GAS FOR CLIMATE 2050: the role of gas in a decarbonized energy system

6th Ministerial Gas Forum
Barcelona, 22 November 2018

KEES VAN DER LEUN
DEEP DECARBONISATION OF EU ENERGY SYSTEM NEEDED TO MEET CLIMATE GOALS

• In the 2015 Paris Agreement, 195 countries agreed to limit global warming to well below 2°C, and aim for 1.5°C

• To meet the target, studies show that the world should aim for net-zero carbon emissions by 2050

• This implies that countries (and the EU) need to decarbonise their energy systems
The Gas for Climate initiative

A group of seven major European gas TSOs and two biogas associations which developed a vision on how to achieve a net zero EU energy system.

Gas for Climate sees an important role for renewable gas alongside renewable electricity.

gasforclimate2050.eu

The group consists of:

- Snam
- Gastrans
- Enagas
- Terega
- Fluxys
- GRTgaz
- CIB
- Open Grid Europe
- EBA
The CEOs of all Gas for Climate member companies stated a bold commitment, positioning the consortium as leader in the fight against climate change.

This statement goes further than the current EU target of 80-95% reduction.

The CEOs of the nine Gas for Climate members (Piero Gattoni, CIB, Marcelino Oreja Arburúa, Enagás, Jan Štambaský, EBA, Pascal De Buck, Fluxys, Han Fennema, Gasunie, Thierry Trouvé, GRTgaz, Dr. Jörg Bergmann, Open Grid Europe, Marco Alverà, Snam and Dominique Mockly, TIGF) jointly declared:

"We are committed to achieve net zero greenhouse gas emissions in the EU by 2050 to meet the Paris Agreement target. Renewable gas used in existing gas infrastructure can play an important role in this."

"We want to facilitate a large scale-up of EU produced renewable hydrogen and biomethane that is transported, stored and distributed through existing gas infrastructure to be used in our energy system in a smart combination with renewable electricity. This will help Europe to meet the Paris Agreement target at the lowest possible costs while enhancing Europe’s energy security.”
GAS FOR CLIMATE VISION AND ACTIVITIES

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CEOs of Gas for Climate members

- **February 2018**: Study by Navigant on the role of renewable gas in the EU energy system by 2050
- **September 2018**: Publication of the 2030 Action Plan, presented to the European Commissioner for Climate & Energy, Mr. Arias Cañete at a Gas for Climate event in Brussels
- **November 2018**: Study on the role of green and blue hydrogen in the future EU energy system
- **February 2019**: Updated, more refined 2050 study with (1) updated potentials of green and blue hydrogen, (2) more refined energy demand analysis (incl. industry, transport), and (3) updated allocation of renewable and low carbon gas to various demand sectors
- **Spring 2019**: Updated, more refined 2030 Action plan. The current ‘2030 to-do list’ will be enriched based on in-depth analysis on how selected actions can be successfully implemented in practice
To assess whether a future decarbonised energy system should include renewable gas, research by Navigant answered two key questions:

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

2. **Cost Savings**
   To what extent can use of this gas through existing gas infrastructure decrease energy system costs in 2050?
IT IS POSSIBLE TO SCALE UP EU BIOMETHANE PRODUCTION TO 98 BCM AND GREEN HYDROGEN TO AT LEAST 24 BCM

Biomethane Potential 2050, per Feedstock Type

Hydrogen Potential 2050

24 bcm of hydrogen (in methane energy equivalent) can be produced from renewable electricity in the EU.

This only takes into account hydrogen from surplus renewable electricity that would otherwise be curtailed.

Additional potential is possible from, for example, seaweed as feedstock, from roundwood, and from imported biomethane.

Source: Navigant
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THIS RENEWABLE GAS CAN SIGNIFICANTLY REDUCE SYSTEM COSTS IN THREE KEY SWEET SPOTS

- **Dispatchable Power**
- **Cold Spells**
- **Industrial Applications**

**COST SAVINGS**

Source: Energy-Charts.de
Source: US National Weather Service

**CH₄** → **H₂O** → **CH₃OH** → **H₂** → **CO₂**

**significant energy system cost reductions**
USING 122 BCM RENEWABLE GAS IN A FULLY DECARBONISED EU ENERGY SYSTEM SAVES €138 BILLION PER YEAR BY 2050

Summary of annual costs and cost difference by 2050 between the “no gas” and “with gas” scenarios (rounded) and resulting total annual societal cost savings achieved by using renewable gas in existing EU gas infrastructure.

<table>
<thead>
<tr>
<th>Costs for:</th>
<th>Sector</th>
<th>No Gas (€ billion)</th>
<th>With Gas (€ billion)</th>
<th>Difference (€ billion)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heating Technologies</td>
<td>Building</td>
<td>210</td>
<td>173</td>
<td>37</td>
</tr>
<tr>
<td>Insulation</td>
<td>Building</td>
<td>180</td>
<td>159</td>
<td>21</td>
</tr>
<tr>
<td>Energy Production for Heating</td>
<td>Building</td>
<td>61</td>
<td>67</td>
<td>-6</td>
</tr>
<tr>
<td>Gas Infrastructure Cost</td>
<td>Infrastructure</td>
<td>20</td>
<td>24</td>
<td>-4</td>
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<tr>
<td>Electricity Distribution Infrastructure</td>
<td>Infrastructure</td>
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<td>1</td>
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<tr>
<td>Electricity Transmission Infrastructure</td>
<td>Infrastructure</td>
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<td>65</td>
<td>5</td>
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<tr>
<td>Heat Infrastructure Cost for Heating</td>
<td>Infrastructure</td>
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<td>0</td>
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<tr>
<td>Electricity Production</td>
<td>Energy</td>
<td>386</td>
<td>302</td>
<td>84</td>
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<tr>
<td>Total</td>
<td></td>
<td>995</td>
<td>857</td>
<td>138</td>
</tr>
</tbody>
</table>

Source: Navigant
**ACHIEVEMENTS GAS FOR CLIMATE TO DATE**

**LAUNCH OF OUR STUDY AND WEBSITE IN FEBRUARY 2018**

> > 100 articles published on our study

in more than 12 countries

“Best study we have seen so far on the future role of gas”

The European Climate Foundation

100s of thousands of followers reached via our combined effort
We met with 30+ policy makers since Jan

- DG CLIMA: Tom van Ierland, Kostis Sakellaris
- DG AGRI: Mauro Poinelli
- DG ENER: Multiple units (9 policy makers)
- DG INNO: Philippe Tulkens
- DG MOVE: Isabelle Vandoorne

- Council: Janusz Bielecki
- German PermRep: Gisela Hohensee
- Spanish PermRep: Juan Aristegui Laborde

- EP ITRE: Jaromír Kohlíček
- EP ENVI: Bas Eickhout, Peter Liese, Filip Alexandru (Assistant to Ms. Valean)
- EP TRAN: Wim van de Camp
ACTION PLAN: SCALING UP RENEWABLE GAS REQUIRES ACTION STARTING TODAY

Gas for Climate presented its Action Plan to boost renewable gas to EU Commissioner for Climate & Energy Miguel Arias Cañete (Brussels, Sept 2018)

Thierry Trouvé, CEO of GRTgaz:  
“This Action Plan demonstrates our unequivocal commitment to the energy transition and decarbonisation of the European gas grid.”

- Commitments to facilitate the scale-up of renewable gas  
- ‘To do list’ for companies and policy makers up to 2030
Electrolyzer cost reductions may enable additional renewable electricity generation used to produce hydrogen. Currently being analysed by Gas for Climate.

E.g. large scale production of green hydrogen and electricity from solar PV in the Middle-East and Northern Africa: local energy demand, plus transport hydrogen to the EU using gas infrastructure.