE HYDROGEN





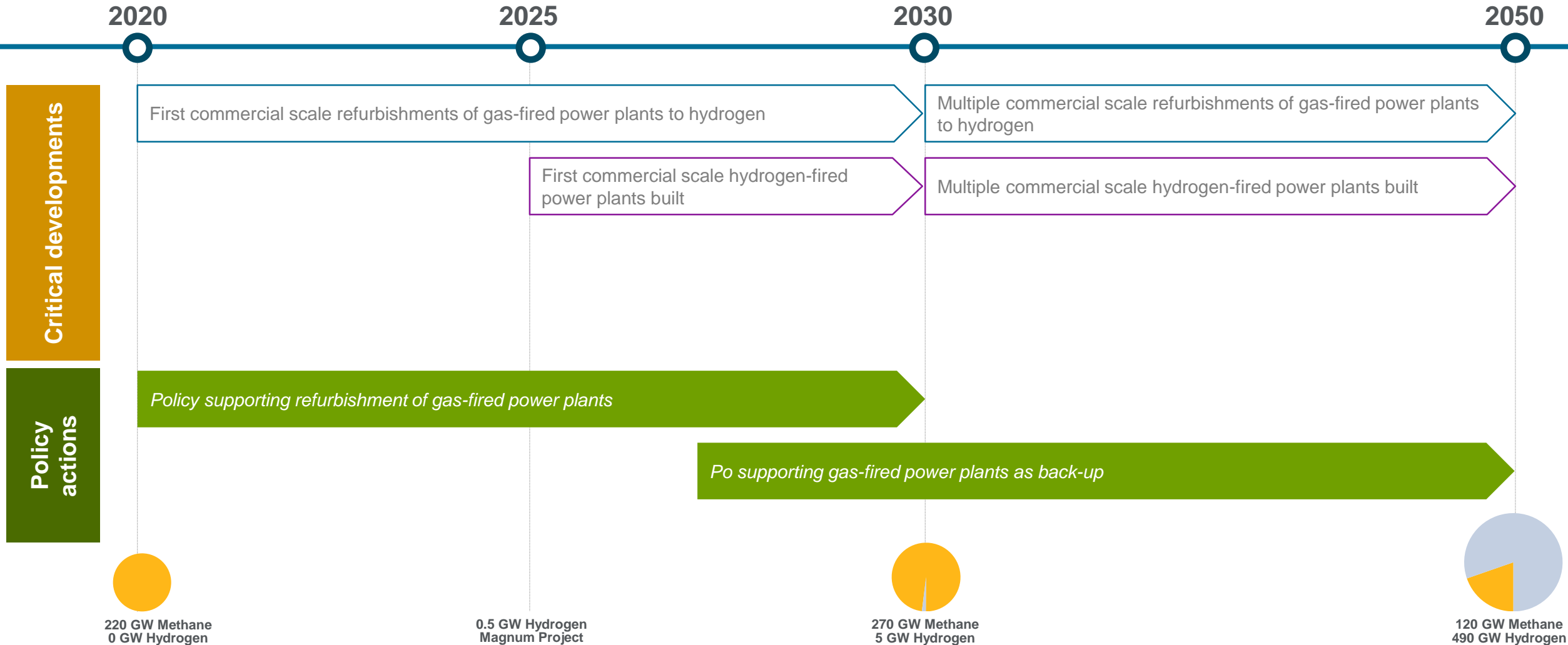
TIMELINE INDUSTRY





ACCELERATED DECARBONISATION SCENARIO

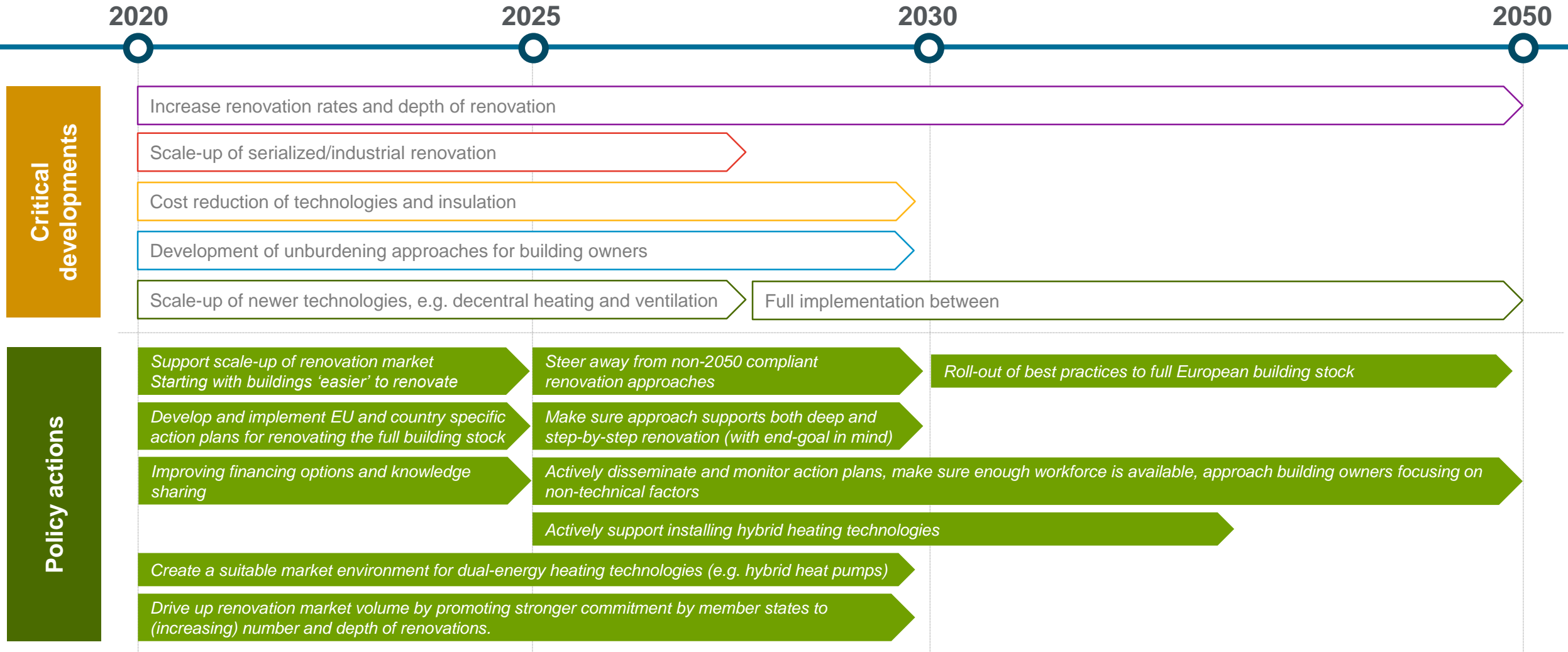
TIMELINE POWER





ACCELERATED DECARBONISATION SCENARIO

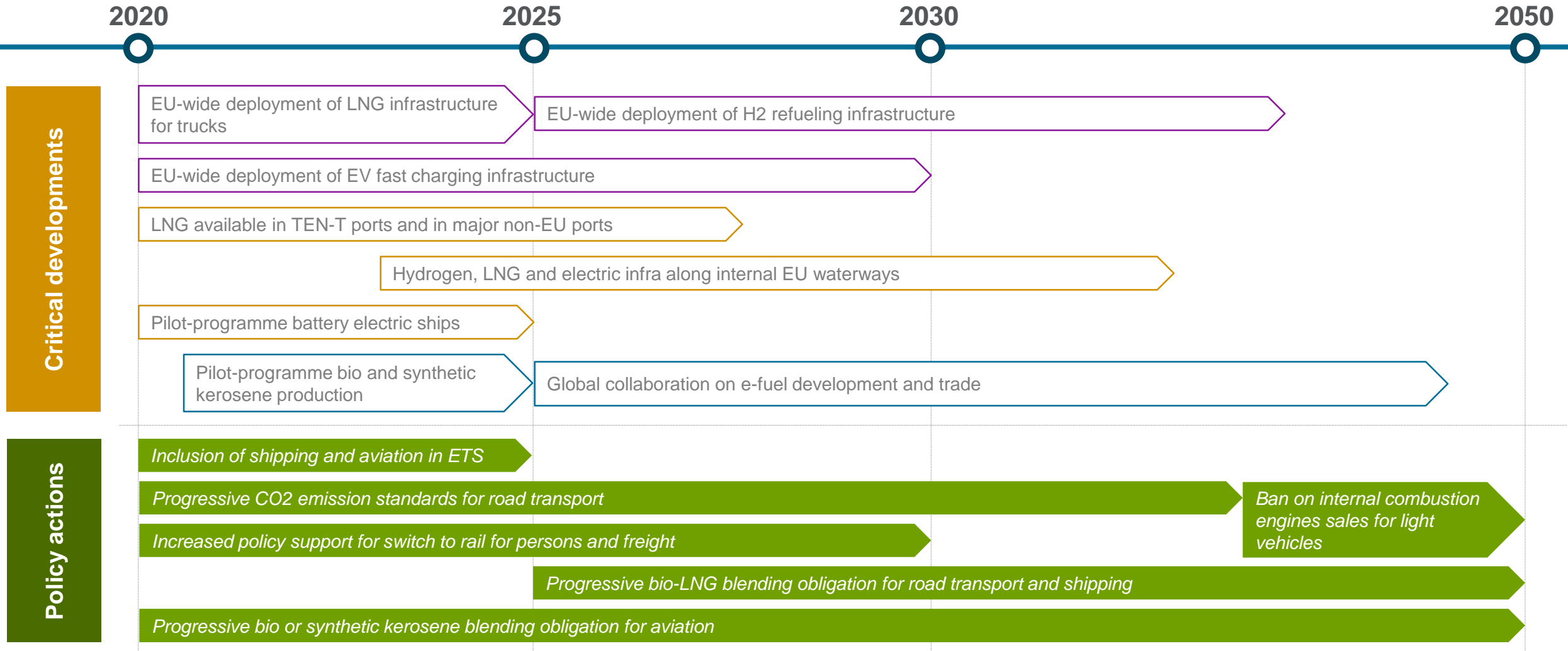
TIMELINE BUILDINGS





ACCELERATED DECARBONISATION SCENARIO

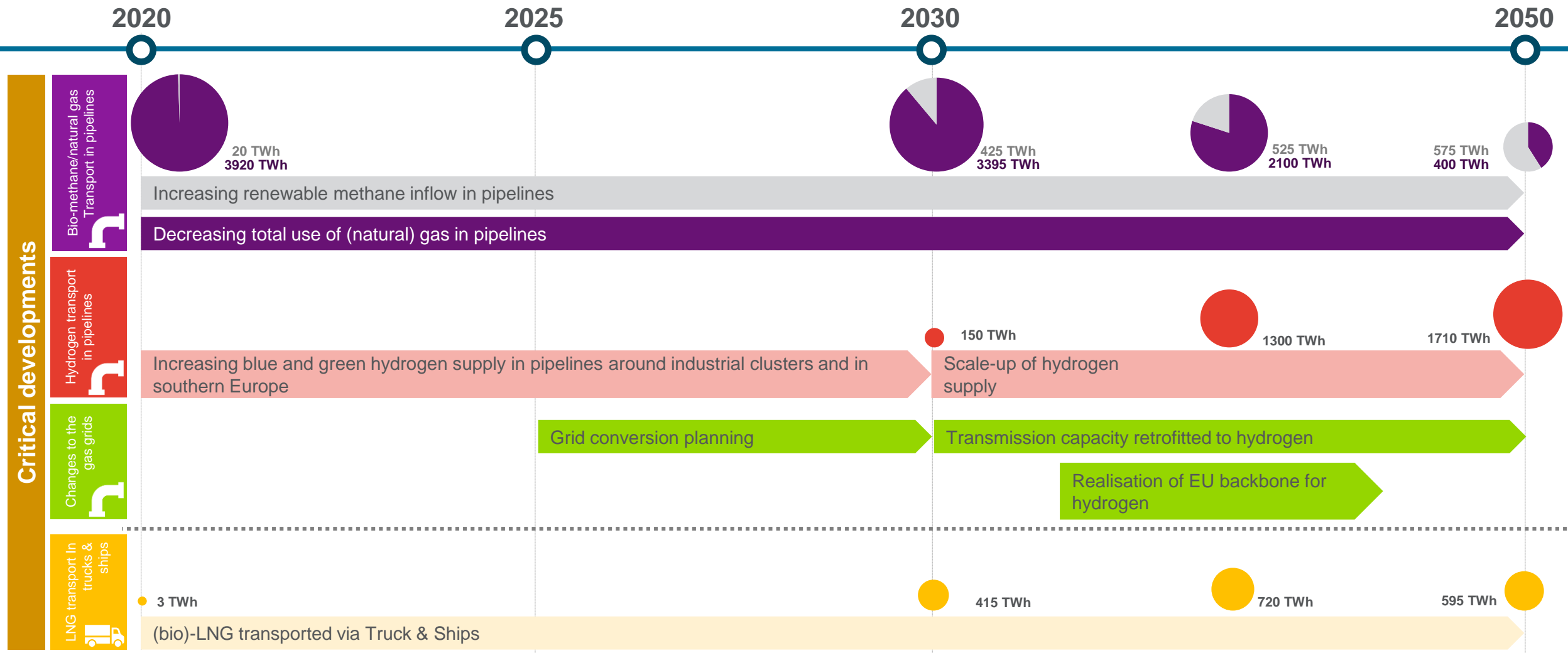
TIMELINE TRANSPORT





ACCELERATED DECARBONISATION SCENARIO

TIMELINE PIPELINE INFRASTRUCTURE



GLOBAL CLIMATE ACTION SCENARIO

IF DEVELOPMENTS CATCH ON GLOBALLY, RENEWABLE AND LOW-CARBON GASES CAN PLAY A ROLE AT LOWER COST

SCENARIO DESCRIPTION

The Global Climate Action Scenario describes how a 2030 and 2050 pathway develops if globally similar effort as in the Green Deal will happen leading to technological and commercial breakthroughs. Global climate policy leads to accelerated technological development. As such, the developments in the Global Climate Action scenario are technology driven and in addition to the Accelerated Decarbonisation scenario.

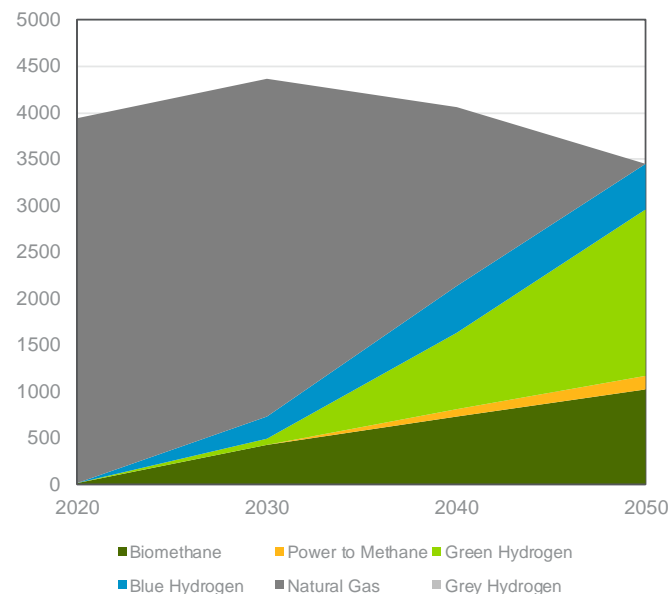
KEY FINDINGS

- If the main countries around the world indeed start to work towards meeting the Paris Agreement goals, high shares of renewable energy will play a major role all over the world, and so will electrification.
- Increased climate mitigation actions in other continents can be beneficial for the speed, scale, and cost of renewable and low carbon gas developments in the EU's energy transition.
- Technology costs will decrease faster on the demand side (e.g. hybrid heat pumps and hydrogen trucks) and the supply side (e.g. in biomethane from gasification and imported green and blue hydrogen). This provides a major upside compared to the Accelerated Decarbonisation Pathway Scenario.

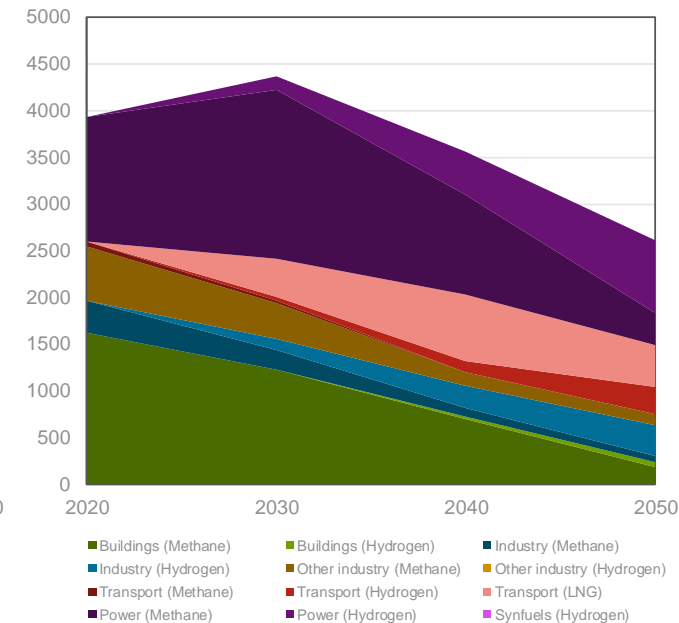
KEY ASSUMPTIONS

- Worldwide efforts in line with the EU Green Deal
- Technologies are poised to decarbonise the energy system at higher speed, with lower cost, and with higher renewable gas volumes compared to the Accelerated Decarbonisation Scenario
- Biomethane costs are the same as in the Accelerated Decarbonisation Scenario
- Hydrogen price: 35 €/MWh in 2030
- Global carbon price in 2030: 55 €/tonne CO₂

Gas supply in the Global Climate Action Scenario (TWh)



Gas demand in the Global Climate Action Scenario (TWh)



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