



# GAS FOR CLIMATE

---

THE ROLE OF GAS IN A  
NET-ZERO EMISSION  
EUROPEAN ENERGY SYSTEM

14 FEBRUARY 2018



**GAS FOR CLIMATE**  
A path to 2050

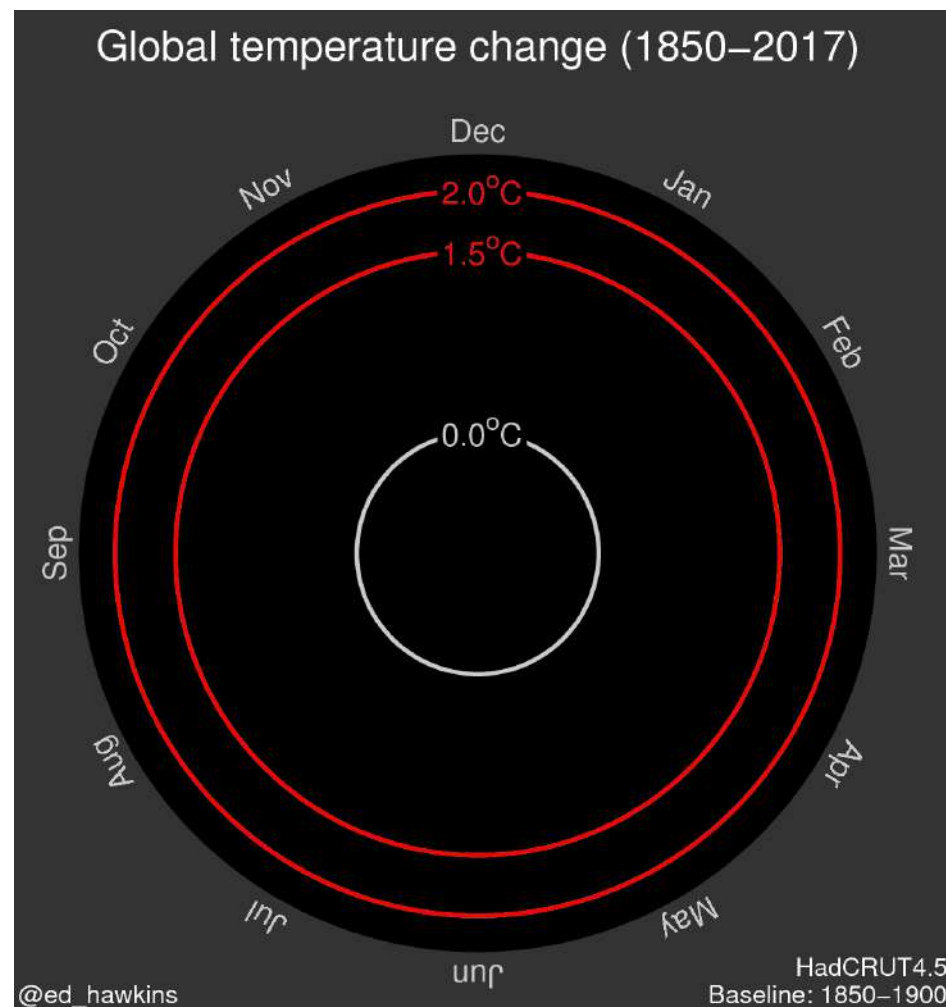


**BIOGASITALY**

**ECOFYS**

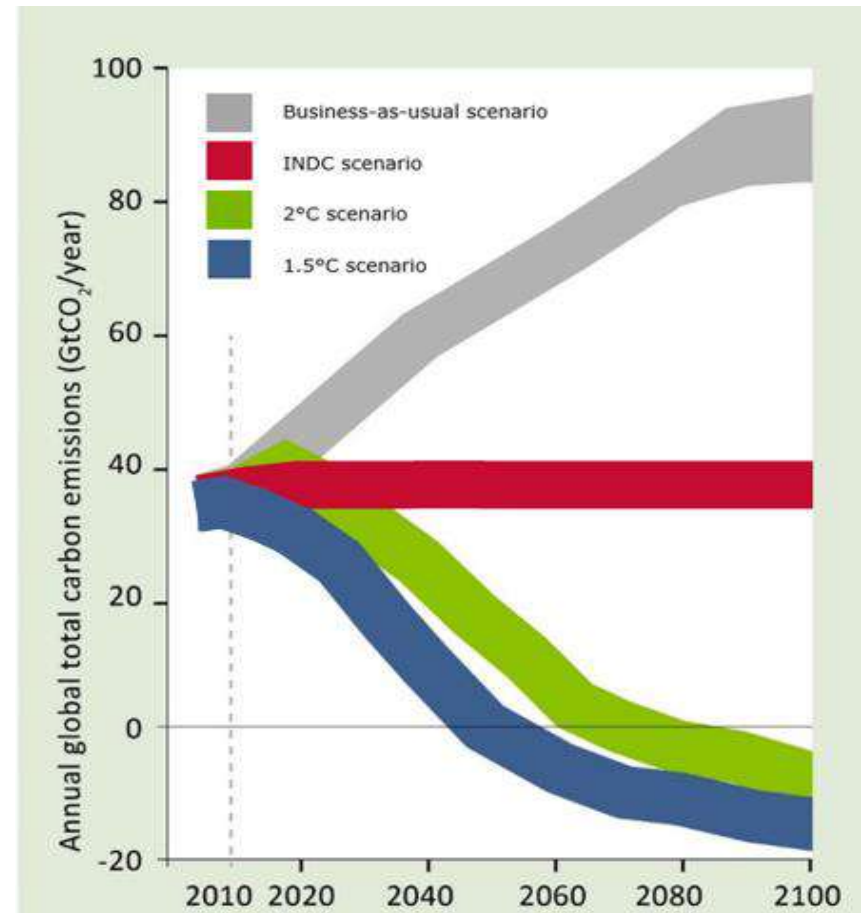
A Navigant Company

# GLOBAL WARMING PROGRESSING RAPIDLY



# DEEP DECARBONISATION OF EU ENERGY SYSTEM NEEDED TO MEET CLIMATE GOALS

- With the 2015 Paris Agreement, 195 countries agreed to limit global warming to well below 2°C, and aim for 1.5°C
- Studies show that to meet the target, we should aim for net zero carbon emissions in 2050
- This implies that to meet the target, countries (including the EU) need to decarbonize their energy systems



# GAS FOR CLIMATE: HOW CAN GAS HELP MEET THE PARIS AGREEMENT CLIMATE GOALS?

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



gasunie



TIGF

FLUXYS



**CIB**  
CONSORZIO  
ITALIANO  
BIOGAS



Open Grid Europe  
The Gas Wheel



**EBA**  
European Biogas Association

*Ecofys performs a modelling study to quantify the lowest cost design of the EU energy system by 2050 in full compliance with the Paris Agreement and Ecofys helps the group to develop its vision and storyline.*

# THE ENERGY TRANSITION DEBATE FOCUSES ON ELECTRIFICATION, AND NOT ON THE ROLE OF GAS

## The debate on the energy transition often focuses on electrification

*“All scenarios show electricity will have to play a much greater role than now [...] and will have to contribute to the decarbonisation of transport and heating/cooling”*



Source: European Energy Roadmap 2050

## Gas is often regarded as a transition fuel and its role in the 2050 energy system is unclear

### Gas as a transition fuel

With a low carbon intensity, natural gas is an ideal fuel to replace coal in electricity generation



- Gas is abundant, clean and affordable
- Gas is excellent opportunity as we transition from more GHG intensive power generation to renewable forms later in the century

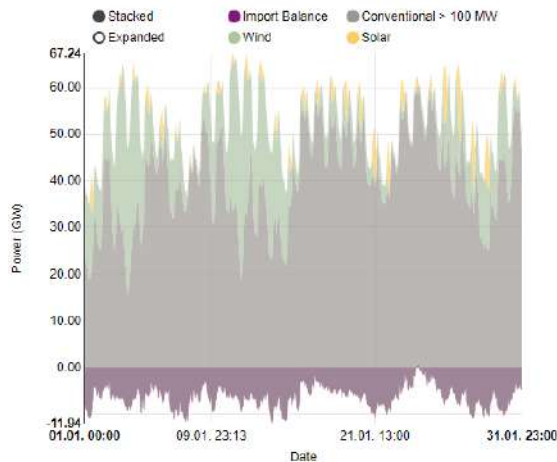
Esso Imperial Oil

Source: Imperial Oil presentation (2011)

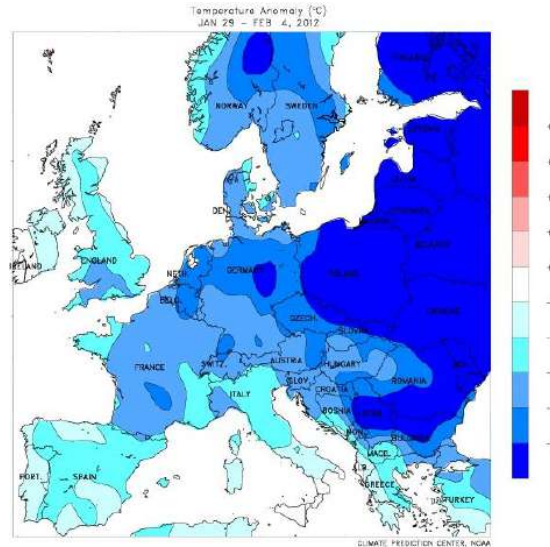
**It is currently not always clear how the gas sector intends to add value in a decarbonised future energy system**

# HOWEVER, GAS CAN SIGNIFICANTLY REDUCE SYSTEM COSTS, ESPECIALLY IN 3 KEY SWEET SPOTS

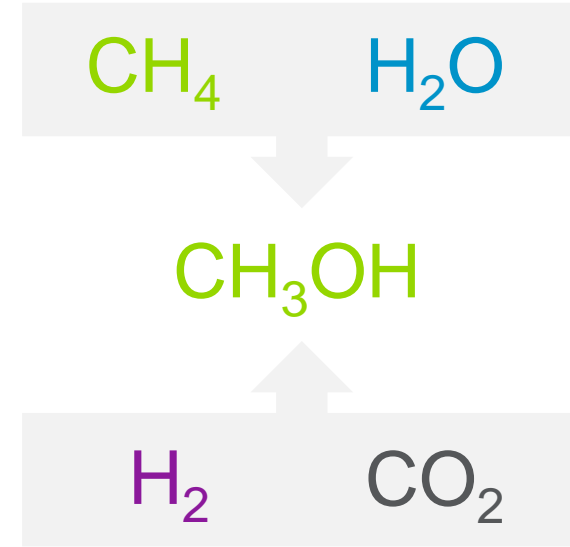
## DISPATCHABLE POWER



## COLD SPELLS



## INDUSTRIAL APPLICATIONS



Significant energy system cost reductions

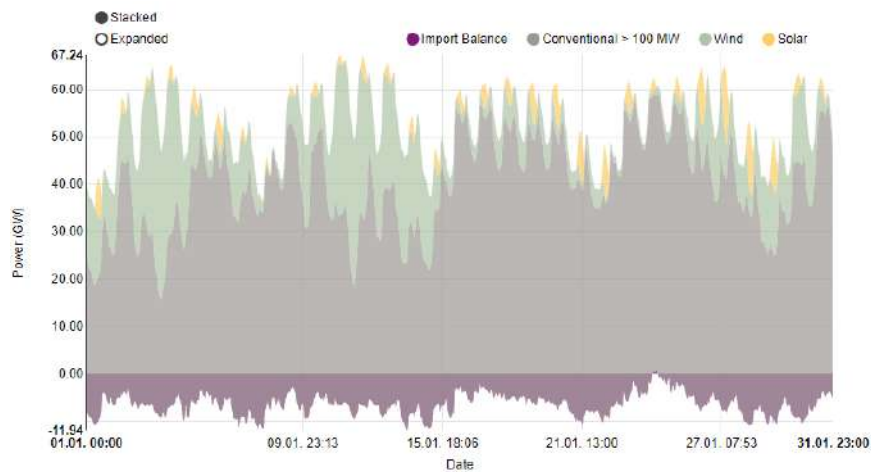
# SWEET SPOT 1: DISPATCHABLE POWER



## Problem

### Increasing shares of wind and solar power pose balancing problems

Electricity production in Germany in January 2017



Source: Energy-Charts.de

## Solutions

- Demand response
- Storage
- Interconnection
- Dispatchable power

## Advantages gas-fired units

- Low cost of capacity
- High flexibility
- Zero emissions when using biomethane

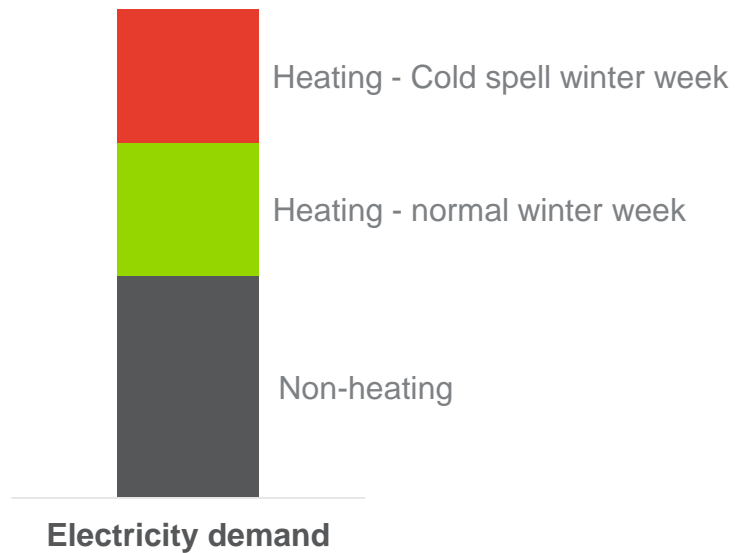
# SWEET SPOT 2: COLD SPELLS



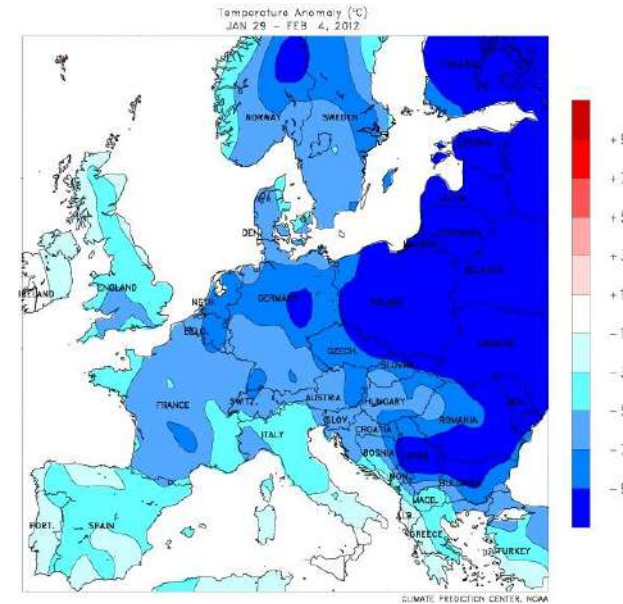
## Problem

High power system capacity needed to meet heating demand during cold spells, when using 100% electric heating

Illustrative chart



## Cold spell in Europe in 2012



## Solutions

- Renewable district heating
- High quality heat pumps
- Hybrid heating solutions, making use of existing gas (distribution) grids



# SWEET SPOT 3: INDUSTRIAL APPLICATIONS

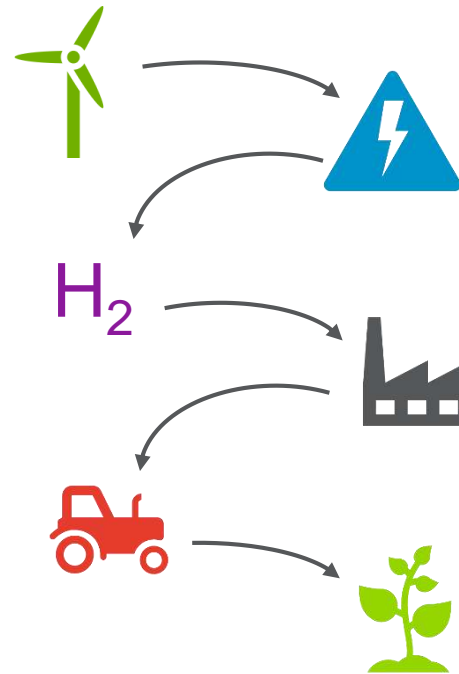


## STEEL

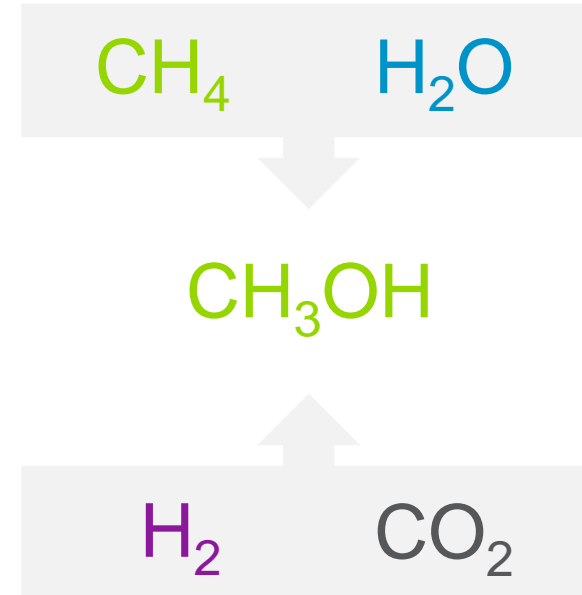


Source: SSAB & LKAB HYBRIT joint venture

## FERTILIZER



## METHANOL



## 2 KEY QUESTIONS ANSWERED IN OUR RESEARCH

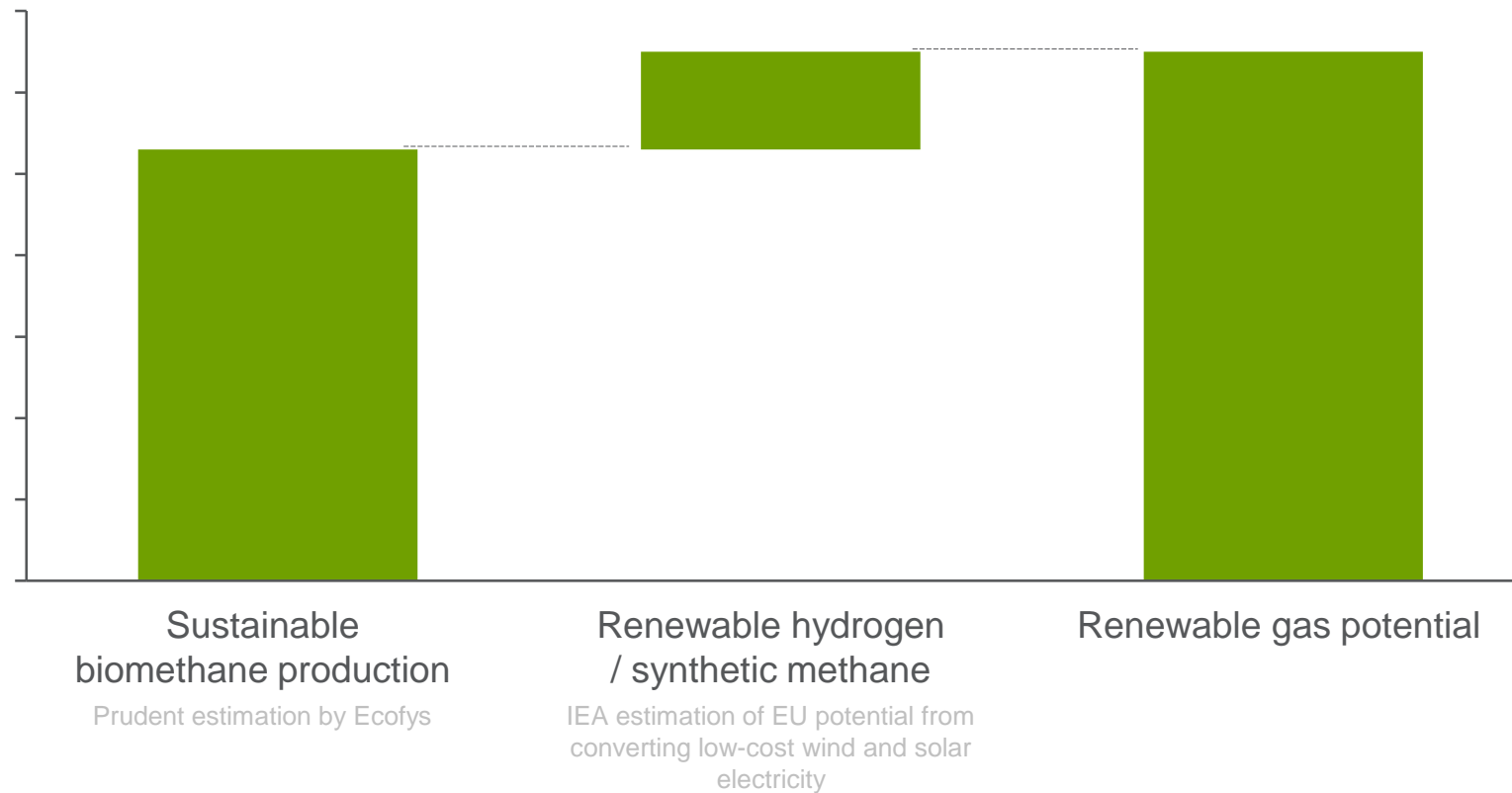
To assess whether a future decarbonized energy system should include renewable gas, our research answered 2 key questions:

**1** **Potential** What is the potential for renewable gas in Europe in 2050?

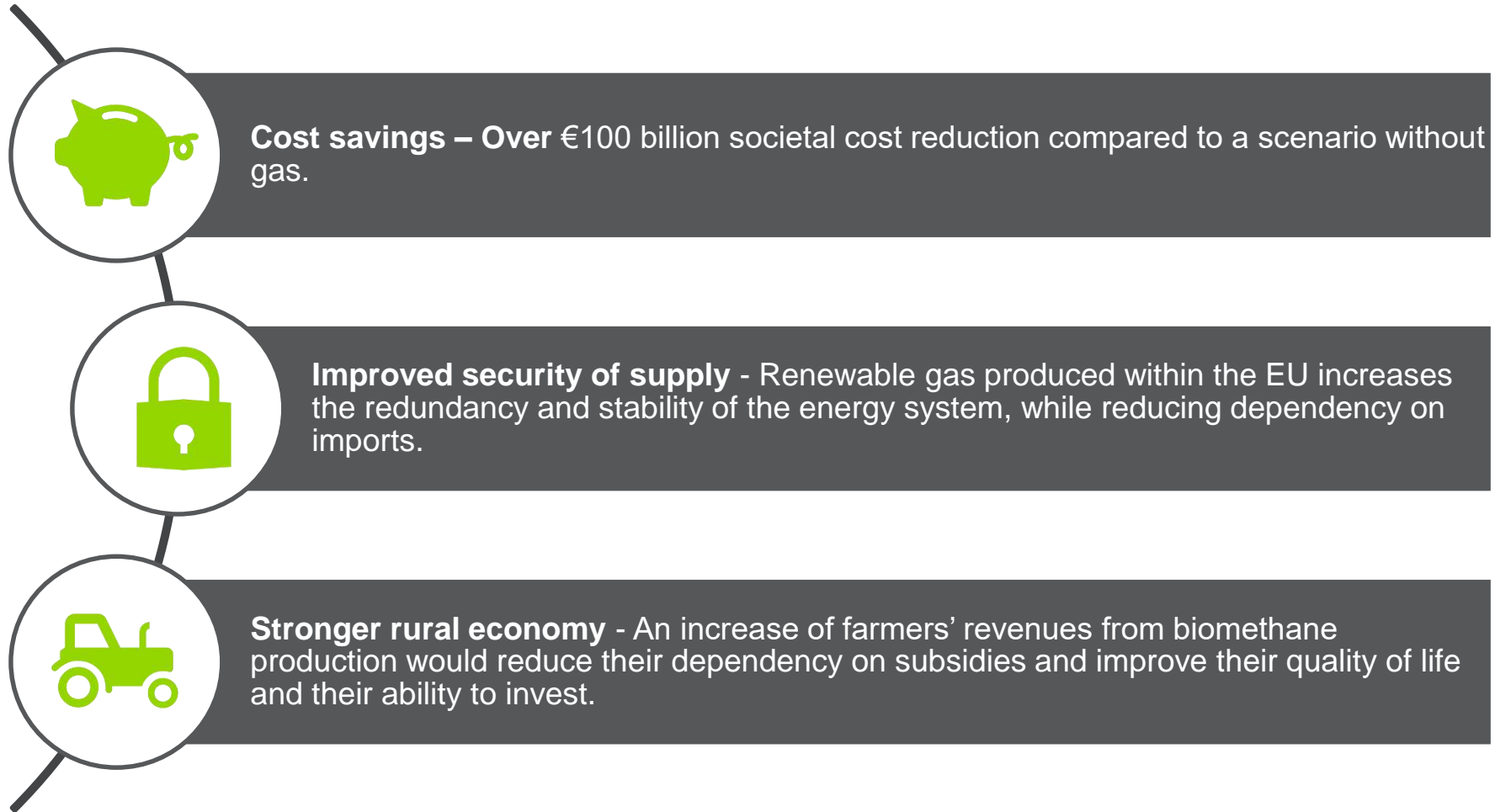
**2** **Cost savings** To what extent can using this gas through existing gas infrastructure decrease energy system costs in 2050?

# THERE IS OVER 100 BCM POTENTIAL FOR ZERO-CARBON GAS IN THE 2050 ENERGY SYSTEM

**Renewable gas potential**  
Billion cubic meter



# INCLUDING GAS IN THE 2050 ENERGY SYSTEM RESULTS IN COST SAVINGS AND OTHER BENEFITS



# EUROPE SHOULD ALIGN ITS INVESTMENTS WITH THE LONG-TERM ROLE OF GAS IN THE ENERGY TRANSITION



The energy transition remains an enormous challenge, and it is uncertain which combination of existing and future technologies will provide our energy services in 2050.



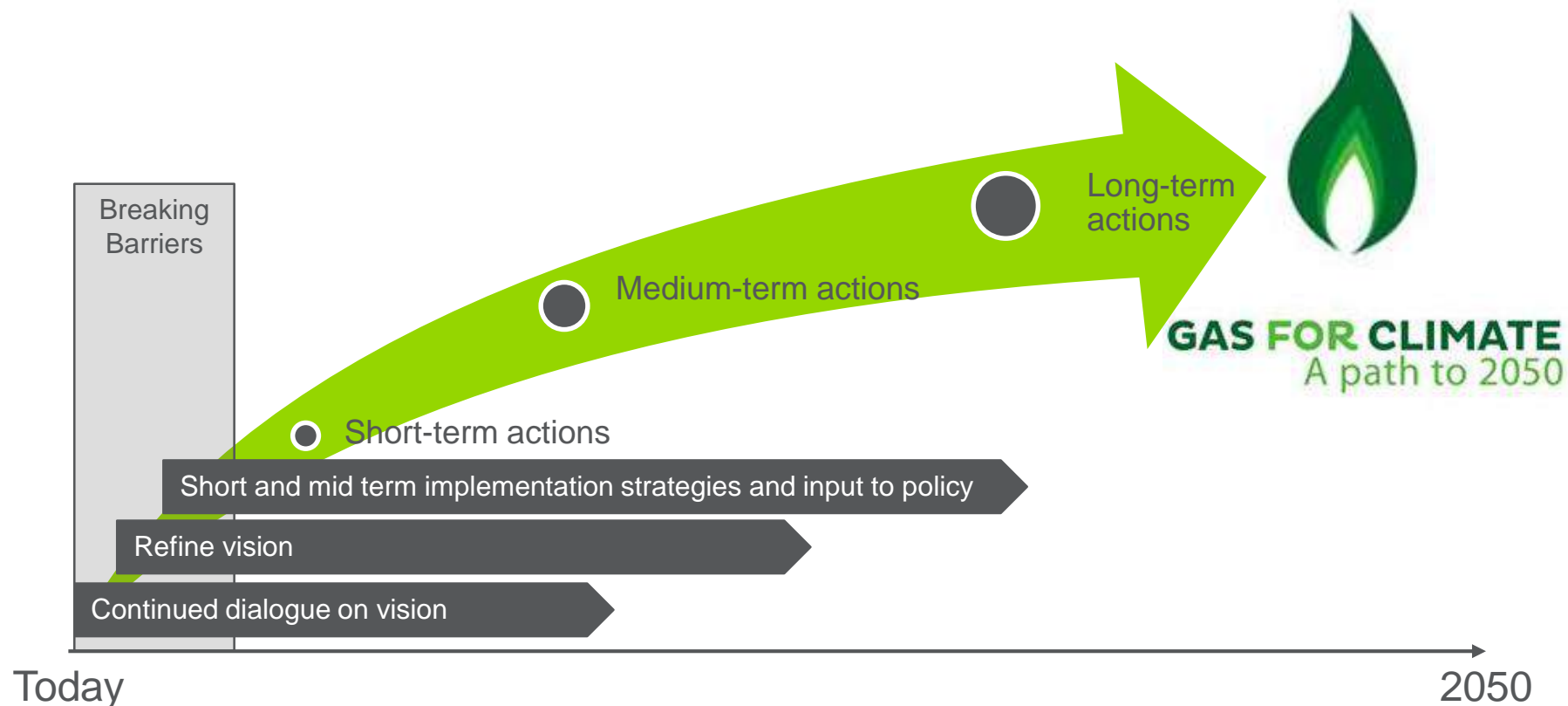
Therefore, we should not exclude upfront any technology from playing a long-term role, and especially not gas infrastructure that has been paid for and is capable of transporting large volumes of energy efficiently over long distances.



Europe does not have to stop investing in gas infrastructure but check that these investments fit the long-term role of gas in the energy transition.

# A ROADMAP SHOULD BE DEVELOPED THAT SPECIFIES WHAT ACTIONS ARE NEEDED TO REALIZE THIS VISION

The required steps for the gas sector, policy makers and other stakeholders today and tomorrow to scale-up renewable gas production and to ensure its best use in our energy system should be mapped.





**DAAN PETERS**

Managing Consultant  
Ecofys – A Navigant Company  
+31 30 662 3710 Direct  
+31 61186 9801 Mobile  
[d.peters@ecofys.com](mailto:d.peters@ecofys.com)



**KEES VAN DER LEUN**

Director  
Ecofys – A Navigant Company  
+31 30 662 3310 Direct  
+31 6 5493 3496 Mobile  
[k.vanderleun@ecofys.com](mailto:k.vanderleun@ecofys.com)



**TIMME VAN MELLE**

Managing Consultant  
Ecofys – A Navigant Company  
+31 30 662 3654 Direct  
+31 6 3101 3756 Mobile  
[t.vanmelle@ecofys.com](mailto:t.vanmelle@ecofys.com)





## CONNECT WITH US

**ECOFYS.COM**



@ecofys



fb.com/ecofys



linkedin.com/company/ecofys



SlideShare slideshare.net/Ecofys



xing.com/companies/ecofysgermanygmbh



---

**NAVIGANT.COM**



@NavigantEnergy



@NavigantRsrch



linkedin.com/company/navigant-energy

