EUROPEAN BIOGAS CONFERENCE

23 - 24 OCTOBER 2024

EUROPEAN BIOMETHANE WEEK

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BIP Europe
Biomethane Industrial Partnership

KEYNOTE SPEECH

Paolo Frankl

Head of Renewable Energy Division
International Energy Agency

EUROPEAN BIOMETHANE WEEK

International Energy Agency

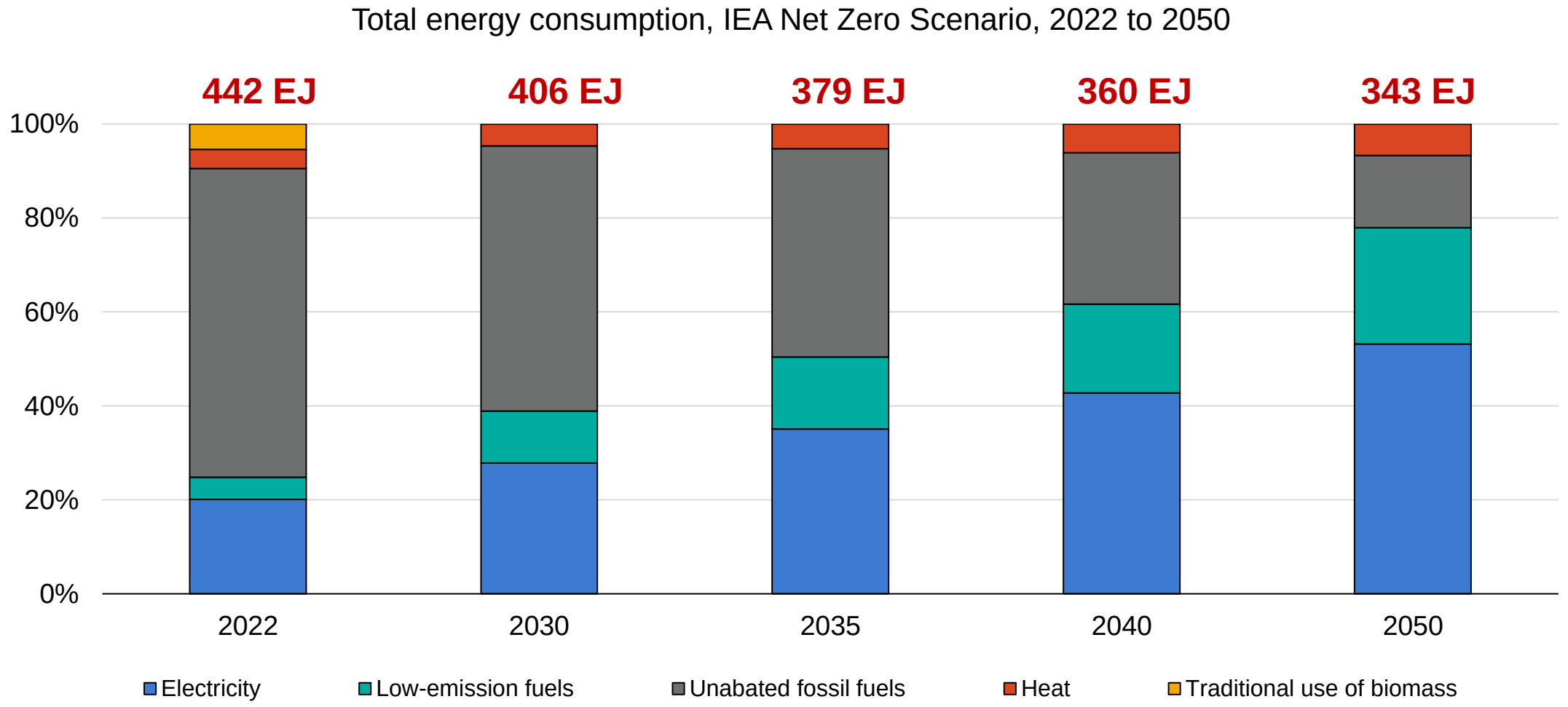
The role of biogases in global energy transitions

Dr. Paolo Frankl, Head of the Renewable Energy Division

European Biomethane Week – European Biogas Conference

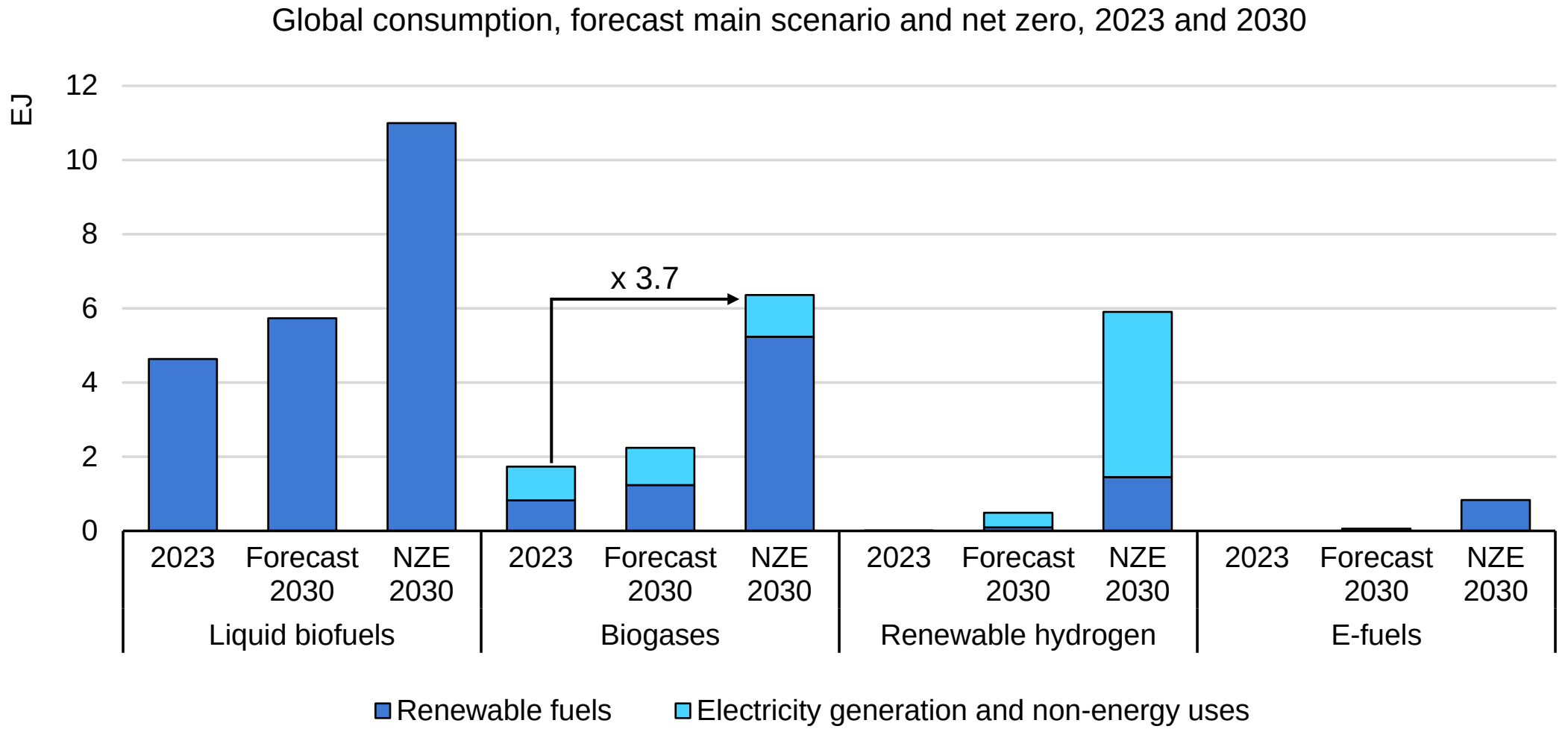
Brussels, 24 October 2024

Renewable fuels are a pillar of the energy transition



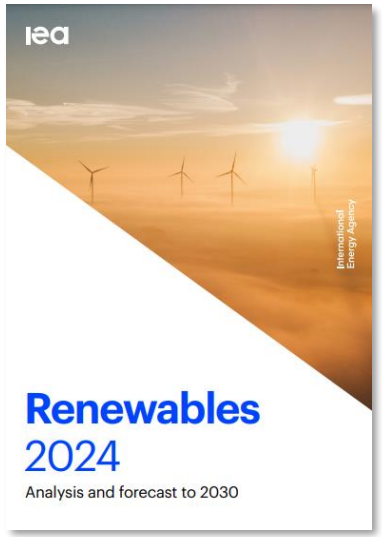
Sustainable fuels such as biofuels, hydrogen and hydrogen-based fuels provide 85 EJ of energy in 2050 in NZE, equal to global electricity demand today. By 2050 they support one quarter of global energy consumption.

Biogases would need to almost quadruple by 2030 to be on track with NZE

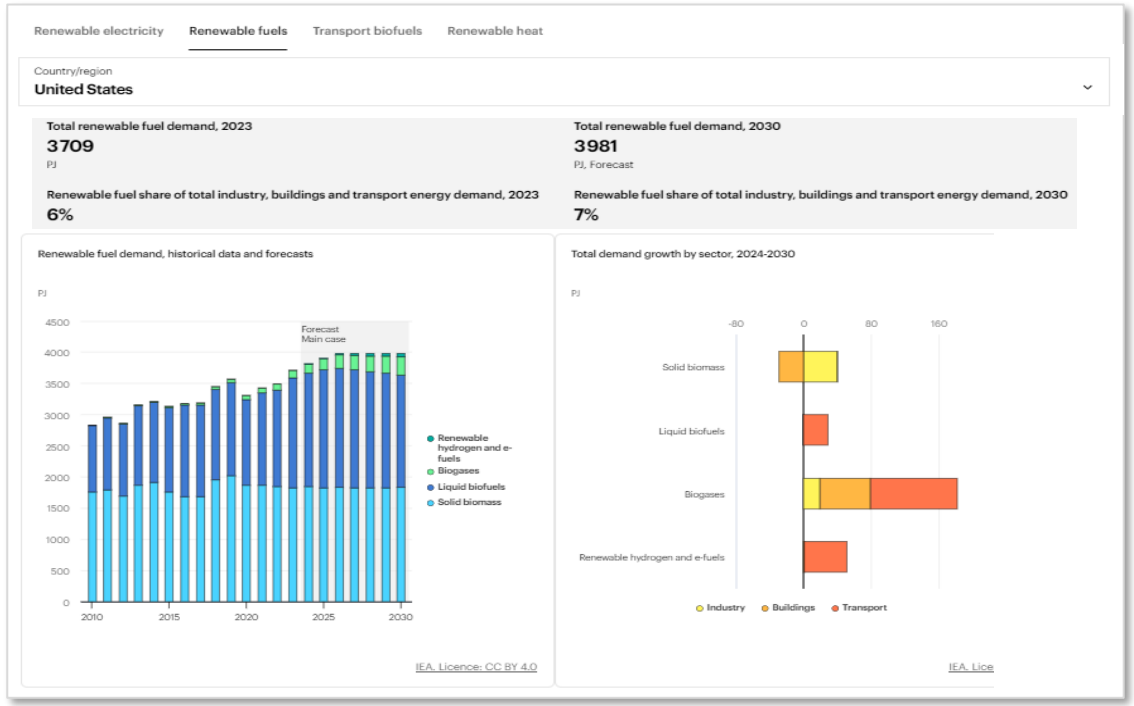


Renewable fuels vary significantly in terms of costs, infrastructure requirements, availability and maturity. Demand and supply policies are needed to close the gap to net zero.

Dedicated chapter on fuels in the Renewables 2024 market report



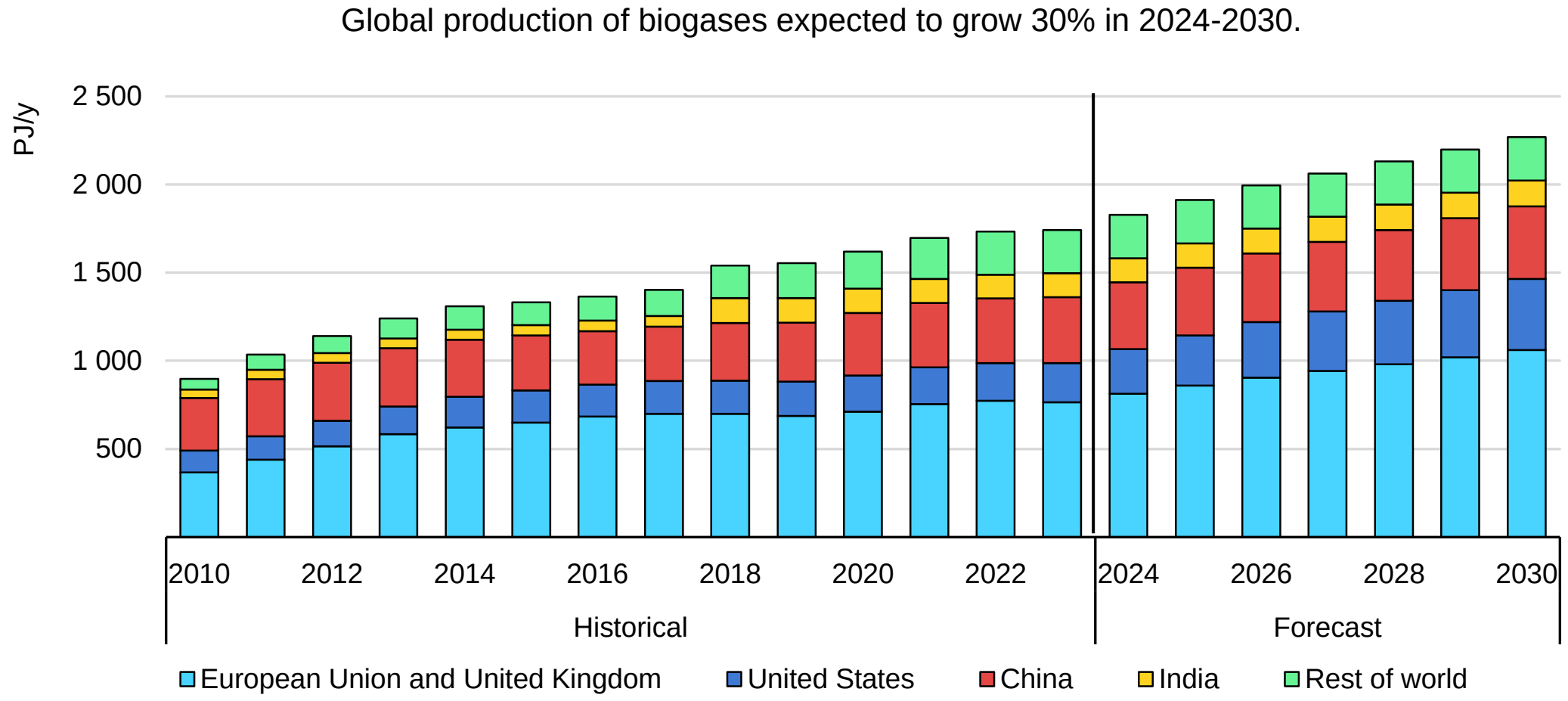
- **Renewables 2024** tracks global market deployment and forecasts growth to 2030 in renewable power and fuels.
- **Biogas and biomethane** have a dedicated section since 2023's edition.



- For the first time, we are grouping the contributions of **all renewable fuels** together.
- Renewable fuels have a critical **complementary role** to electrification and energy efficiency in clean energy transition
- Added to the visual online tool (the tracker)

Report: https://www.iea.org/reports/renewables-2024
Tracker: https://www.iea.org/data-and-statistics/data-tools/renewable-energy-progress-tracker

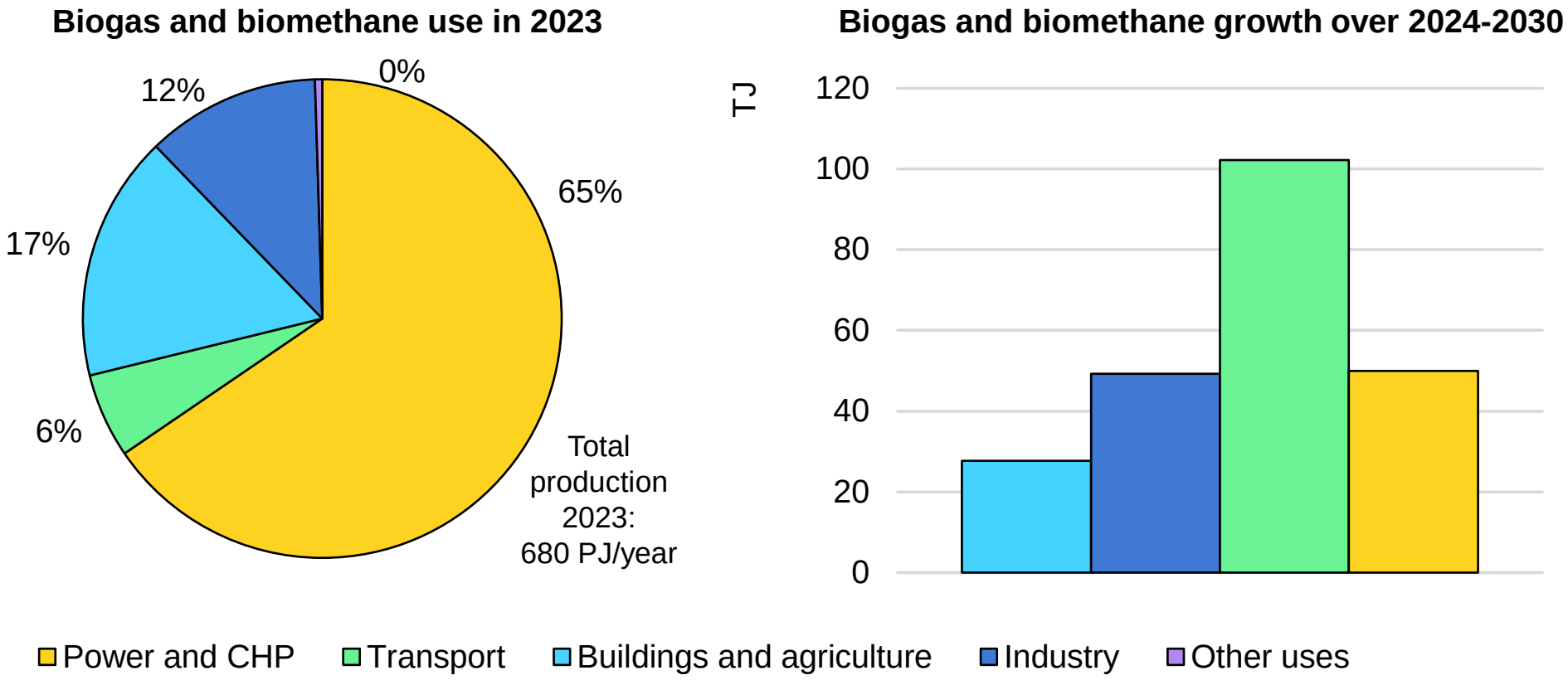
Biogases growth accelerates through 2030



Most growth to come from Europe and US. China and India have ambitious expansion plans but need to grow infrastructure and feedstock supply chains.

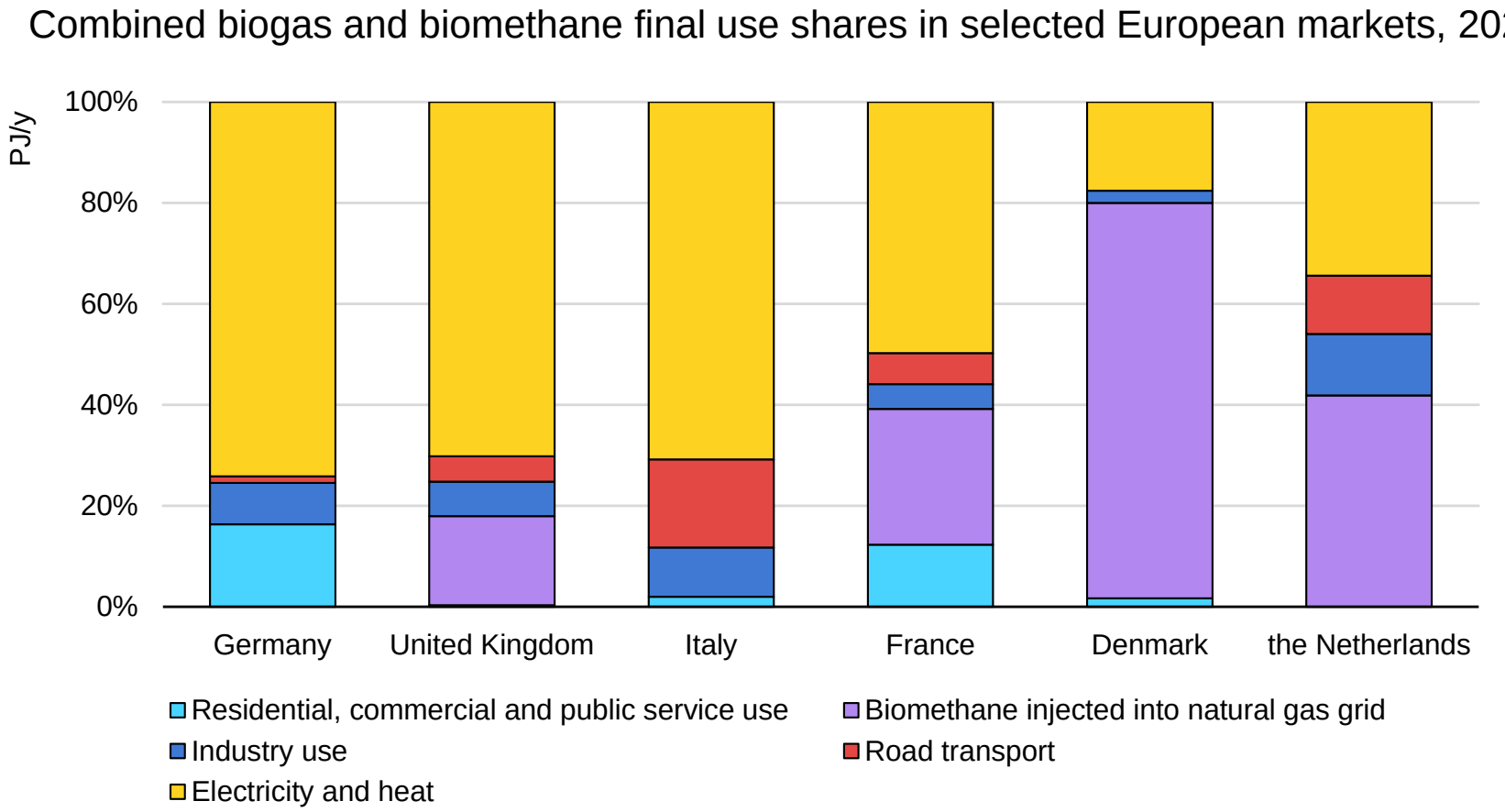
Growth is supported by versatility of end-uses

Production of biogases in the European Union in 2023 and growth over 2024-2030 per end-use sector



Strong short-term growth in transport supported by double counting of waste-based biomethane. Industry and buildings will become most important uses in the long-term, driven by national policies and private voluntary reduction targets.

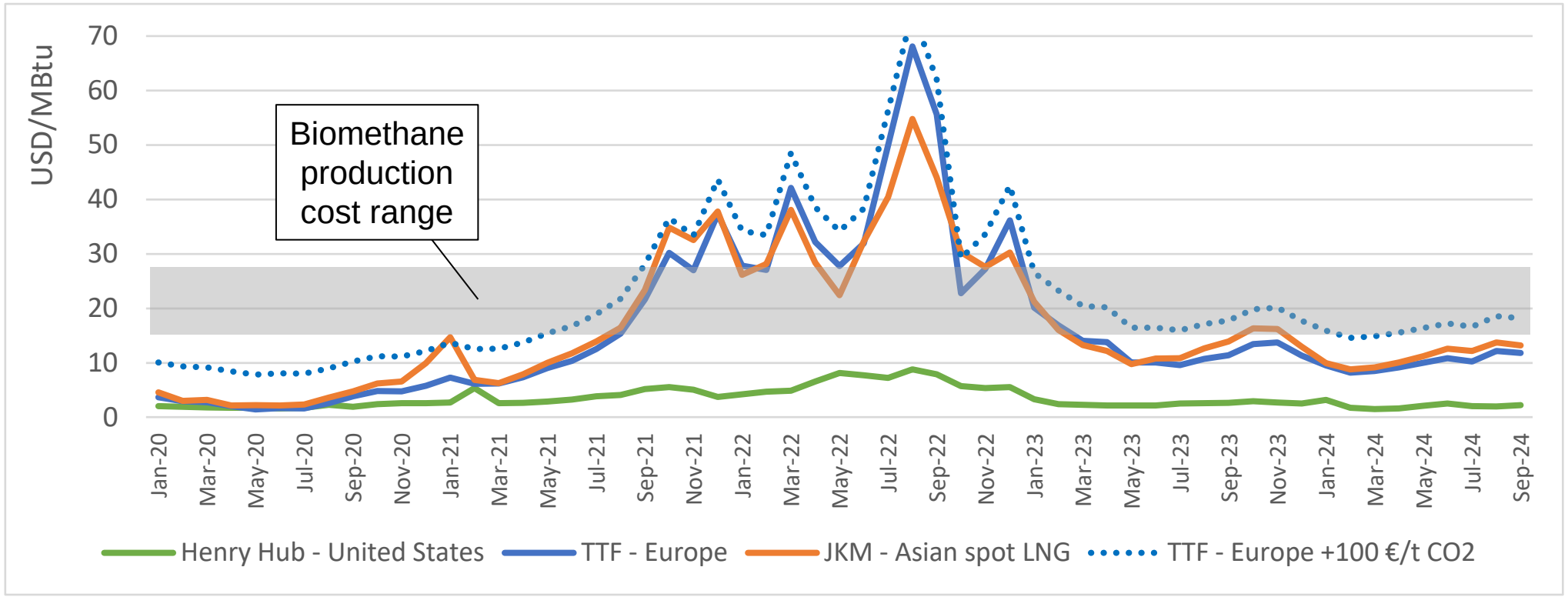
Priority uses vary significantly by country



Strong specific policies in place to support injection in the grid in order to displace natural gas imports .

Note: "Biomethane injected into natural gas grid" does not include transport use, which is reported in a separate category. For Germany, biomethane injected into the grid is allocated to final uses, as it is consumed predominantly for power generation.

Biogas needs policy support for deployment



Policy frameworks to support biogas deployment must be designed in a holistic way, taking into account the multiple benefits of biogas. Carbon pricing can help close the gap with fossil fuel prices.

Multiple benefits of biogas & biomethane are not always rewarded

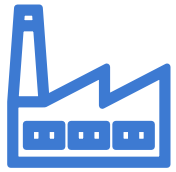
- **Energy security –** Domestic supply to offset imports and provide modern energy services to not connected areas

- **Waste management –** municipal solid waste, sewage, agricultural residues and manure, and industry waste

- **GHG reductions** CO_2 and methane

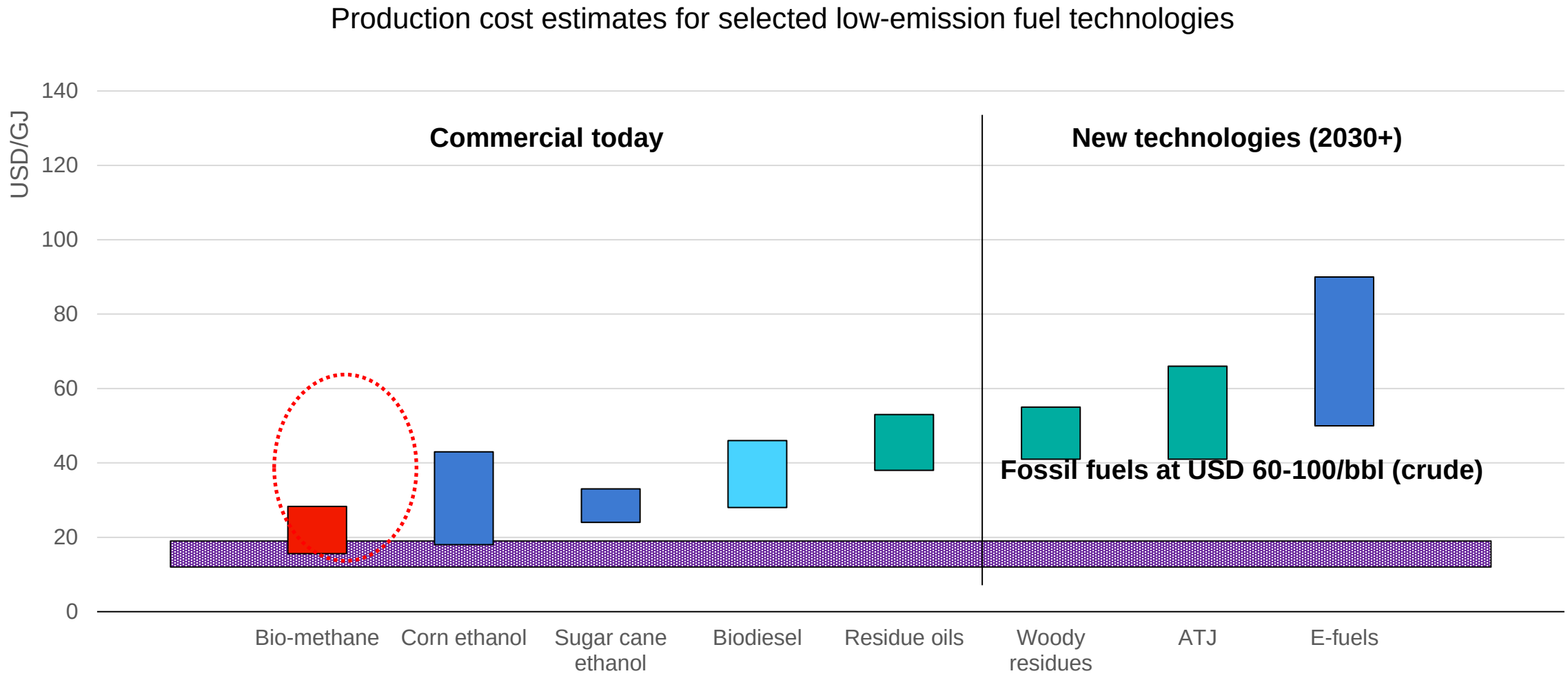
- **Organic fertiliser** as co-product

- **Economic and employment opportunities** especially in rural areas



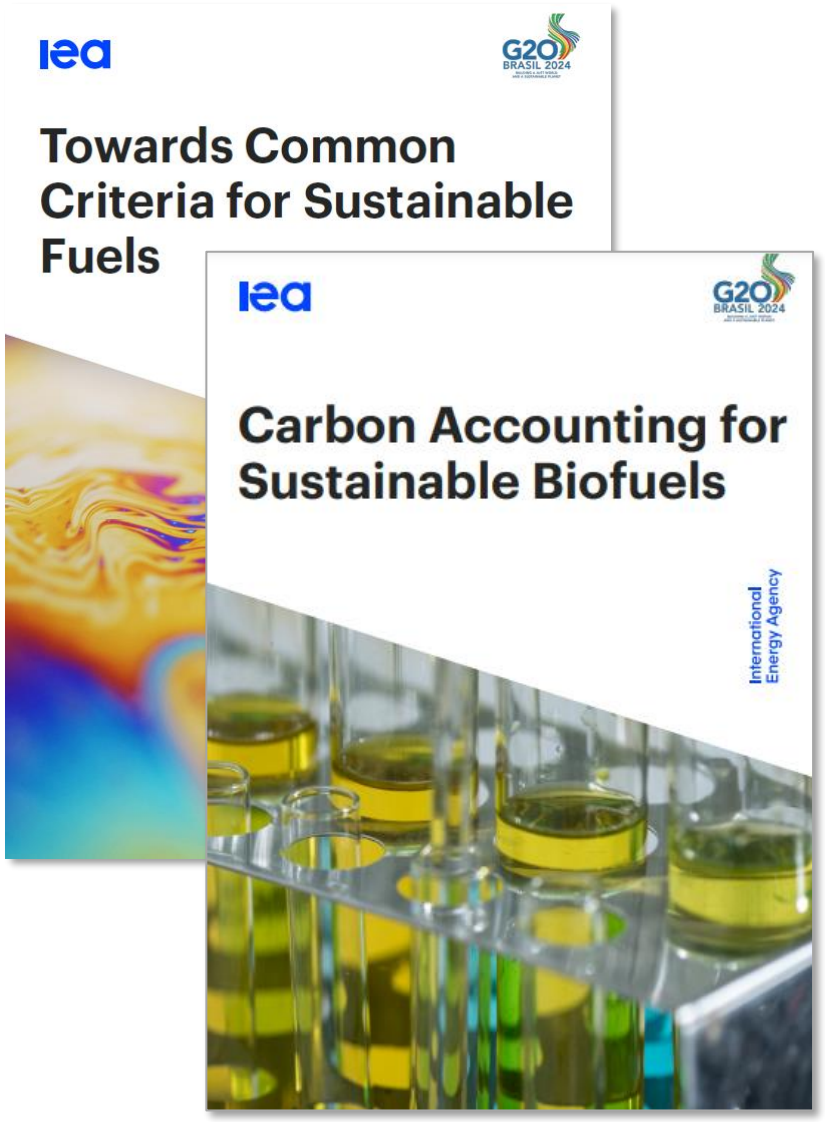
- **Compatibility** with existing natural gas infrastructure and end-uses

Biomethane is the most competitive biofuel



Several emerging technology pathways can jointly deliver higher blending shares of low-emission fuels post 2030. Although initially more expensive, they could compete with waste oil-based biofuel technologies once at scale.

Renewable fuels lack commonly agreed sustainability criteria



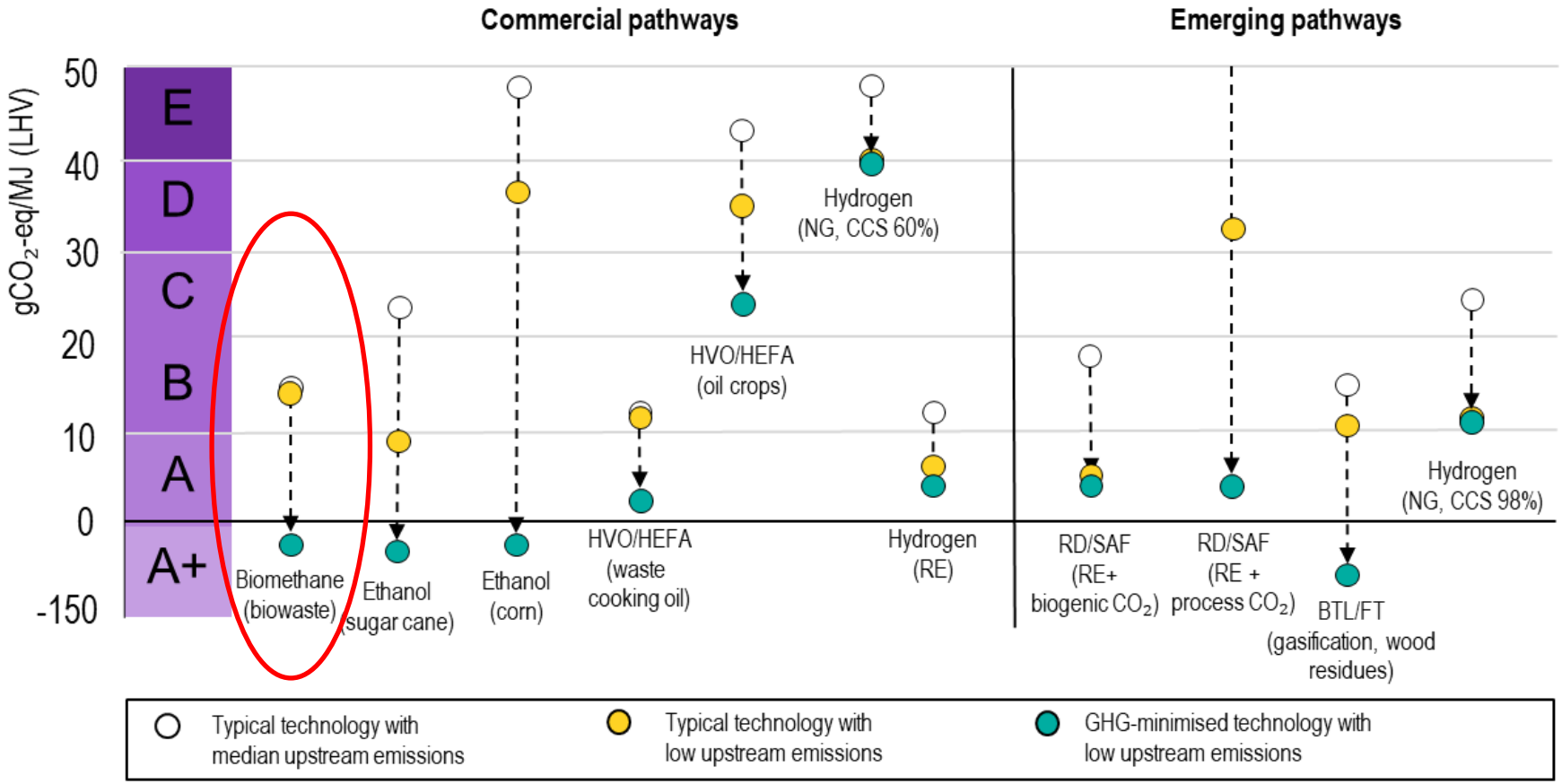
- IEA has supported **Brazil's G20 presidency** with two dedicated reports on sustainable fuels

Key Questions / objectives of these reports

- **Mapping** (commonalities/differences) of existing global sustainability criteria for biofuels, hydrogen, and H_2-based fuels.
- What are the possible **metrics** that would allow comparison across different fuels and jurisdictions in a transparent way?
- How to set up policy frameworks that would foster **continuous improvement** in GHG performance of fuels over time?
- How to **involve also countries that cannot immediately afford** to use the lowest or zero-emission fuels?

Developing a common GHG intensity label for sustainable fuels

Example of a quantitative GHG intensity labelling system for selected sustainable fuel pathways at the point of delivery



A labelling system enables to assess better performance, both today and over time, allowing consistent comparison across fuels and schemes and the use of portfolios of low(er)-GHG fuels, while fostering continuous improvement.

Conclusions and next steps for accelerating the development of biogases

- Biogases can play a significant role decarbonising transport, industry and building heating, in addition to providing dispatchable renewable electricity.

- Accelerating the growth of biogases requires:
  - **Establishing and scaling up collection of waste and residue feedstocks**, including from agriculture, livestock and municipal waste
  - **Supporting new investment** through national targets and quotas, operating green certificate registries and by facilitating grid injection
  - **Creating new demand in end-use sectors,** allowing for carbon credits and the use of green certificates

Thank you

Morning plenary

Biomethane frontrunners

Tom Howes

DG ENER, European Commission

Michał Łęski

Ministry of Climate and Environment, Poland

Giovanni Perrella

Ministry of Environment and Energy Security, Italy

Aymeric de Loubens

Ministry of Energy Transition, France

EUROPEAN BIOMETHANE WEEK

Morning plenary

Biomethane frontrunners

Tom Howes

Adviser in Green Transition and Market Regulation

DG ENER , European Commission

EUROPEAN BIOMETHANE WEEK

Morning plenary

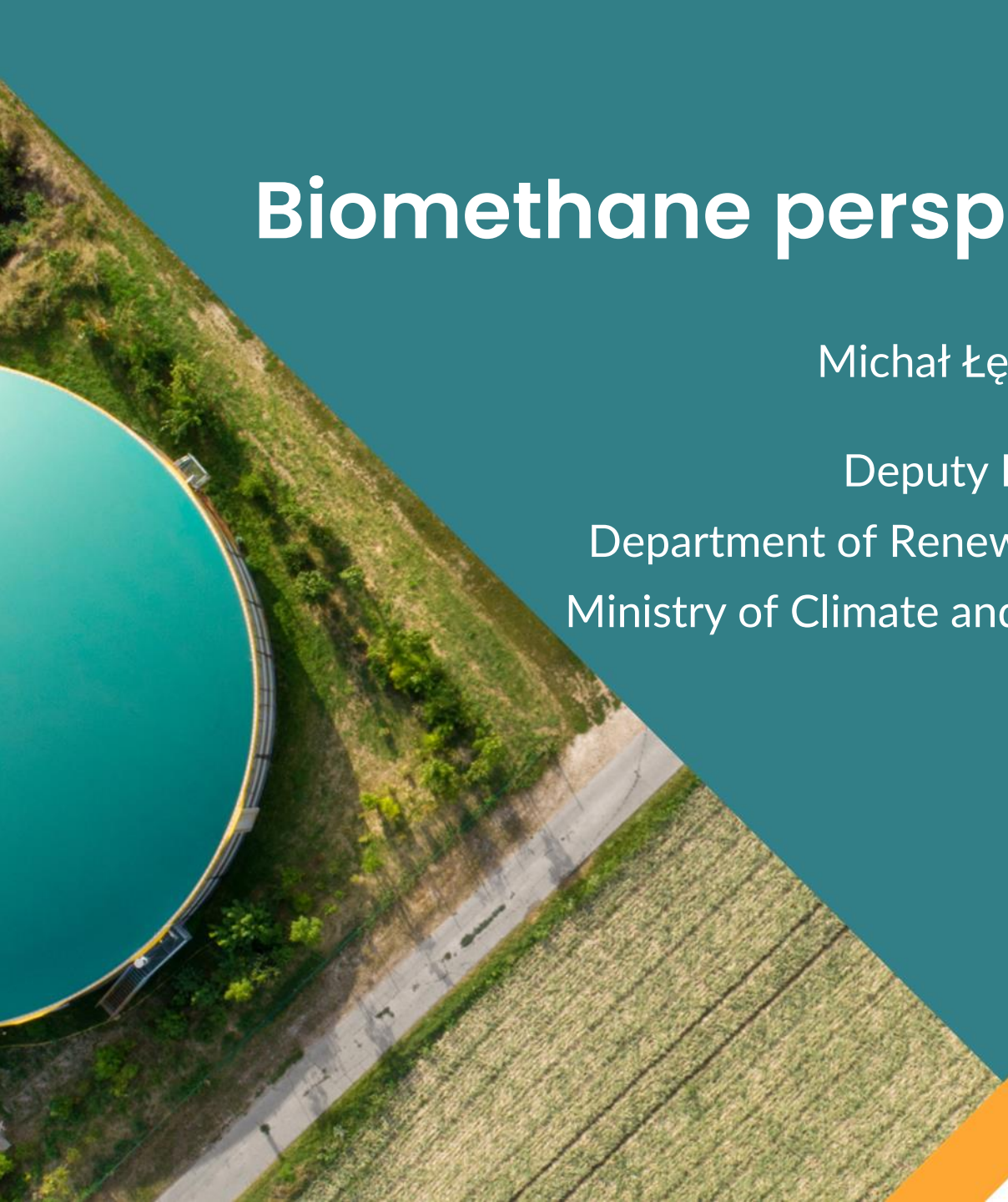
Biomethane frontrunners

Michał Łęski

Deputy Director of Department of Renewable Energy Sources

Ministry of Climate and Environment, Poland

EUROPEAN BIOMETHANE WEEK



Biomethane perspectives for Poland

Michał Łęski, Ph.D.

Deputy Director

Department of Renewable Energy Sources

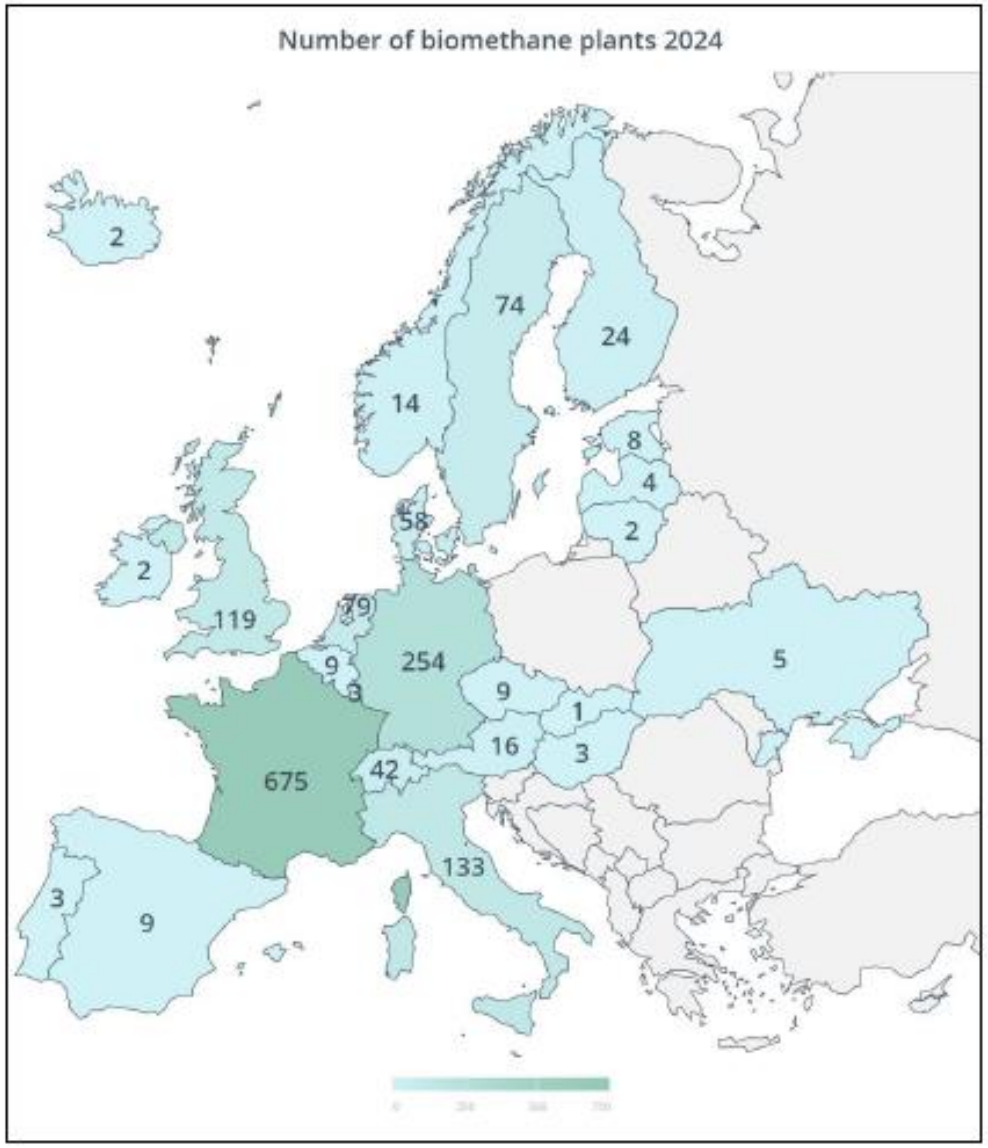
Ministry of Climate and Environment, Poland

BIP Europe

Biomethane Industrial Partnership

The EU biomethane market

- There are 1,548 biomethane plants in Europe, of which 1,364 are in the EU.
- In the next 5 years, 950 biomethane plants are expected to become operational.
- By 2030, investments in the sector are projected to amount to 24.5 billion euros.
- EBA indicates that **Poland ranks 2nd in Europe in terms of planned investments totaling €3.4 bilion.**



Source: European Biogas Association

The National Energy and Climate Plan – Poland

32.6% RES In gross final energy consumption by 2030

56.1% 

In electircity sector

35.4% 

In heating and cooling sector

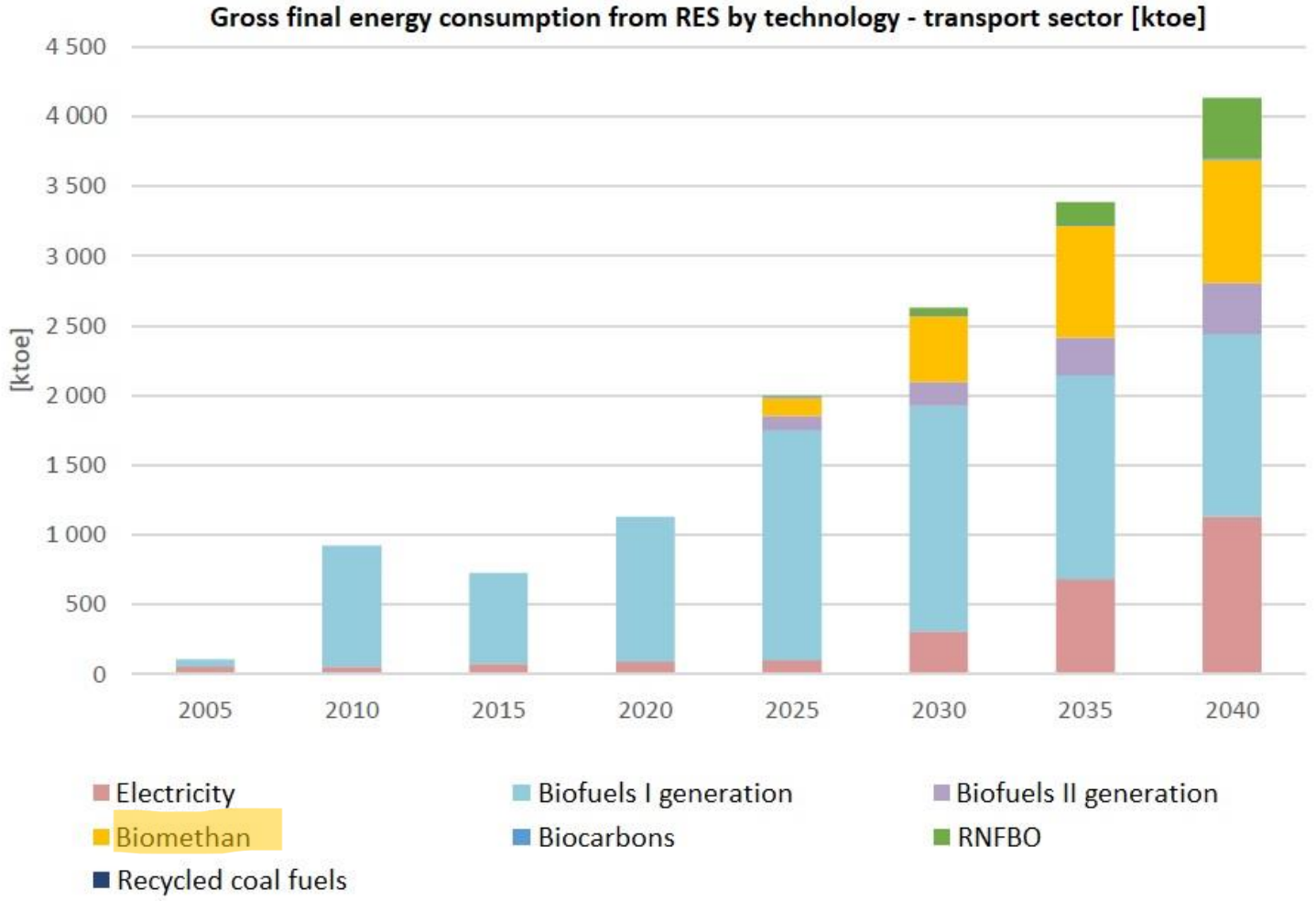
17.7% 

In transportation

Biogas in Poland in 2024

- The installed capacity of biogas power plants in Poland is approx. **305 MW** in more than **400 biogas plants**.
- In 2023, 1.5 TWh of electricity were produced using biogas, accounting for 3.4% of total electricity from all renewable energy sources.
- In the NECP WAM scenario (with additional measures), biogas is projected to generate 3.2 TWh of electricity by **2030 (doubling the 2024 output**) and 4.8 TWh by 2040.
- The potential for biomass, agricultural by-products, and wastes is estimated at about **120-150 million tons** of useful biogas.

The National Energy and Climate Plan - Poland



NECP draft of 2024 (WAM scenario)

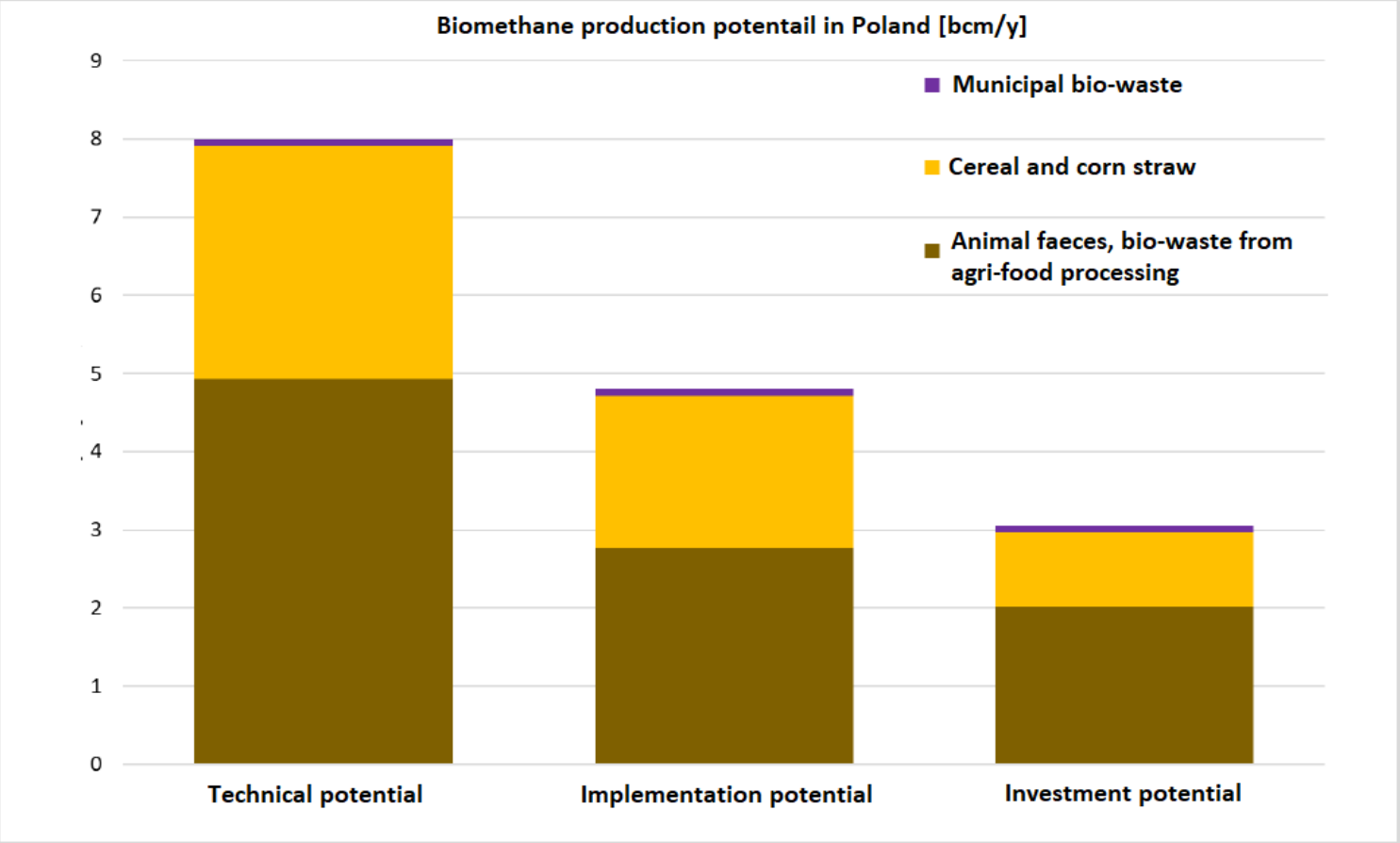
Biomethane potential in Poland

Technical potential for **biogas** production:

- approx. 13-15 bcm = 8 bcm of **biomethane**.

Investment potential by the National Center for R&D report is:

- aprox. **3.2 bcm of biomethane.**



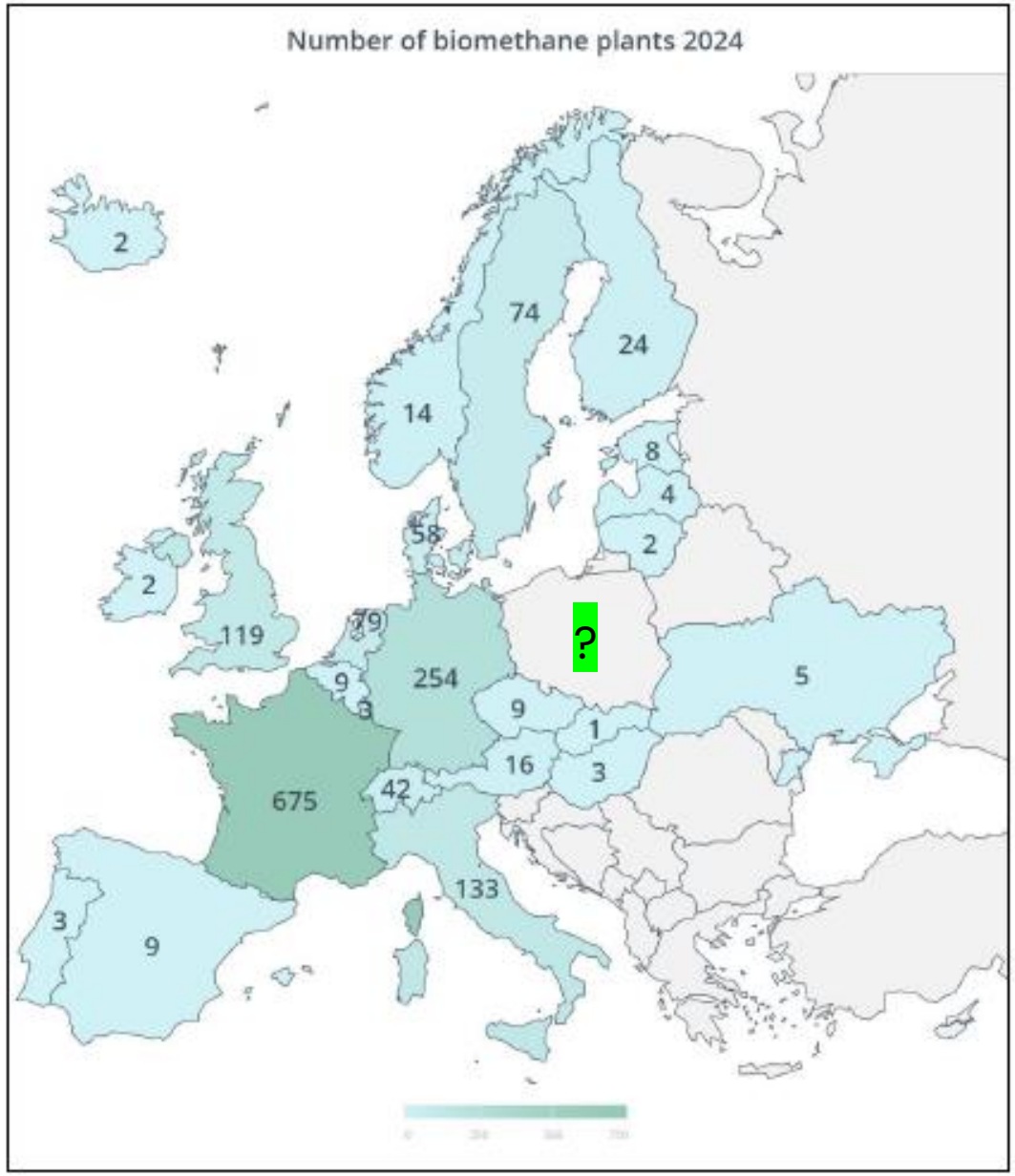
Suorce: The National Center for Research and Development (NCBiR)

Biomethane suport in Poland

- **FIP support system** for biomethane plant 0,5-1 MW
- **Financial instruments** – direct aid (incl. EU Funds)
- **Dedicated act for agricultural biogas inwestments** (2023) – acceleration of the construction proces, simplier connection to the grid, spatial planning changes, exemptions from restrictive waste regulations, easier management of the post-fermentation product as fertilizer.
- **Sector deal for biogas and biomethane sectors**

Current works in Poland

- **Auction system** for biomethane plants >1 MW
- Legal framework for the construction and operation of **direct biogas pipelines**
- **Implementation of RED III** – Renewable energy acceleration areas (RAAs)



Thank you!

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Biomethane Industrial Partnership

Join the work of the BIP!
bip-europe.eu/get-involved/

Morning plenary

Biomethane frontrunners

Giovanni Perrella

President of the Italian inter-Ministerial Committe on biofuels

Ministry of Environment and Energy Security, Italy

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Ministero dell'Ambiente e
della Sicurezza Energetica

EUROPEAN BIOGAS CONFERENCE
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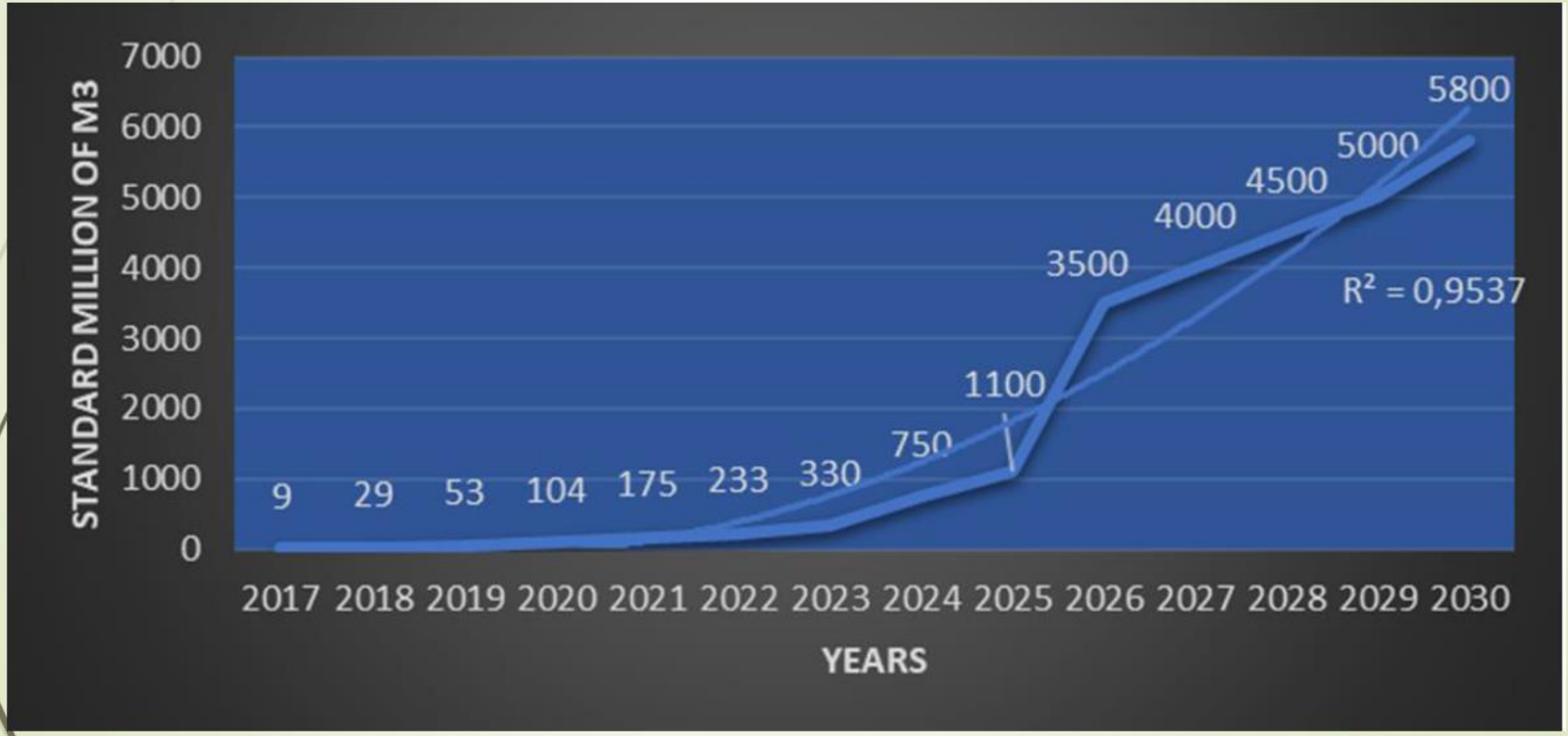
Biomethane frontrunners:

The Italian experiences and perspectives at 2030

Giovanni Perrella
Italian Ministry of environment and energy security
Energy Department
President of the National Inter-Ministerial Committee on Biofuels

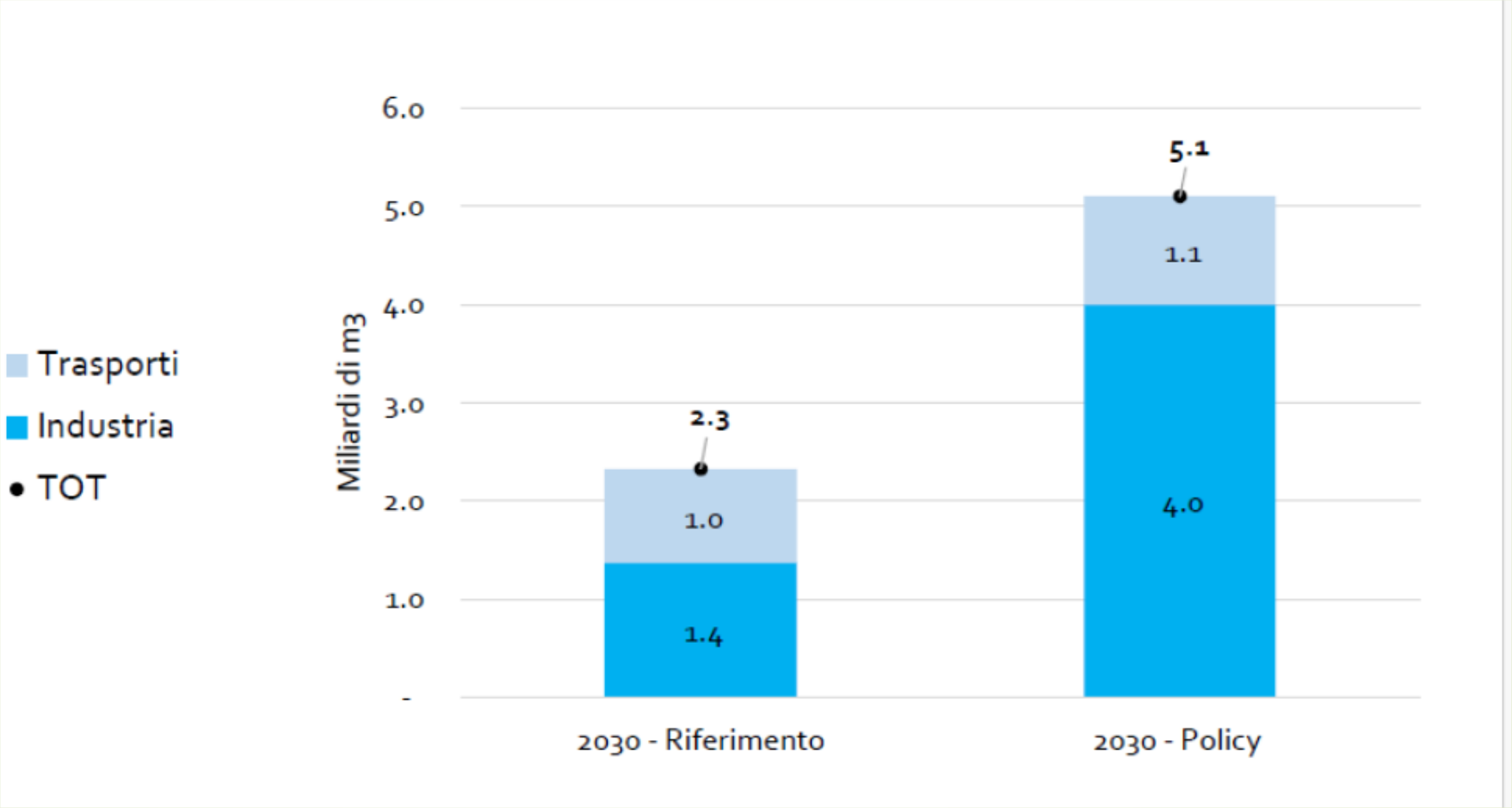
Thursday 24th of October 2024
Brussels

The production of biomethane in Italy: hystorical data until 2023 and forecast from 2024

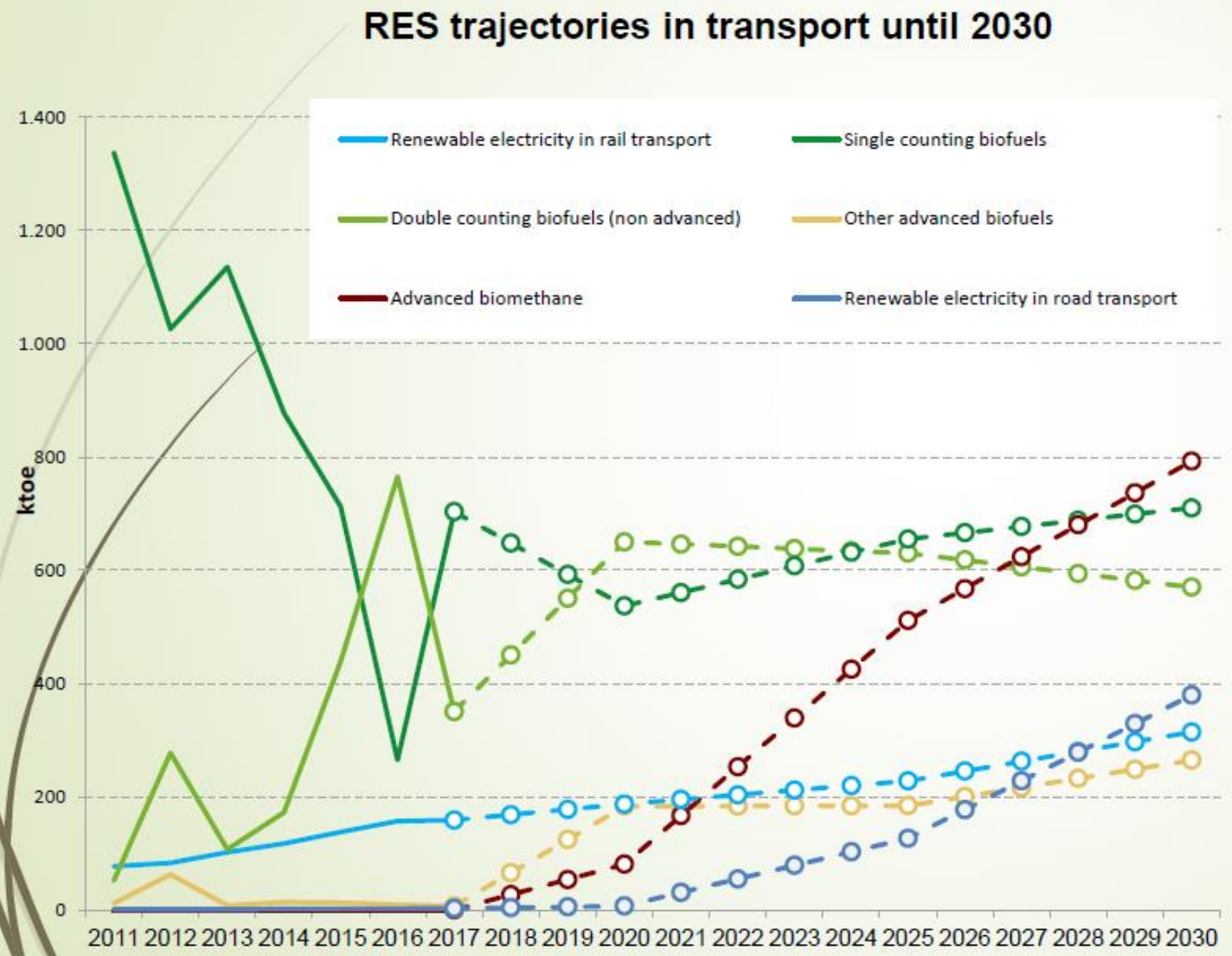


The role of the biomethane by 2030 into the 2024 NECP

- Biomethane final uses foresee at 5.1 billion m3: 4.0 in Industry and 1.1 in the transport sector.
- For the production of electricity, 1.3 billion m3 biogas is foreseen consumed (corresponding to approximately 0.7 billion m3 biomethane). (Minimum iphotesis)
- Overall, 5.8 billion m3 biomethane.



The role of the biomethane renewable energy in Transport up to 2030 into the final 2024 NECP (Ktoe)



- **Advanced biofuels will reach around 10% (near twice the RED 3 target of 5,5%)**
- **The contribution of biomethane is of 0.8 Mtoe and will cover 6% of the target RES_T that is increased at 34.2%;**

Positive sentiment for the expected role of the biomethane in Italy by 2030

- **Guarantees of origin**, proving the renewable origin of the biomethane withdrawn from the grid, **can be used by the obligated entities of the ETS system** instead of purchasing the corresponding avoided carbon dioxide equivalent quotas: we register exceptional, **big request from industries of biomethane.**
- **It will favour objectives of GHG emissions reduction in particular in the agricultural sector and increase the revenue of farmers and it allows the take the maximum economic advantage of agricultural by-products and animal waste, and the to take economic advantage of catch crops, obtained in the periods of the year when the land remains uncultivated or under crop cultivation (double harvest).**
- **Production of biomethane help the circular economy of waste and residues of the agri-food industry, considering that the digestate produced is a "soil conditioner" that replaces fertilizers obtained from fossil fuels, reducing the production costs of cereals and increasing production per hectare.**

Key messages for biomethane in Italy:

- Italy will improve the security of gas supply and to replace with biomethane about 10% of the 2030 Natural Gas consumption.
- Italy could additionally reduce Natural Gas import dependency by including its major synthetic fertiliser production capacities in improvement and marketing of digestate, or extract of macro-nutrients for bio-fertilisers.
- In Italy by 2026 all the natural gas used in the transport sector will be BIOMETHANE.
- To have full effect of biomethane production on the green transition, biomethane production support is to be linked with the agri-food industry along the value chain to avoid transportation costs and feedstock loss, with local digestate application, renewable CO_2 and biomethane use in industry (ETS sector).
- Transition from food & feed feedstock to sequential cropping and digestate use is on-going given the Italian "BiogasDoneRight" concept which increases the impact on GHG emission savings and green transition of already operational biogas and biomethane plants.

What we need for further rapid development of the biomethane in EU?

- Address quality of gas issues in cross border trade
- Clear and uniform rules at EU level for use of biomethane for to cover the ETS obligation
- Long term contract on biomethane with industry related to the ETS mechanism
- New reform for connection cost to the grid (transport or distribution) paid from the general cost of the system and not from the biomethane project (a RepowerEU project is ongoing for Italy)
- To foresee the possibility of "easy" reverse flows from the distribution grids to the transport grids
- To allow the account of the use of biomethane in the Effort sharing sector (IPCC rules to be changed or clarification and clear guide from Eurostat/DGENER into this statistical allocation)
- Simplified permitting procedure in "go-to" areas and into reconversion from biogas to biomethane plant
- Procedures to overcome the NIMBY effect
- Long term incentive scheme (Italy are working for the new scheme starting from 2027)

THANK YOU for the attention

Morning plenary

Biomethane frontrunners

Aymeric de Loubens

Deputy Head of Renewable and Low-Carbon Gas Office

Ministry of Energy Transition, France

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BIOMETHANE SCALE-UP: THE CASE OF FRANCE

Aymeric de LOUBENS

Deputy head of Renewable and Low-Carbon Gas Office

Ministry of Energy Transition, France

Brussels, October 24th, 2024

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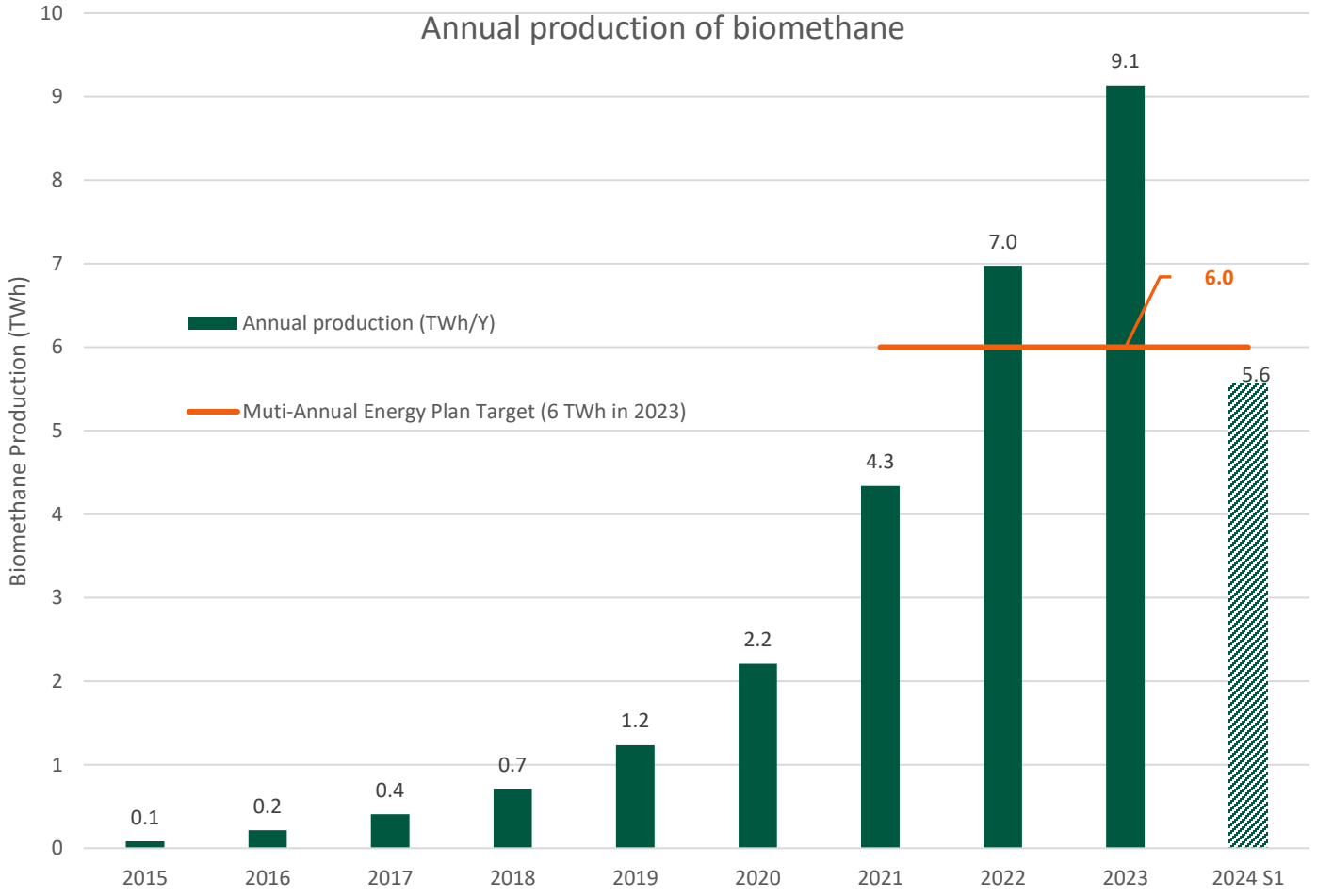
Current state of biomethane development

Biomethane production has rapidly increased in France in the last decade:

- Initiated in 2011
- In 2022, the target set for 2023 is exceeded
- In 2023, 31% production increase compared to 2022
- As of 30 June 2024:
  - **694** biomethane plants
  - 51% of them producing < 15 GWh/year
  - Total production capacity: **12,6 TWh/year**
  - Production capacity of future plants that have already signed contracts: **7,6 TWh/year**



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Support mechanisms for biomethane development

Since the cost of producing biomethane is **significantly higher** than the price of natural gas, the development of biogas production requires **public support**

1- Biomethane feed-in tariffs: main support mechanism since 2011

- Tariffs adjusted several times (2020, 2021 and 2023)
- For all plants until 2020, then only for ‘small’ plants (production capacity < 25 GWh HHV/year)
- 15 year contracts with purchase guarantee by a natural gas supplier
- Funded by the national budget

2- Biogas production certificates (Green certificates): a market mechanism starting from 2026

- Comparable to an incorporation obligation for biomethane
- Imposed on natural gas suppliers
- Well suited for ‘larger’ plants (production capacity > 25 GWh HHV/year)
- Calibrated to support the injection of more than 10 TWh of biomethane into natural gas networks over the period 2026-2028

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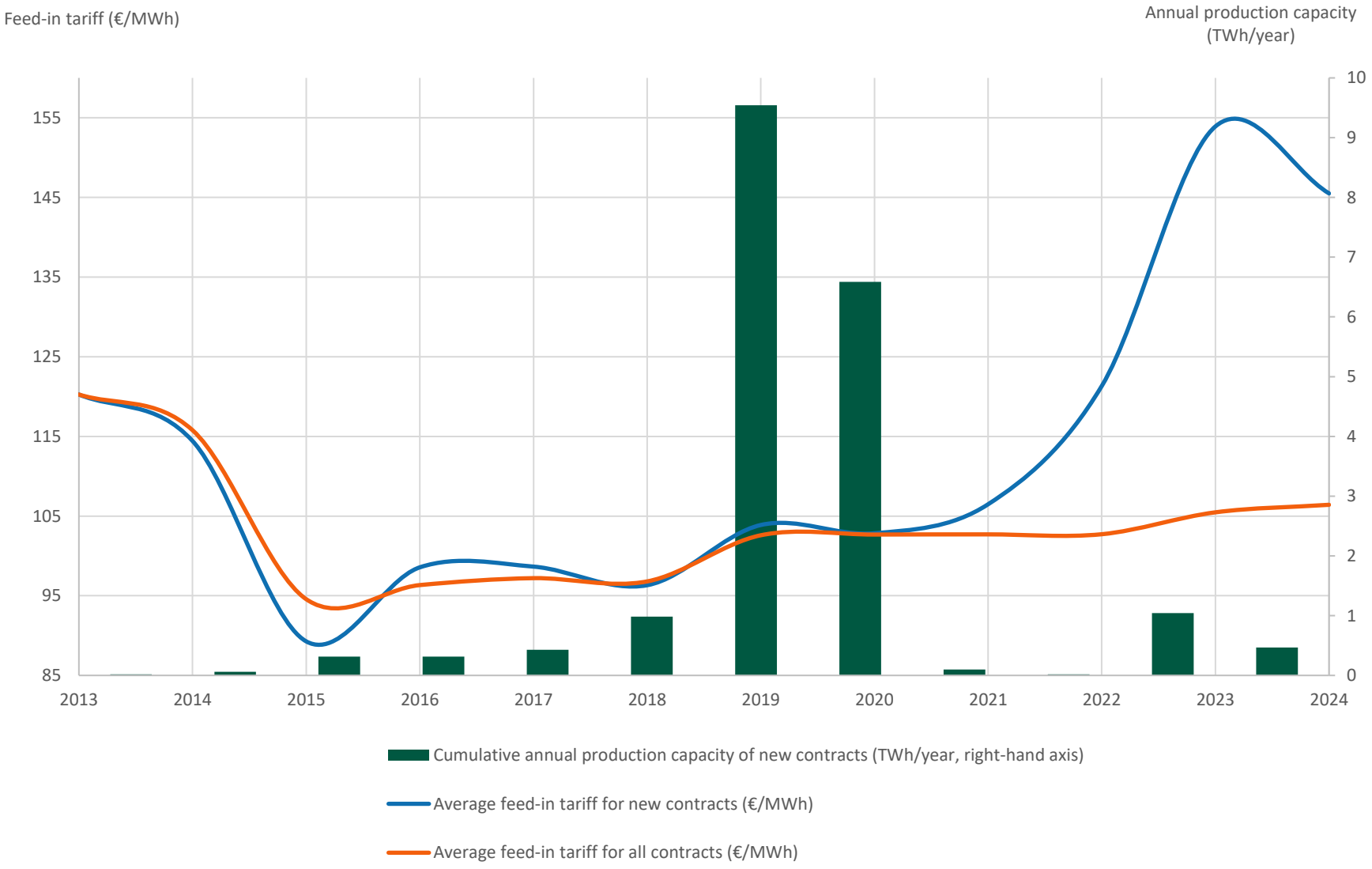
The expected reduction in production costs did not materialise



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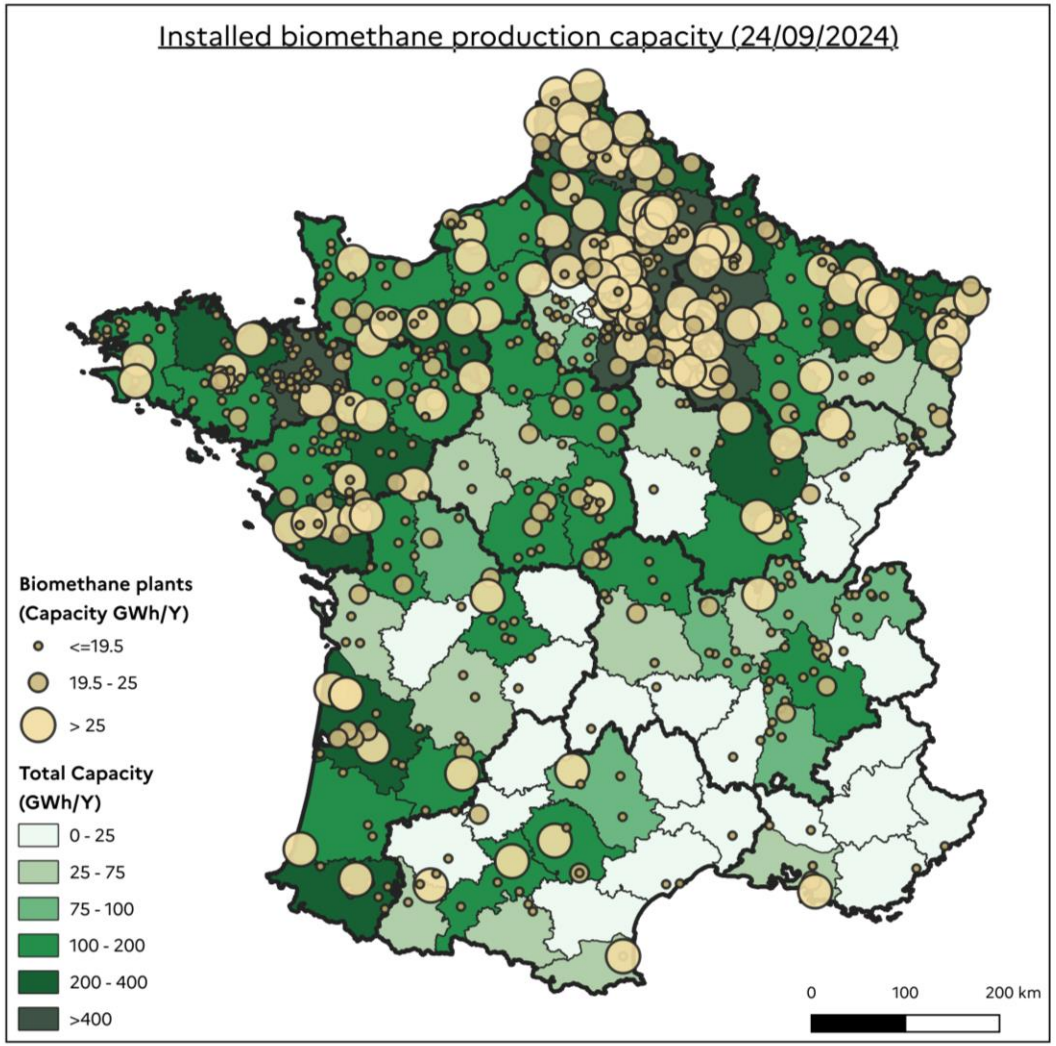
Towards increased competition between biomass uses at the local level

More and more plants that are **geographically closer and closer** to each other: how to **manage competition for biomass** supplies between existing and new plants?

The impact of new plants, particularly large ones, on **the economic balance of biomass supply chains** must be anticipated and controlled at the local level

Local biomass suppliers will **arbitrate between the different sectors of use**, taking into account the potential for valorisation and the specific constraints (e.g. sustainability requirements for bioenergies) of each sector

⇒ These developments raise questions of **territorial organisation** which must be **addressed by the sector itself** (rather than by public regulation)



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Biomethane future and challenges

Re-evaluation of the targets to set higher goals

A target of **15% of gas consumption** in 2030 is being discussed for the **Multi-Annual Energy Plan (2024-2033) under revision** :

Targets	**2030**	**2035**
Biomethane production (injected)	**44 TWh HHV**	**50 to 85 TWh HHV**

New challenges faced by the sector

- **Higher ambitions** in terms of production
- **Higher production** costs in an **inflationary context**
- A **good level of maturity** in the sector but still efforts to be made **to gain in productive efficiency**
- **Availability** and **mobilisation** of **biomass:** food production vs energy crops

Thank you for your attention

Q&A Session

Biomethane frontrunners

Paolo Frankl

International Energy Agency (IEA)

Tom Howes

DG ENER, European Commission

Michał Łęski

Ministry of Climate and Environment, Poland

Giovanni Perrella

Ministry of Environment and Energy Security, Italy

Aymeric de Loubens

Ministry of Energy Transition, France

EUROPEAN BIOMETHANE WEEK

Visual summary of the plenary

EUROPEAN BIOMETHANE WEEK

EBA AWARDS
WINNERS ANNOUNCEMENT

Green Horizon Narrator Award

Safety First Award

Biogas Problem Solver Award

Women Trailblazer Award

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Green Horizon Narrator Award

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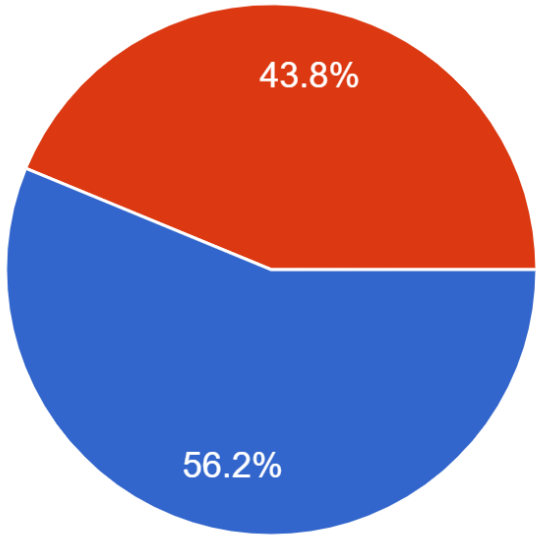
Green Horizon Narrator Award

Which candidate would be most suitable for the GREEN HORIZON NARRATOR AWARD? This award recognizes excellence in biogas storytelling, specifically in successful communication campaigns.

201 responses



- CONSORZIO ITALIANO BIOGAS - https://www.europeanbiomethaneweek.eu/speaker/finalist-2-green-horizon-narrator/
- RENERA - https://www.europeanbiomethaneweek.eu/speaker/finalist-1-green-horizon-narrator/

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EBA AWARDS

WINNERS ANNOUNCEMENT

Green Horizon Narrator Award

Consorzio Italiano Biogas

EUROPEAN BIOMETHANE WEEK

EBA AWARDS
Safety First Award

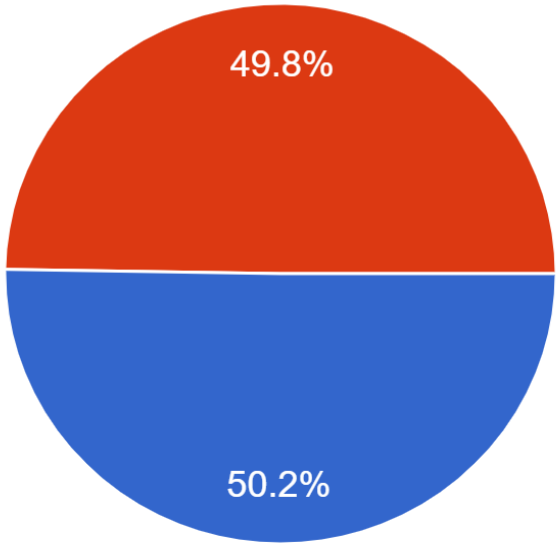
EUROPEAN BIOMETHANE WEEK

EBA AWARDS

Safety First Award

Which candidate is most suitable for the SAFETY-FIRST BIOGAS AWARD? This award recognizes exceptional commitment to safety in the biogas ind...cation to maintaining a safe working environment.

201 responses



- German Biogas Training Network - https://www.europeanbiomethaneweek.eu/speaker/finalist-1-safety-first/
- PRODEVAL - https://www.europeanbiomethaneweek.eu/speaker/finalist-2-safety-first/

EUROPEAN BIOMETHANE WEEK

EBA AWARDS

WINNERS ANNOUNCEMENT

Safety First Award

Schulungsverbund BIOGAS

German Biogas Training Network

EUROPEAN BIOMETHANE WEEK

EBA AWARDS
Biogas Problem Solver Award

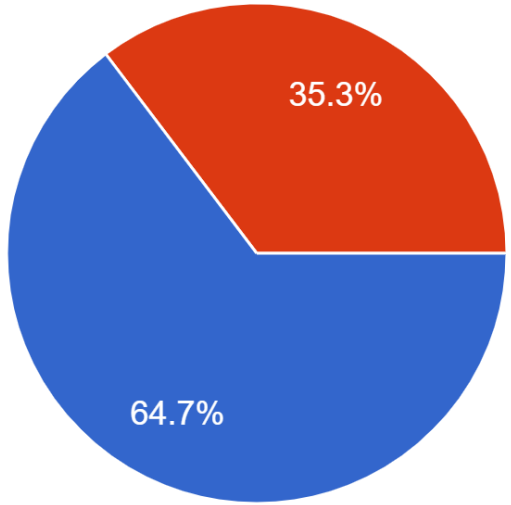
EUROPEAN BIOMETHANE WEEK

EBA AWARDS

Biogas Problem Solver Award

Which candidate is the most suitable for the BIOGAS PROBLEM-SOLVER AWARD? This award honors individuals or initiatives in the biogas indu...lutions to overcome challenges in the biogas sector.

201 responses



- AGRIPORTANCE GMBH - https://www.europeanbiomethaneweek.eu/speaker/finalist-2-biogas-problem-solver/
- CPL/PURAGEN ACTIVATED CARBONS - https://www.europeanbiomethaneweek.eu/speaker/finalist-1-biogas-problem-solver/

EUROPEAN BIOMETHANE WEEK

EBA AWARDS

WINNERS ANNOUNCEMENT

Biogas Problem Solver Award

agriportance.

Agriportance GmbH

EUROPEAN BIOMETHANE WEEK

EBA AWARDS

Women Trailblazer Award

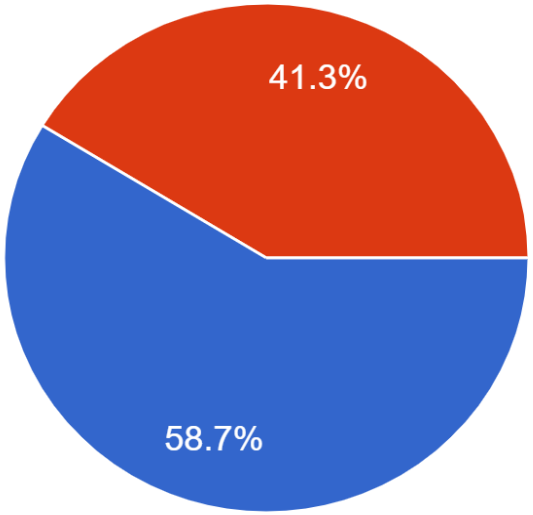
EUROPEAN BIOMETHANE WEEK

EBA AWARDS

Women Trailblazer Award

Which candidate would be the most suitable for the WOMEN TRAILBLAZER AWARD? This award recognizes courageous women who are leading the e...vancing gender equality in the biogases sector.

201 responses



- ANITA BEDNAREK, Polish Association of Agricultural Biogas Producers/ Goodvalley - https://www.europeanbiomethaneweek.eu/speaker/finalist-1-women-trailblazer/
- MIRIAM WEISSROTH, Lundsby Renewable Solutions - https://www.europeanbiomethaneweek.eu/speaker/finalist-2-women-trailblazer/

EUROPEAN BIOMETHANE WEEK

EBA AWARDS

WINNERS ANNOUNCEMENT

Women Trailblazer Award

Anita Bednarek

EUROPEAN BIOMETHANE WEEK

SPOTLIGHT SPEECH

Charles-Henri des Villettes

Vice-President

Air Liquide Biogas Solutions

EUROPEAN BIOMETHANE WEEK

Biogas Solutions

Defining a sustainable way of producing biomethane

2024

Biogas Solutions at a glance

26
biomethane production units worldwide

1.8 terawatt-hour
of biomethane production capacity per year

250+ people
international teams

Following a **circular economy** approach, we **build, own and operate** biomethane production units on **3** continents to support the decarbonization of **Industry** and **Transportation**.

We are a member of:

BIP Europe
Biomethane Industrial Partnership

EBA
European Biogas Association

Avoided vs. induced emissions?

Better water management vs risk of contamination?

Carbon storage and nutrients management vs. soil microbiological balance and potential contamination?

Is biomethane inherently virtuous?

A collaborative approach to define a sustainable way of producing biomethane

Leveraging the expertise of the ecosystem

WWF

EBA European Biogas Association

GHENT UNIVERSITY

United Experts Group

Actionable deliverables

- Project scoring for opportunities selection and plant design
- Key Sustainability Indicators (KSI) for operations

a public synthesis for the industry!

Sustainable biomethane production principles

Contribute efficiently to the energy transition

Be a lever for agroecological practices

Maximise benefits for local ecosystems and promote a circular economy

Prevent risks on the environment and preserve biodiversity

Download our public synthesis!

Inspiration CHALLENGE

ADVANCING THE SUSTAINABILITY OF THE SECTOR

EUROPEAN BIOMETHANE WEEK

Inspiration Challenge

Burak Yirmibesoglu, Cofounder

NPHarvest

Emile Baier, VP Corporate Strategy & Public Affairs

Prodeval

Fabien David, Project Manager

Vinci Energies

Maïlis Benazet, Business Developer New gases

Storengy/Engie

Scott Treadwell, President

SixRing

Terje Hauan, CTO

Seid

EUROPEAN BIOMETHANE WEEK

Inspiration Challenge

NUTRIENT CATCHERS: Recovering the essence of life

Burak Yirmibesoglu

Cofounder - Business Developer

NPHarvest Oy

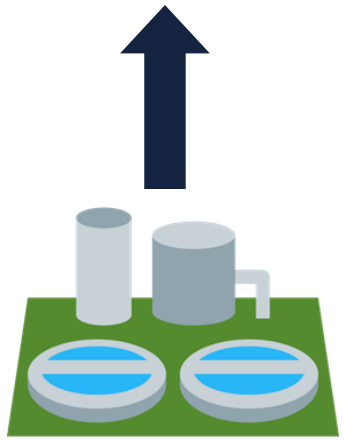
EUROPEAN BIOMETHANE WEEK

WHERE AND HOW NPHARVEST CREATES VALUE?

Current situation

GHG emissions

Nutrients rich wastewater



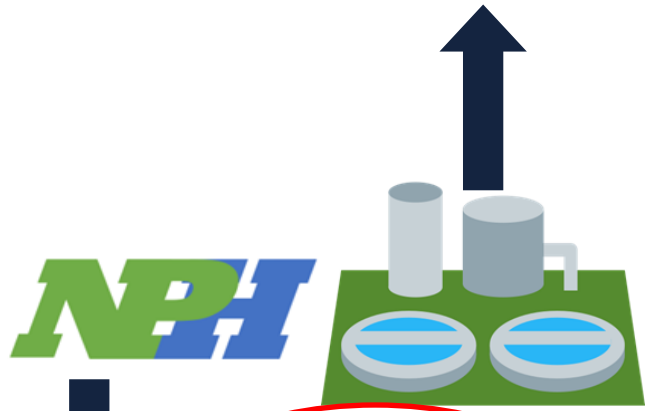
High treatment costs

Nutrients not recovered

NPHarvest kicks in

Reduced GHG emissions

Nutrients rich wastewater



Lower treatment costs

90% nutrients recovered

Inspiration Challenge

ALLIANCE : A World First in the Biogas Sector!

Emile Baier

VP Corporate Strategy & Public Affairs

Prodeval

EUROPEAN BIOMETHANE WEEK

Inspiration Challenge

Zero Emission Gas Sampling System

Fabien David

Project Manager

Actemium by Vinci Energies

EUROPEAN BIOMETHANE WEEK

ACTEMIUM

Zero emission gas sampling system

DAVID Fabien
Responsable d'affaires
+33 6 27 13 84 01
fabien.david@actemium.com

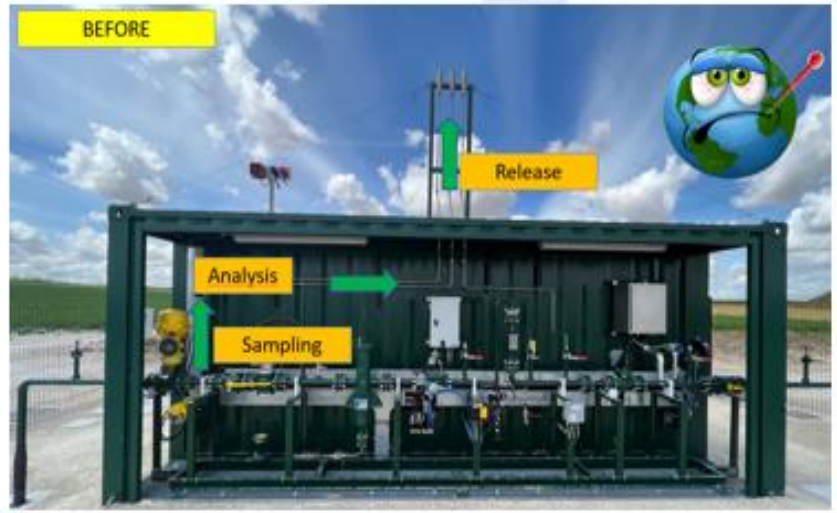
VINCI ENERGIES

Inspiration Challenge #EUBW2024

Solution developped with our Customer GRTgaz

Installation of a recirculation pump for methane samples dedicated to analyzes

- 100% ACTEMIUM Laxou solution
- Implementation of the solution on a pilot biomethane injection site with success
- Tests also carried out on an Hydrogen application



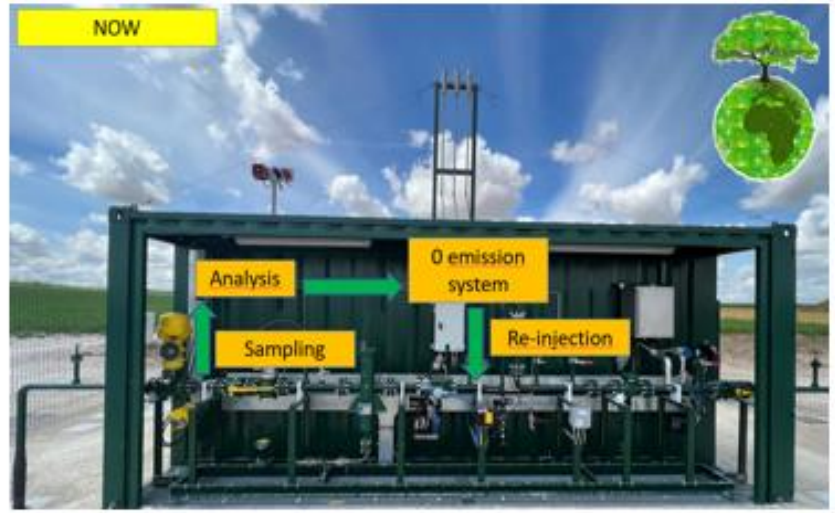
Focus on the Benefits

A reduction in GHG emissions at a biogas injection station : - 50 Teq CO_2

- So, almost 250.000km with a diesel car!

Sales potential

- A turnkey solution currently estimated at €25k per injection point
- Reference to our Client GRTgaz for new biogas injection stations
- Retrofit of biogas stations in service !
- All gas analysis applications !!



Inspiration Challenge

Salamandre: Insightful Takeaways of a Pyrogasification Project for the Biomethane Community

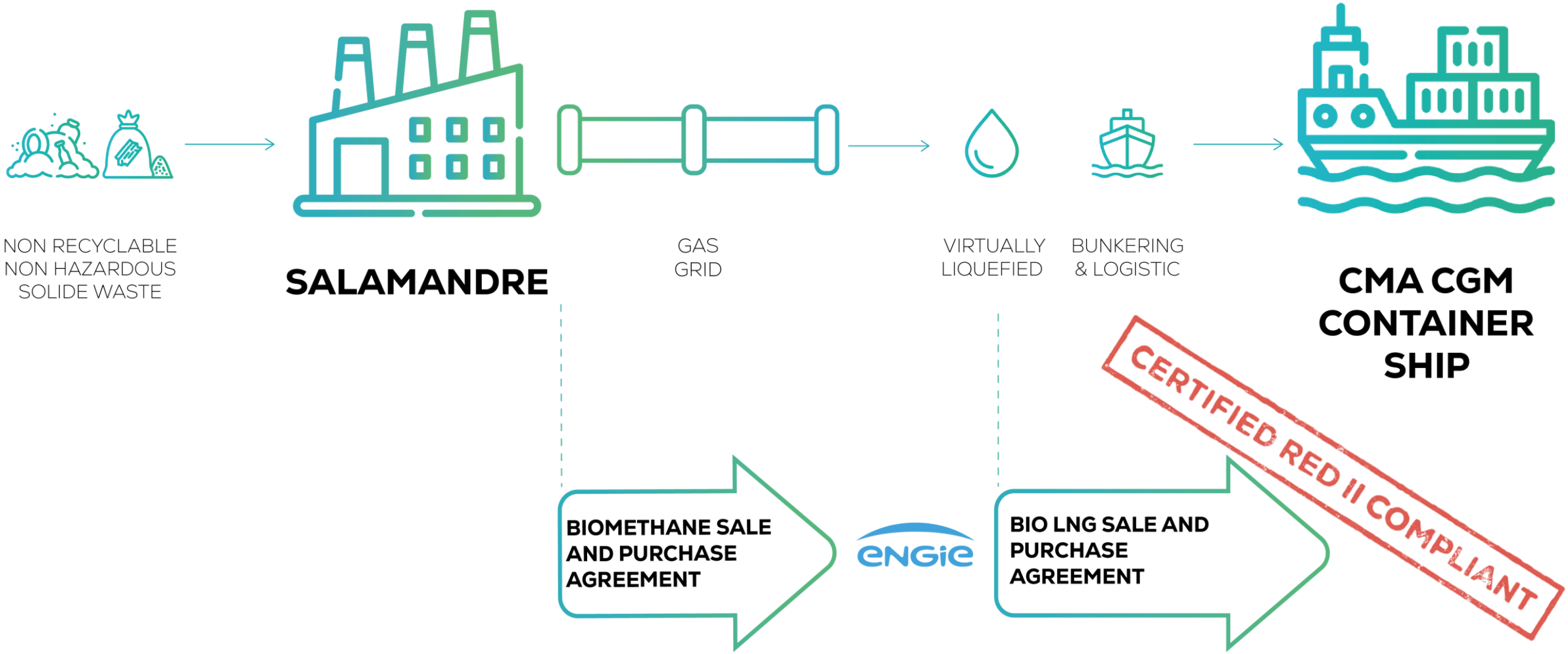
Maïlis Benazet

Business Developer New gases

Storengy/Engie

EUROPEAN BIOMETHANE WEEK

SALAMANDRE: insightful takeaways for the biomethane community



ENGIE

Inspiration Challenge

Stimulose™ – High Purity Catalytic Cellulosic AD Supplement

Scott Treadwell

President

SixRing Inc

EUROPEAN BIOMETHANE WEEK

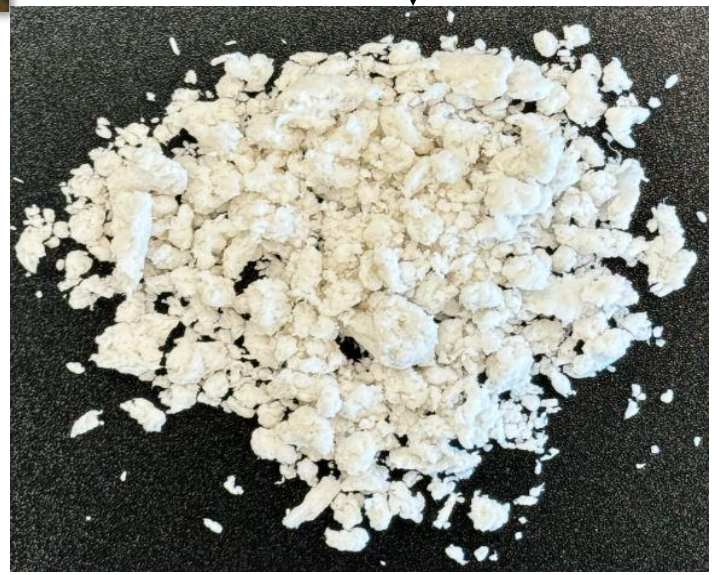
Stimulose™ - Catalytic Cellulosic Additive

SixRing™

10-120% increase in biomethane

€40 -€55/MWh
Lower H_2S %
Higher CH_4 %
€0 Capex

Non-Food Biomass (all types)
Commodity Chemicals & Materials
Ambient Conditions & Exothermic
80+% conversion of biomass to products

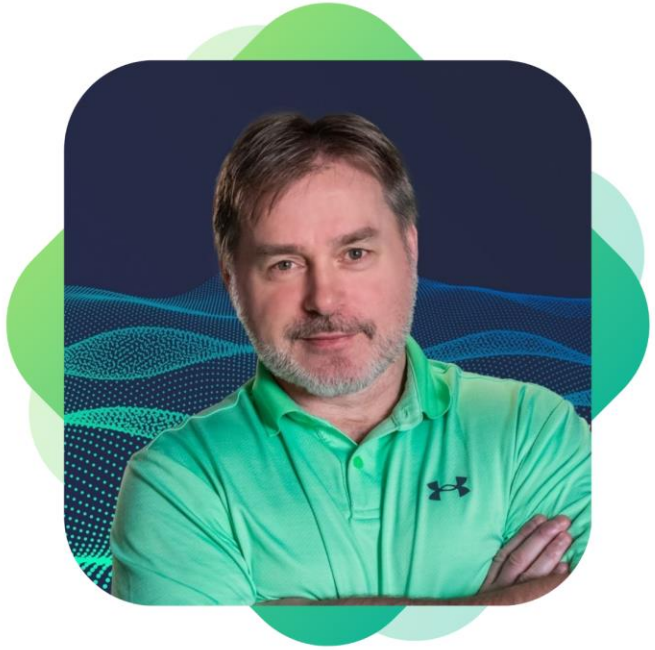


Stimulose™
High Surface Area
Low Lignin Content (<0.5%)
High bioavailability

Increased VS Conversion
Promotes Methanogenesis

Inspiration Challenge

ColdSpark® - Pioneering High-Purity Carbon Production and Clean and Decarbonised-Carbon Hydrogen



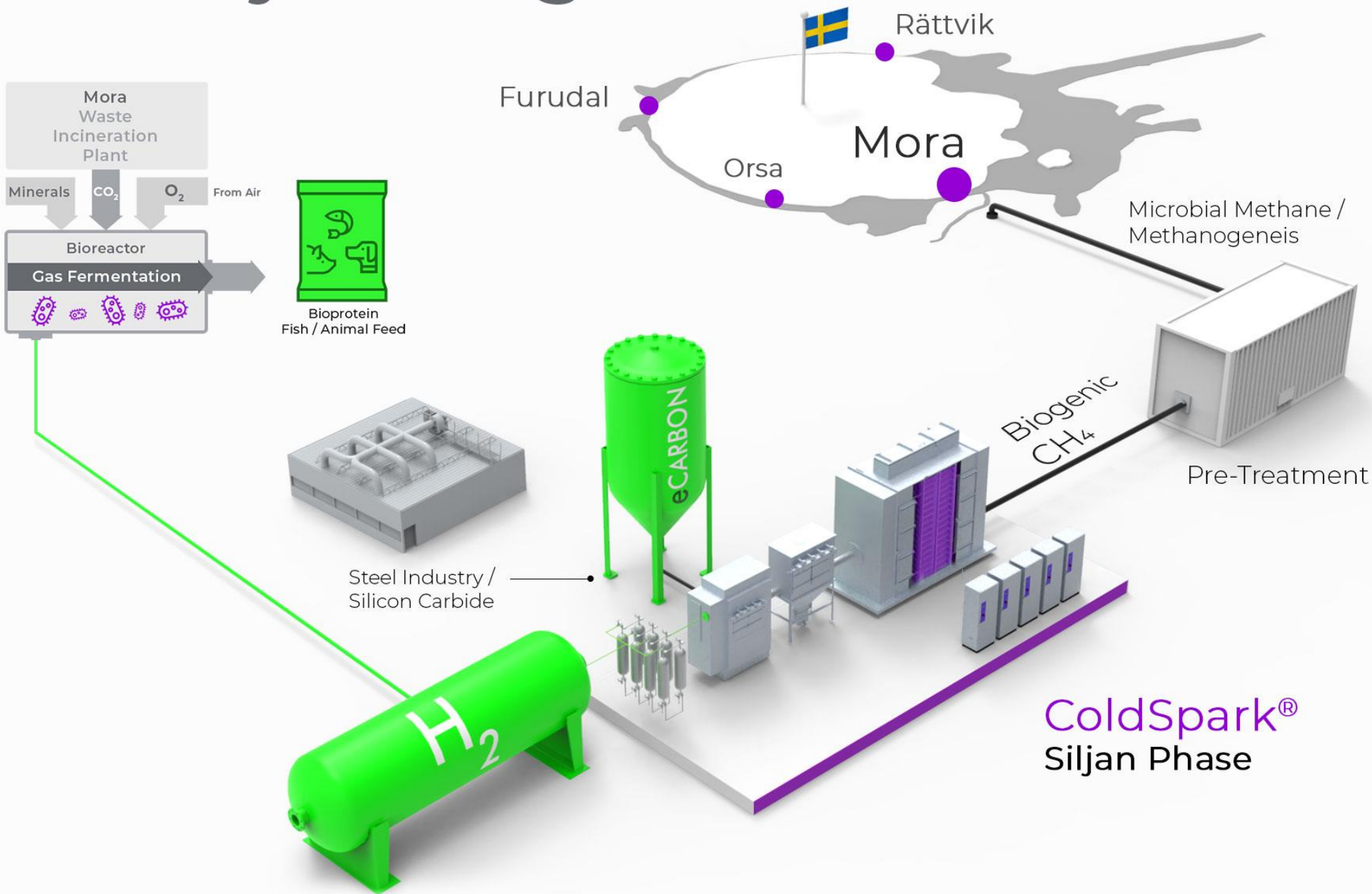
Terje Hauan

CTO

SEID

EUROPEAN BIOMETHANE WEEK

The Siljan Ring



Inspiration Challenge: Q&A Session

NPHarvest
By NPHarvest Oy

ALLIANCE : A World First in the Biogas Sector!
By Prodeval

Zero Emission Gas Sampling System
By Actemium by Vinci Energies

Salamandre: Insightful Takeaways of a Pyrogasification Project for the Biomethane Community
By Storengy/Engie

Low-cost Biomass Processing Technology to Increase Biomethane Production by Up to 100%
By SixRing

ColdSpark® - Pioneering High-Purity Carbon Production and Clean and Decarbonised-Carbon Hydrogen
By SEID

EUROPEAN BIOMETHANE WEEK

Parallel breakout

Biomethane across borders: trading and procurement explained

Moderated by Tim Hamers

Jacob Boon

Olyx

Paul Vonk

Tata Steel

Henning Singelsö

Gasum

Adrian Dorsch

S&P Global Commodity Insights

Diego Radlmaier

bmp greengas

EUROPEAN BIOMETHANE WEEK

Parallel breakout

Biomethane across borders: trading and procurement explained

Jacob Boon

Broker

Olyx

EUROPEAN BIOMETHANE WEEK

OLYX.NL

OLYX

Value for all.

European Biomethane Week
2024

Memoirs of a middle man

- About OLYX
- Prices came down.. what's next?
- New consumers come in..
  - How?
- **Key takeaways**

OLYX

700+
Trading partners worldwide

€ 9bn+
Intermediated deal value

60+
Trading countries

2014 — 2024

Prices came down.. what's next?

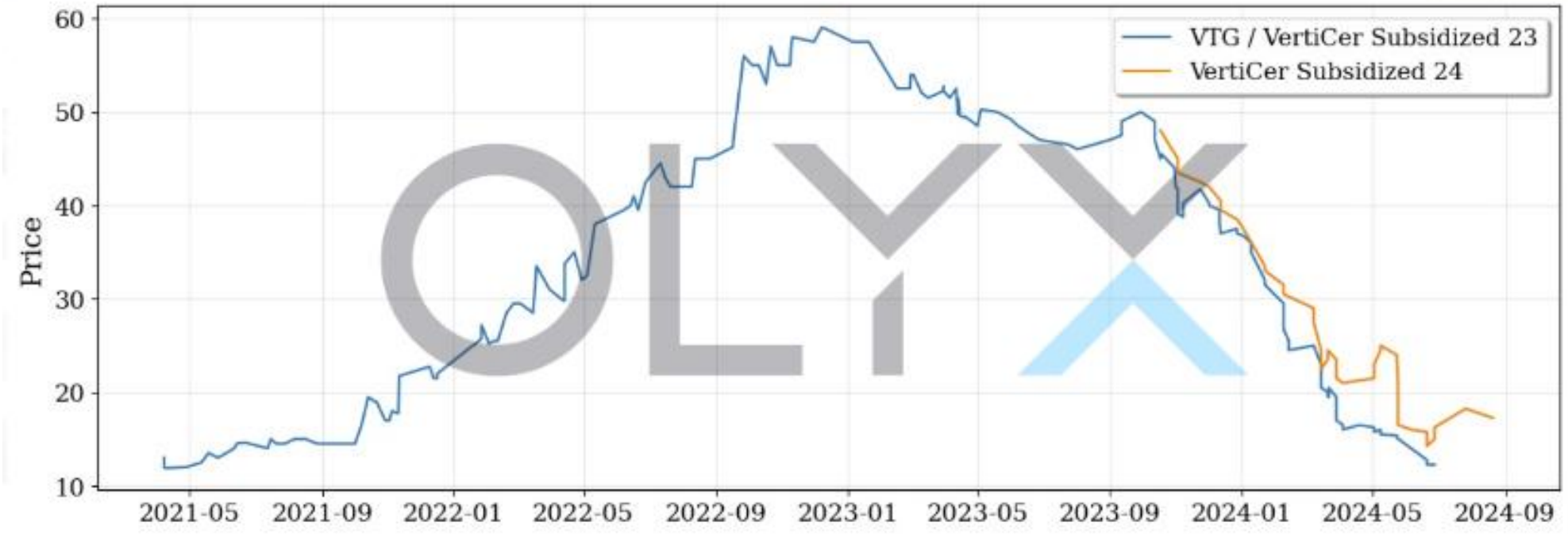


Figure 1: Subsidised biomethane (NL/DK/UK origin), certified ISCC EU, 0-20g/MJ, 10.000 MWh HHV, TTF nominated
(source: OLYX daily market price assessment)

....new consumers

OLYX.NL

The best cure against high prices is high prices... and the other way around.

Opportunity for the biomethane industry to onboard more consumers

More business cases start making sense
- Outright EUA arbitrage
- Or f.i. low-carbon product premium over EUA pricing

What makes sense for such companies/entities to look for?

Searching price information

Set-up (registries, capacity building, etc)

Understanding regulatory frameworks

Finding the right specifications (and risks)

Developing business cases internally

...in a fragmented regulatory landscape, this takes a while

And how do they procure?

Bilateral

- Limited counterparties
- Flexible and fast
- Tailored solutions
- Requires (and builds) trust

Tender formats

- ‘Beauty contest’
- Time consuming
- Rigid
- Market reach

OLYX.NL

- New consumers are coming
- Interaction with current industry is key
- Market info is influential to consumer success

OLYX.NL

Value for all.

Parallel breakout

Biomethane across borders: trading and procurement explained

Paul Vonk

Hydrogen & CCS Business Lead

Tata Steel Netherlands

EUROPEAN BIOMETHANE WEEK

TATA STEEL

TATA

Clean

Green

Circular

Leadership principles

Themes

Connect

Change

Care

People & Society

Environment & Community

Decarbonisation & Sustainability

Customers & Value

Purpose

Why we are on the journey

Improving how people around the world work, live and move, through sustainable steel

Mission

The route we follow

To continue to play a meaningful role for all our stakeholders as a clean, green, circular steel company that creates value, is an employer of choice, and maintains an ongoing dialogue with our neighbours

Vision

What we expect to find when we arrive

A clean, green and circular steel company that is sustainable in every sense

First step – replace coal with natural gas
Second step – replace natural gas to eliminate CO_2 emissions

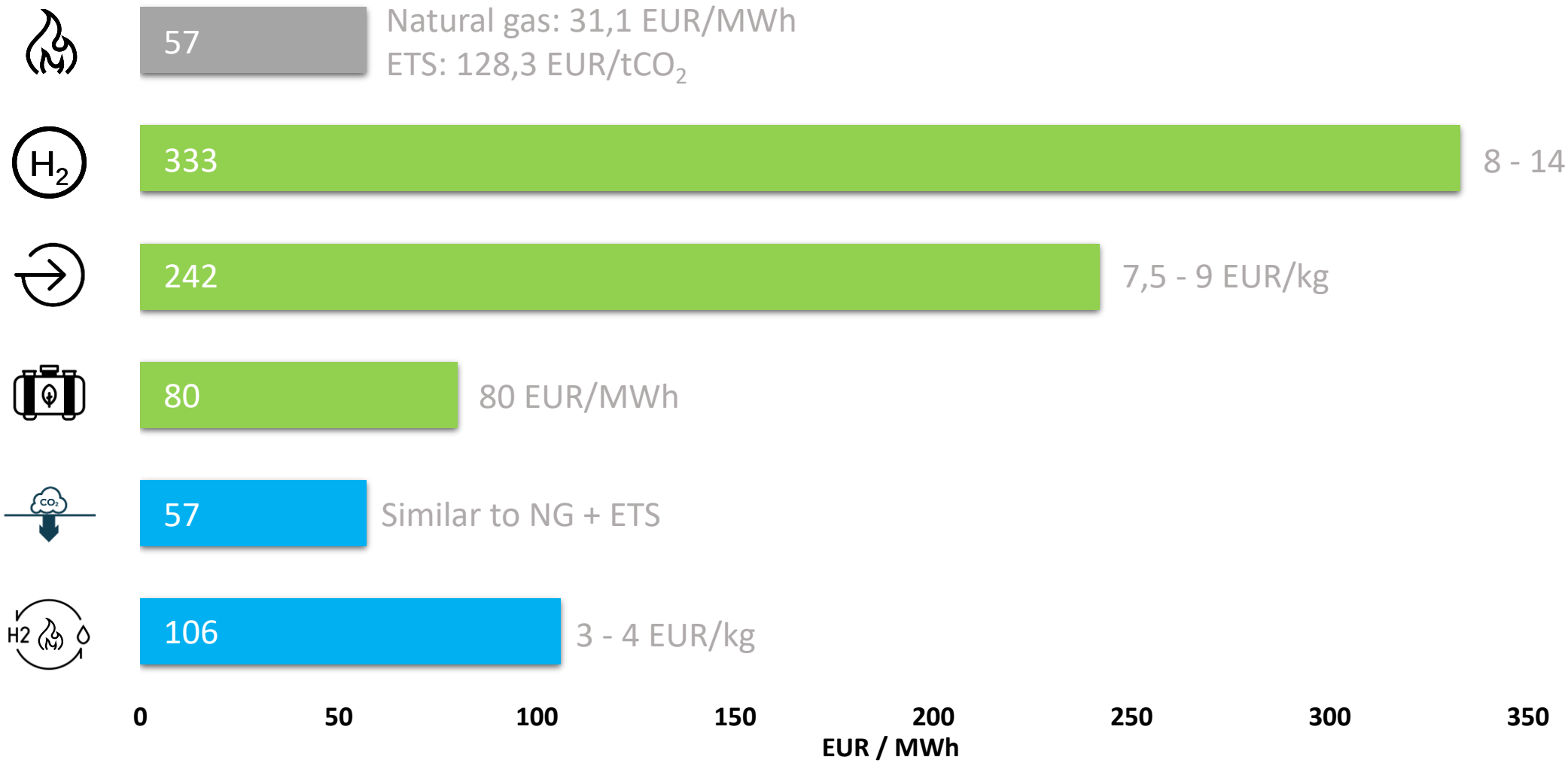
Energyvector	Renewable
Natural Gas	
EU Green Hydrogen	✓
Imported Green Hydrogen	✓
Biomethane	✓
CCS	
Blue Hydrogen	
Elektricity	✓

Kostenvergelijking aardgas alternatieven in 2030

In Euro per MWh (at the gate)

TATA STEEL

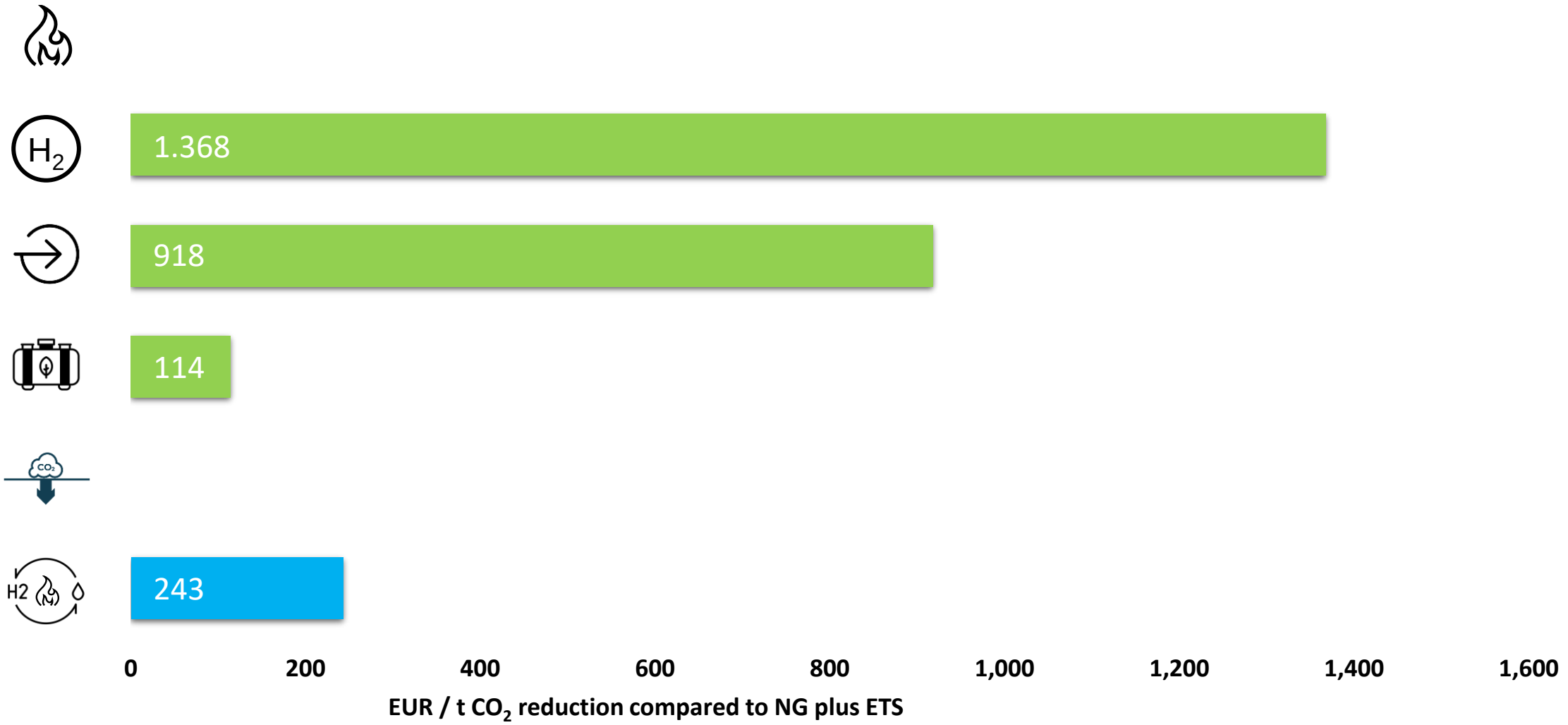
Costs in EUR/MWh (real 2024)



1 Source: IEA, 2024. 2 Source: IEA, 2023. 3 Source: CE Delft, 2023. 4 Source: McKinsey, 2023. 5 Source: NG+ETS and NG+CCS have the same costs, assuming SDE++ subsidy closes gap to ETS and CCS. 6 Source: IEA, 2023.

Feasibility gap natural gas alternatives in 2030

Additional costs compared to natural gas in EUR/tCO_2 *abated*



1: Om 1 ton CO_2 uit te stoten met aardgas, moet 4,21 MWh aan aardgas worden verbruikt. 2: Waterstofequivalent: 4,21 MWh aan waterstof is ongeveer gelijk aan 108 kg waterstof. 3: Aanname voor alternatieven: Alle alternatieve energiebronnen worden verondersteld een emissiefactor van 0 te hebben, wat betekent dat er geen CO_2-uitstoot wordt.

Requirements for the large industrial usage of biomethane

Focus areas for change

Biomethane roll-out policy should cover industries' carbon needs

Allow the use of foreign biomethane GoO certificates in the Netherlands for lowering the required EU-ETS allowances

Reduced energy taxes for biomethane

Acknowledgement of biomethane for scope 1 emissions under the GHG Protocol and SBTi

TATA STEEL

Parallel breakout

Biomethane across borders: trading and procurement explained

Henning Singelsö

Senior Development and Porfolio Manager, Renewable Gases

Gasum

EUROPEAN BIOMETHANE WEEK

Experience of Biomethane market

Henning Singelsö
Senior Development and Portfolio Manager
Renewable Gases, Gasum

Gasum

10/28/2024

Content

- Company presentation
- Experiences
- Market outlook

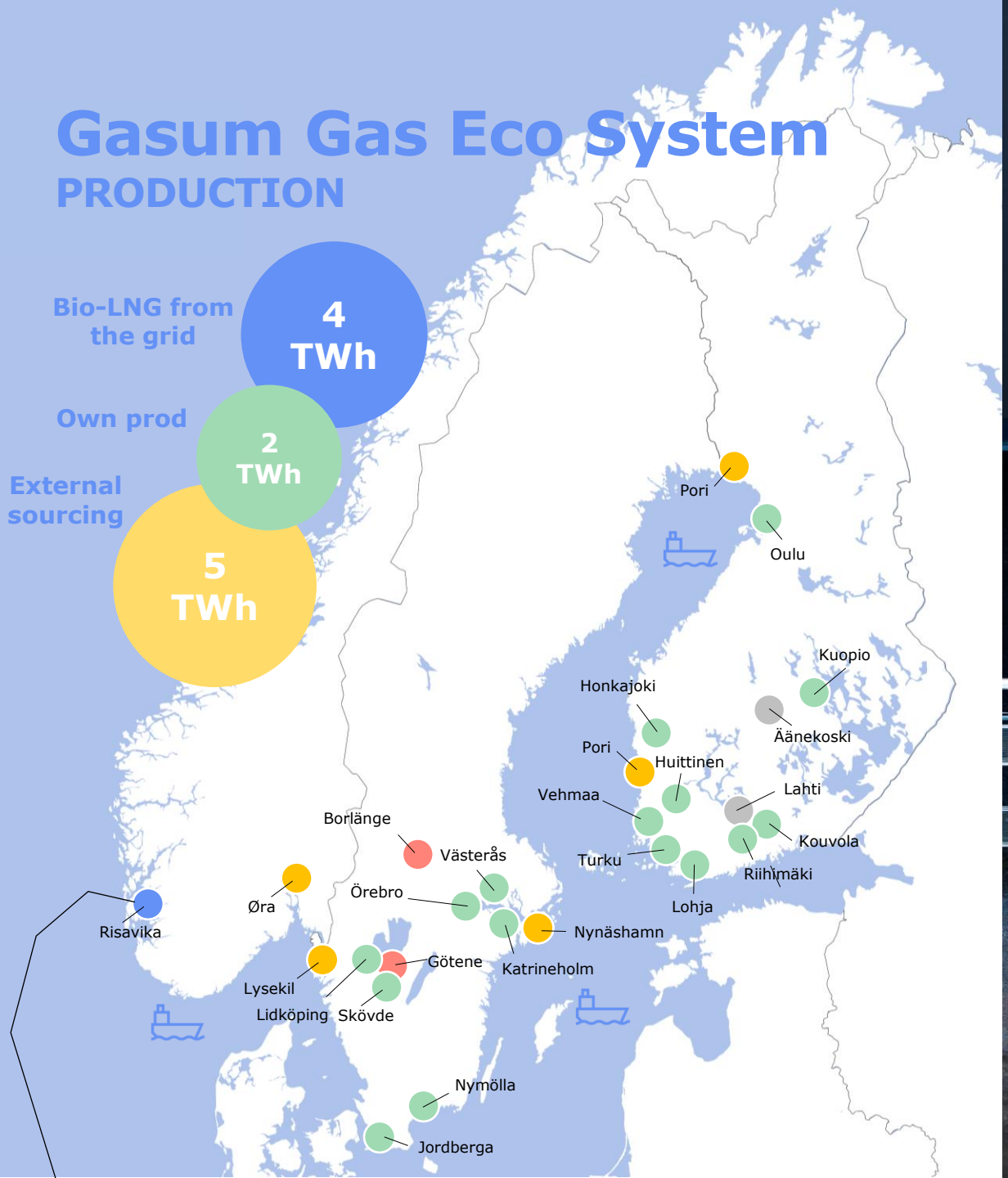
Gasum Gas Eco System

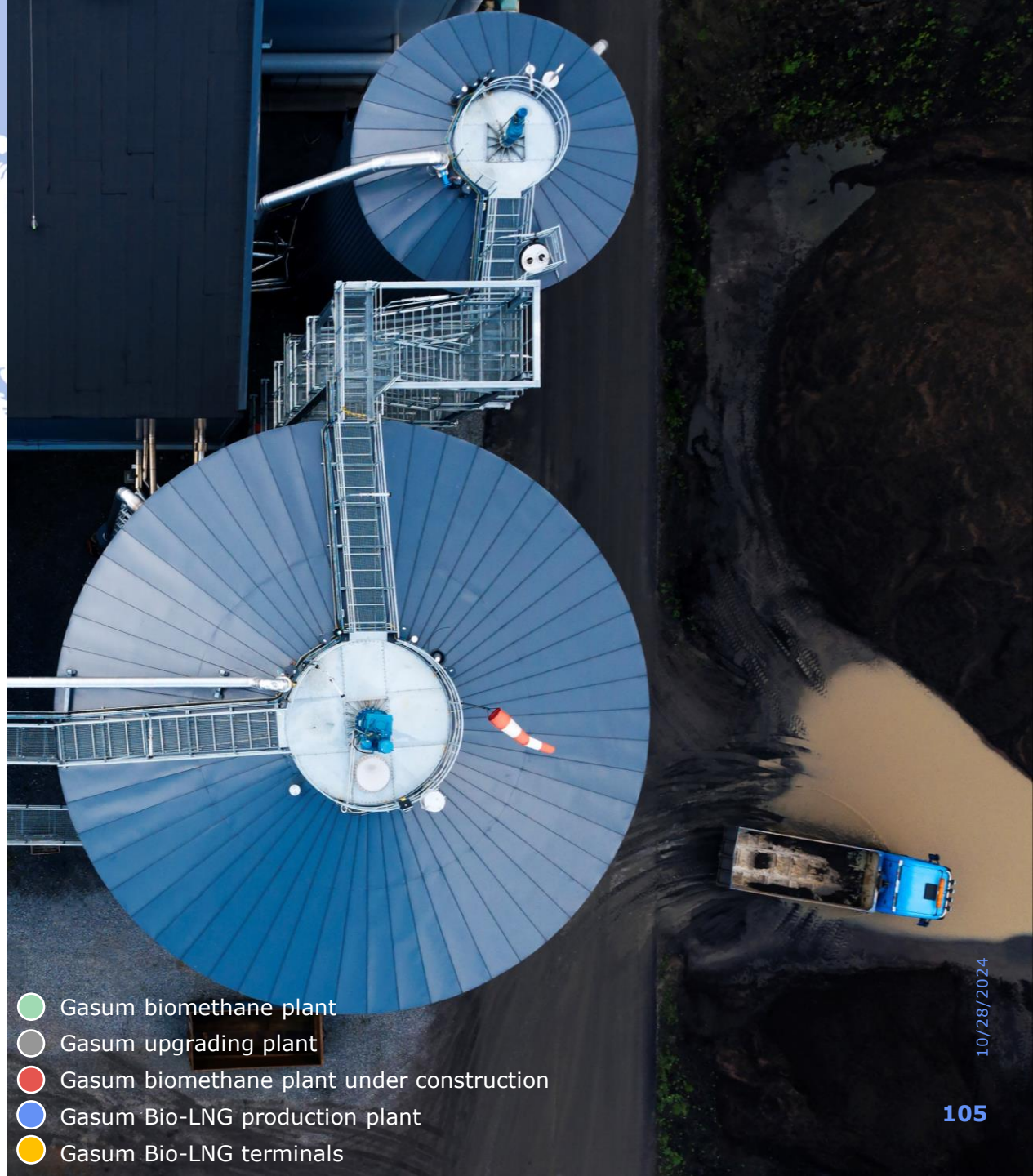
PRODUCTION

Bio-LNG from the grid **4 TWh**

Own prod **2 TWh**

External sourcing **5 TWh**





- Gasum biomethane plant
- Gasum upgrading plant
- Gasum biomethane plant under construction
- Gasum Bio-LNG production plant
- Gasum Bio-LNG terminals

Gasum Gas Ecosystem
LOGISTICS SOLUTIONS

Ship and truck transportation of liquefied gas

Truck transportation in pressurised gas containers

Gas transmission in transmission and distribution networks

Mass balance system with Guarantees of Origin (GoO) and Proof of Sustainability (PoS)

Gasum Gas Eco system

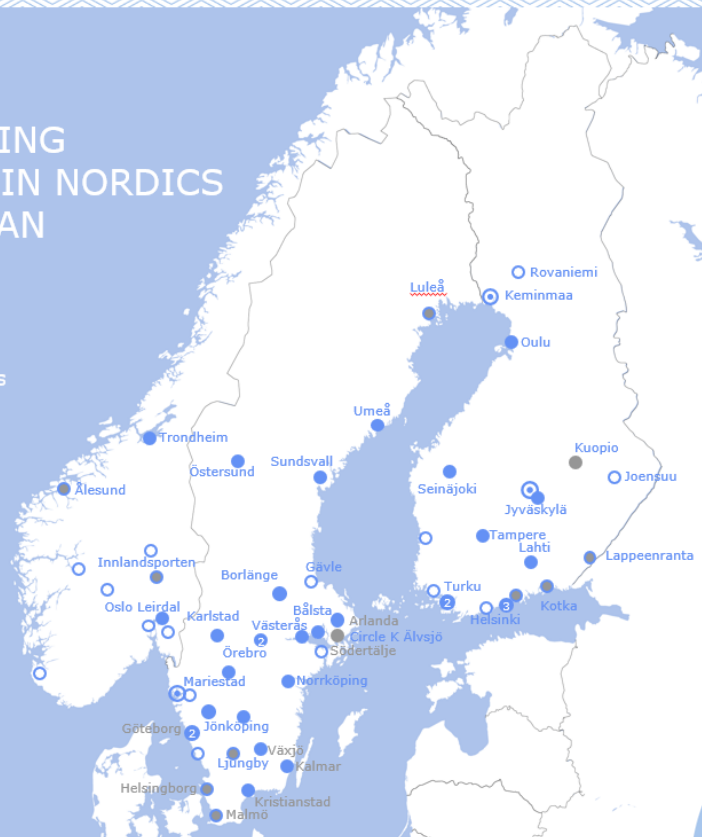
RETAIL AND SALES NETWORK

NETWORK OF LNG FILLING STATIONS EXPANDING IN NORDICS – GASUM NETWORK PLAN

Targeting a network of 50 filling stations in the Nordic countries by the early 2020s. Today totally 42 stations.

Key Drivers for market development:

- Significant market potential
- Requirements for fast emission reduction and low emission solutions
- Expanding filling stations network
- Availability of vehicles
- Regulatory environment and incentives for gas
- Increase awareness of gas solution



- Existing LNG filling station
- Upcoming LNG filling station
- Planned LNG filling station

16 TWh NG & LNG

1.7 TWh Biomethane

Certified Sustainability • ISCC • Certified GHG Savings

- 7 LNG-terminals (1 for liquification)
- 5 Bunkering vessels
- 17 Biogas plants, 3 partner plants
- 2 (+3) plants under construction
- More than 100 gas filling stations

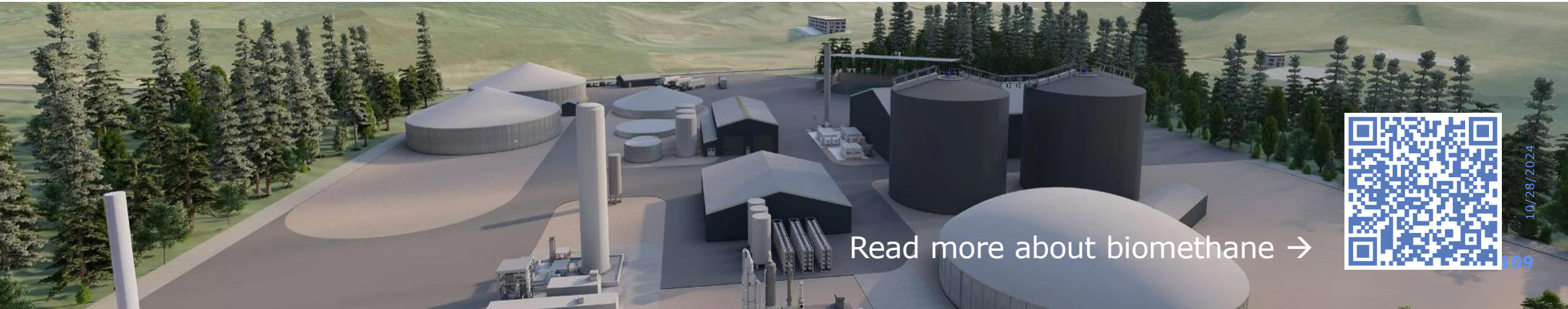
10/28/2024

Biomethane market
REFLECTIONS & EXPERIENCIES

- Biomethane demand increasing every day
- Well established infrastructure via European natural gas grid
- Liquification capabilities
- Increase biomethane production (REPowerEU)
- E-methane
- Minimize value chain footprint
- Sustainability tracking essential
- Renewable Energy Directive
- Harmonize the way how to value the biomethane (Energy and Reduction)
- Remove obstacles for cross border trading

Market outlook
WHAT IS NEEDED TO EVOLVE

- Long term commitment give predictability to the market
- In the Nordics, it is essential to deliver biomethane via Bio-LNG value chain
- Liquid biomethane is crucial for the Maritime market to utilize on renewable gases
- Focus on carbon reduction and environmental contribution
- Allocate the right biomethane product to the right customer
- Implement system support and regulatory consistency
- Make it easy to buy and sell renewable gases



Gasum

CLEANER ENERGY

Parallel breakout

Biomethane across borders: trading and procurement explained

Adrian Dorsch

Associate Director – Global Gas, LNG, and Energy Transition Consulting

S&P Global Commodity Insights

EUROPEAN BIOMETHANE WEEK

CI Consulting

S&P Global
Commodity Insights

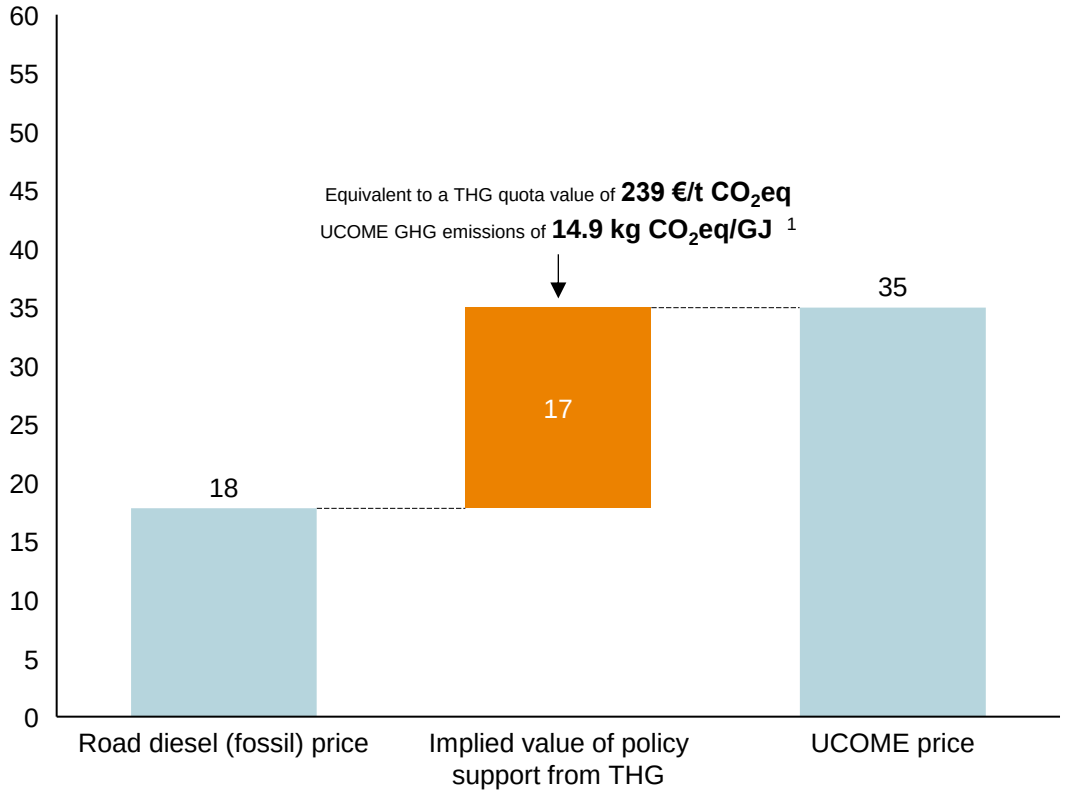
Value of Biomethane Certificates in Europe

Adrian Dorsch,
Associate Director,
Gas, LNG and Low Carbon Gas Practice

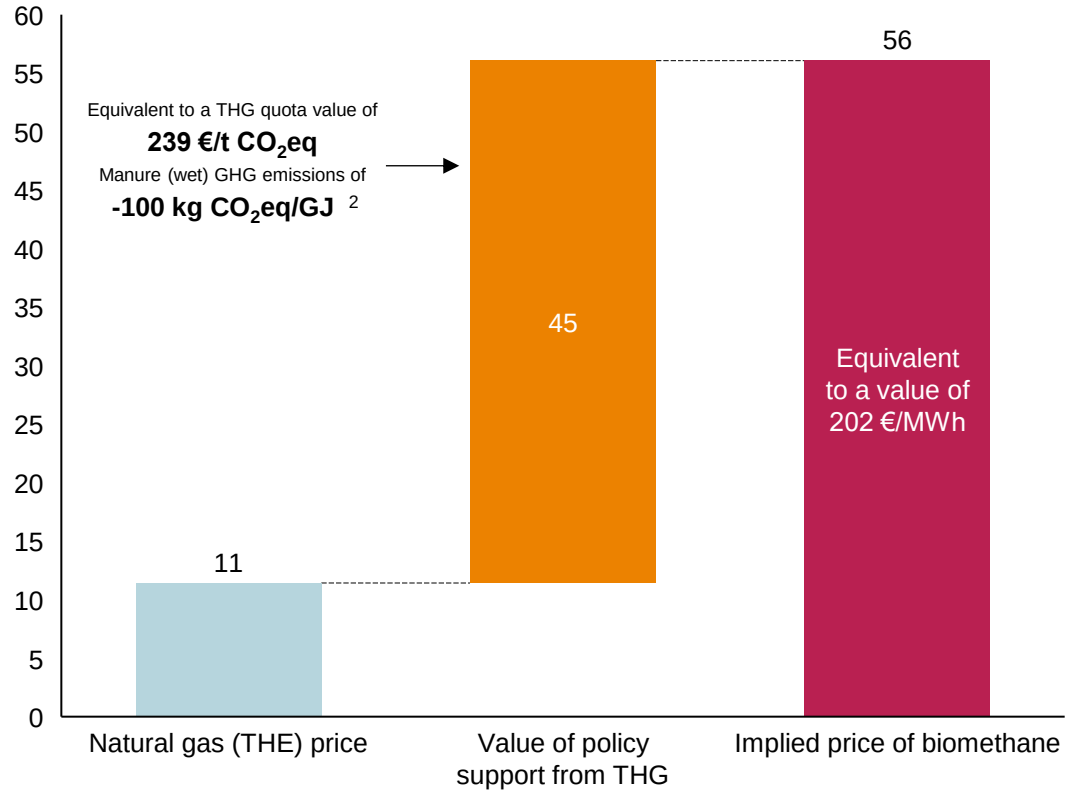
24 October 2024

German THG Quota driven demand for biofuels is a key driver of the value of Biomethane certificates and reductions in European road transport emissions

THG quota value based on road diesel and UCOME price
€/GJ (2023)



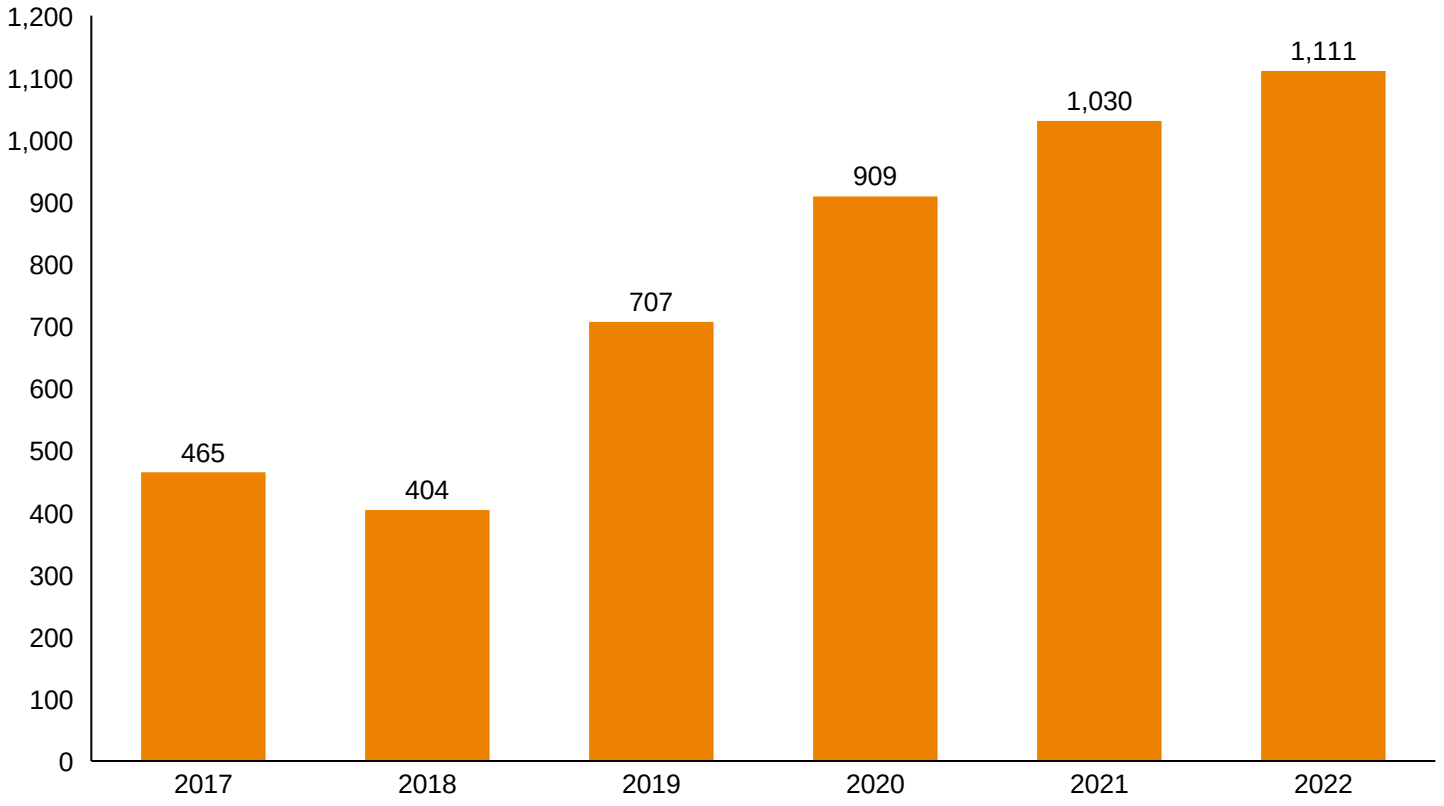
Biomethane price based on THG quota value and natural gas price
€/GJ (2023)



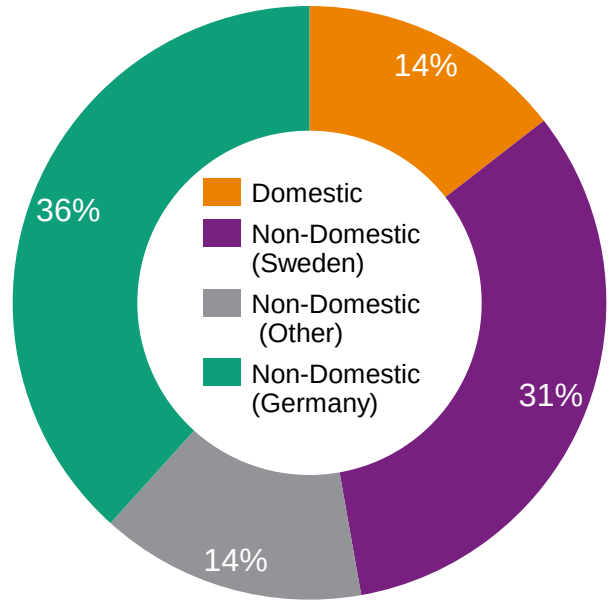
1 Where THG is awarded for GHG savings exceeding the mandate, as per the formula: emissions from fossil fuel comparator (94 kg CO_2eq/GJ) *less* savings required by the mandate (8% in 2023 = 7.5 kg CO_2eq/GJ) *less* emission of UCOME (14.9 kg CO_2eq/GJ) = 71.6 kg CO_2eq/GJ
2 As per the formula: [emissions from the fossil fuel comparator (94 kg CO_2eq/GJ) *less* savings required by the mandate (8% in 2023 = 7.5 kg CO_2eq/GJ) *less* emission of wet manure Biomethane (-100 kg CO_2eq/GJ) = 186.5 kg CO_2eq/GJ] x 239 €/t CO_2eq

The competitiveness of Biomethane due to certified low CI values in the German transport sector is likely to have been a key driver demand and cross border trade

Biomethane certificates used in German Transport Sector
GWh



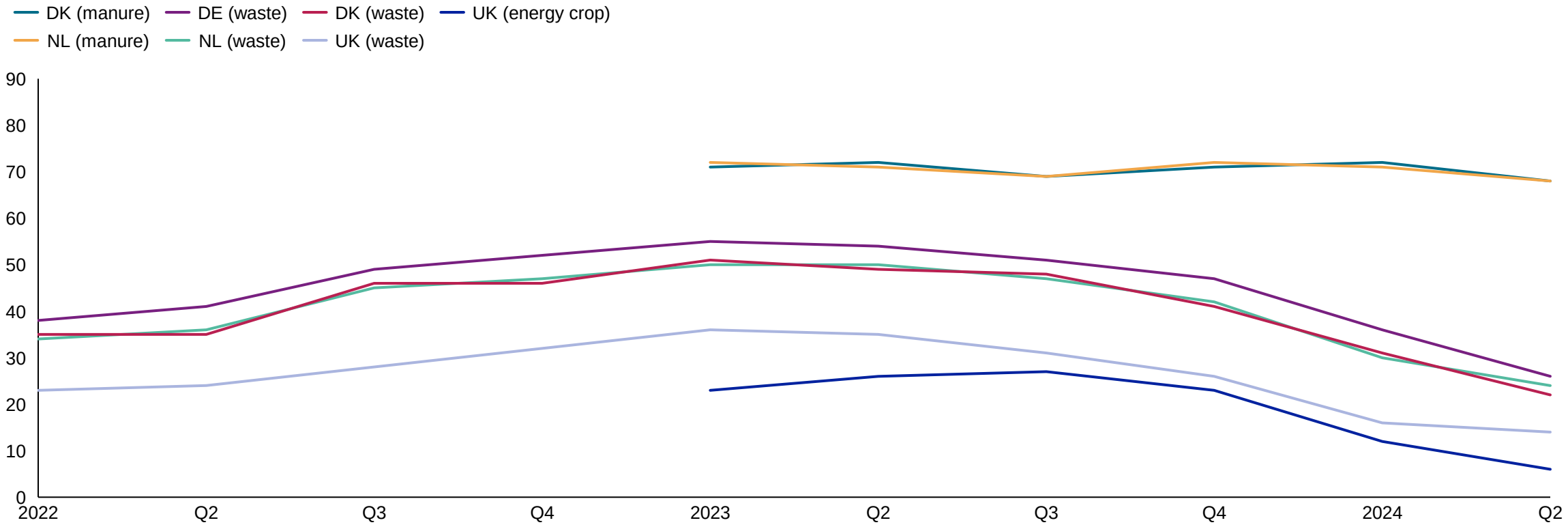
Danish Biomethane Certificates Use by Sector
%



Note: Data for 2023 certificates not yet available
Source: dena, ENERGINET and EBA

While some European Biomethane GO values have dropped in 2024, the lowest Carbon intensity feedstocks they remain a key driver of value for biomethane producers

Biomethane GO certificate prices as assessed by S&P Global Platts, 2022-2024[1]
EUR/MWh (spot, nominal)

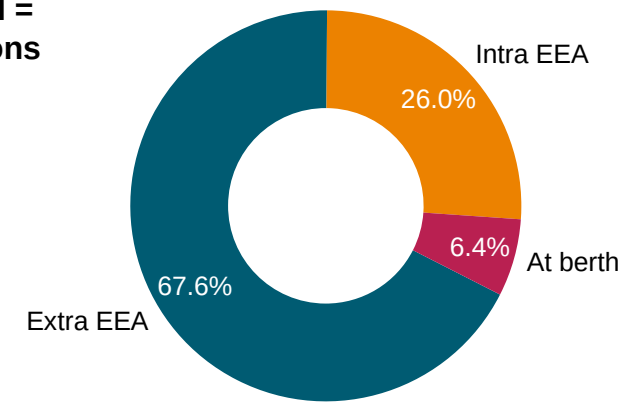


Source: S&P Global CI Platts
1 Spot prices have been used. Refer to S&P Global CI Platts Methodology and Specifications Guide – Low Carbon Gas for details on price assessment methodology

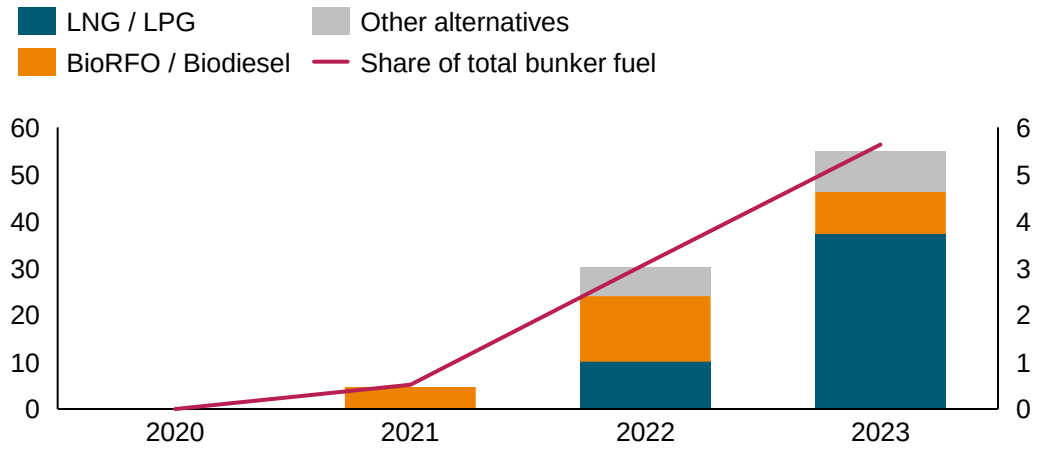
EU carbon pricing covers a significant proportion of global shipping, providing opportunity for Biomethane-derived fuels and potentially connecting global biomethane markets

2021 EU MRV [1] CO_2 emissions by voyage type
Million tons CO_2eq

EU MRV Total = 124 million tons



Alternative European bunker fuel demand by type
Thousand barrels of oil eq. per day;[2] %



- EU ETS and FuelEU Maritime will not only cover intra-EU voyages, but also partially cover (50%) emissions for voyages to and from ports outside of the EU, leading to a coverage of close to 15% of total global shipping emissions (2021)
- Rising EU carbon prices and the high cost of non-compliance with FuelEU Maritime (€640/tCO_2eq) could potentially drive Bio-LNG economics as attractive in the German transport sector in the long-term

Source: European Commission, SPGCI Freight Markets Bunker Forecast (July 2024)
1 MRV = Monitoring , Reporting and Verification = emissions covered under EU ETS and FuelEU.
2 One thousand barrels of Oil Eq. per day = 0.65 TWh/a

S&P Global Commodity Insights CI Consulting has produced a Joint Whitepaper with key Biomethane industry bodies Biomethane Tracking Systems and Value of Certificates

Report Coverage:

- A comprehensive overview of existing biomethane certification and tracking systems across Europe / US
- An analysis of the evolving role of biomethane certificates for producers and consumers across key demand sectors
- An assessment of historic biomethane certificate values in Europe / US with a review of the key price drivers

Key Conclusions:

- Biomethane certification and tracking systems have enabled efficient use of Biomethane and decarbonisation efforts in compliance markets. Recognition of Biomethane under the GHG Protocol accounting framework could enable more efficient use of Biomethane in voluntary markets
- Biomethane production is a key driver of GHG emissions reductions, amounting to ~5 million tons of CO_2eq in the US (Biomethane LCFS credits data) and ~15 million tons of CO_2eq in the EU (Biomethane production data) in 2023

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Parallel breakout

Biomethane across borders: trading and procurement explained

Diego Radlmaier

Responsible for the international sales and origination of renewable gases

bmp greengas

EUROPEAN BIOMETHANE WEEK

European Biogas Conference

Opportunities for international biomethane volumes in the German market

Diego Radlmaier | 24th October 2024

Link between production and consumption

Purchase

Transportation

Balancing group management | Registry | Certification

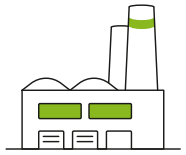
Sale

Compliance versus voluntary markets in Germany

Compliance markets

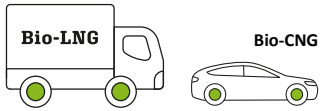
Biomethane used to comply with renewable energy targets.

Power
EEG



Industry
EU-ETS / BEHG

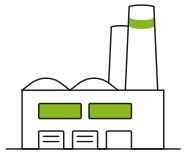
Heating
GEG / EWärmeG



Mobility
GHG-quota

Voluntary markets

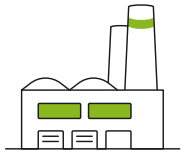
Biomethane used to comply with voluntarily set carbon reduction targets.



Industry
GHG-Protocol / SBTi

Different markets = different qualities and requirements

Import of biomethane possible for all listed sectors

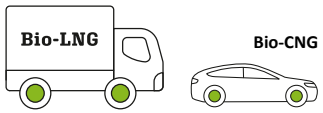


Industry
EU-ETS / BEHG

- Proof of Sustainability (PoS) via Nabisy
- Required CI-scores: 24 or 21 gCO2/MJ

- Certificate of Origin (CoO) via dena biogasregister
- Various Feedstock options, but must meet dena-certified → audit report required

Heating
GEG / EWärmeG



Mobility
GHG-quota

- Proof of Sustainability (PoS) via Nabisy
- Double-counting possible if advanced (Annex IX RED II / III)
- Pricing influenced by CI-score

Transport across borders

MASS BALANCE

- Nabisy: Transport via interconnected infrastructure (= EU-gas-grid) – Proof of Sustainability (PoS) can be transferred between countries
- ISCC: PoS including gas – especially used in voluntary markets

BOOK AND CLAIM

- Certificate transfer between registries (e.g. AGCS -> dena)

UNION DATABASE (UDB)

Integration of UDB as transaction tracking tool as of 21st of November – effects to be seen

Outlook for imported Biomethane in the German market

- Higher ambition level in GHG-quota via national implementation of RED III - GHG-quota in effect also after 2030
- New demand from shipping industry

MOBILITY

- Higher demand for biomethane in municipal utilities starting from 2029
- According to dena[1] (2024) additional demand from GEG for biomethane in 2040 ranges between 13.4 to 44.6 TWh

HEATING

- Implementation of EU-ETS 2 (i. e. BEHG-transition)
- EU Commission's Green Deal Industrial Plan and NZIA with effects on biomethane market

INDUSTRY

[1] https://www.dena.de/PUBLIKATION684

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Q&A Session

Biomethane across borders: trading and procurement explained

Moderated by Tim Hamers

Jacob Boon

Olyx

Paul Vonk

Tata Steel

Henning Singelsö

Gasum

Adrian Dorsch

S&P Global Commodity Insights

Diego Radlmaier

bmp greengas

EUROPEAN BIOMETHANE WEEK

Afternoon plenary

Charting new horizons: biomethane's voyage in maritime and aviation

Annika Kroon

DG MOVE , European Commission

Filippo Munna

Hexagon Agility

David Chiaramonti

Politecnico di Torino

Andrea Qualiano

Edison Spa

Anna Venturini

European Biogas Association

EUROPEAN BIOMETHANE WEEK

Afternoon plenary

Charting new horizons: biomethane's voyage in maritime and aviation

Annika Kroon

Head of the Maritime Transport and Logistics Unit

DG MOVE , European Commission

EUROPEAN BIOMETHANE WEEK

SUSTAINABLE & SMART
MOBILITY STRATEGY

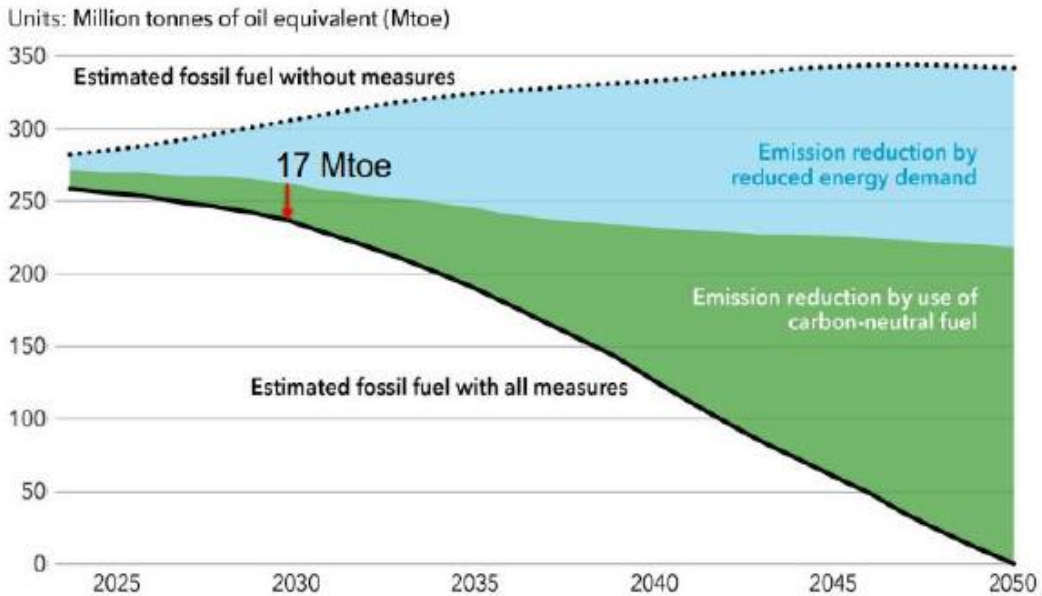
Decarbonisation of Maritime transport

European Biogas Conference 2024

European Commission
Directorate-General for Mobility and Transport
Unit D.1 – Maritime Transport and Logistics

MARITIME DECARBONISATION

Fitfor55 maritime instrument	In short/ Objective
ETS – Extension of the Emission Trading Scheme to maritime transport	• Carbon tax/ Trading scheme • Promote Energy Efficiency and Energy Transition
AFIR – Alternative Fuels Infrastructure Regulation	• Require EU ports to develop shore-power • Bunkering infrastructure for alternative fuels.
FuelEU Maritime Regulation	• Promote the use of renewable and low-carbon fuels in maritime transport.
Renewable Energy Directive (REDIII)	• Renewable Energy targets for transport sector • Sustainability criteria and Certification framework for renewable fuels.



Abating maritime emissions requires:

- Improving energy efficiency ➔ **using less fuel**
- Using renewable and low carbon fuels ➔ **using cleaner fuels**

Eligibility of Renewable and Low-Carbon Fuels in FuelEU Maritime

Biofuels:

- **Sustainability** and GHG saving criteria - **RED Article 29**
- No "**food-and-feed**" crop Biofuels

RFNBOs and Recycled Carbon Fuels:

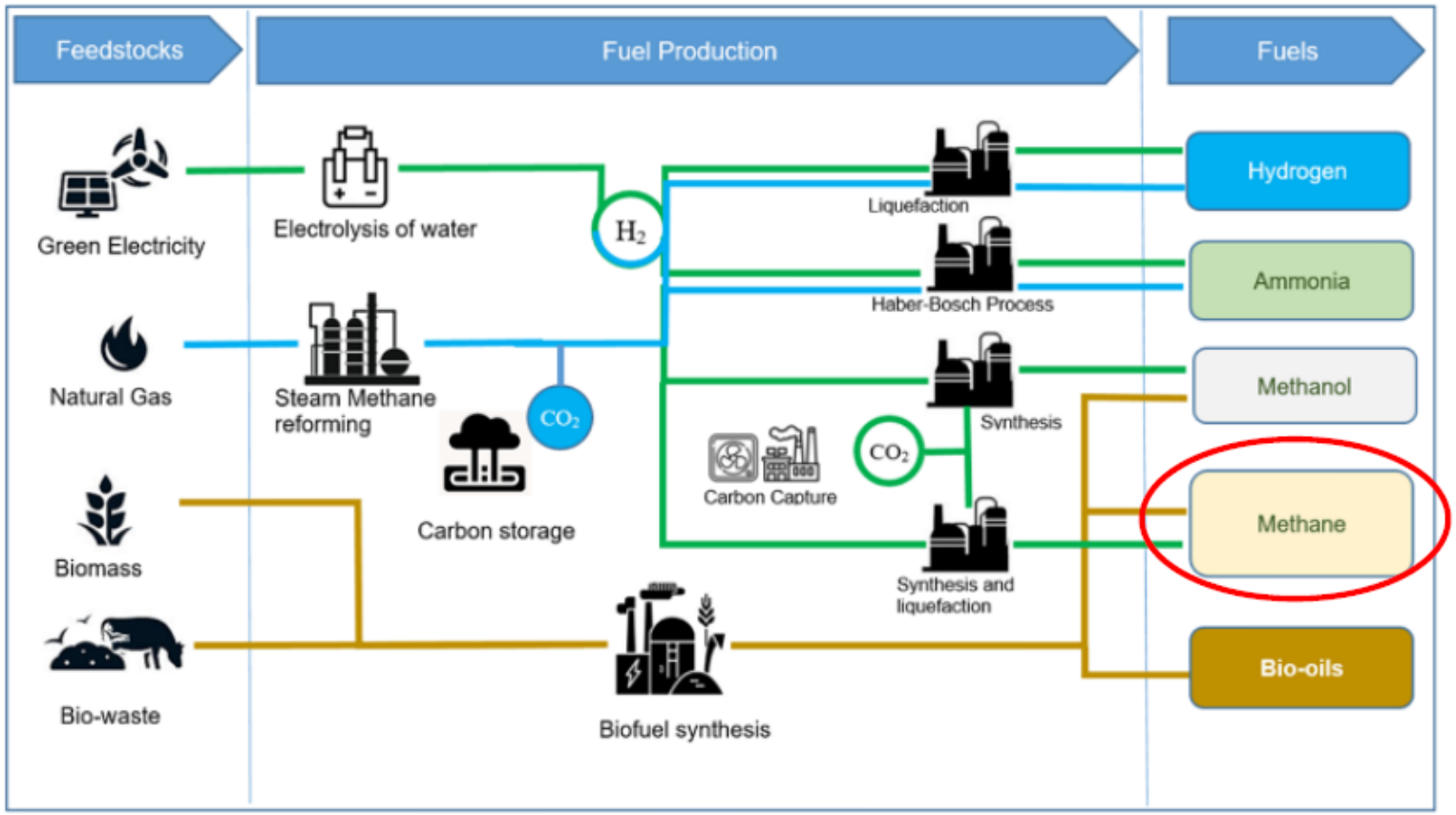
- GHG saving threshold - **RED Article 27(2)**

Low-Carbon Synthetic Fuels:

Revised (recast) **Gas Directive**

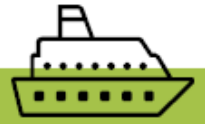
Fuels not meeting criteria treated as fossil fuels

Several Pathways possible:



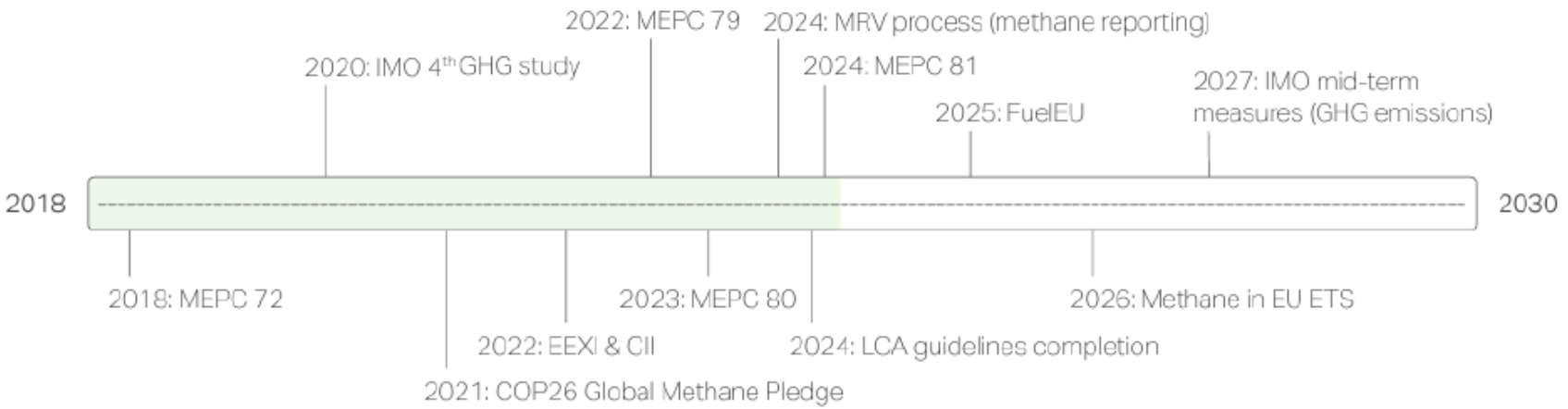
FuelEU Maritime Compliance Technologies

The Benefits and Downsides of Methane



- Environmental benefits:
  - up to 30% lower TTW CO_2 emissions
  - lower emissions of local air pollutants
- Readily available, relatively affordable
- Can be used with existing infrastructure

- The second largest contributor to global warming
- Methane slip during combustion and fuel production



To make methane-based fuel pathways a viable solution for net-zero shipping, methane emissions during the whole life cycle need to be monitored, regulated and managed

Timeline of regulatory measures relevant to methane emissions

MMMC Zero Carbon Shipping: Tackling Methane Slip in Shipping

Thank you!

European Commission | Mobility and Transport

Afternoon plenary

Charting new horizons: biomethane's voyage in maritime and aviation

Filippo Munna

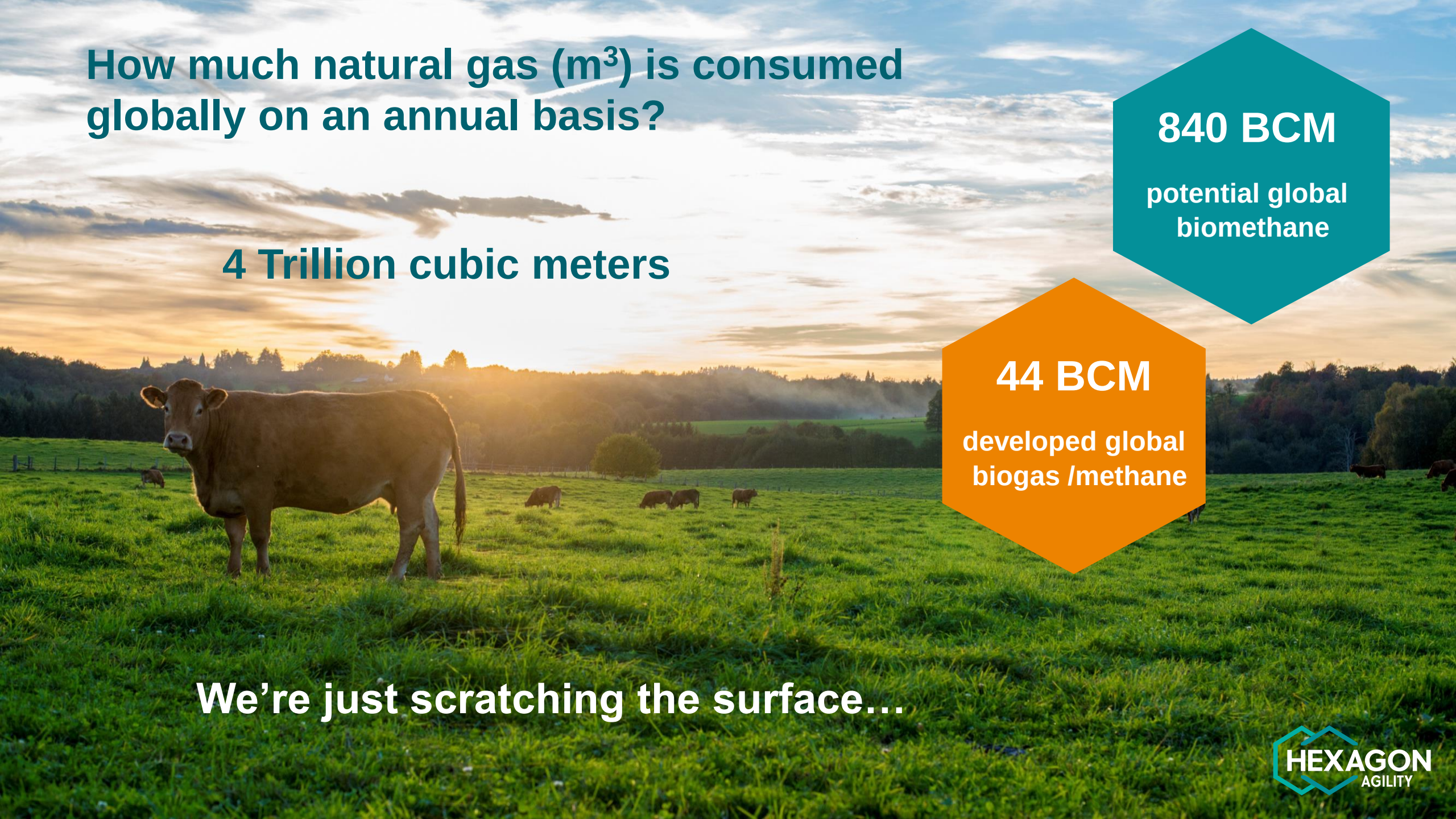
Sales Director Mobile Pipeline

Hexagon Agility

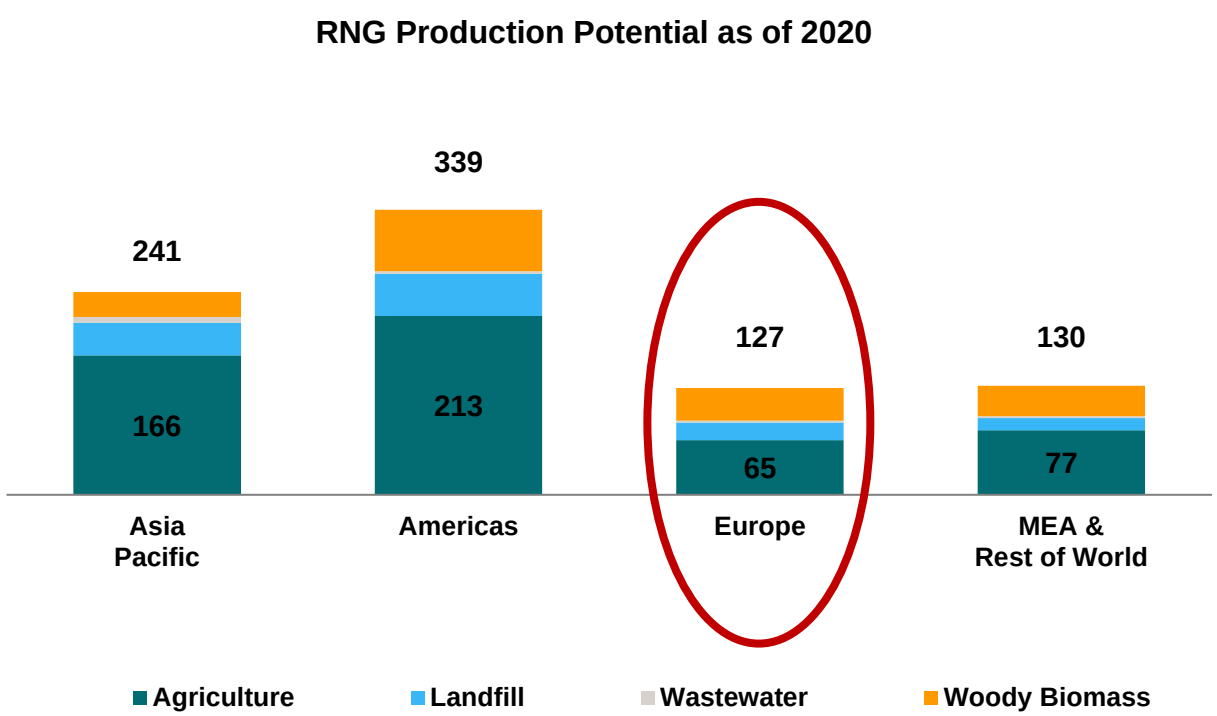
EUROPEAN BIOMETHANE WEEK

Unlocking the potential of biomethane to drive Europe’s decarbonization and energy security

Filippo Munna
Sales Director, Mobile Pipeline
EMEAA


How much natural gas (m^3) is consumed globally on an annual basis?
4 Trillion cubic meters
840 BCM
potential global biomethane
44 BCM
developed global biogas /methane
We're just scratching the surface…
HEXAGON
AGILITY

In Europe, biomethane has the potential to account for 16% of the energy supply



Outlook for Biogas and Biomethane | IEA 2020. All rights reserved

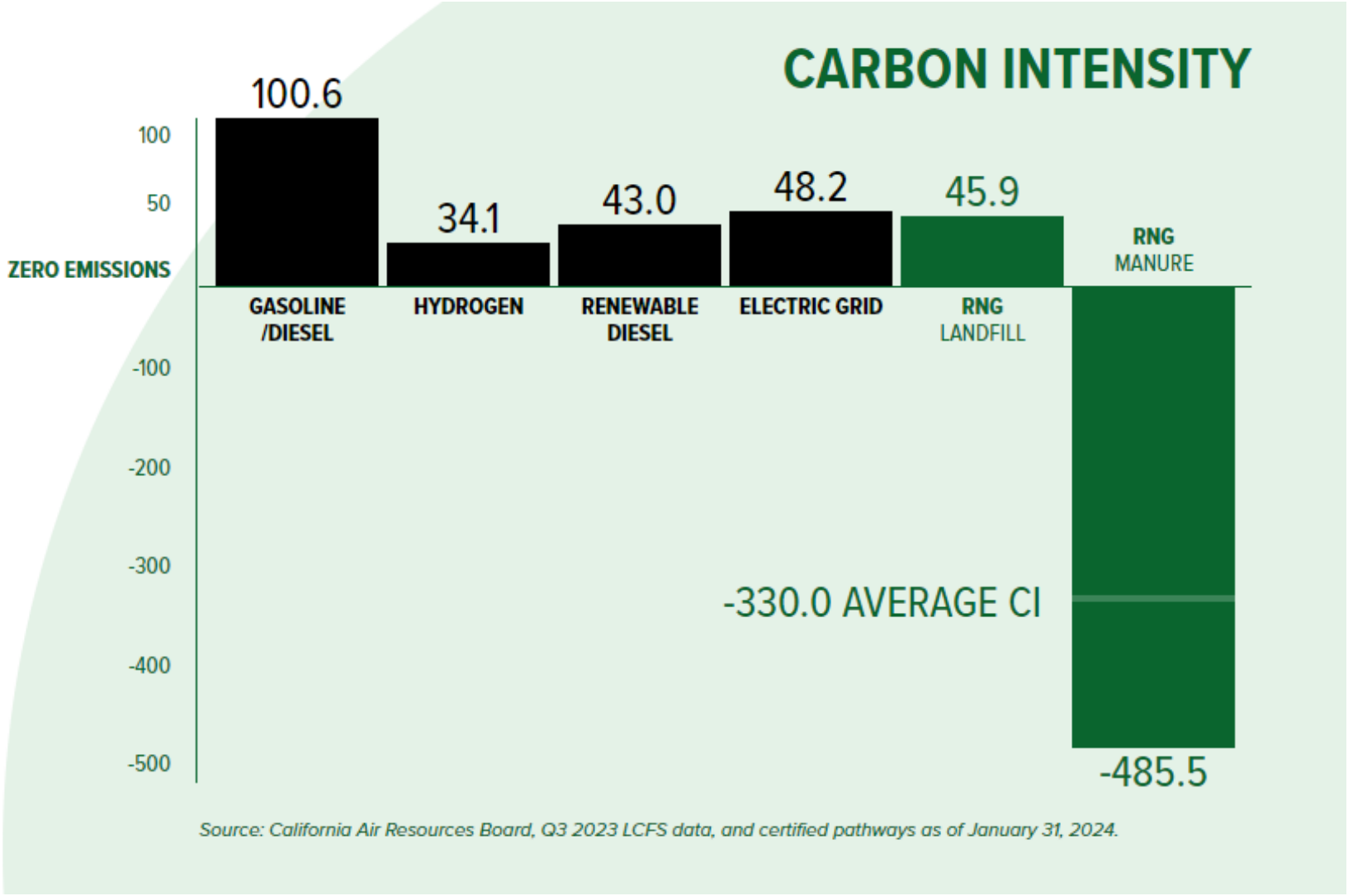
127 BCMY
potential in Europe

~ 24 BCMY produced biogas & biomethane

Source: IEA Key World Energy Statistics 2020

HEXAGON AGILITY

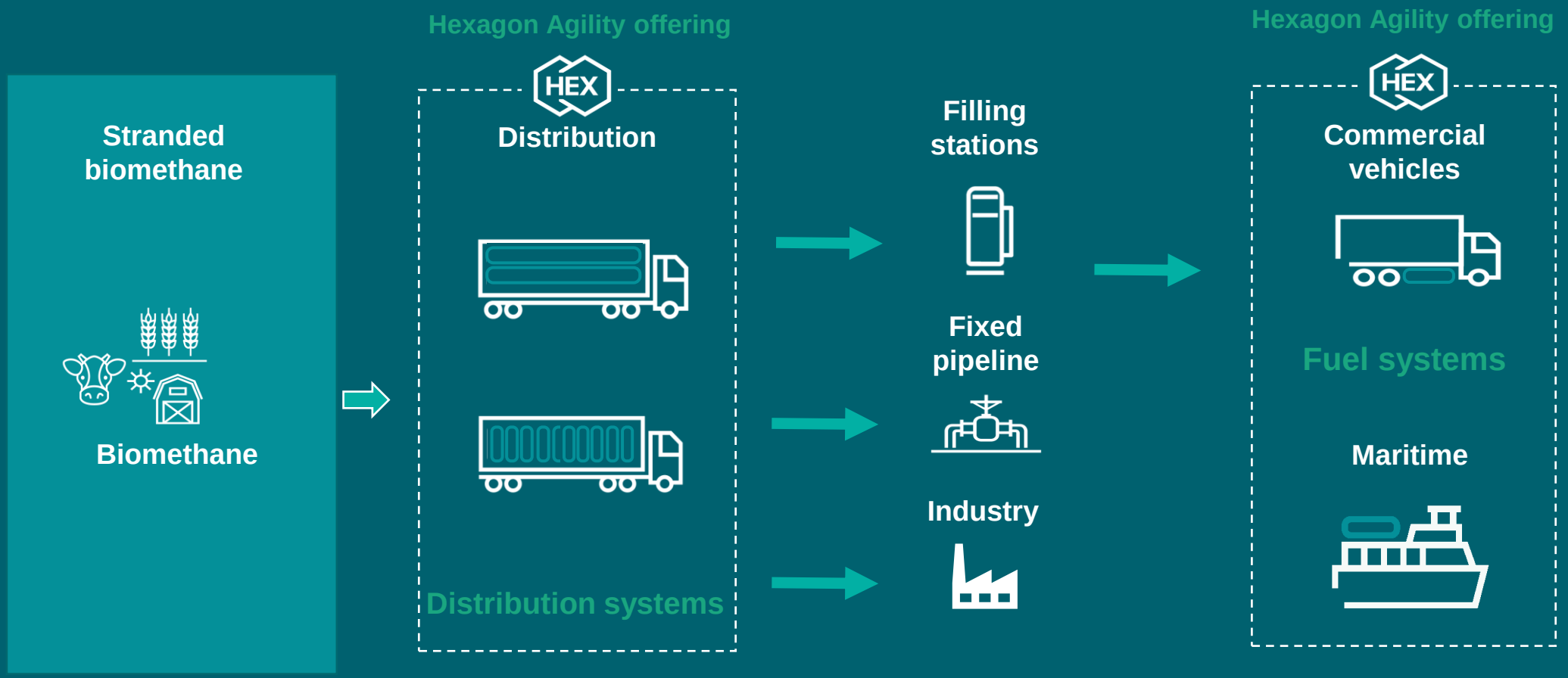
Biomethane is the only carbon negative clean energy solution



Source: California Air Resources Board, Q3 2023 LCFS data, and certified pathways as of January 31, 2024.

Hexagon Agility's offering is critical to biomethane supply chains

Value chain illustration



RNG = Biomethane

2,000

gas distribution modules in operation globally

Selected key customers

Linde

MANASEER Oil & Gas

CERTARUS Low Carbon Energy Solutions

Air Liquide

WM WASTE MANAGEMENT, INC.

TITAN® is currently the largest Type 4 composite cylinder in the world at

12,000L

Mobile Pipeline serving biogas facilities in Europe and US

Afternoon plenary

Charting new horizons: biomethane's voyage in maritime and aviation

David Chiaramonti

Professor

Department of Energy, Politecnico di Torino

EUROPEAN BIOMETHANE WEEK

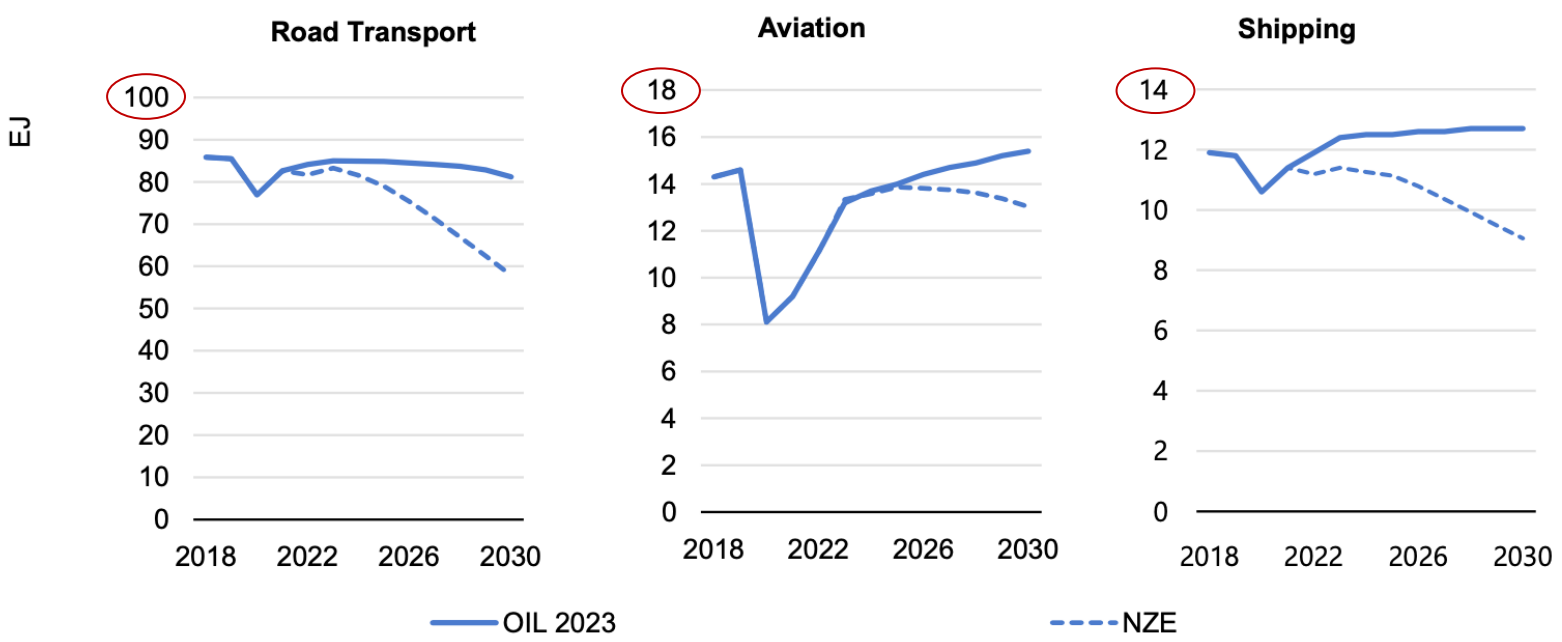
Charting new horizons: biomethane's voyage in maritime and aviation

David Chiaramonti

Politecnico di Torino

Fit4Foresight FUEL

Transport sector oil demand under current policies and net zero targets



Notes: Oil 2023 = data from the IEA's Oil 2023 - Analysis and forecast to 2028. NZE = Net Zero Emissions by 2050 Scenario.

1	=	277.778	=	2.778e+8
EJ		**TWh**		**MWh**

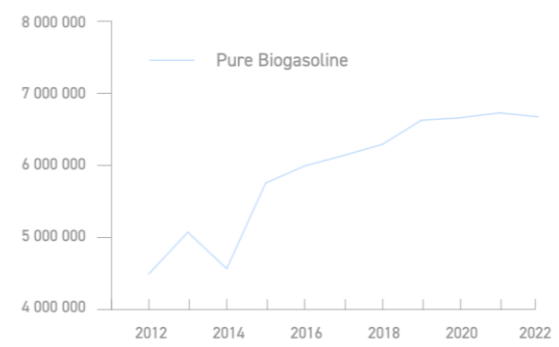
= 277,000,000 MWh
= 23.88 MTOE

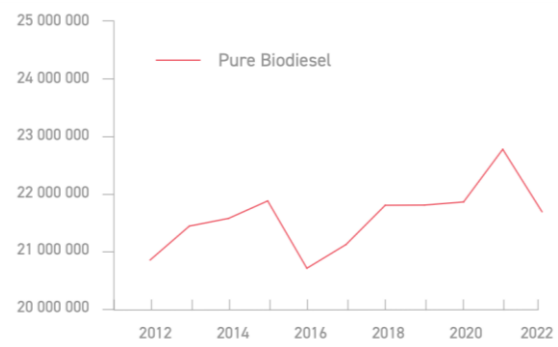
Power consumption in IT 2022: 295.8 TWh

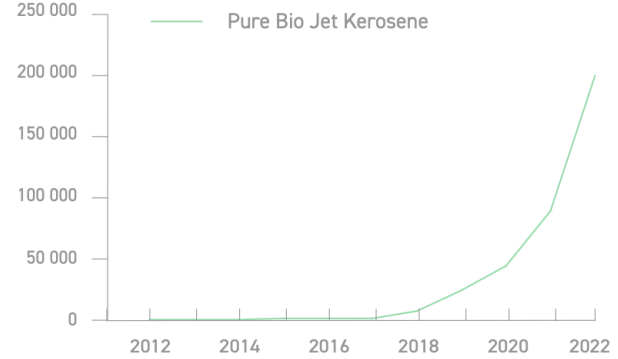
EU Oil Products demand (MTOE/y) – focus on SAF & Maritime

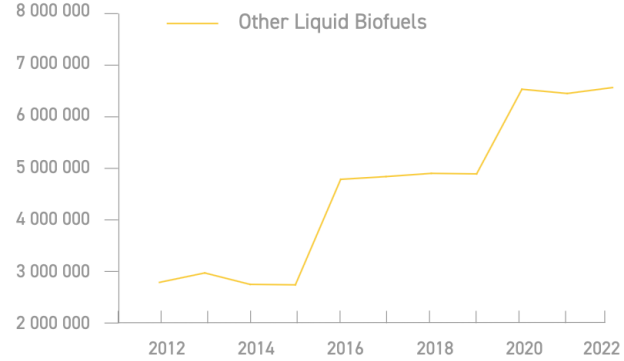
FuelsEurope
FUELLING EUROPE'S FUTURE

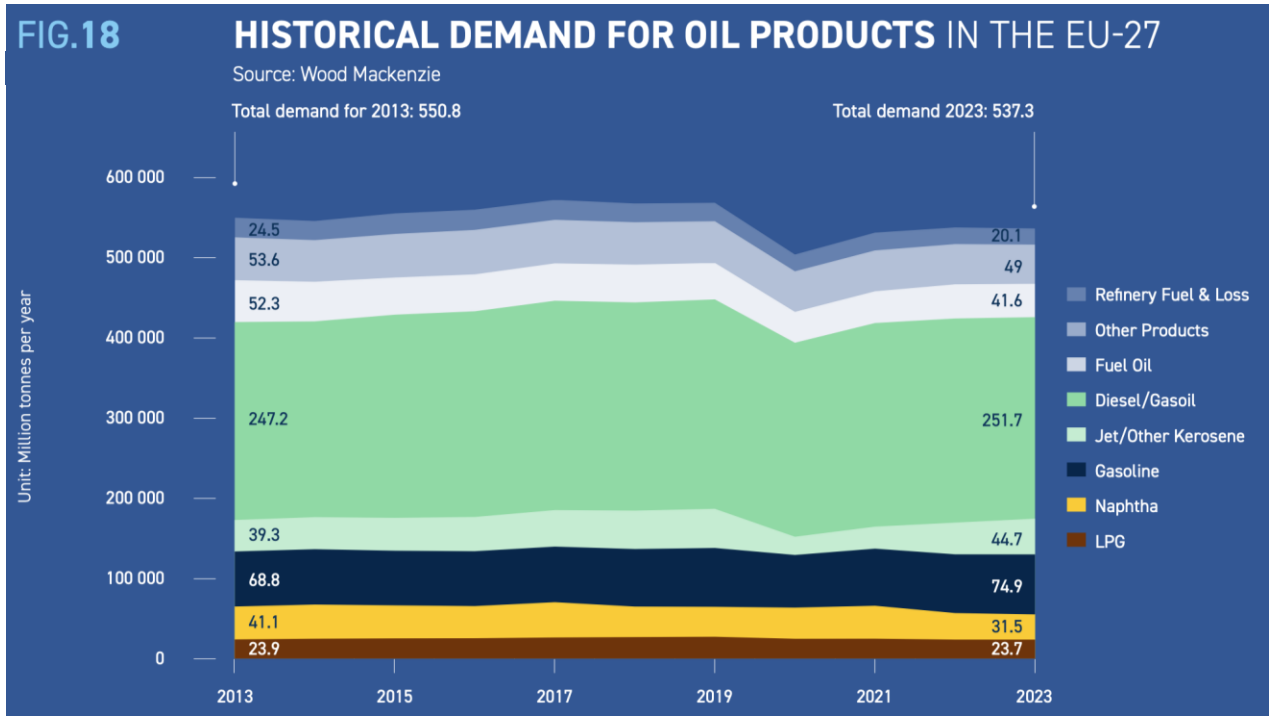
Unit: Thousand tonnes per year Source: Eurostat

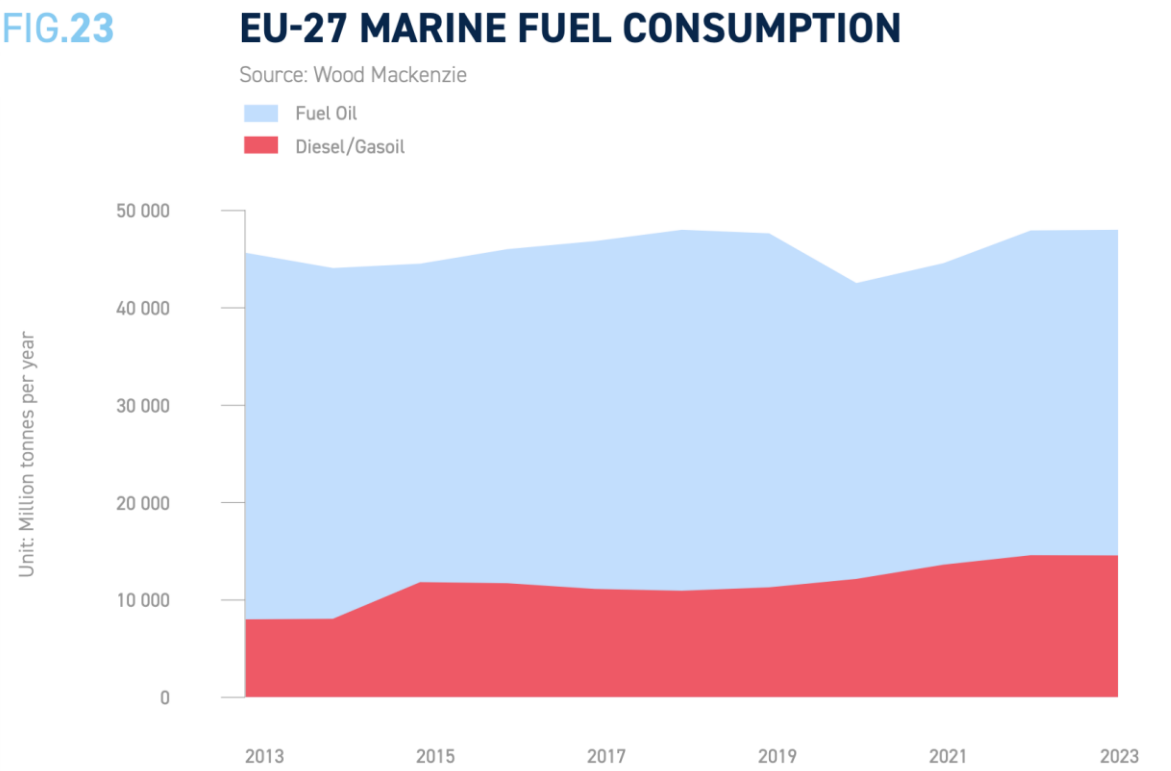






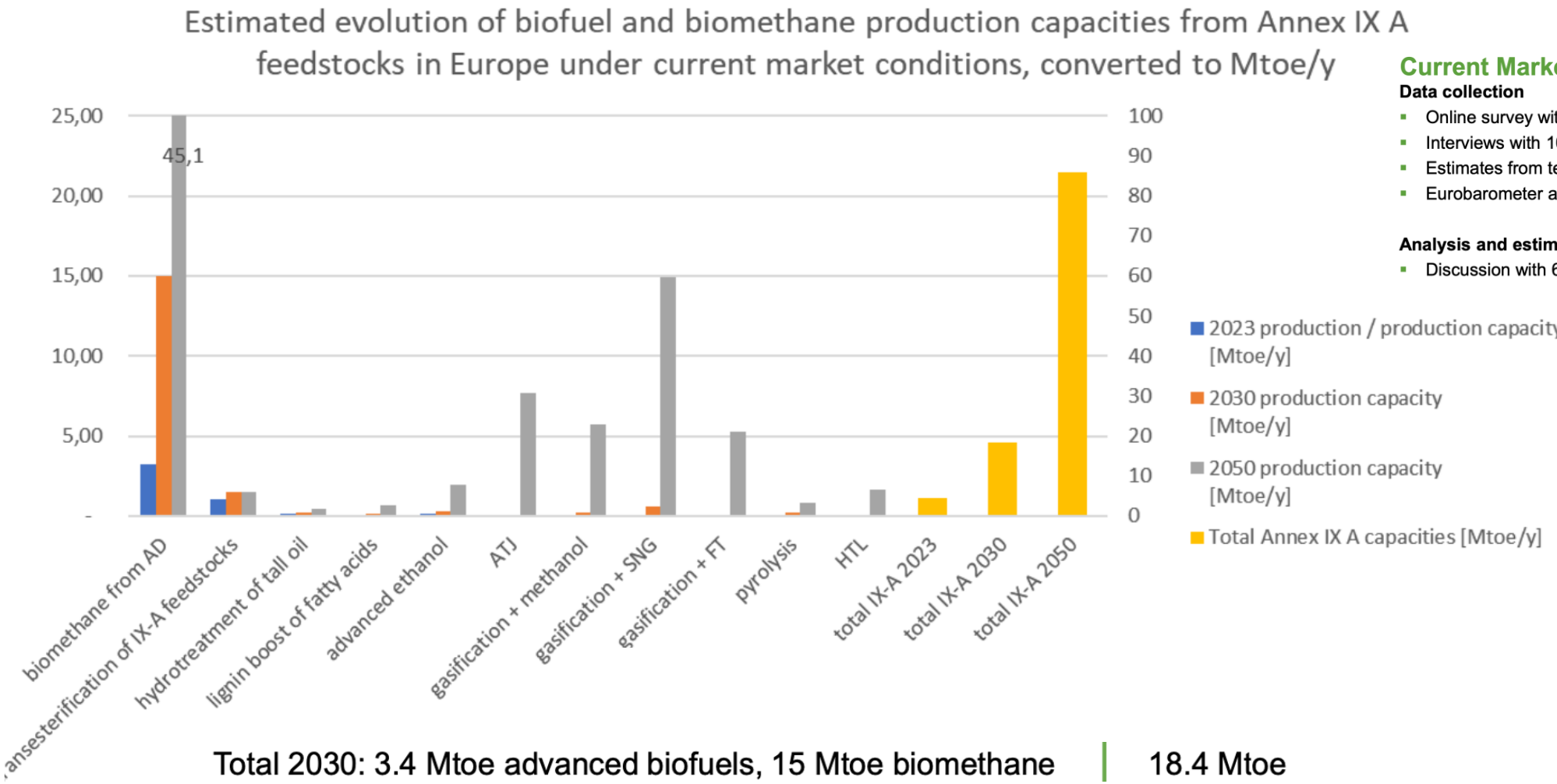






Current SAF supply remains low: less than 0.05 percent of total EU aviation fuel use *(EASA: EU Envir.Report 2022)*

Current market conditions: industries' survey findings



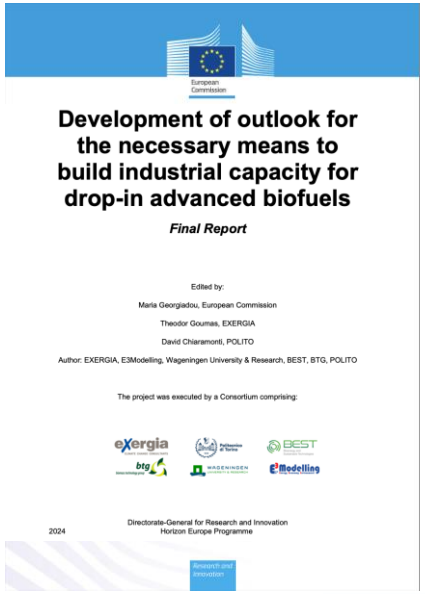
Current Market Conditions: Methodology

Data collection

- Online survey with companies
- Interviews with 10 associations plus one big company
- Estimates from technology experts
- Eurobarometer and other public reports

Analysis and estimate

- Discussion with 6 high-level experts with a broad view on biofuels



Total 2030: 3.4 Mtoe advanced biofuels, 15 Mtoe biomethane | 18.4 Mtoe

REMARK - Only 10% of this biomethane was assumed to be available for transports → 1.5 MTOE

… so, which new possible horizons? …

… a couple of options …

Biomethane as Energy Vector

Decentralised + Centralised schemes

Decentralized bioenergy combined with infrastructure and conventional refining
A win-win solution, deploying High-TRL demonstrated technologies.

Applied Energy 366 (2024) 123306

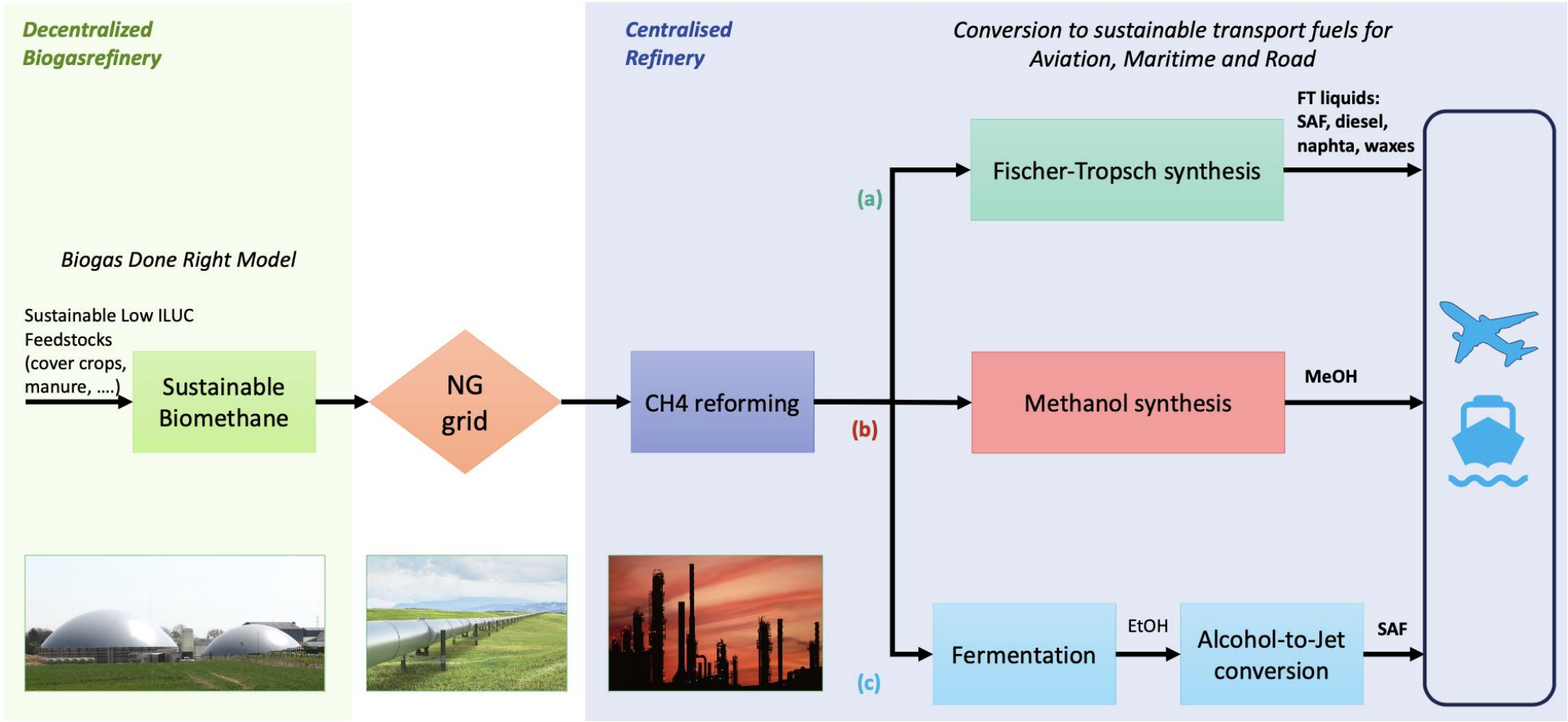
Contents lists available at ScienceDirect

Applied Energy

journal homepage: www.elsevier.com/locate/apenergy

Deploying EU biomethane potential for transports: Centralized/ decentralized biogasrefinery schemes to SAF and maritime fuels

David Chiaramonti [a,b,*], Lorenzo Testa [a]



Assumptions:

10,000 barrels per day (bpd) GTL FT

2,000 t/d GTL MeOH industrial plant

1,000 t/d products

Contribution to EU/IT goals

Assumptions for Potential estim. EU-27 Biomethane and IT (Gas4Climate) :

EU27: 38 bcm (2030), 91 bmc (2050)
IT: 5.6 bcm (2030), 8.2 bcm (2050)

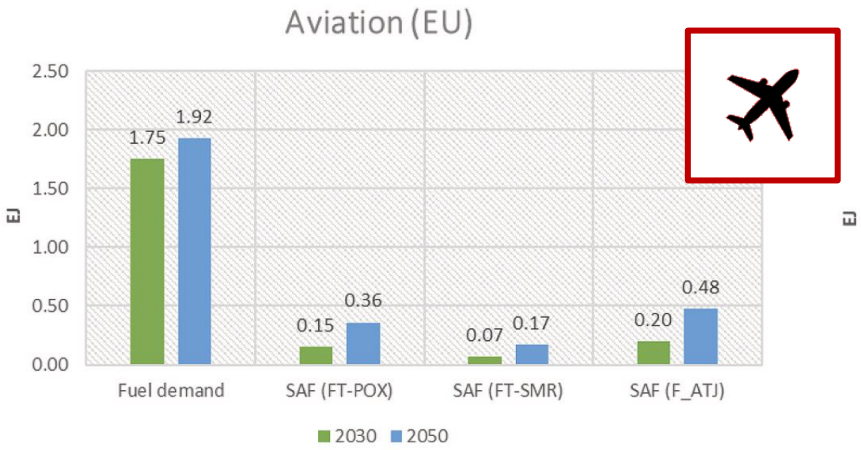


Fig. 16. 2030 and 2050 European fuel demand in the aviation sector (EJ) and potential production of SAF according to the different value chains.

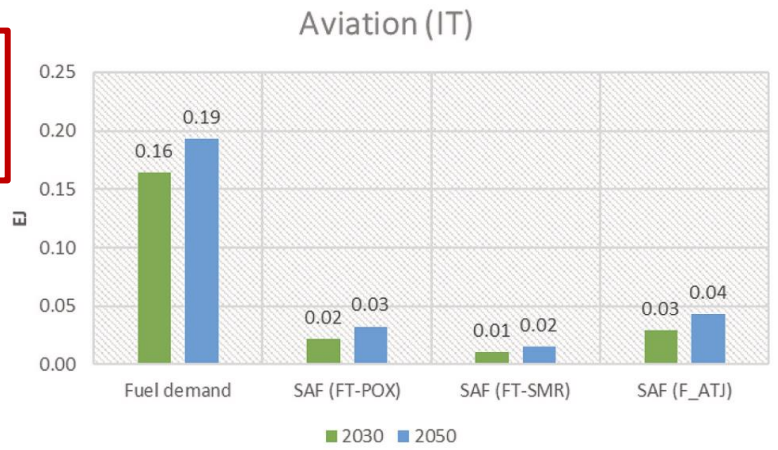


Fig. 18. 2030 and 2050 Italian fuel demand in the aviation sector (EJ) and potential production of SAF according to the different value chains.

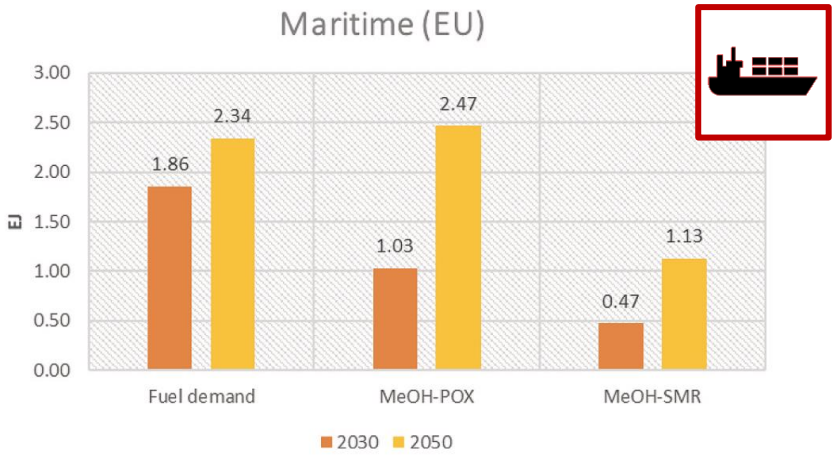


Fig. 17. 2030 and 2050 European fuel demand in the maritime sector (EJ) and potential production of MeOH according to the different value chains.

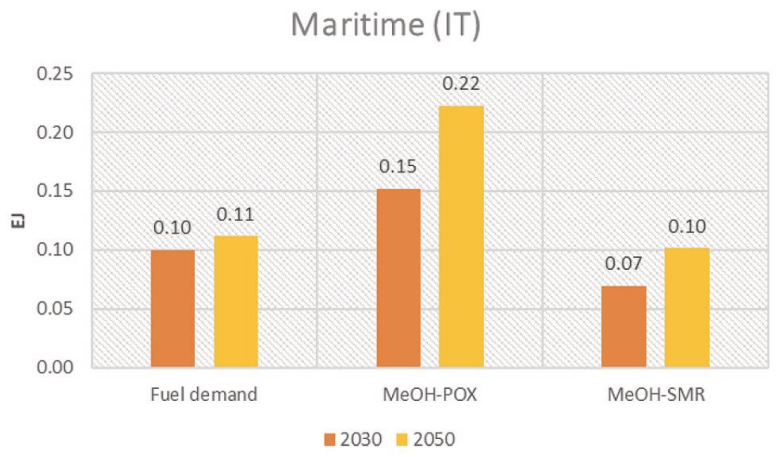


Fig. 19. 2030 and 2050 Italian fuel demand in the maritime sector (EJ) and potential production of MeOH according to the different value chains.

Carbon and H2 from BioCH4 via methane Pyrolysis

CMD-Catalytic Methane Decomposition: from Steel to SAF & Maritime

RE·CORD

H2Steel

Green hydrogen

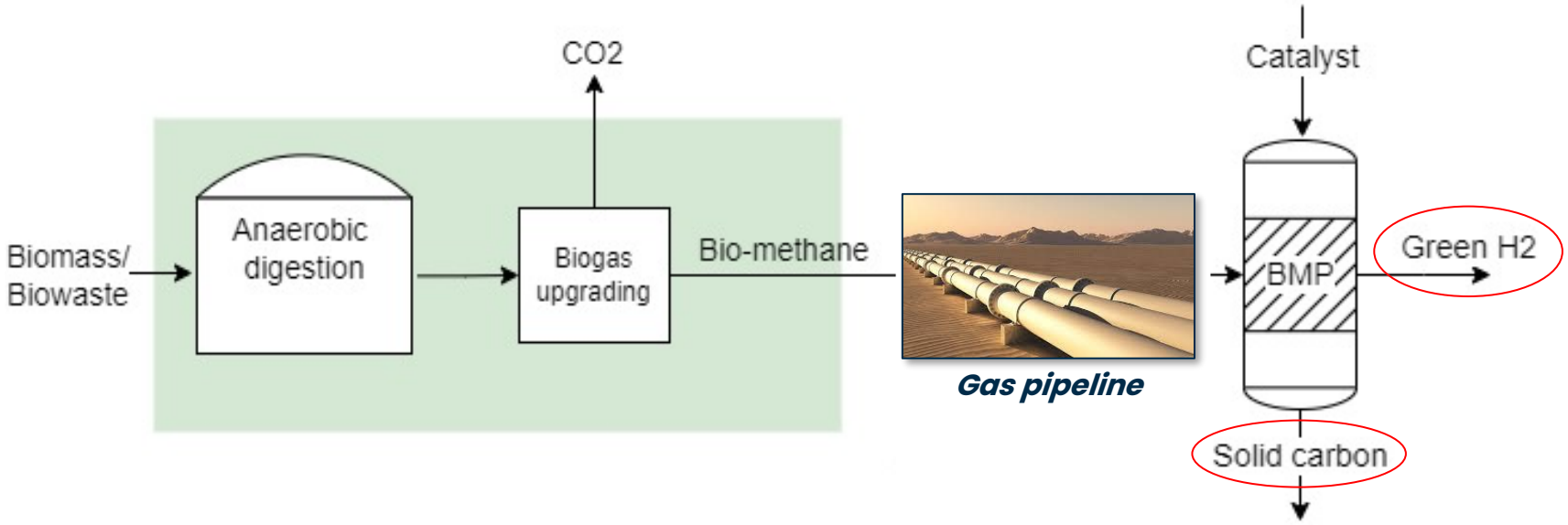
Sustainable H2 production through a ground-breaking methodology.

Energy from biowaste

Green hydrogen and bio coal production from circular biowaste streams.

Contribution to steel industry's green transition

Reducing GHG emissions and providing clean energy to the European steel sector.



- **Green H2** to SAF/Maritime production
- **Biogenic C** to many applications

Thanks for your attention

David Chiaramonti

Politecnico di Torino

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Afternoon plenary

Charting new horizons: biomethane's voyage in maritime and aviation

Andrea Qualiano

Head of Green Gas Origination & Gas Supply Portfolio Decarbonization

Edison Spa

EUROPEAN BIOMETHANE WEEK

European Biomethane Week 2024

Charting new horizons: biomethane's voyage in maritime and aviation

24th October 2024

Andrea Qualiano

Head of Green Gas Origination and Gas Supply Portfolio Decarbonization
Member of the TF 2 of the Biomethane Industrial Partnership

EDISON: THE OLDEST ENERGY COMPANY IN EUROPE

Over 140 Years of Excellence in the Energy…

1881

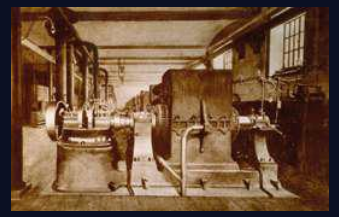
The story begins in **1881**, when Giuseppe Colombo visited the Exposition Internationale d'Electricité in Paris where he admired the dynamos designed and built by Thomas Alva Edison. The following year, Colombo founded the Committee for the Applications of Electricity 'Edison System' in Italy, that built the first thermoelectric power station in continental Europe in Milan.

1883

The energy from the Santa Radegonda power station lit La Scala Theatre for the first time, a bright vision of the future to come.

1884

Following the dissolution of the Committee, a joint-stock company called **Società Generale Italiana di Elettricità Sistema Edison** was established on **6th January 1884**. In the following years, the company expanded with new, mainly hydroelectric, plants. The historic core of these were the Bertini, Esterle and Semenza power stations, built along the Adda river.

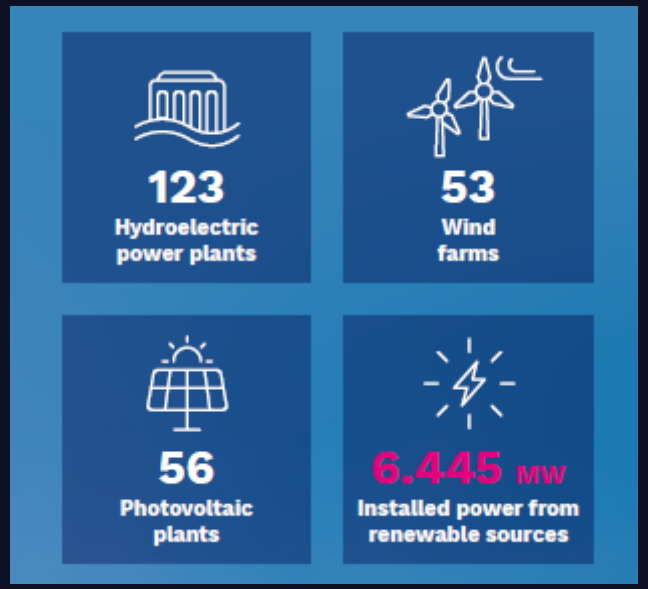


1900

Throughout the 20th century, Edison was a key figure in Italy's industrial and technological development.

…committed to pioneering solutions to enable the energy transition to a sustainable future

- Our commitment is to increase energy generation from **renewable sources to 40% of our production mix by 2030** and progressively **decarbonize the natural gas portfolio** by increasing the volume of green gases, representing **5% by 2030 and up to 15% by 2040**.
- To do so, we are investing in production from **renewable sources**, always relying on **state-of-the-art gas plants** to protect the stability of the national electricity grid.
- And by developing **energy-efficient solutions** for a more conscious use of energy and to offer **innovative all-round services** to end consumers.



EDISON

BIP Europe
Biomethane Industrial Partnership

A SOLID EXPERTISE IN THE WHOLE VALUE CHAIN…

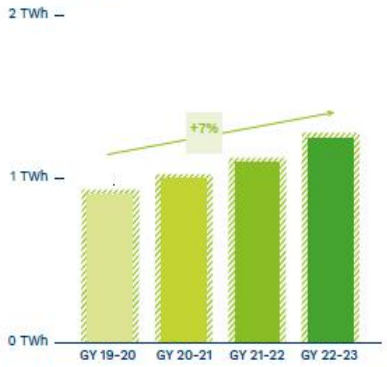
… AND A LEADING COMPANY IN THE BIOMETHANE SECTOR

Biomethane offtaking

Helping producers to sell biomethane over long-term horizons

- Edison has led the biomethane since construction of the first plants began in early 2018.
- Offtake management has gradually reached a consistent volume of biomethane withdrawn and sold in the transport sector.

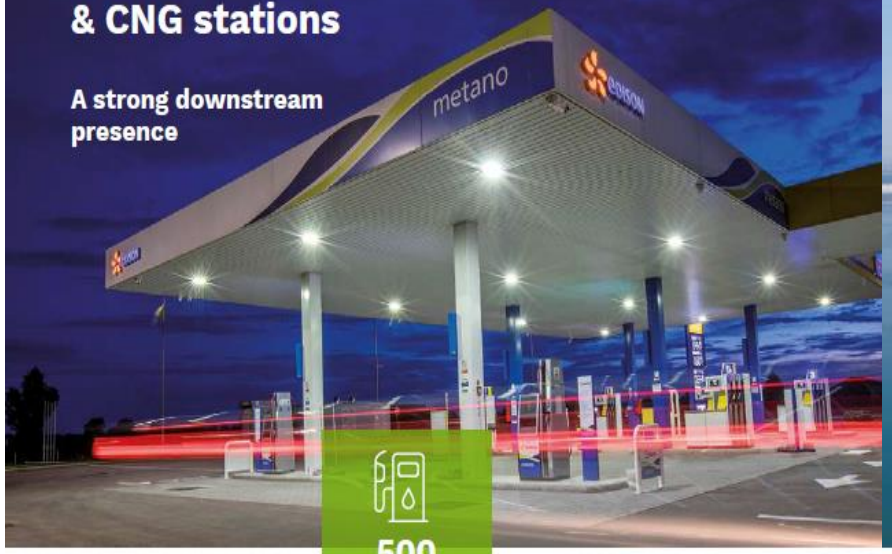
Edison offtaking services have increased over the years



Our expertise in the gas and biomethane sectors enables us to provide long-term custom offtake solutions to accommodate customers' needs

Biomethane downstream sale & CNG stations

A strong downstream presence



500
Stations supplied in 2023

- **2** stations owned
- **15** stations with facilities on loan for use
- **45** Edison-branded stations
- More than **500** stations supplied in 2023
- About **200 mcm/yr** of CNG expected to be sold in the transport sector in GY23/24

Small-scale LNG deposits

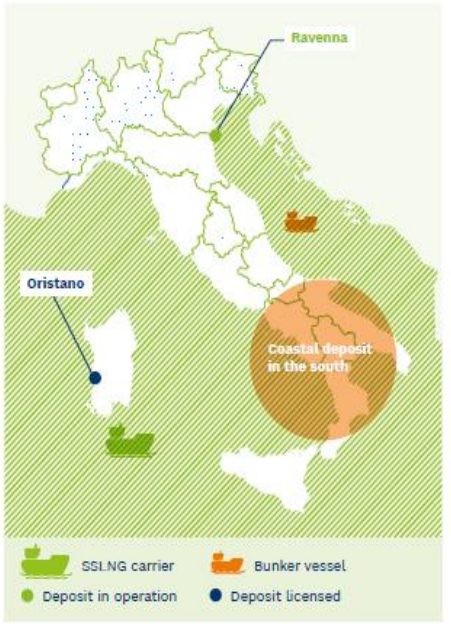
A unique position in the LNG and SSLNG value chain

STEP 1

1. **Ravenna: 20,000 m³**
2. **Long-term TCP for small-scale LNG carrier: 30,000 m³**

STEP 2

1. **Coastal deposit in Southern Italy**
2. **Bunker vessel**
3. **Oristano depot (according to local regulations) and mid-scale second ship**



EU REGULATION TO CALL FOR CLEANER FUEL IN THE MARITIME SECTOR

WHY BIOLNG IS THE MOST EFFECTIVE SOLUTION

LNG benefits as a fuel

- LNG reduces NOx emissions by up to 80% and almost eliminates SOx, particulate matter (PM)
- LNG as a fuel enables the design of ships with a reduction of around 20% of their Energy Efficiency Design Index rating than the conventional ones, and whose Carbon Intensity Indicator is expected to be decrease of the same amount.
- Technology is largely mature, but the recent progress in modern engine technology my enhance the GHG emissions reduction by up to ~20%.
- The ongoing developments in conventional LNG supply infrastructures are fostering LNG abundance and affordability.

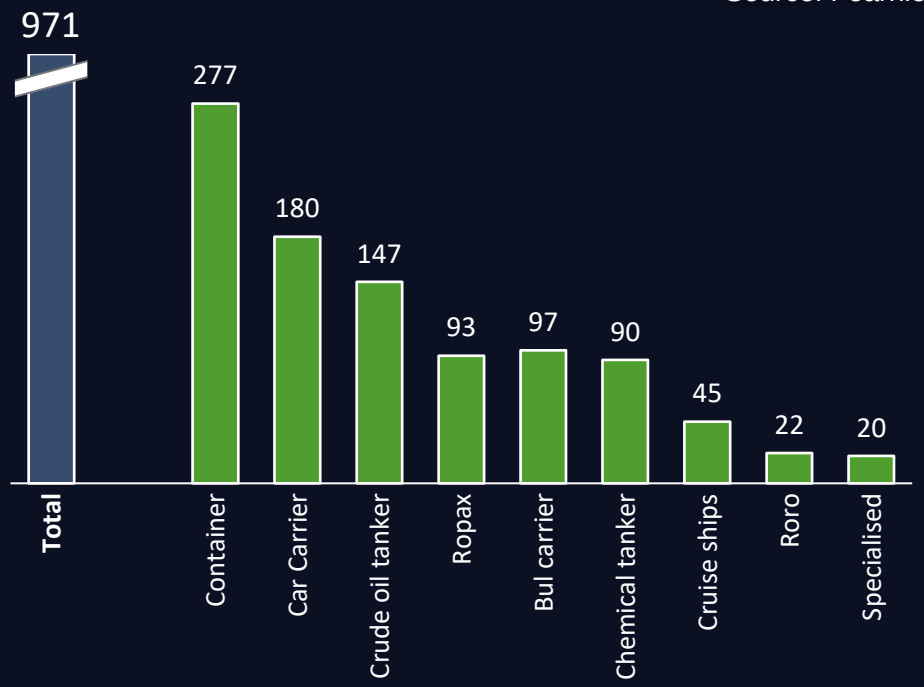
BioLNG bolster the GHG reduction

- Whilst LNG is deemed to be a transition fuel to strongly support the reduction of GHG energy intensity of vessels, it shall be blended with BioLNG to enhance its ability to further hammer down the carbon emissions of the maritime sector.
- Indeed, as the GHG emissions are calculated in a well-to-wake perspective according to FuelEU Regulation (2023/1805), BioLNG can contribute to squeeze emission of up to about 90%.
- Thus, BioLNG blending will be key to achieve the emission targets.
- Ultimately, the total cost of ownership of a vessel fueled with BioLNG is comparable with LNG, thus making BioLNG a competitive solution in the long run.

A PRAGMATIC AND COST-EFFECTIVE APPROACH IS NEEDED TO MEET EU TARGETS
THE LNG FUELLED FLEET IS SET TO GROW GLOBALLY, BY EXPANDING THE TARGETABLE DEMAND FOR BIOLNG

Global LNG Fuelled Ships in operation

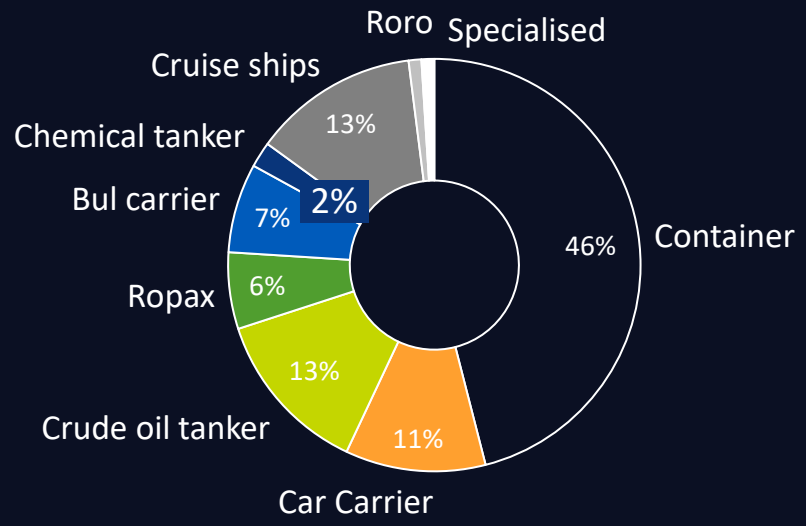
Source: Fearnleys



- Almost a thousand of vessels are currently fuelled with LNG, mostly used for containerships and car carriers

Order Book of LNG Fuelled Ships

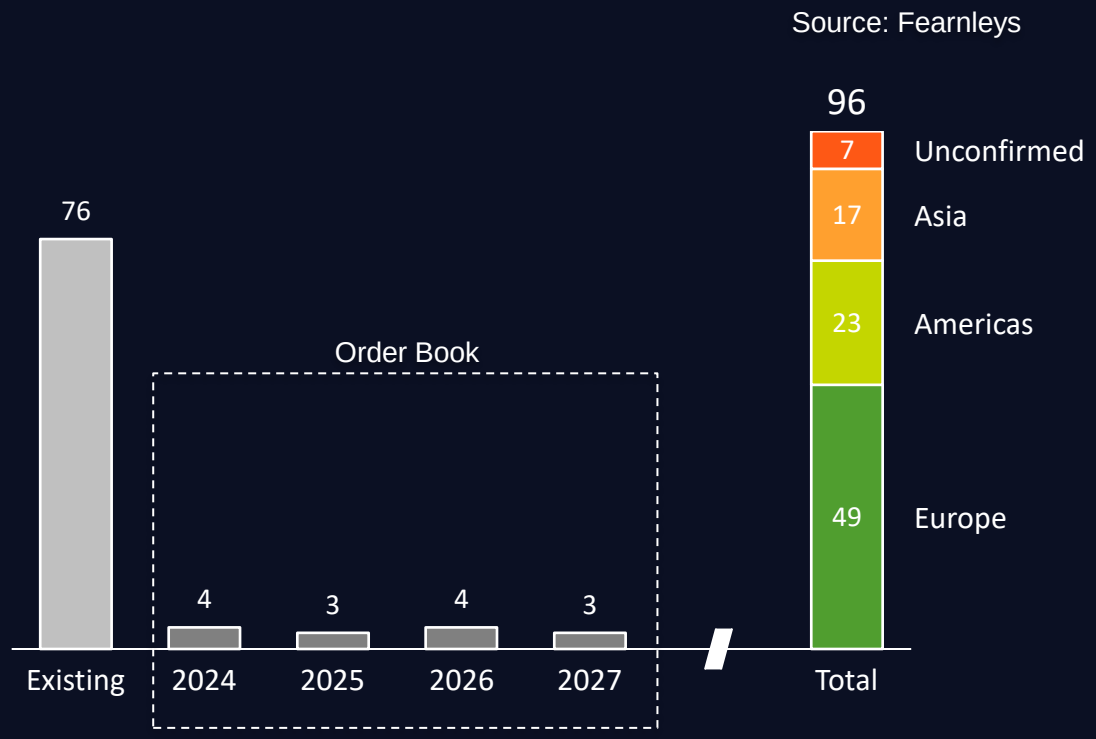
Source: Fearnleys



- The order book is mostly driven by Containerships
- So far, LNG vessels were accounting for a third of new orders with alternative fuels, on the expectation that other fuels would have been more viable than LNG.
- However, such alternative fuels are apparently facing major concerns about costs and large-scale availability, thereby prompting LNG back on the shipowners radar

BUNKER VESSELS TO INCREASE THE LOADING SOLUTIONS FOR BIOLNG

LNG Bunker Vessels in operation and ordered



- So far a total of 76 SSLNG vessels and bunkers are operating globally.
- Around 65% of these vessels are operating primarily for bunkering purposes, whilst 25% are serving as SSLNG carriers (i.e., transporting LNG to terminals) and the remaining 10% can operate in both ways.

Set the pathway to BioLNG in the Maritime Sector

- Sustainable fuels are key to meet the GHG emission targets set by FuelEU Regulation 2023/1805.
- Although some alternative fuels were initially expected to gain more attention from the industry, cost concerns and time-to-market are prompting LNG to be deemed as the most cost-effectiveness solution.
- Thus, the more LNG vessels are ordered the more chances there are for BioLNG to contribute to decarbonize the shipping industry.
- In fact, BioLNG can be delivered in the form of physical molecules or "virtually" whereby biomethane is injected into the gas network and virtually transported to LNG terminals using the existing infrastructure through a system of mass balancing and guarantees of origin.
- However, some operating and regulatory issues are still preventing BioLNG to consistently support the maritime industry to reduce its GHG energy intensity:
  - **Operating:** how to preserve the chain of custody along the value chain
  - **Infrastructural:** LNG Coastal Deposits to be enlisted as key assets for LNG bunkering.
  - **Regulatory:** lack of harmonization of rules among MS on PoS transfer.

Afternoon plenary

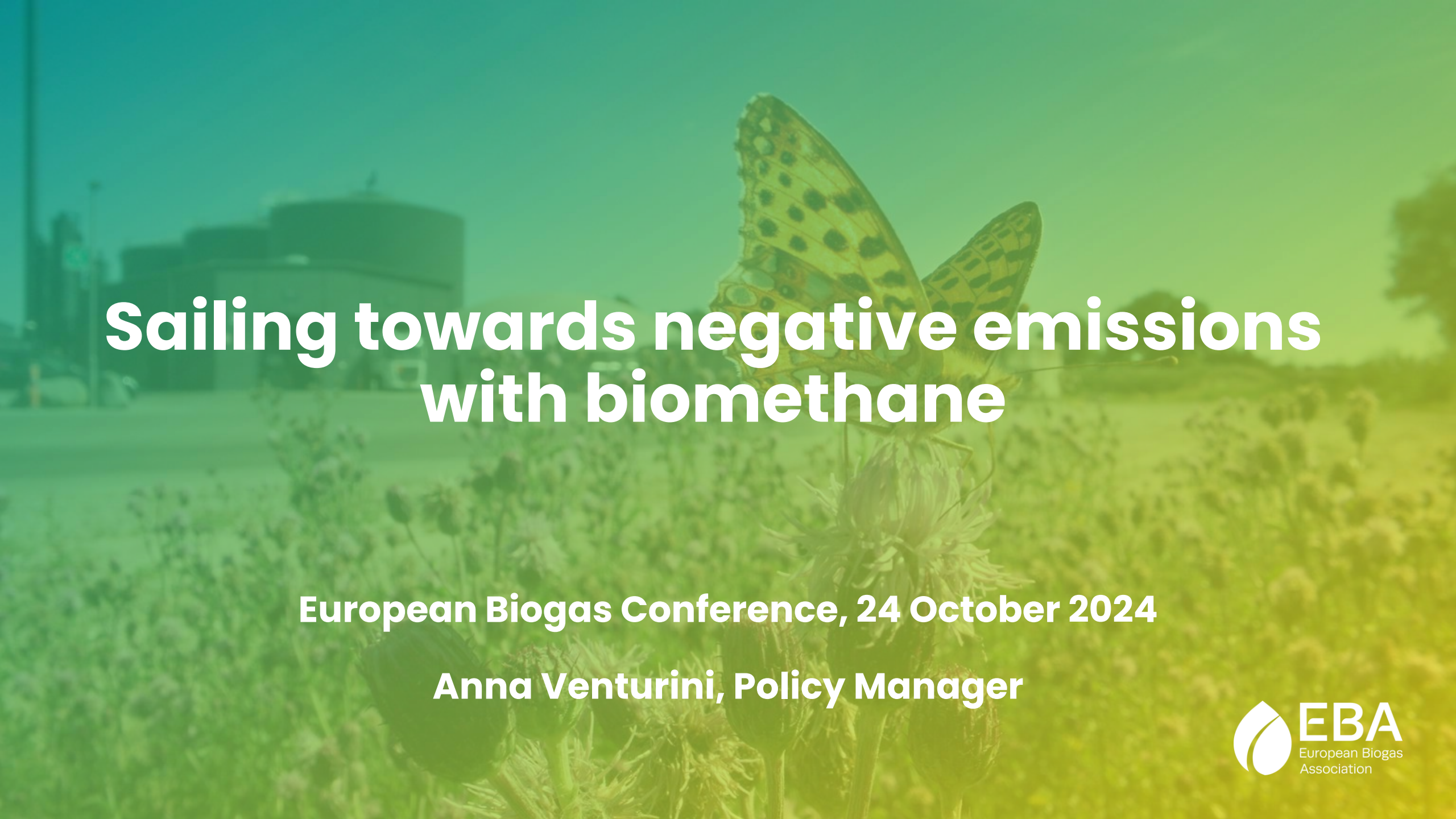
Charting new horizons: biomethane's voyage in maritime and aviation

Anna Venturini

Policy Manager

European Biogas Association

EUROPEAN BIOMETHANE WEEK



Sailing towards negative emissions with biomethane

European Biogas Conference, 24 October 2024

Anna Venturini, Policy Manager

EBA
European Biogas Association

18% more biomethane in Europe in 2022

21 bcm of biogases in Europe in 2022

= 6% EU gas consumption

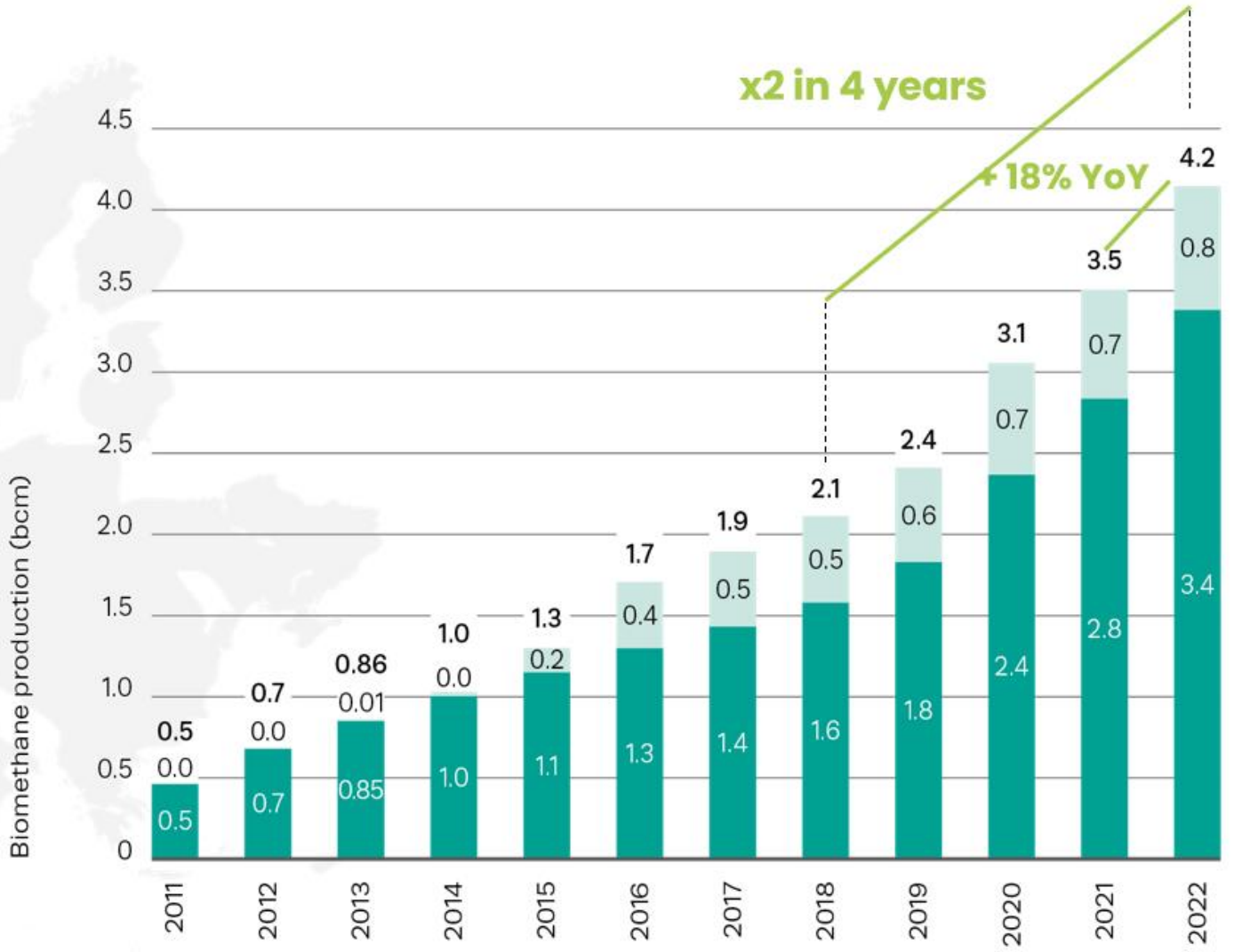
4.2 bcm (3.4 in EU-27)

4.5 bcm installed capacity

x2 production since 2018

France, Italy, Denmark, UK fastest growing countries

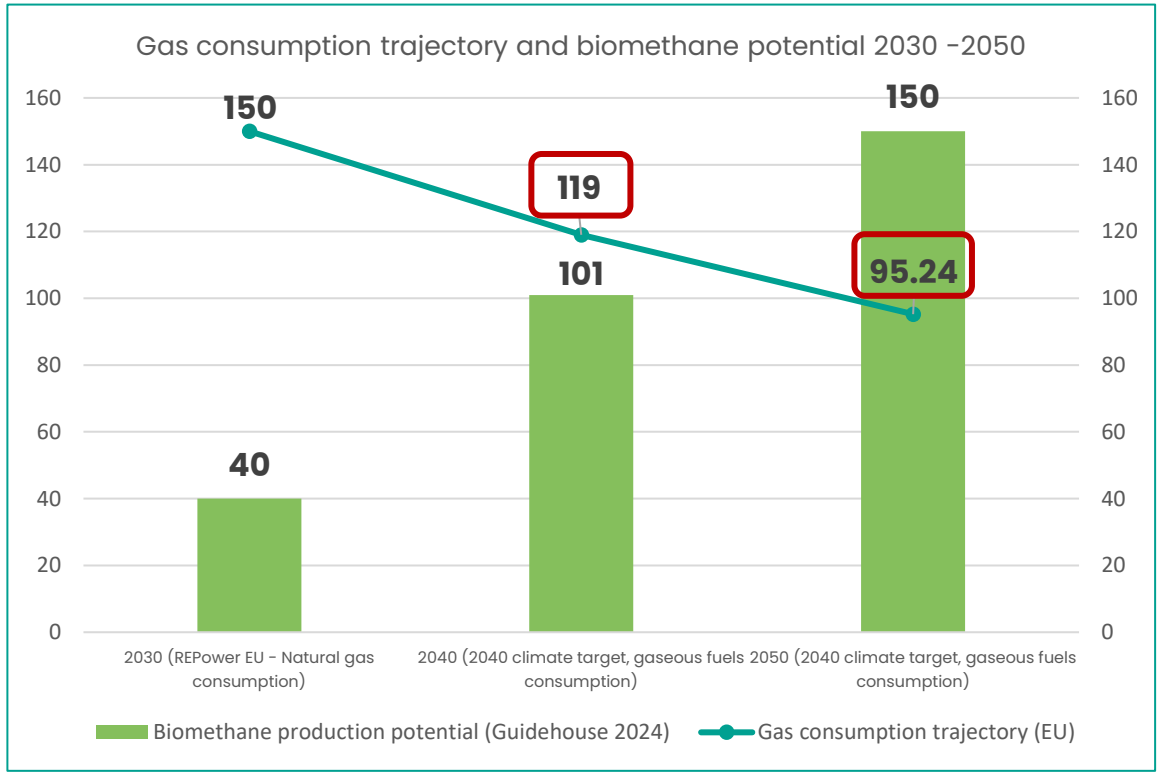
European biomethane production in EU-27 and Europe



2040 Climate Target Plan: Biogases role

The Target Plan foresees a reduction in grid-injected gaseous fuels to 119 bcm by 2040

(Natural gas, e-methane, biomethane)



Biomethane's role in maritime transport

- 8% of transport fuels in 2040 & 16% in 2050
- EC projected 19 TWh biomethane in maritime transport in 2030. Focus on maritime likely to continue

Emission Trading System

0 rated Surrender allowances

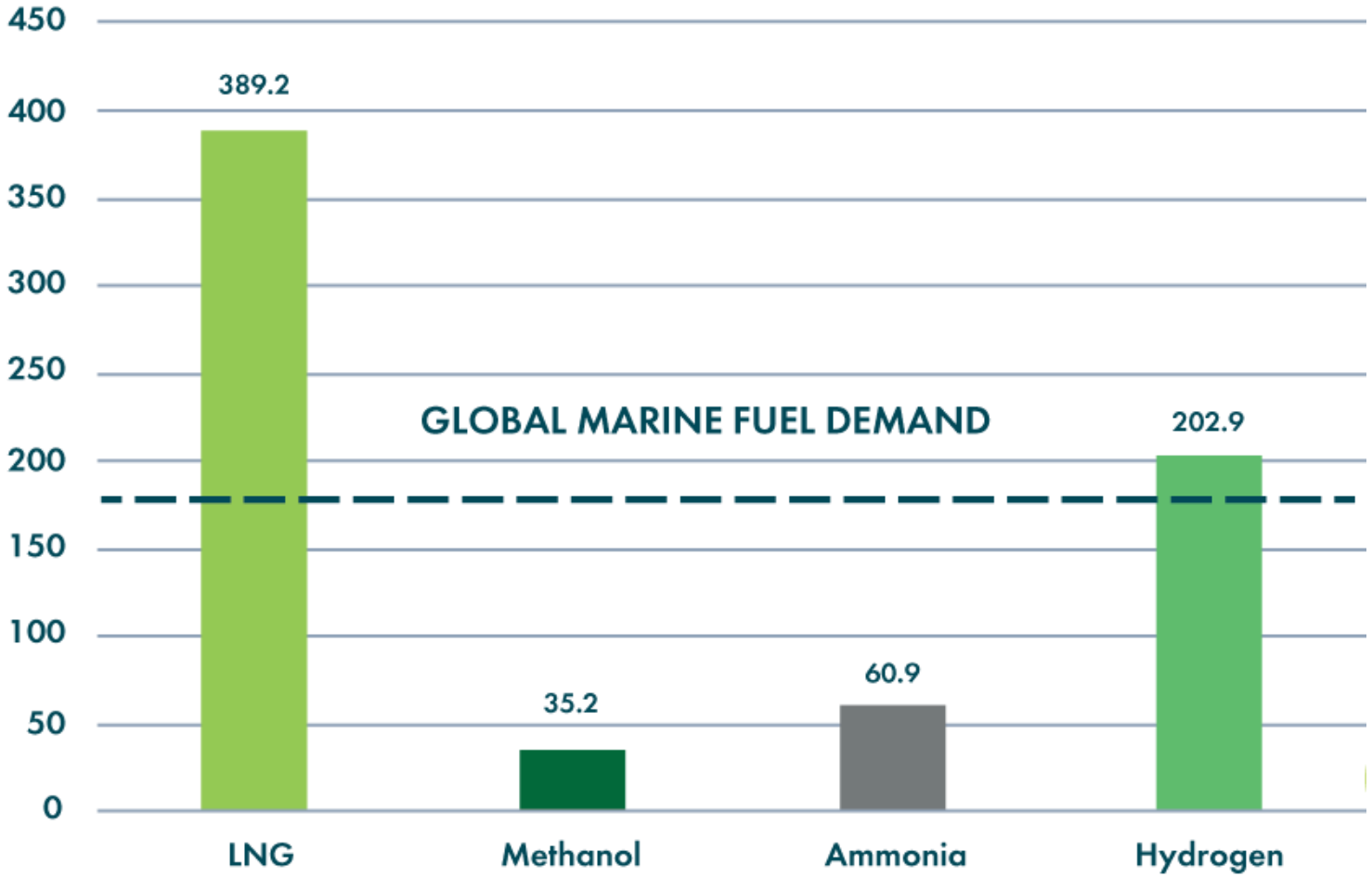
Fuel EU Maritime

GHG intensity limits on LCA Methodology

EBA European Biogas Association

FUEL MARKET SIZE vs MARITIME DEMAND

Size of current fuel market (Mtpa LNGe)



Sources: GIIGNL. Methanol Institute, IEA & IRENA

Growing (bio-)LNG fleet

- 469 operational LNG vessels
- 537 booked LNG vessels

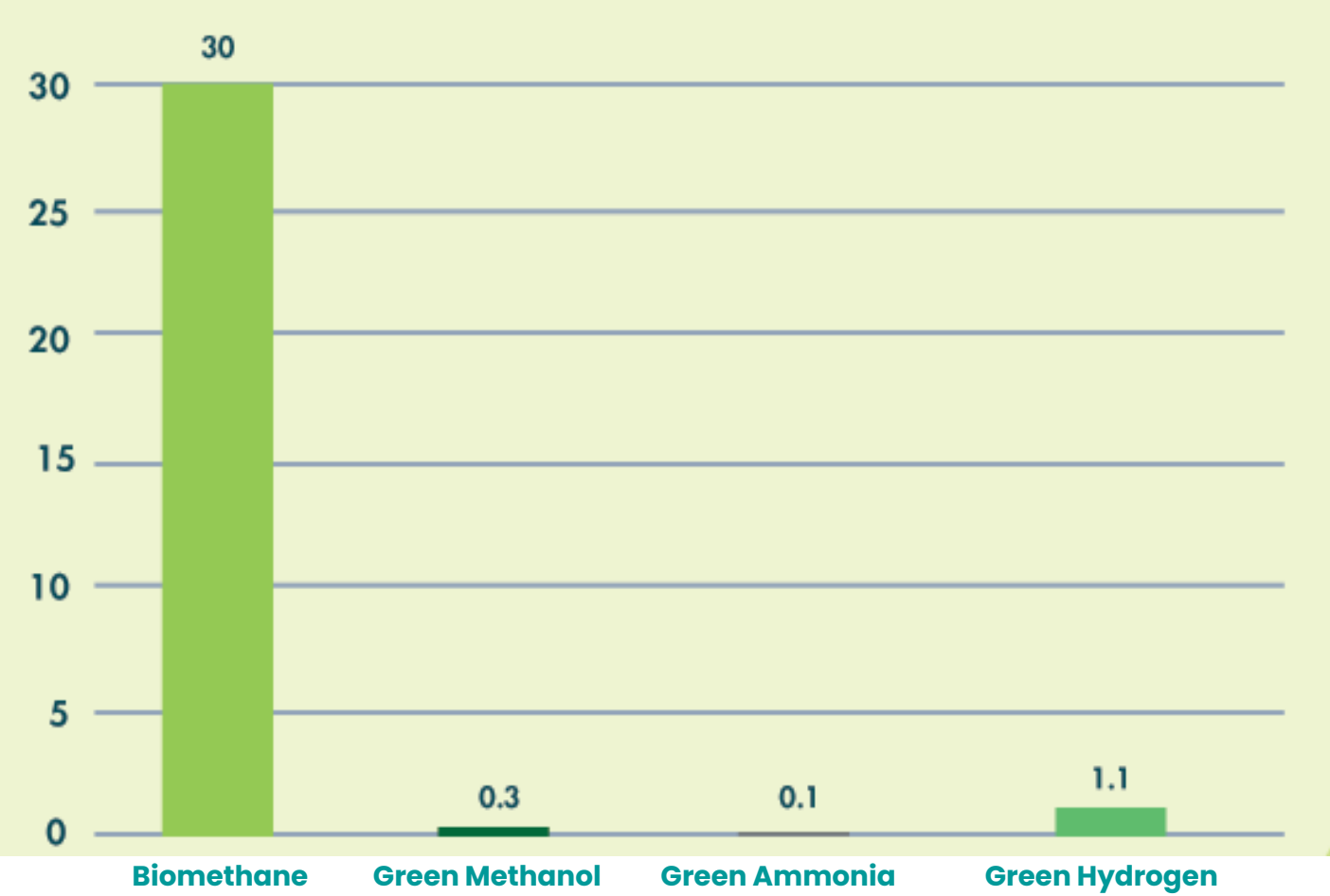
Source: DNV 12/2023

Bunkering infrastructure

- 96 ports LNG bunkering
- 55 ports LNG bunkering investments

Biomethane: a versatile low-carbon fuel

Current green fuel production (Mtpa LNGe)



Sources: GIIGNL. Methanol Institute, IEA & IRENA

GHG savings in maritime

20% bioLNG mix: - 34% CO_2

100% bioLNG: negative emissions

-95% NOx | -99% SOx | -99% particulate

Reliable production

- 29 Bio-LNG plants (2023)
- 134 Bio-LNG plants by 2027
- 144 Bio-CNG plants (2023)

EU Transport Legislation

Count Emissions EU

Transport service
GHG emission calculate on
Well-to-Wheel Methodology

RED III

RES-T 29%
or
14.5% GHG intensity
&
binding combined Advanced Biofuels & RFNBO sub-target of 5,5% by 2030

ETS II

42% emission reduction by 2030
Surrender allowances

CO2 Emission Standards

Tailpipe approach
No technology neutrality
No level playing field

Fuel EU Maritime

GHG intensity limits on LCA Methodology

ReFuel EU Aviation

Increasing minimum SAF share blending mandate

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European Biogas Association

THANK YOU!

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Re-thinking our economy. Making the energy transition happen.

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Follow us on

Q&A Session

Charting new horizons: biomethane's voyage in maritime and aviation

Annika Kroon

DG MOVE , European Commission

Filippo Munna

Hexagon Agility

David Chiaramonti

Politecnico di Torino

Andrea Qualiano

Edison Spa

Anna Venturini

European Biogas Association

EUROPEAN BIOMETHANE WEEK

Visual summary of the plenary

EUROPEAN BIOMETHANE WEEK

CHECKING FOR PERFECTION

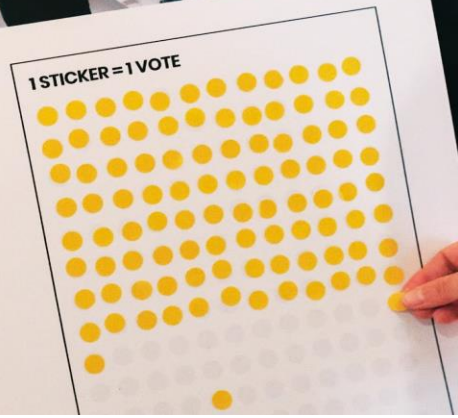
Latvia

April 2024

Paulo Sampaio

SYSADVANCE, Portugal

This image shows the SYSADVANCE team's commitment to quality and precision in producing biomethane through their state-of-the-art Biogas Upgrading systems.



CLOSING CONFERENCE

Harmen Dekker

CEO

European Biogas Association

EUROPEAN BIOMETHANE WEEK

EUROPEAN
RENEWABLE GAS
TRAINING CENTRE

Just launched: European Renewable Gas Training Centre

Consolidate knowledge on renewable gas throughout Europe

Offer and facilitate **courses and training programmes**, independently and in collaboration with national associations

Foster **critical and creative thinking** to enhance the EU's competitiveness in clean technologies and accelerate climate neutrality

What's next?

A series of four deep-dive courses in 2025 focussed on the most influencing areas and aspects of de-risking a biogas plant:

- Financing
- Operations
- Technology
- Health and Safety

EUROPEAN
RENEWABLE GAS
TRAINING CENTRE

BIOGASES BUSINESS DAY

MEMBERS-ONLY NETWORKING EVENT

6-7 February 2025

Interalpen-Hotel Tyrol
Austria

EBAnet
europeanbiogas.eu

EBA
European Biogas Association

A Fresh Setting for the 2025 European Biogas Conference!

Mark your calendars for **14-15 October 2025** as we bring the next edition of the European Biogas Conference to a new location!

Next year, we will gather at **Autoworld**, a stunning venue in the heart of Brussels, set within the beautiful Parc du Cinquantenaire.

See you soon!

Follow our activities

LinkedIn X Youtube Website