WEBINAR

Dig Deep!

9 September 2024
10h - 11h30 AM CEST

info@europeanbiogas.eu
www.europeanbiogas.eu

Mapping e-methane plants and technologies: The role of e-methane in the total energy mix

EBA
European Biogas Association

Gergely Molnár
Energy Analyst – Gas, Coal and Power Markets Division, IEA

Mieke Decorte
Technical Director
European Biogas Association

Alessandro Agostini
Head of the Sustainability of Energy Technologies Unit, Energy Technologies and Renewables department, ENEA

Gautier Mangenot
Public Affairs Senior Consultant–Energy/ENOSIS, Representative from BIP TF 4.1

Étienne Philippe
Renewable and low-carbon gases Project Officer, GRDF

Giulia Cancian
Secretary General
European Biogas Association

Welcome

Giulia Cancian

Secretary General, European Biogas Association

Agenda

10:00 – 10:05 Welcome

10:00 – 10:05 Welcome Giulia Cancian, Secretary General, European Biogas Association

10:05 – 10:15 Keynote Gergely Molnár, Energy Analyst – Natural Gas, IEA

10:15 – 10:30 Mapping e-methane plants and technologies Mieke Decorte, Technical Director, European Biogas Association

10:30 – 10:40 Q&A session

10:40 – 11:25 Panel discussion Moderator: Giulia Cancian

- Alessandro Agostini, Head of the Sustainability of Energy Technologies Unit, Energy Technologies and Renewables department, ENEA
- Gautier Mangenot, Public Affairs Senior Consultant – Energy / ENOSIS, Representative from BIP TF 4.1
- Étienne Philippe, Renewable and low-carbon gases Project Officer, GRDF

11:25 – 11:30 Conclusion and wrap up Giulia Cancian, Secretary General, European Biogas Association

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Keynote

Gergely Molnár
Energy Analyst – Natural Gas, International Energy Agency

International Energy Agency

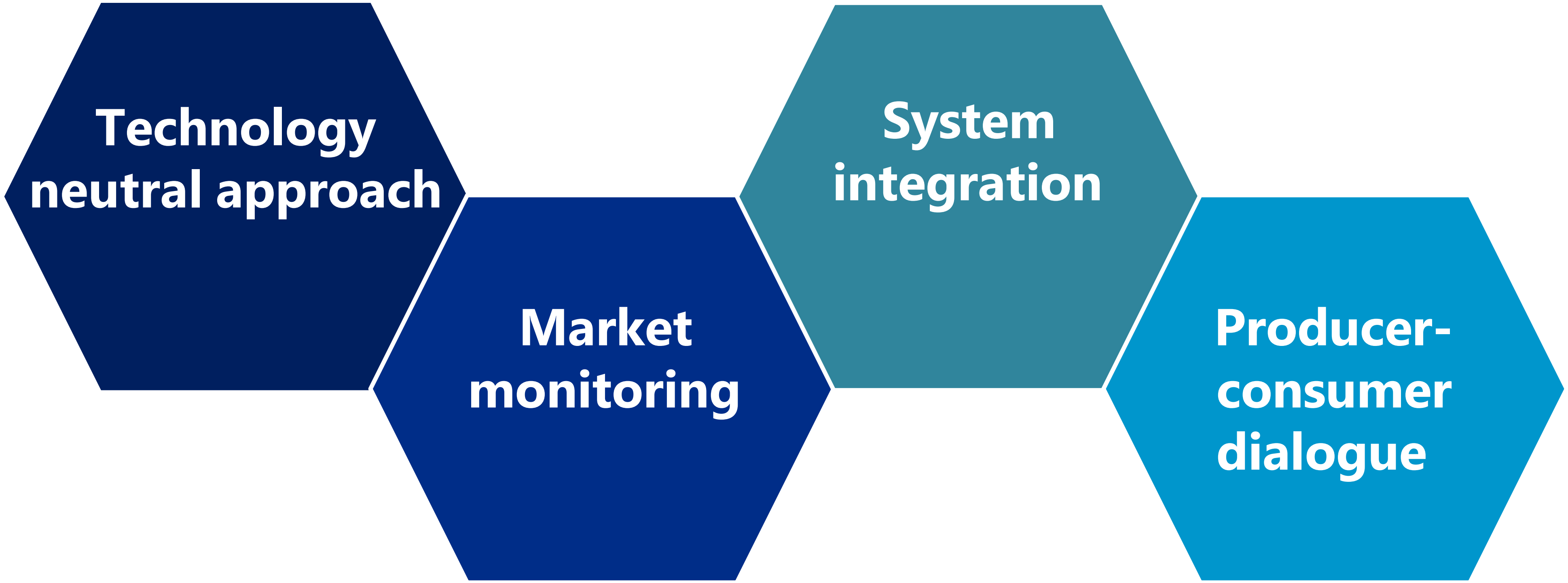
E-methane: the golden molecule?

Gergely MOLNAR, Gas Analyst

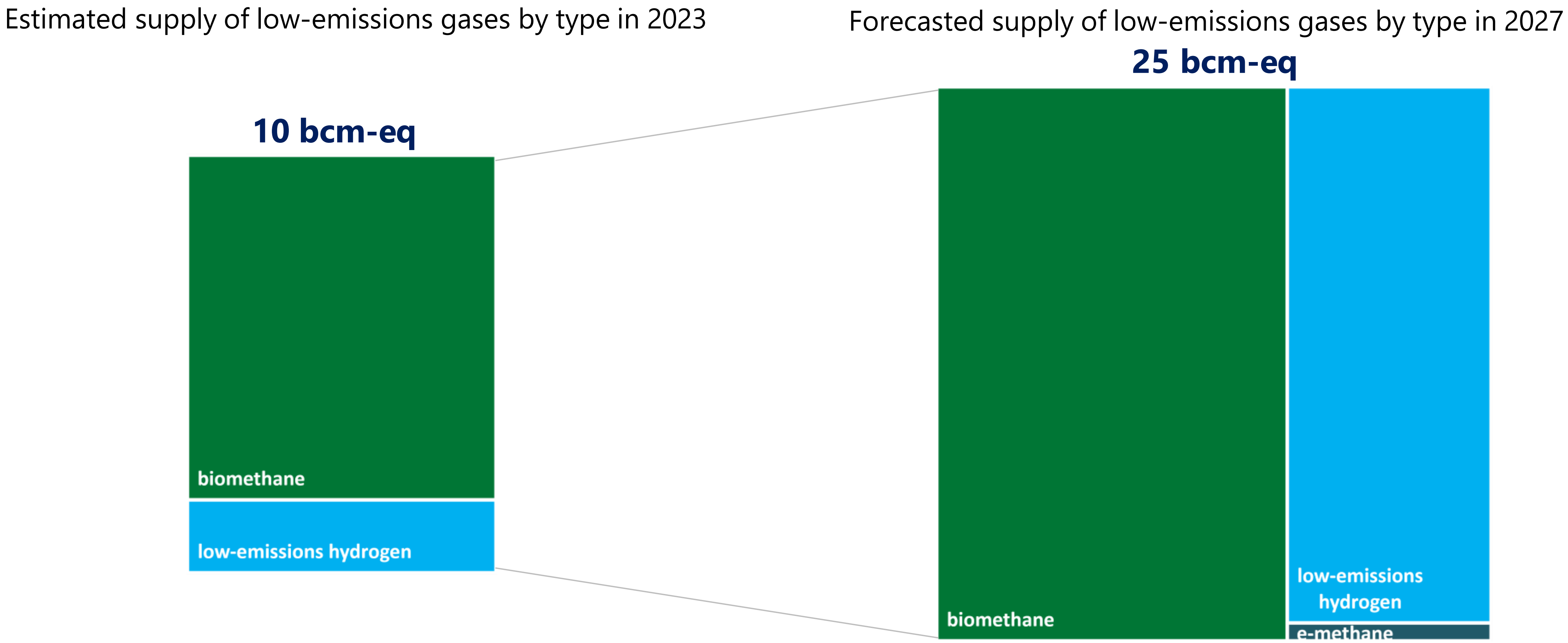
EBA Dig Deep Webinar Series, 9 September 2024

IEA Low-emissions Gases Work Programme

Key pillars of the IEA Low-emissions Gases Work Programme



Low-emissions gases are set for a rapid growth



Low-emissions gases are expected to more than double in the medium-term. Nevertheless, further efforts are required to reach the ambitious targets set by governments.

Key issues related to e-methane

e-methane

Policy agenda and public awareness

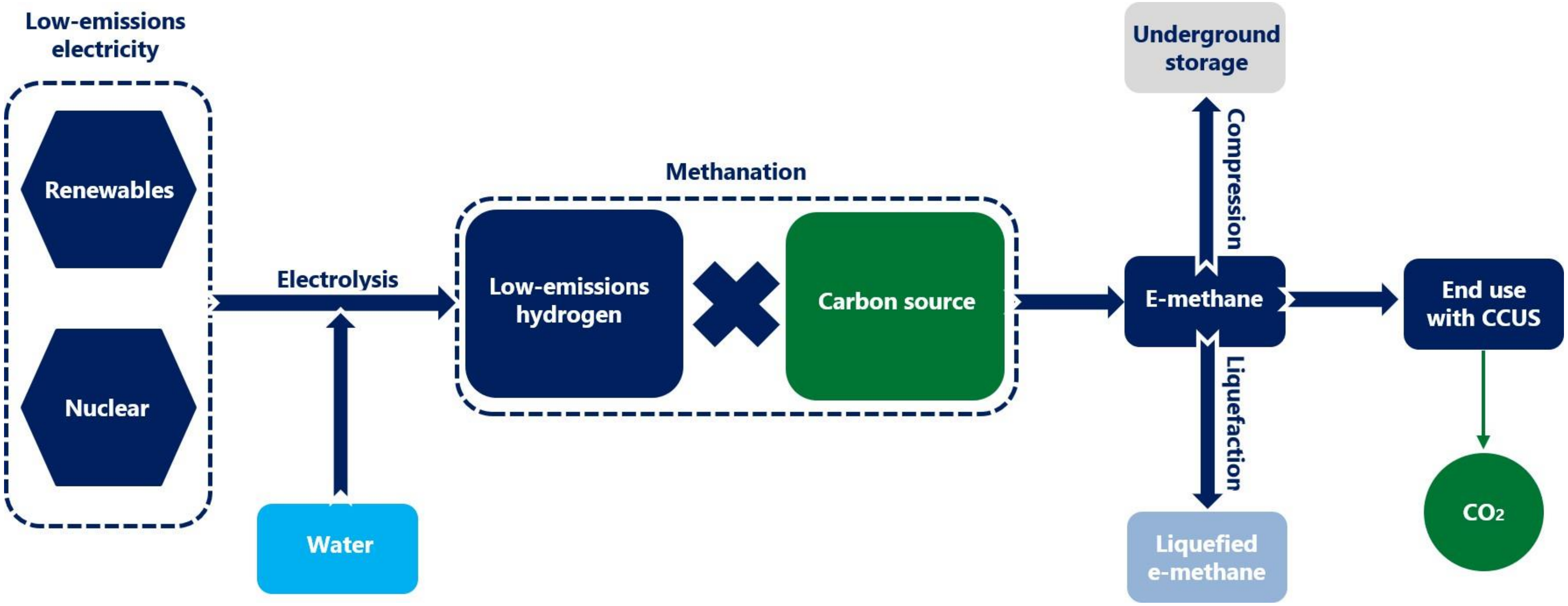
Data availability and transparency

CO_2 accounting rules

High production costs

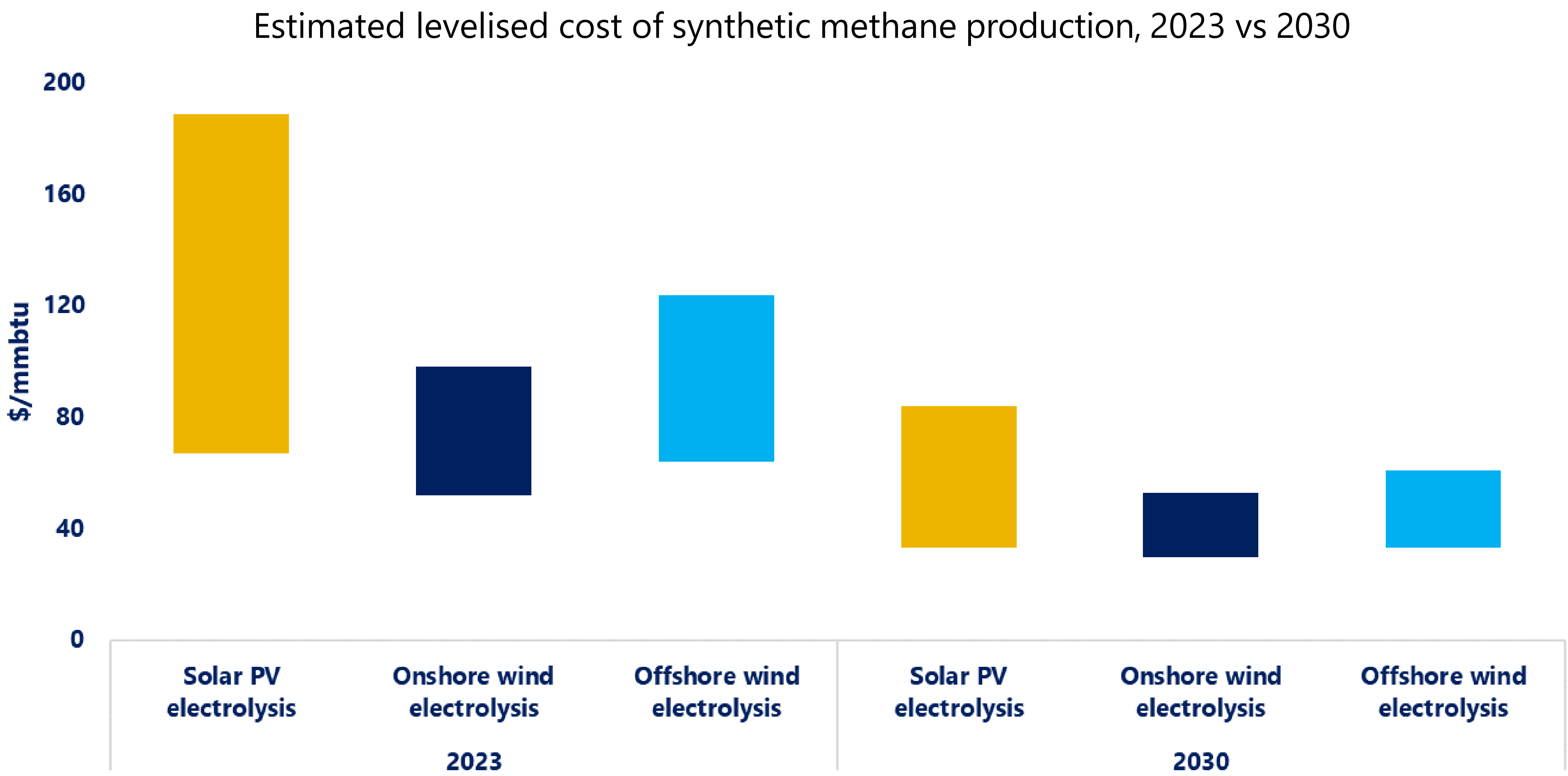
E-methane is produced through a two-step process…

Simplified scheme showing e-methane production



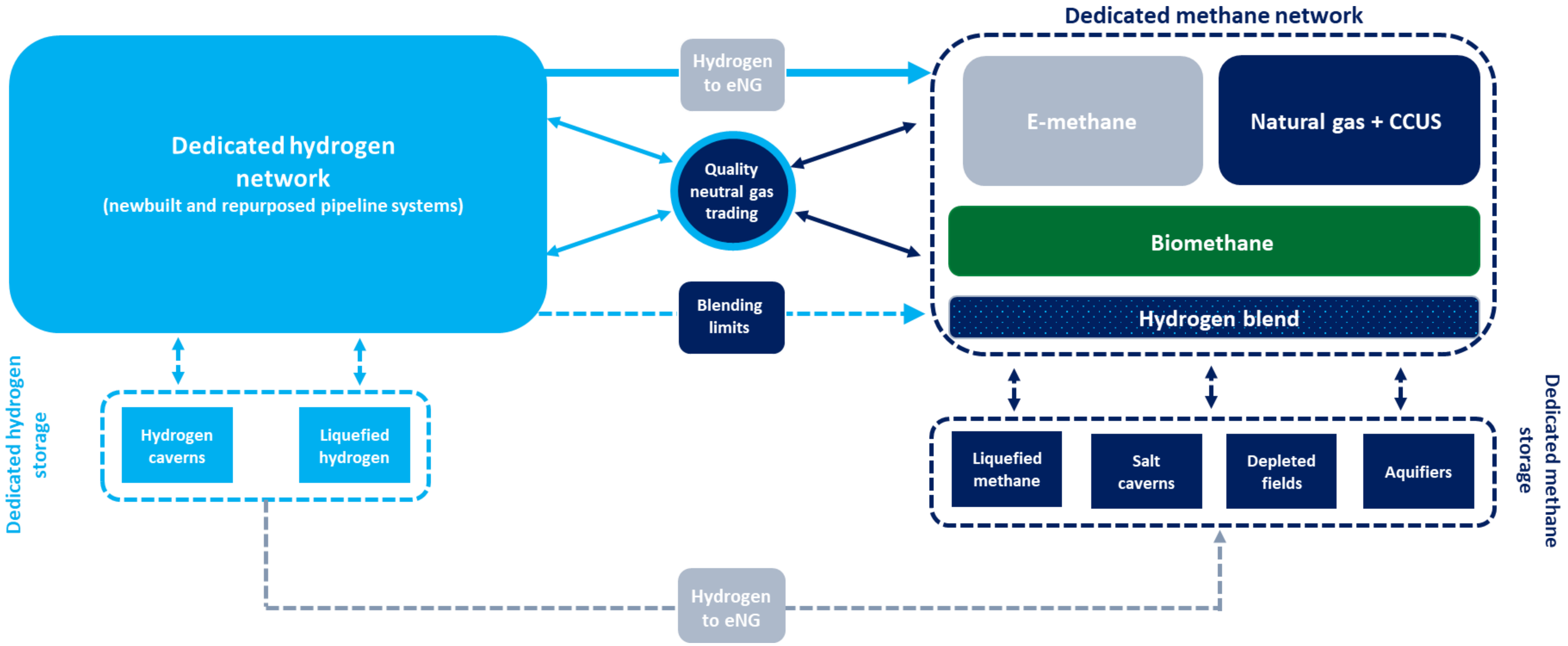
Low-emission electricity is first converted to hydrogen by electrolysis and the resulting is converted via electrolysis into hydrogen, which is then reacted with a carbon source to obtain e-methane.

… and is facing relatively high production costs



Current e-methane production costs are in the range of $50-200/mmbtu, which would be four to fifteen times higher than current Asian spot LNG prices.

E-methane can support the system integration of low-emissions gases



E-methane can play a crucial role in the coupling of future hydrogen and methane networks, facilitate trading and provide a solution to large-scale, seasonal storage in porous formations.

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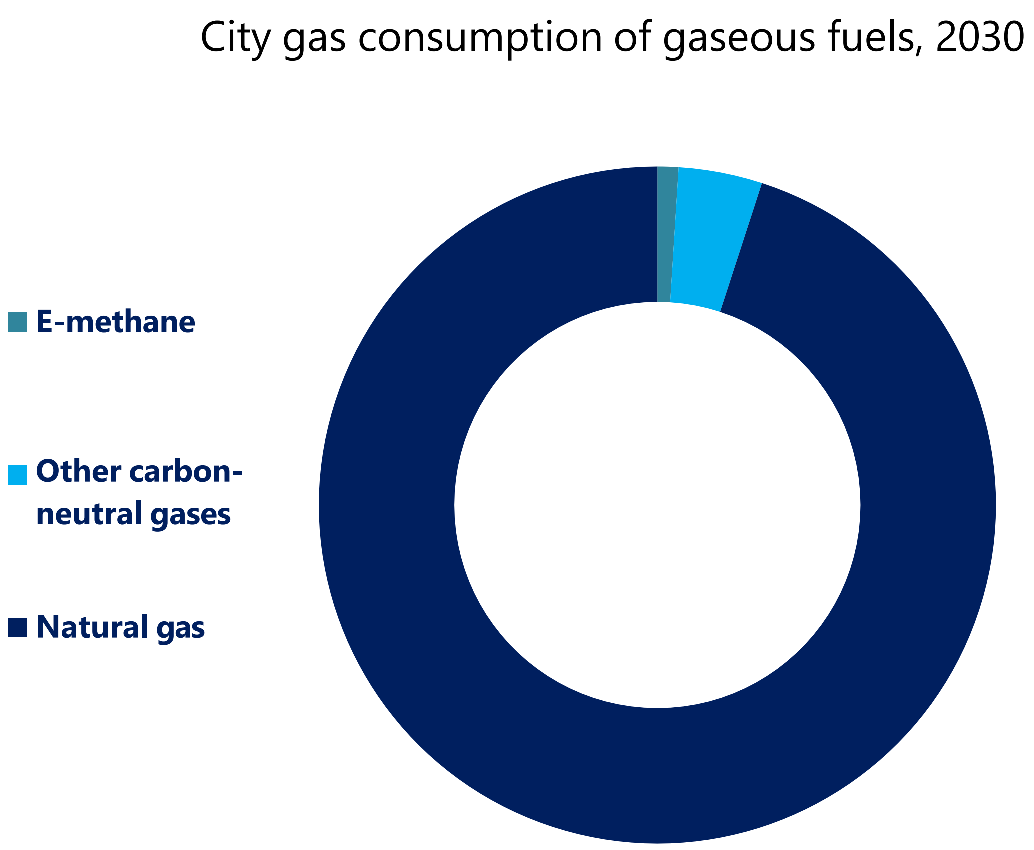
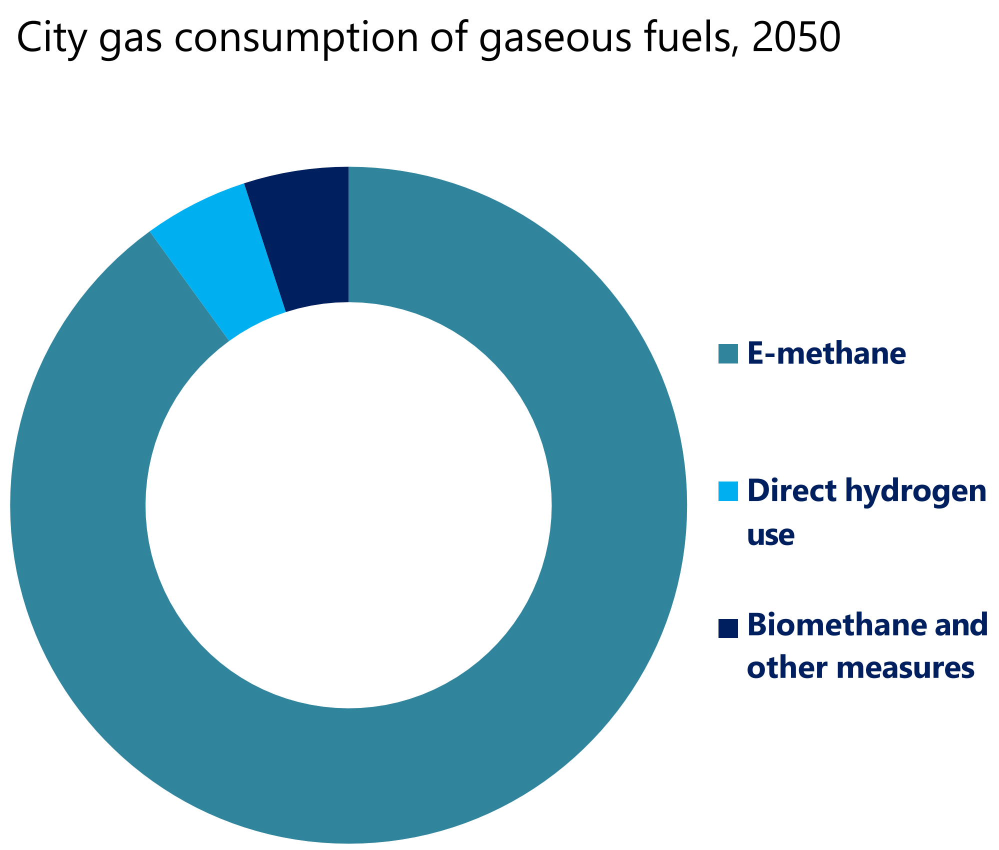
Demand creation will be crucial: the example of Japan





Japan set a target for e-methane to comprise 1% of the gas supply in existing networks by 2030, increasing to 90% by 2050.

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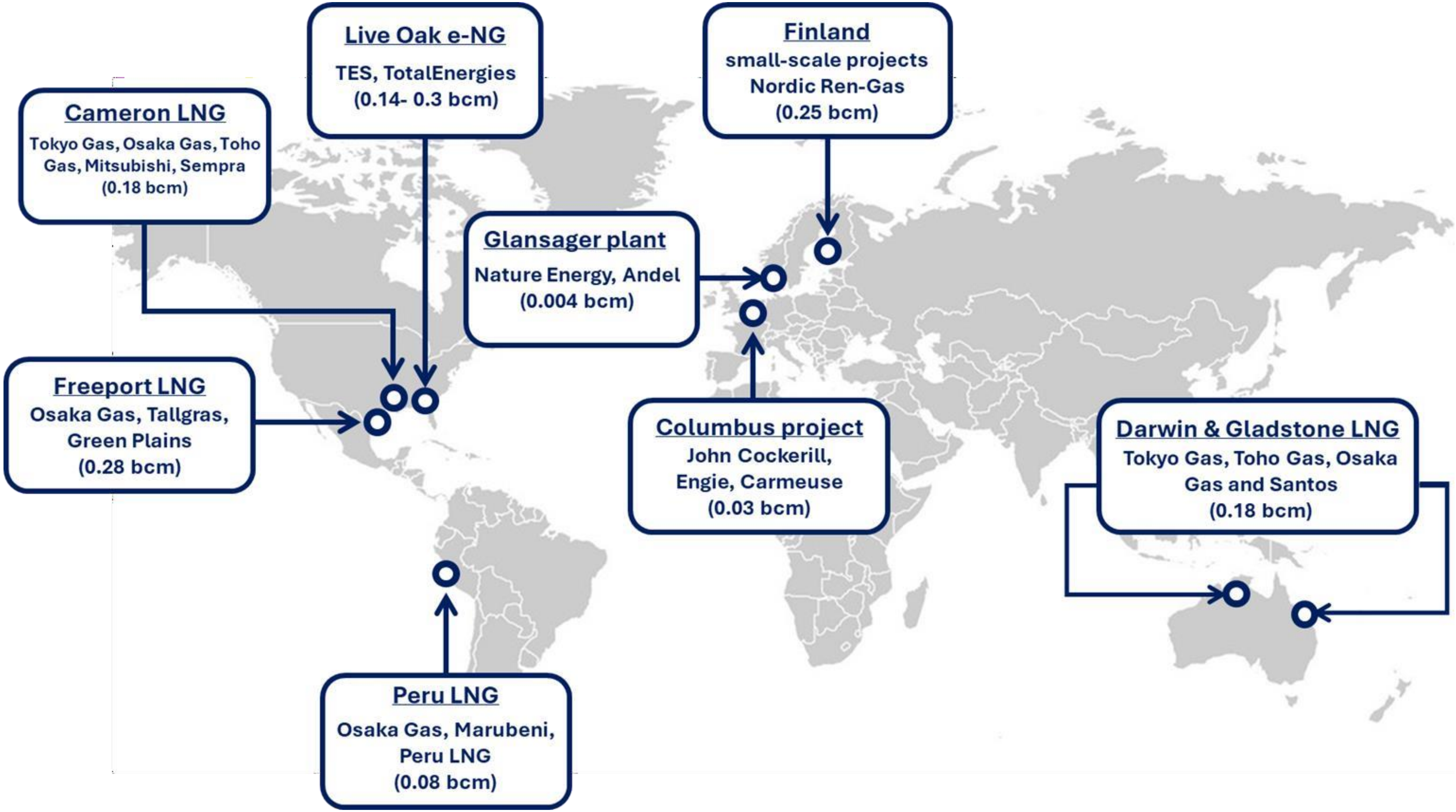
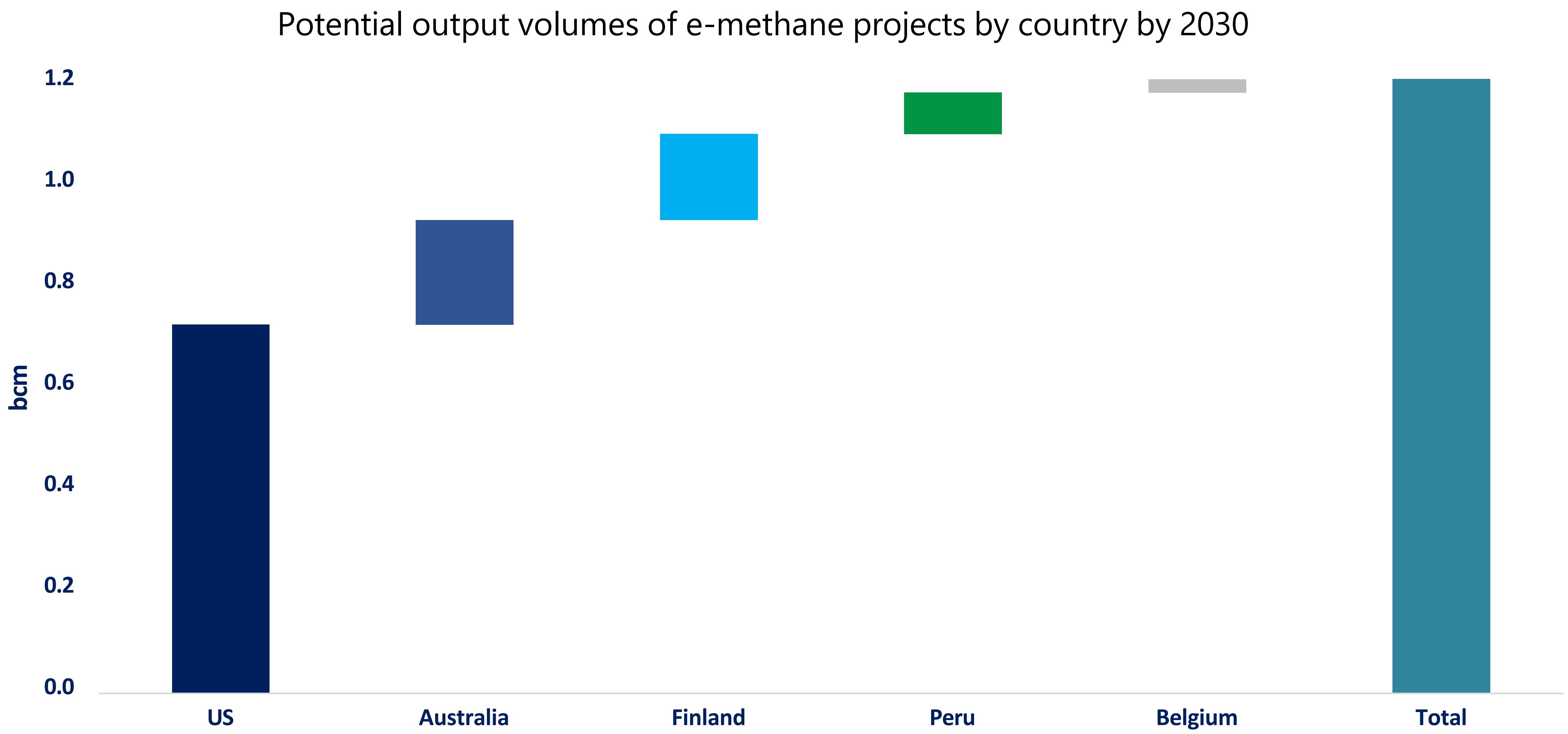
International partnerships drive e-methane projects…



…potentially delivering over 1 bcm by 2030



Global e-methane production could reach just over 1 bcm by 2030, albeit their development is pending on project partners successfully reaching final investment decisions in the coming years.

Key takeaways

- **Low-emissions gases** are expected to **more than double** in the medium-term. Nevertheless, **further efforts are required** to reach the ambitious targets set by governments.

- Being interchangeable with natural gas, **e-methane could play a significant role in decarbonising** existing gas networks **without the need for retrofitting**.

- The **complex value chain** underpinning the production of e-methane means that **both investment costs** and operational expenses are relatively high.

- E-methane can play a crucial role in the **system integration of low-emissions gases**, while enhancing the seasonal and short-term **flexibility** of the overall gas system.

- **Demand creation** will be critical to support **final investment decisions** in e-methane, with global production potentially reaching over 1 bcm by 2030.

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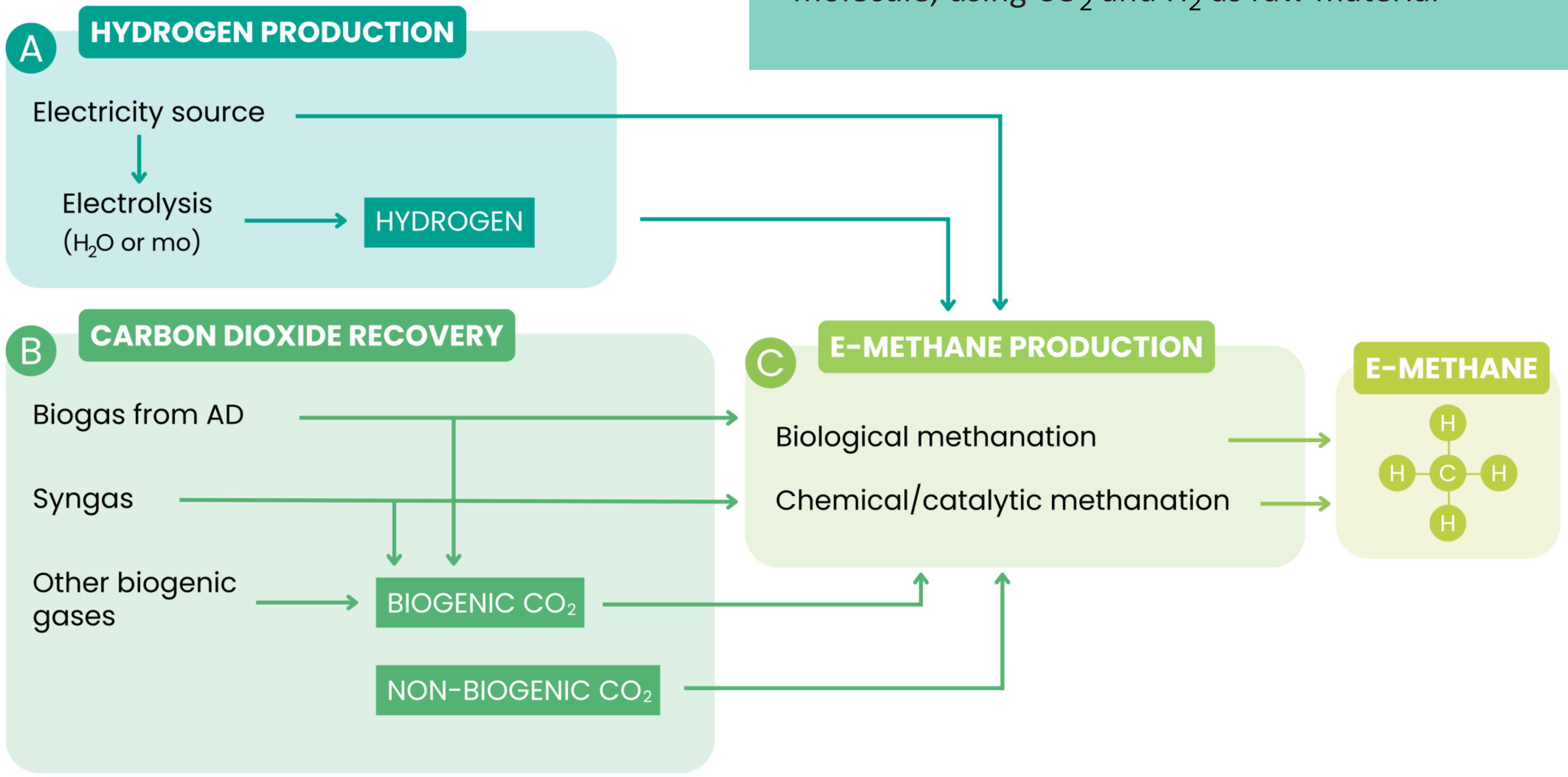
Mapping e-methane plants and technologies

Mieke Decorte

Technical Director, European Biogas Association

What is methanation?

E-methane production refers to a group of technologies that enables the conversion of electricity into the methane molecule, using CO_2 and H_2 as raw material



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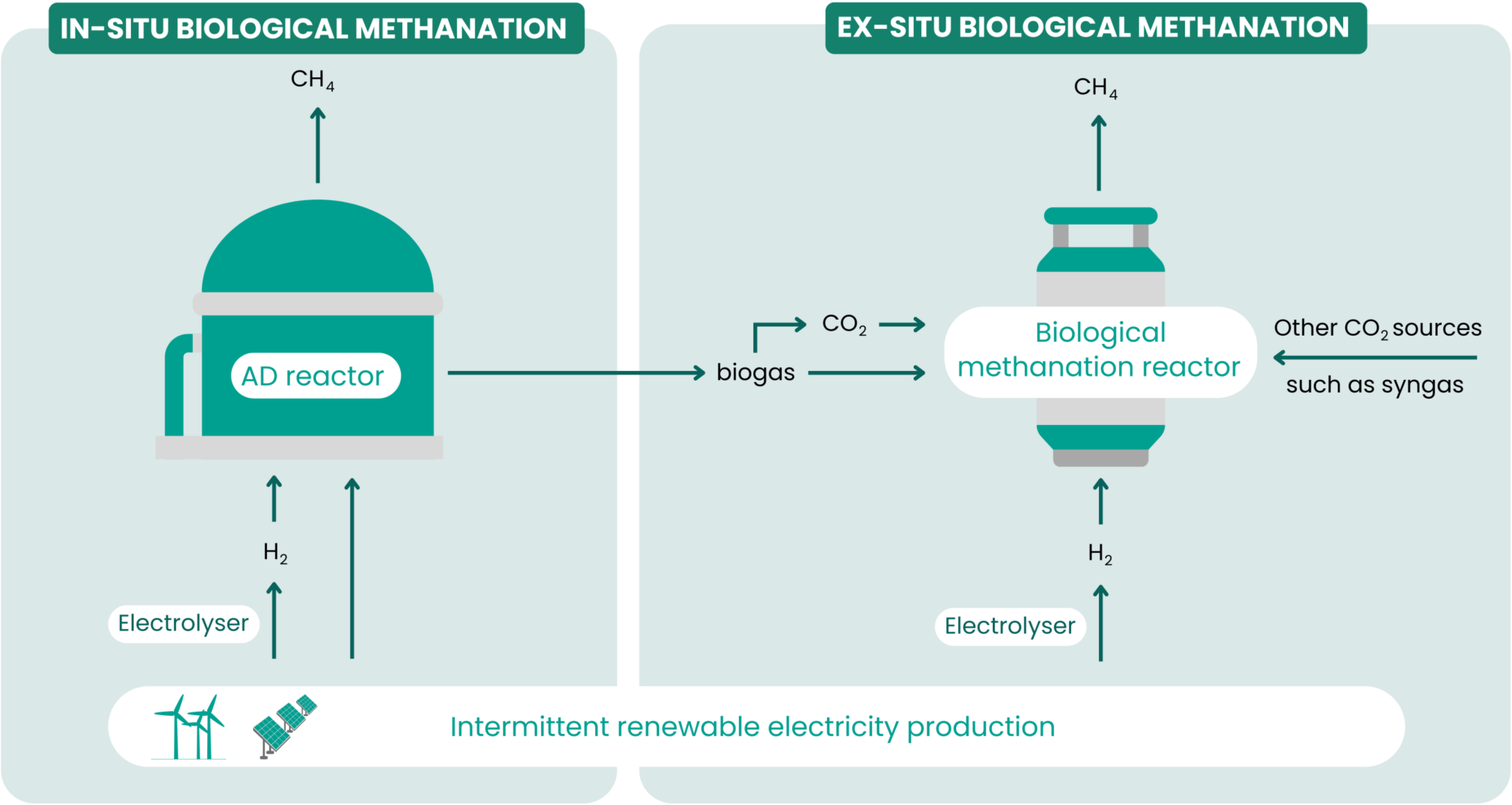
In-situ versus ex-situ

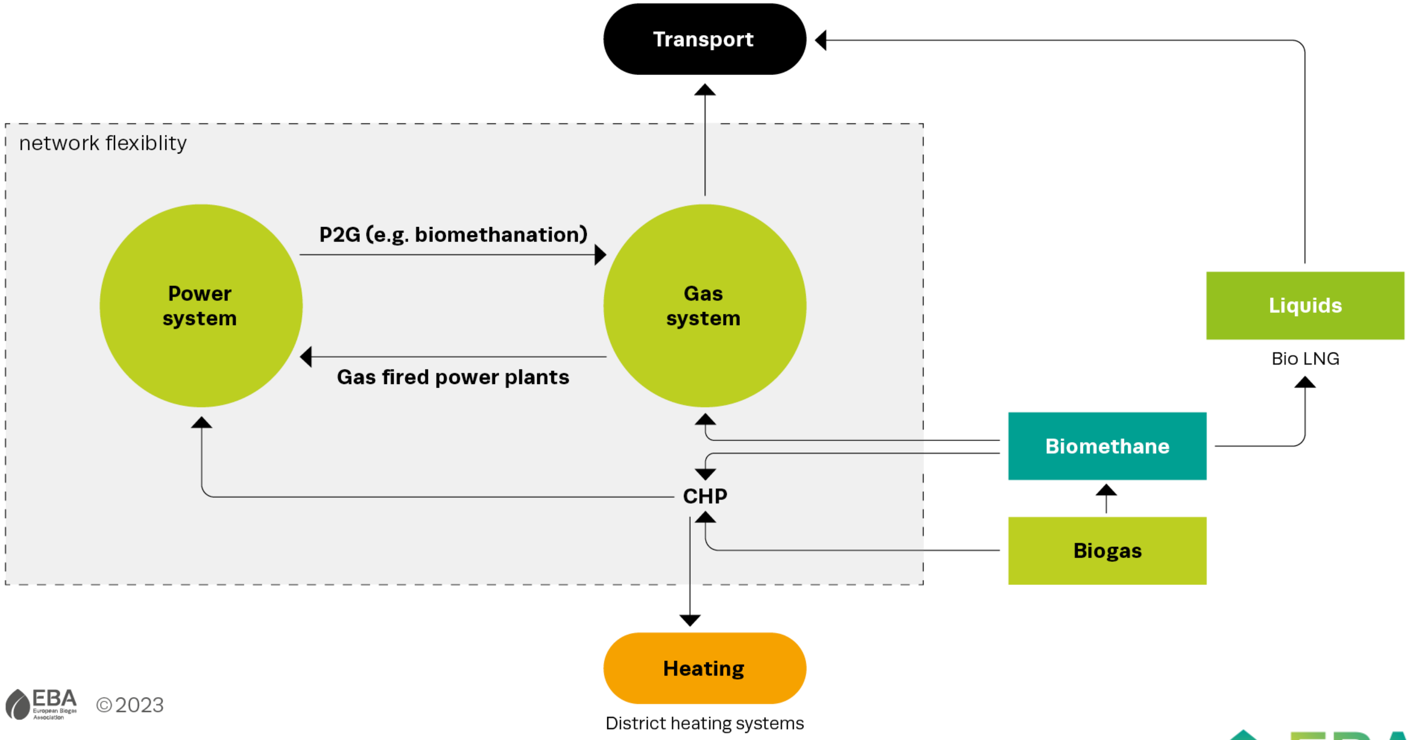


Why methanation?

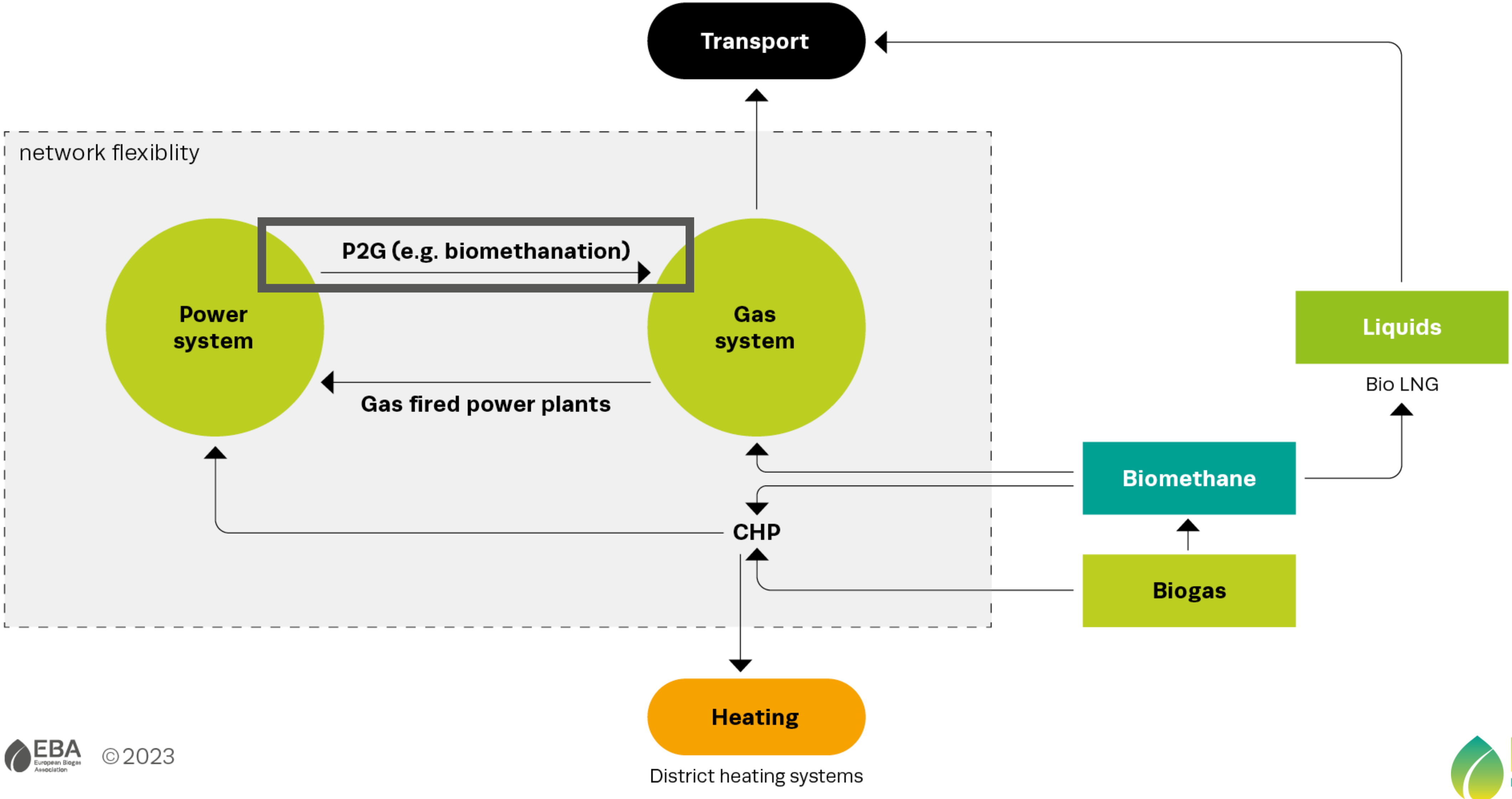
Integration of the energy system
Stronger connection between the electricity and gas grid

Seasonal energy storage
Excess renewable electricity is stored in the gas grid in the form of e-methane

Complementary roles for
hydrogen and biomethane



Why methanation?



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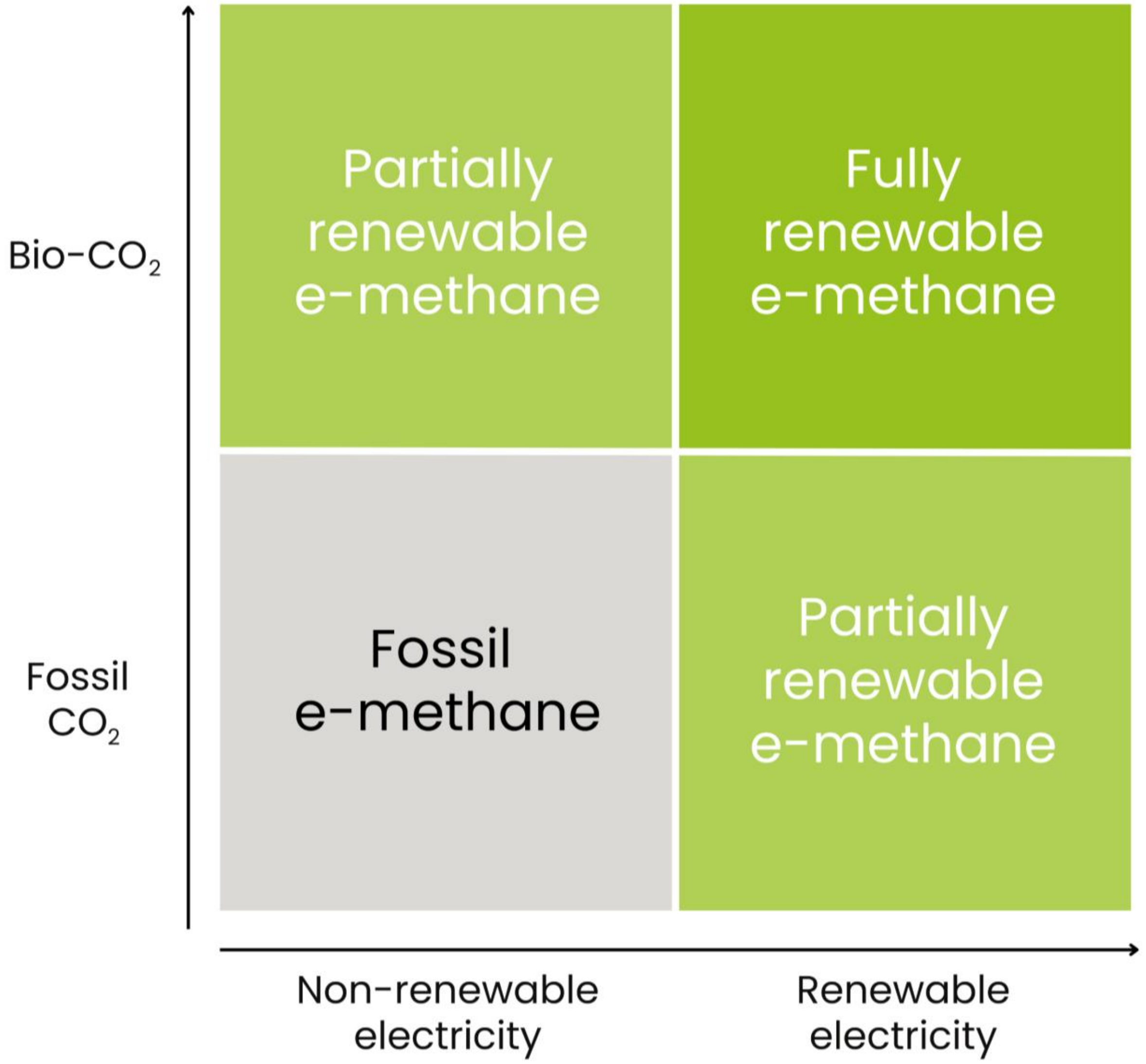
Scope and Methodology



Categorisation of plants based on **source of electricity and CO_2**

Other attributes:

- Planned and operating plants
- Pilot and industrial
- Geographical distribution

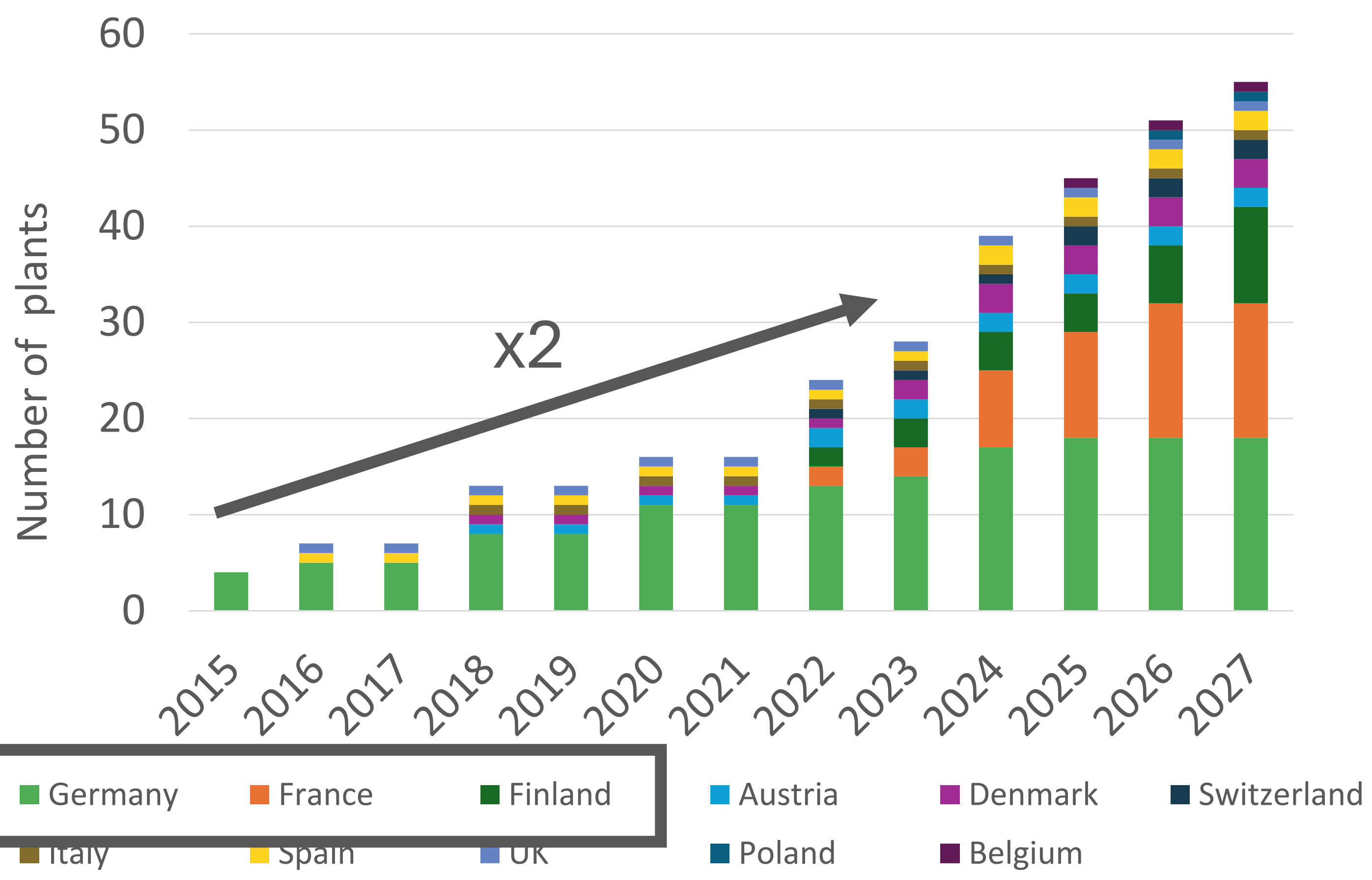
Number of plants

Plant/Projects	n° methanation –projects plants	n° active in 2023	n° under development/plan	Production capacity (GWh/year)
Fully renewable	44	32	12	2,773
Partially renewable[1]	6	3	3	36
Partially renewable[2]	5	0	5	12
Non-renewable	na	na	na	na
Total	55	35	20	2,820

[1] industrial CO_2 + green hydrogen/ electricity
[2] biogenic CO_2 + non-renewable hydrogen /electricity

Fully renewable plants represent 98% of total production capacity

Number of plants



10 European countries have running or expected plants by 2027

Growth expected

- France (+11 plants)
- Finland (+8 plants)
- Germany (+6 plants)

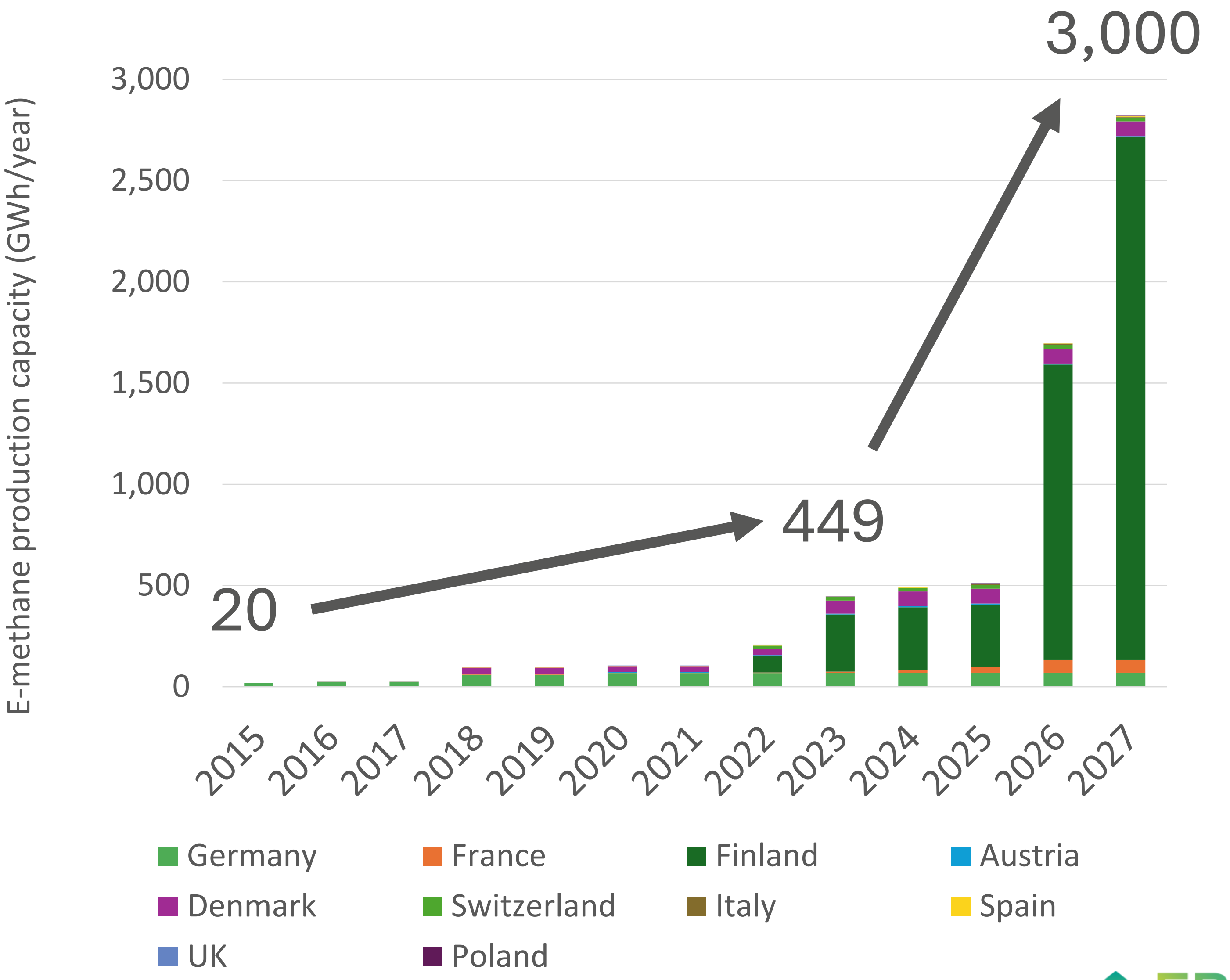
Production capacity

Production capacity shows even steeper growth

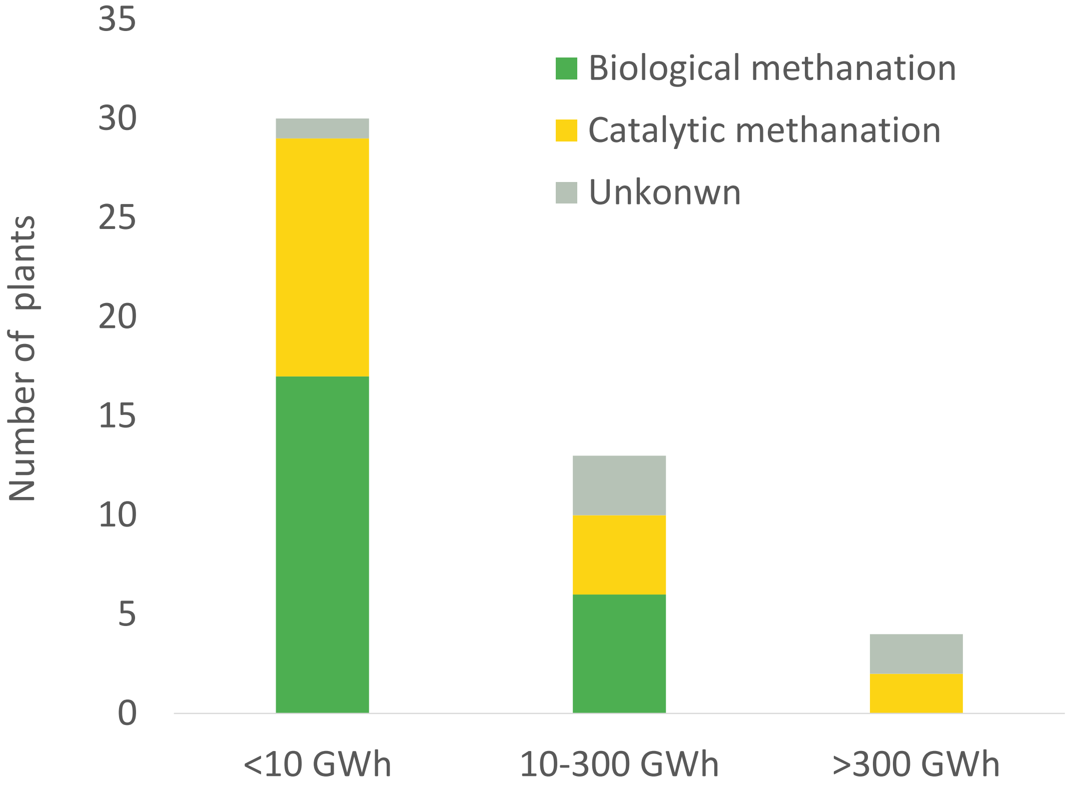
Biggest production capacities in 2023

- Finland (282 GWh/year)
- Germany (68 GWh/year)
- Denmark (64 GWh/year)

Finland has big biogenic reservers, linked to district heating facilities, pulp and paper, waste-to-energy and AD

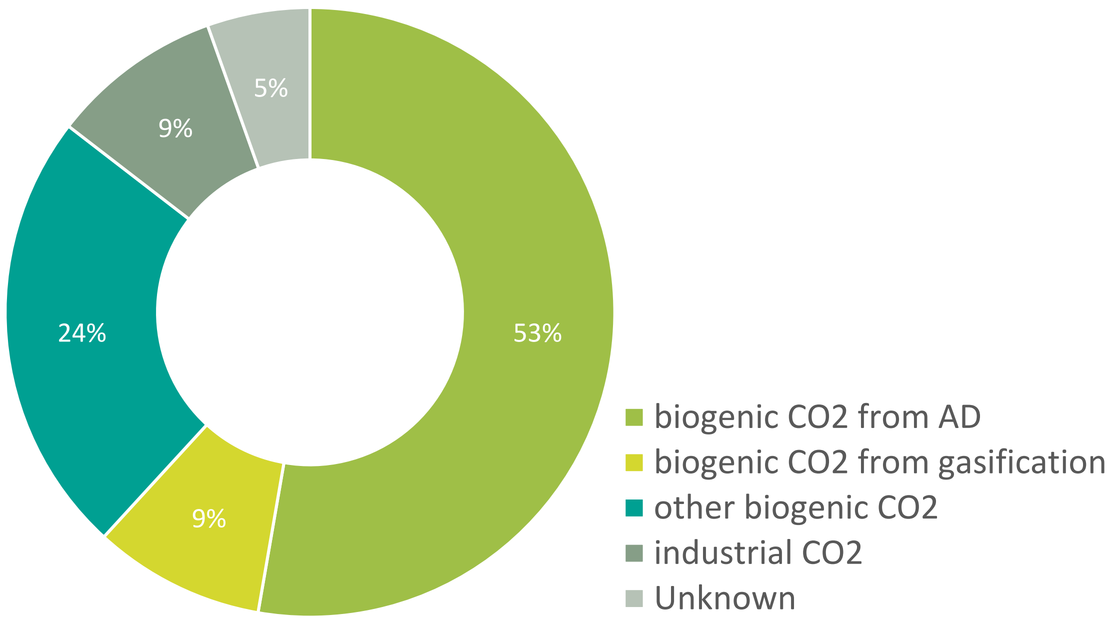


Plant size distribution



Pilot and demo scale

CO_2 sourcing



Economic consideration

- Significant potential for **existing biomethane plants**: methane output can be increased by 40-60%
- Promising in **future power system** scenarios dominated by intermittent renewables
- **Profitability** will highly depend on hydrogen or power costs and the **value of power grid stability**
- Different **operating strategies**
    - Operate few hours with cheap electricity (high capex)
    - Operate for longer periods at somewhat higher prices (lower capex)

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We want to hear from you!

Insert your question(s) in the Q&A

Panel discussion

Alessandro Agostini

Head of the Sustainability of Energy Technologies Unit, Energy Technologies and Renewables department, ENEA

Gautier Mangenot

Public Affairs Senior Consultant – Energy / ENOSIS, Representative from BIP TF 4.1

Étienne Philippe

Renewable and low-carbon gases Project Officer, GRDF

Conclusion and wrap up

Giulia Cancian

Secretary General, European Biogas Association

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Discover the 3 topics

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Submit your photos

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WEBINAR

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Diversifying biomethane production: Gasification potential unlocked

12 DECEMBER 2024

10h-11h30 AM

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