UNECE

EBA
European Biogas Association

EUROPEAN BIOMETHANE WEEK

With the support of the European Commission

Energy sustainability and security

Increasing role of renewable methane molecules in the gas supply

16 OCTOBER 2025

9.30-12.00

info@europeanbiogas.eu
www.europeanbiomethaneweek.eu

Welcome

Annette Kroll

Board Member

European Biogas Association (EBA)

AGENDA

09:30 | Welcome
- **Annette Kroll**, Board Member, European Biogas Association (EBA)

09:33-10:00 | Introductory Remarks
- **Dario Liguti**, Director Sustainable Energy, United Nations Economic Commission for Europe (UNECE)
- **Francisco de la Flor**, Director, Enagás & GEG Chair, United Nations Economic Commission for Europe (UNECE)
- **Harmen Dekker**, CEO, European Biogas Association (EBA) & GEG Vice Chair, United Nations Economic Commission for Europe (UNECE)

10:00-10:45 | Session 1

Unlocking future potential at the nexus of sustainable biomass and agroecological practices
- **Connie Miller**, GBEP Deputy Coordinator, Food and Agriculture Organization (FAO)
- **Ana Alcalde**, Energy Analyst, International Energy Agency (IEA)
- **Piero Gattoni**, President, European Biogas Association (EBA) & Consorzio Italiano Biogas (CIB)
- **Q&A**

10:45-11:00 | Break

11:00-11:45 | Session 2

Renewable molecules and the interplay between hydrogen and biomethane
- **Jeremiah Murphy**, Director MaREI Centre, University College Cork (UCC)
- **Ilaria Conti**, Coordinator for Strategy and Development, Florence School of Regulation (FSR) & GEG Vice-Chair, United Nations Economic Commission for Europe (UNECE)
- **Gerard Ostheimer**, CEO, Molecule Group
- **Q&A**

11:45-12:00 | Conclusion and wrap up
- **Francisco de la Flor**, Director, Enagás & GEG Chair, United Nations Economic Commission for Europe (UNECE)
- **Annette Kroll**, Board Member, European Biogas Association (EBA)

Introductory remarks

Dario Liguti

Director Sustainable Energy
United Nations Economic Commission for Europe (UNECE)

Introductory remarks

Francisco de la Flor

Director, **Enagás**

GEG Chair, **United Nations Economic Commission for Europe (UNECE)**

Introductory remarks

Harmen Dekker

CEO, **European Biogas Association (EBA)**

GEG Vice Chair, **United Nations Economic Commission for Europe (UNECE)**

Session 1

Unlocking future potential at the nexus of sustainable biomass and agroecological practices

Connie Miller

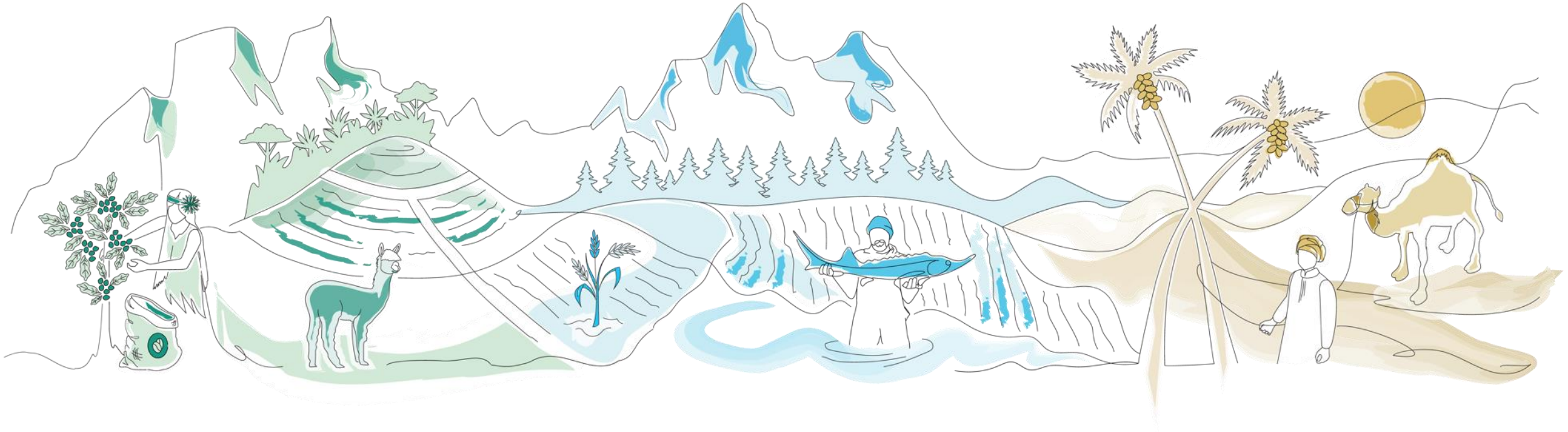
GBEP Deputy Coordinator

Food and Agriculture Organization (FAO)

Food and Agriculture Organization
of the United Nations

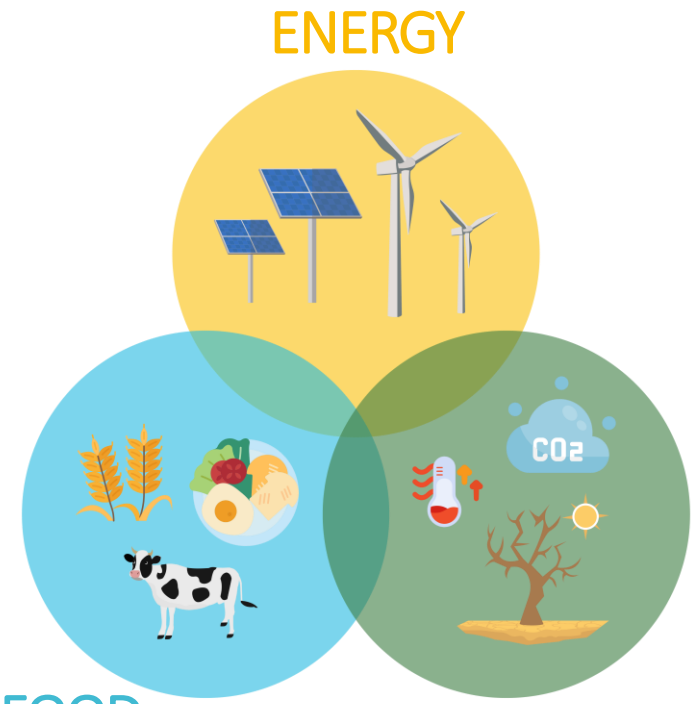
Energy-Smart Agrifood Systems

Circular biogas solutions



Agriculture, energy security and climate change are intrinsically interconnected

- Agrifood systems need energy at each step of the value chain
- 30% of the world energy is consumed within agrifood systems → This energy use is responsible for 29.7% of total anthropogenic GHG emissions produced by agrifood systems



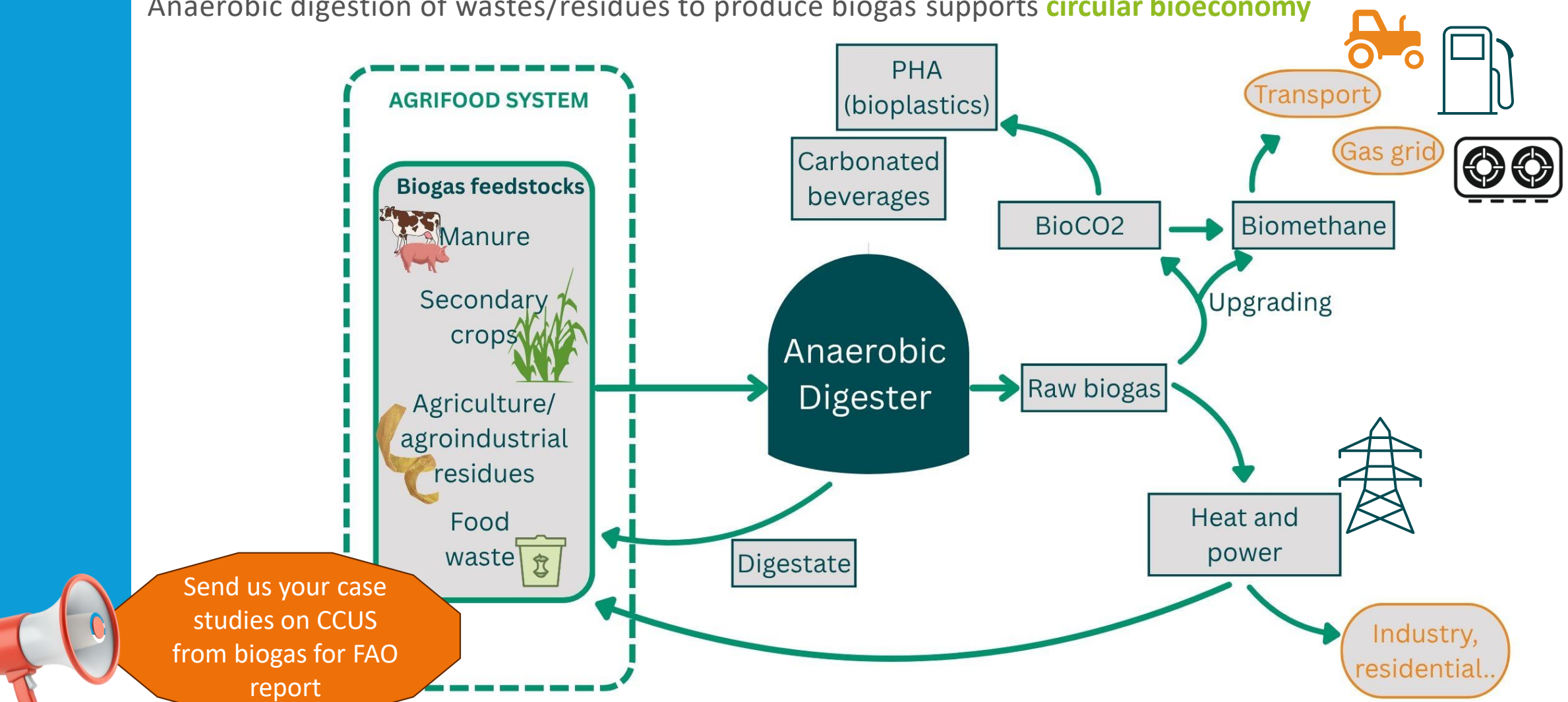
FAO's work

Agrifood system transformation is required.
Energy-smart agrifood system solutions are key.

‘Closing the loop’ – biogas from agrifood wastes and residues

About 1/3 food is lost or wasted after farm gate → 38% of energy equally wasted

Anaerobic digestion of wastes/residues to produce biogas supports **circular bioeconomy**



Send us your case studies on CCUS from biogas for FAO report

‘Closing the loop’ – biogas from agrifood wastes and residues

- Management of agrifood wastes and residues using anaerobic digestion can **reduce GHG emissions** through:
  - reduction in unmanaged decomposition (CH4),
  - replacement of fossil fuels (CO2), and
  - reduction in use of synthetic nitrogen fertilizers (N2O)
- Can provide diversified farm outputs and additional sources of income

Climate change mitigation

Enhanced resilience

- **Not without concerns…**

Other uses of residues

Management of digestate

Incentivisation of intensive systems

Biogas leakage

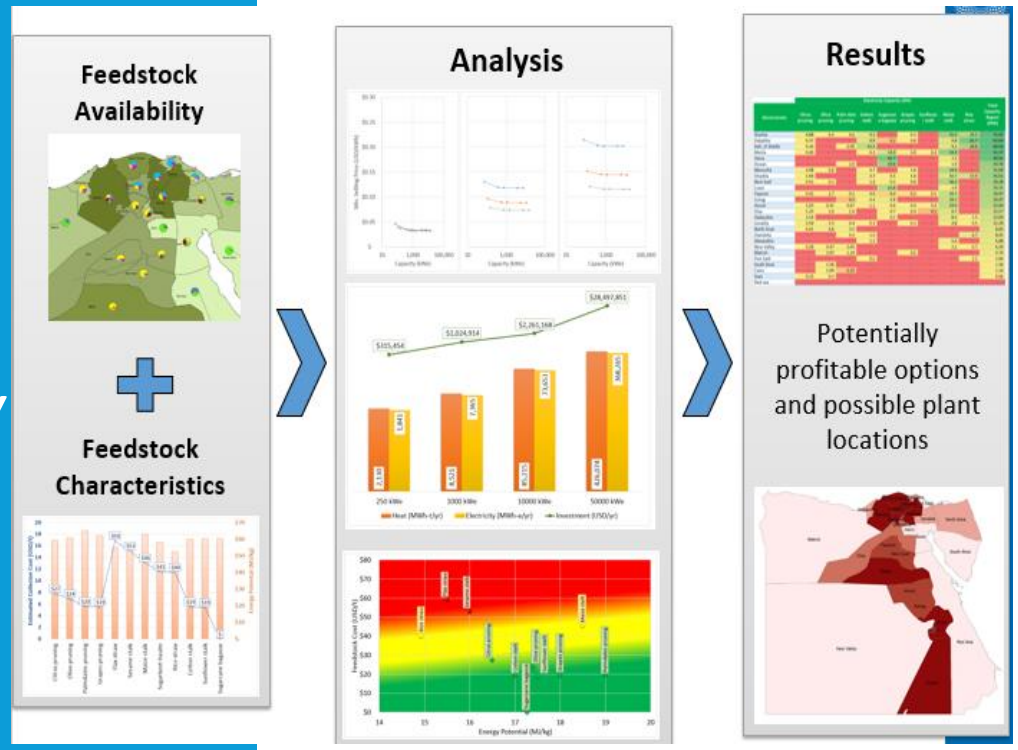
Economic viability

Context-specific sustainability analysis

FAO Methodologies and Tools

FOCUS ON BIOENERGY SUSTAINABILITY

BEFS Assessment Approach - EX-ANTE



GBEP Sustainability indicators - EX-POST

ENVIRONMENTAL

1. Life-cycle GHG emissions
2. Soil quality
3. Harvest levels of wood resources
4. Emissions of non-GHG air pollutants, including air toxics
5. Water use and efficiency
6. Water quality
7. Biological diversity in the landscape
8. Land use and land-use change related to bioenergy feedstock production

SOCIAL

9. Allocation and tenure of land for new bioenergy production
10. Price and supply of a national food basket
11. Change in income
12. Jobs in the bioenergy sector
13. Change in unpaid time spent by women and children collecting biomass
14. Bioenergy used to expand access to modern energy services
15. Change in mortality and burden of disease attributable to indoor smoke
16. Incidence of occupational injury, illness and fatalities

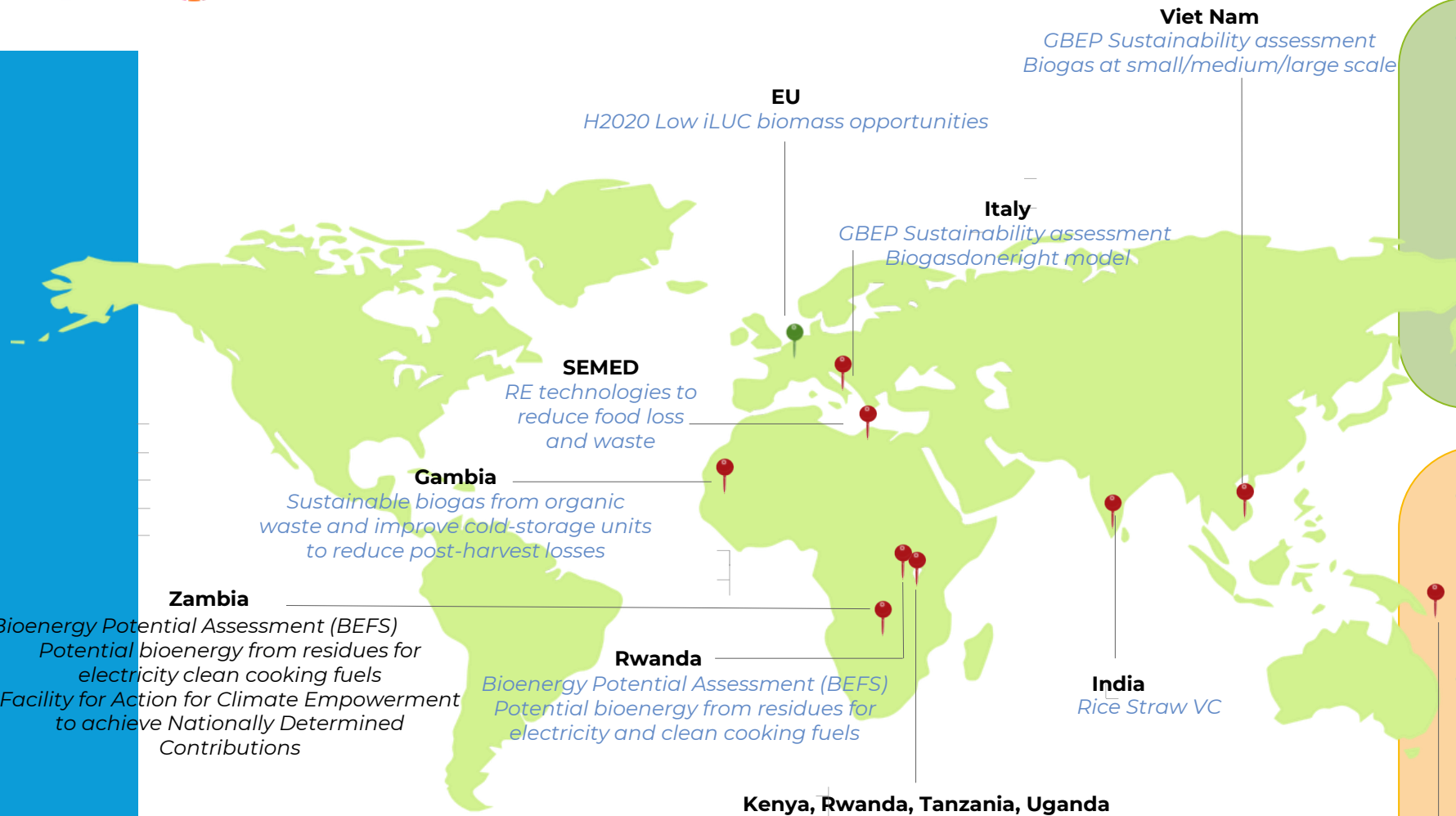
ECONOMIC

17. Productivity
18. Net energy balance
19. Gross value added
20. Change in consumption of fossil fuels and traditional use of biomass
21. Training and re-qualification of the workforce
22. Energy diversity
23. Infrastructure and logistics for distribution of bioenergy
24. Capacity and flexibility of use of bioenergy

CURRENT WORKSTREAM: Bioenergy in the context of bioeconomy

- Extend system boundaries > by-products
- Better consider circularity

Country-level assessments



Viet Nam
GBEP Sustainability assessment
Biogas at small/medium/large scale

EU
H2020 Low iLUC biomass opportunities

Italy
GBEP Sustainability assessment
Biogasdoneright model

SEMED
RE technologies to reduce food loss and waste

Gambia
Sustainable biogas from organic waste and improve cold-storage units to reduce post-harvest losses

Zambia
Bioenergy Potential Assessment (BEFS)
Potential bioenergy from residues for electricity clean cooking fuels
Facility for Action for Climate Empowerment to achieve Nationally Determined Contributions

Rwanda
Bioenergy Potential Assessment (BEFS)
Potential bioenergy from residues for electricity and clean cooking fuels

India
Rice Straw VC

Kenya, Rwanda, Tanzania, Uganda
Biogas in the dairy VC

Solomon Islands
Feasibility study to set up a biogas plant using pig waste at farm level

- Country-level assessments show promising potential for biogas to contribute to climate change mitigation, modern energy access and waste management
- Demonstrates favourable cost of carbon abatement
- Provides green jobs

- Feasibility assessments can ensure selection of appropriate feedstocks and technologies for specific contexts
- Regulatory framework is fundamental to ensure sustainability standards
- There is the need for targeted investment supported by favourable policies

Thank you

Office of Climate Change, Biodiversity and Environment
www.fao.org/climate-change
www.fao.org/biodiversity

Session 1

Unlocking future potential at the nexus of sustainable biomass and agroecological practices

Ana Alcalde

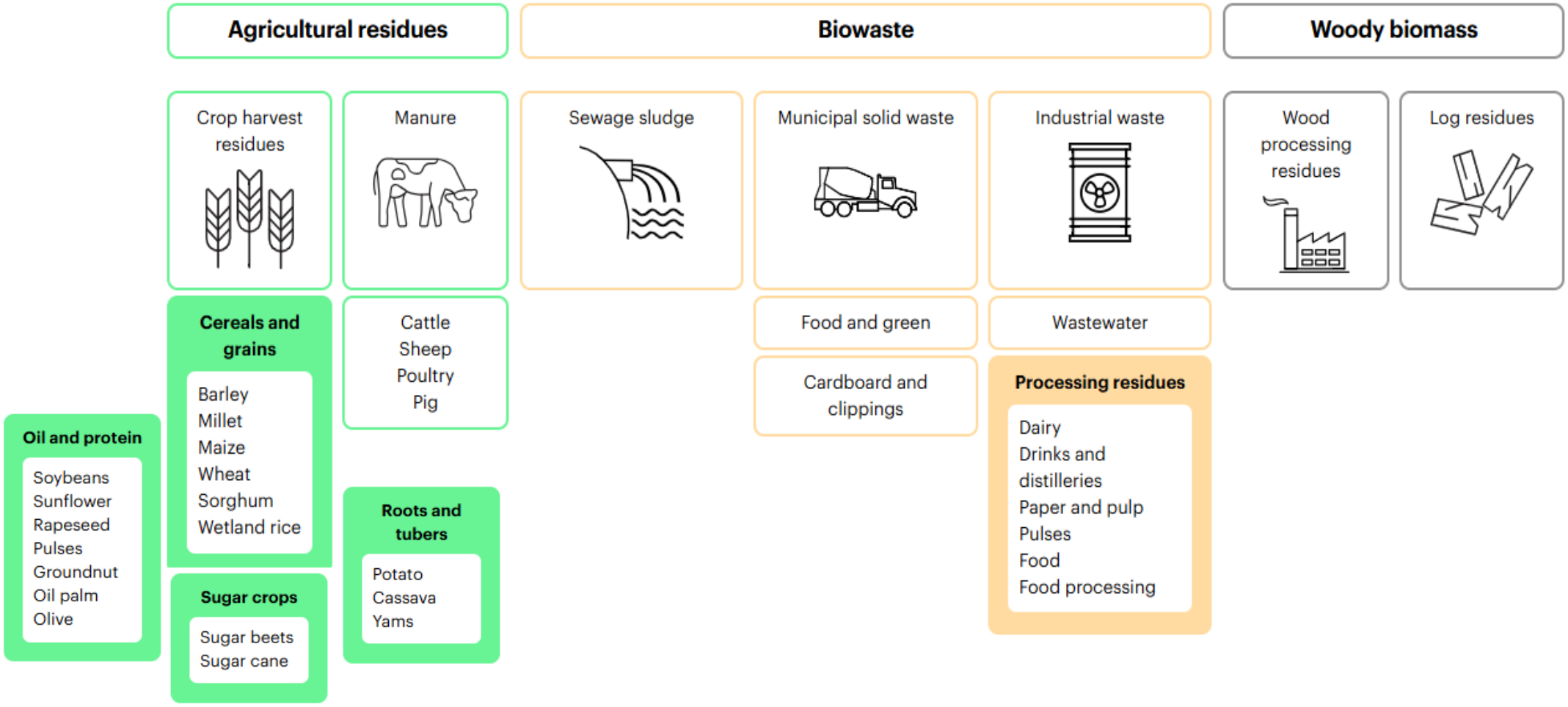
Energy Analyst

International Energy Agency (IEA)

Biogases: geospatial potential analysis and role in energy systems

International Energy Agency

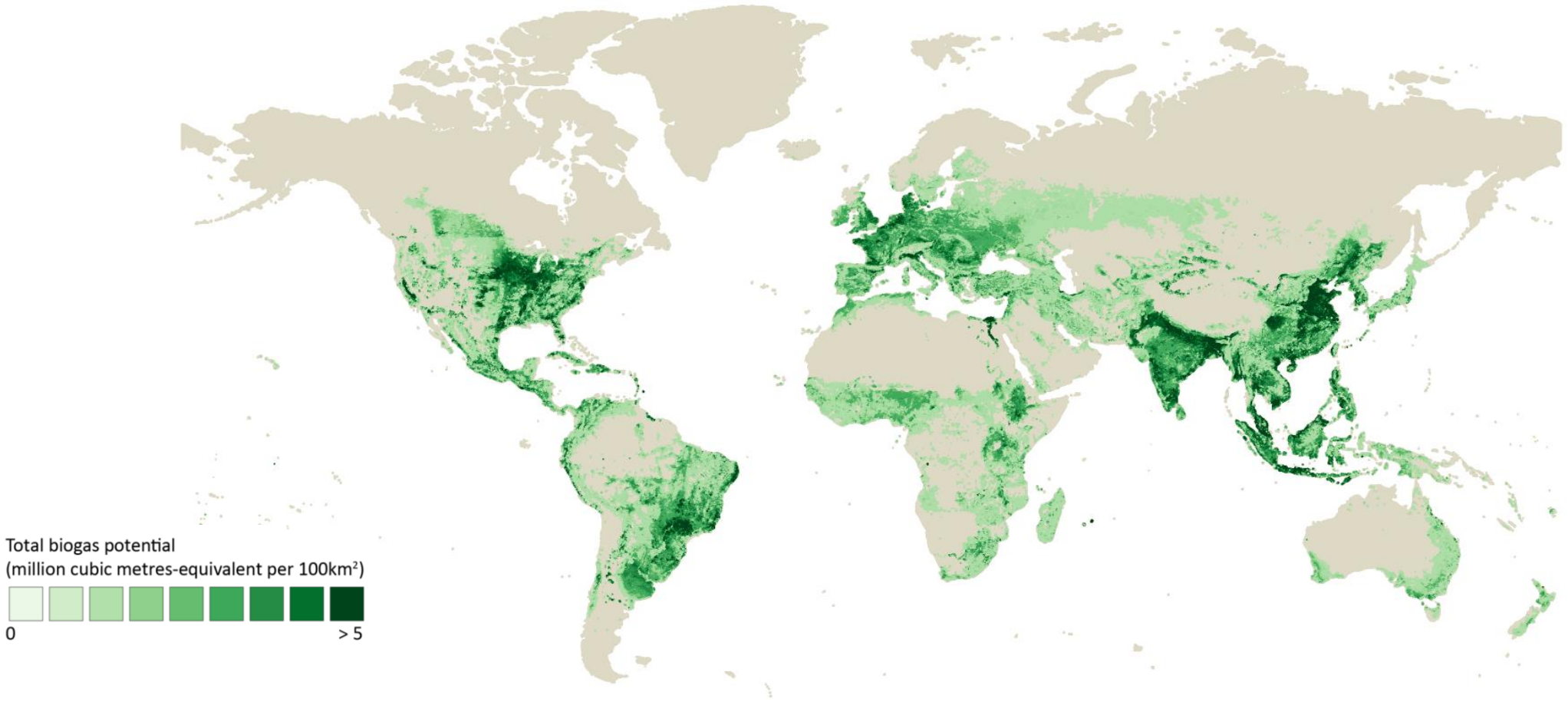
Biogas can be produced from sustainable feedstock



Discounting current other uses for animal feed or soil replenishment, nearly half of feedstock potential comes from crop residues, about 30% from animal manure and 15% from biowaste.

A spatial assessment of global biogases potential

Geographic distribution of biogas and biomethane resources globally, in 2024



Nearly 1 000 bcm-equivalent of biomethane potential has been mapped worldwide, based on sustainable feedstocks. This is equivalent to around 25% of global natural gas demand. Around 80% of this potential lies in emerging markets.

Europe has been the focal point of biogases development to date

Biogas and biomethane resources in Europe and surrounding areas, 2024

15 bcme
biogas demand in 2023

4 bcme
biomethane demand in 2023

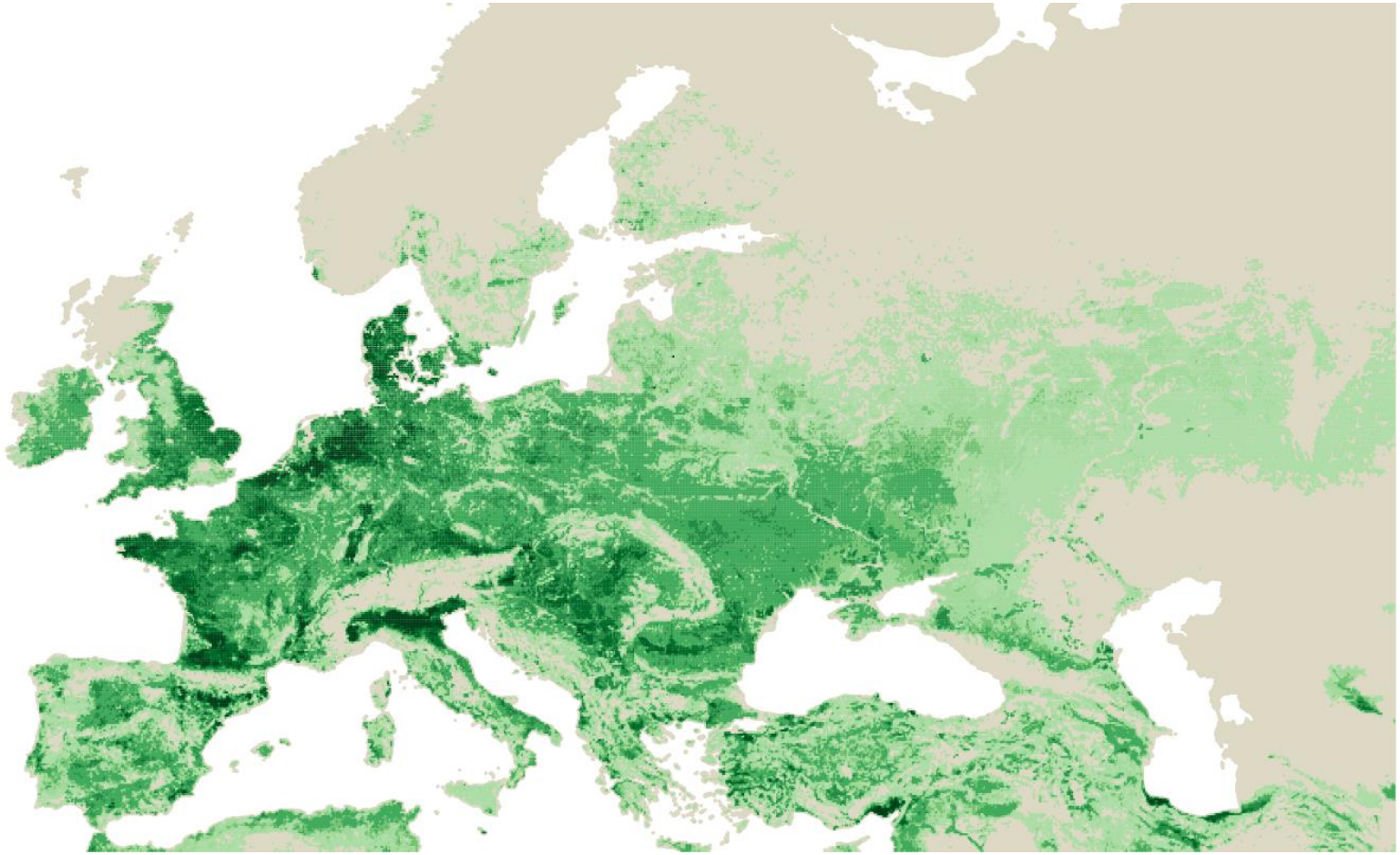
51 bcme
potential for biogases today

15%
as a share of natural gas demand

USD 22/GJ (USD 79/MWh)
average cost of biomethane

USD 15/GJ (USD 54/MWh)
average cost of producing the cheapest 10% of potential

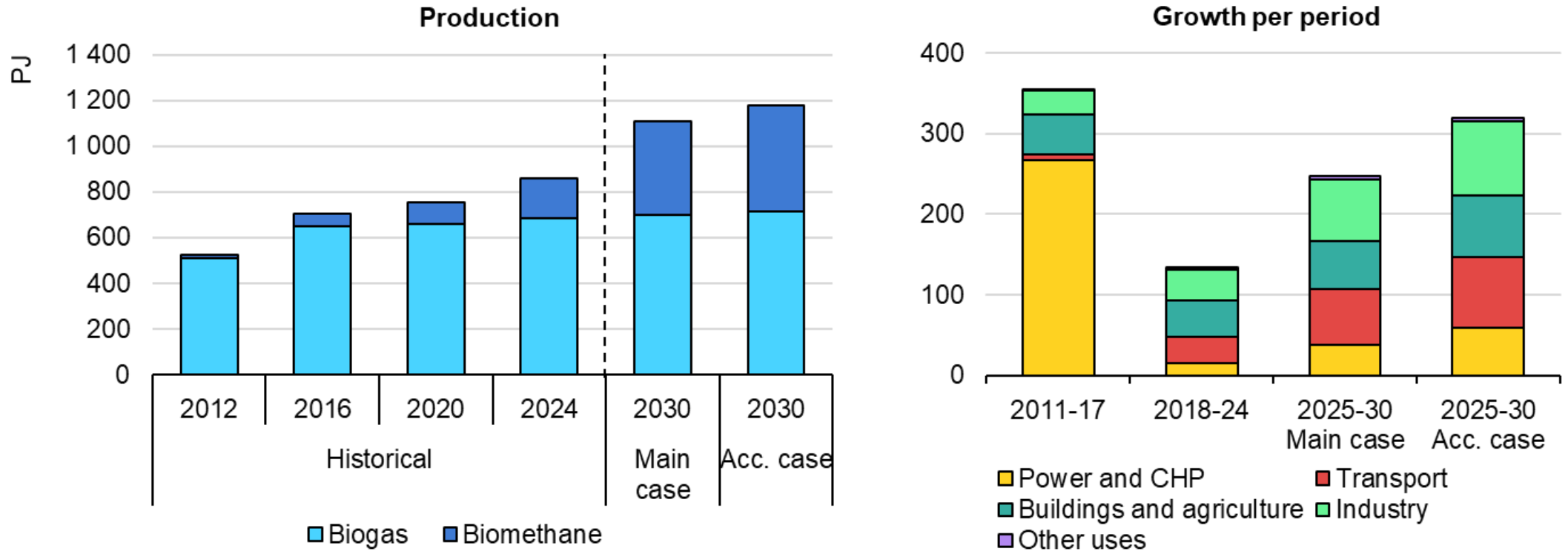
60%
potential <20 km from gas transmission pipelines



Around 50 bcm-equivalent of biogases potential lies in the European Union alone, equivalent to around 15% of the region's natural gas demand.

Biogases are seeing strong growth, underpinned by biomethane

Production and forecast of biogases in Europe, 2010-2030



Almost 20% biomethane growth since 2020, thanks to its versatility to use existing infrastructure and equipment. In GHG performance-based transport regulations, it plays a relevant role due to its low GHG emissions.

Policy priorities for action

An accelerated growth in biogases production is **ambitious but achievable**, if announced policies are consistently and fully implemented and market barriers are removed.

Priorities include:

1. Develop supply chains in an **integrated way with agriculture and waste management** sectors and address **infrastructure needs.**

2. Support the **valorisation of co-products** such as biogenic CO_2 or digestate to reduce the cost gap with fossil fuels.

3. **Develop transparent and robust carbon accounting methodologies** that allow for competition among fuels and reward GHG performance improvement.

4. **Establish roadmaps, targets and support policies** to create long-term visibility for market development.

Additional information

- **Carbon accounting for sustainable biofuels**, July 2024
  https://www.iea.org/reports/carbon-accounting-for-sustainable-biofuels
- **Towards common criteria for sustainable fuels**, September 2024
  https://www.iea.org/reports/towards-common-criteria-for-sustainable-fuels
- **Outlook for biogas and biomethane**, May 2025
  https://www.iea.org/reports/outlook-for-biogas-and-biomethane
- **Renewables 2025**, October 2025
  https://iea.blob.core.windows.net/assets/11fa0e66-6309-4fa7-a108-1f29da2707bc/Renewables2025.pdf
- **Delivering sustainable fuels – Pathways to 2035**, October 2025
  https://www.iea.org/reports/delivering-sustainable-fuels

Thank you

Session 1

Unlocking future potential at the nexus of sustainable biomass and agroecological practices

Piero Gattoni

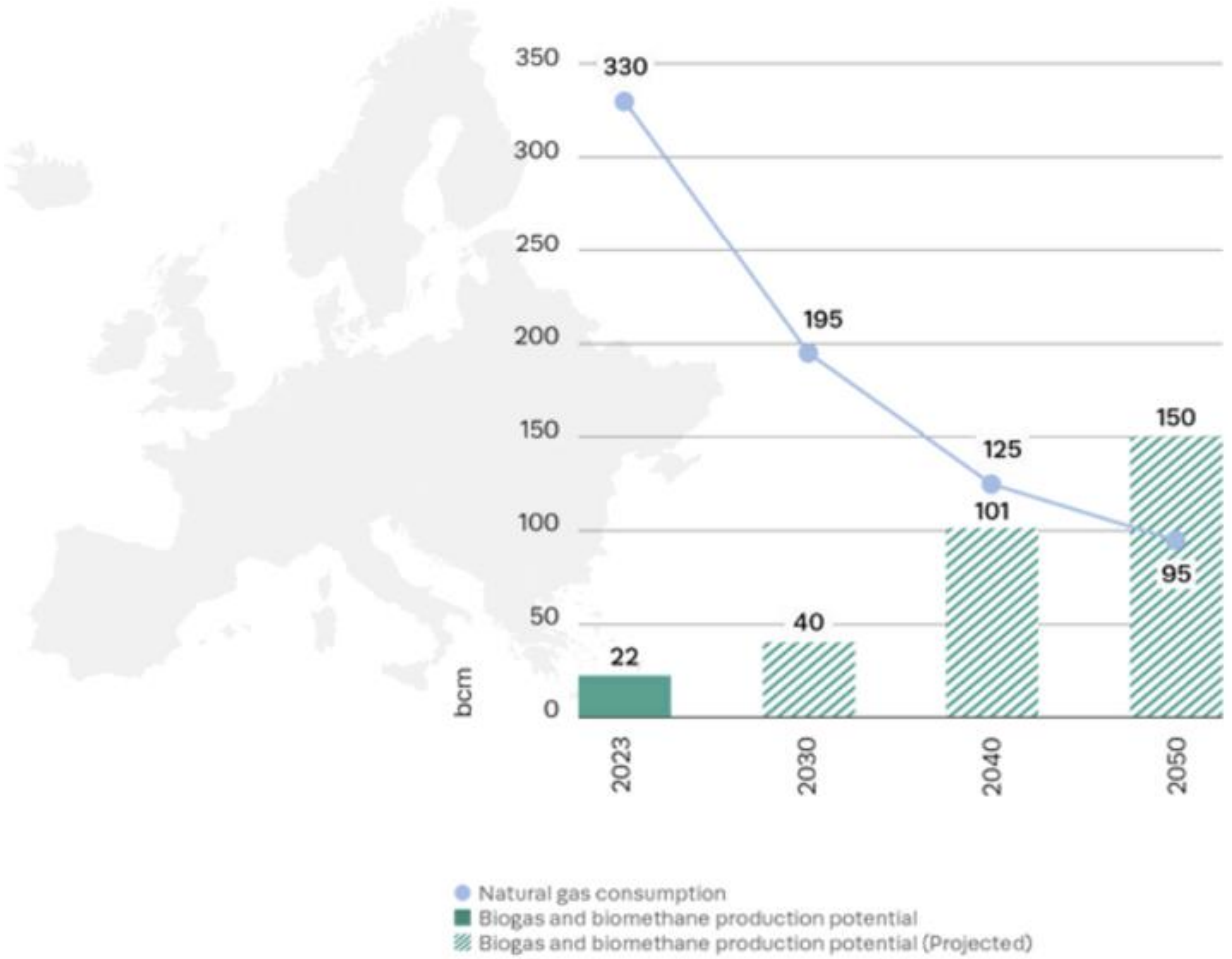
President, **European Biogas Association (EBA)** &
Consorzio Italiano Biogas (CIB)

Biogas and biomethane: the European scenario

Biomethane production potential by 2030 is higher than the 35 bcm proposed in the REPowerEU but needs to be unlocked.

By 2040, biomethane production could supply 85% of a reduced gaseous fuels demand.

EU countries with the highest potential: Germany, France, Spain, Italy, and Poland.

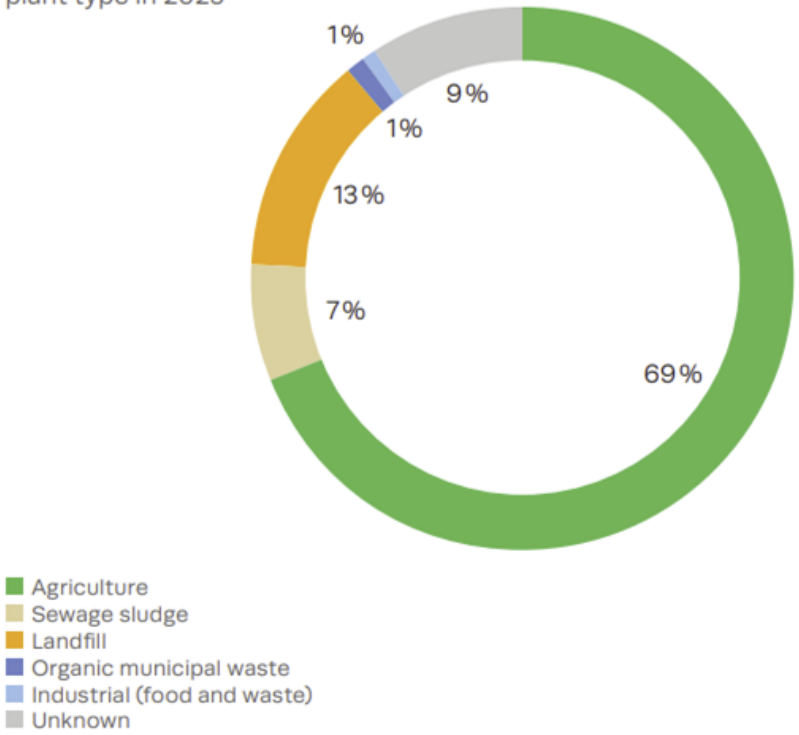


Source: EBA 2025. "Decoding Biogases". Brussels, Belgium, January 2025.

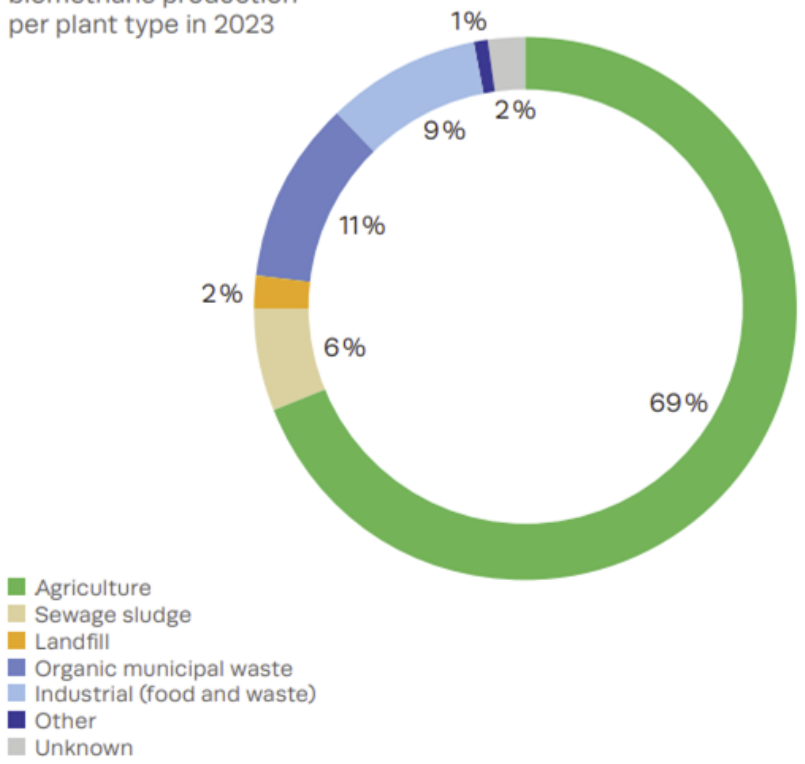
EBA European Biogas Association

Biogas and biomethane: the role of agriculture

Percentage of European biogas production per plant type in 2023



Percentage of European biomethane production per plant type in 2023



Source: EBA Statistical Report 2024

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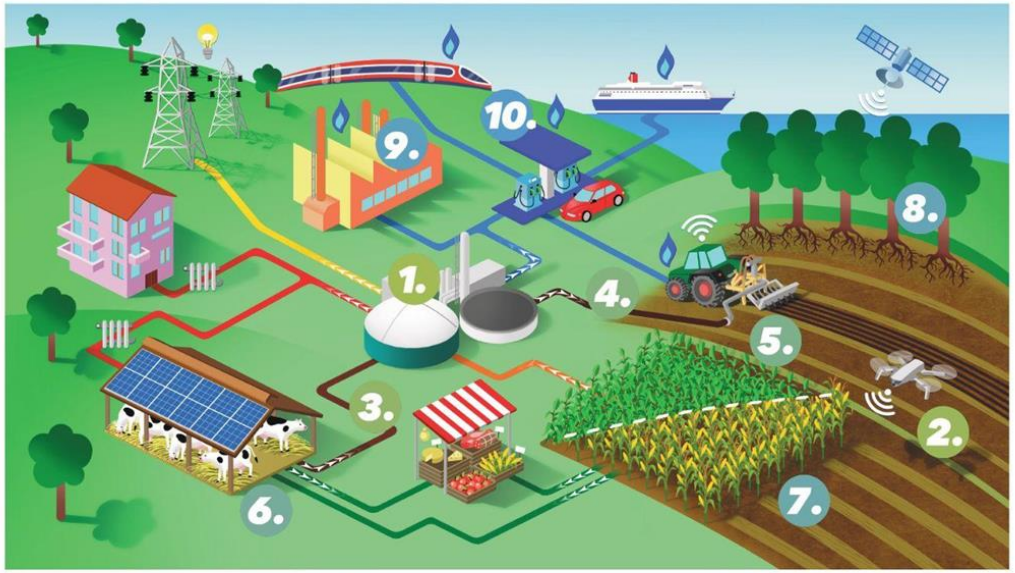
Biogas and biomethane: the agricultural model

Biogas and biomethane in agriculture are a tool to support **energy security and a sustainable agroecological transition**.

Pillars of the model:

- **soil**
- **environment**
- **energy**



1. RENEWABLE ENERGY IN AGRICULTURE
REPLACE FOSSIL FUELS WITH RENEWABLE ENERGY SOURCES TO REDUCE POLLUTION AND EMISSIONS

2. FARM 4.0
ADOPT ADVANCED AGRICULTURAL AND ANIMAL FARMING TECHNOLOGY TO CALIBRATE RESOURCES ACCORDING TO CROP AND LIVESTOCK NEEDS

3. MANAGEMENT OF ANIMAL MANURE
USE ANIMAL MANURE AND AGRICULTURAL BYPRODUCTS IN ANAEROBIC DIGESTION TO REDUCE EMISSIONS AND PRODUCE RENEWABLE BIOENERGY

4. ORGANIC FERITILISATION
USE ORGANIC FERTILISER (DIGESTATE) TO RETURN NUTRIENTS TO THE SOIL AND REDUCE THE USE OF CHEMICAL FERTILISERS

5. INNOVATIVE FARMING PROCESSES
ADOPT ADVANCED SOIL TILLAGE AND ORGANIC FERTILISATION TECHNIQUES TO REDUCE EMISSIONS FROM SOILS

6. ANIMAL QUALITY AND WELFARE
IMPLEMENT ADVANCED AGRICULTURAL AND ZOOTECHNICAL TECHNIQUES TO IMPROVE THE QUALITY AND WELFARE OF LIVESTOCK FARMS

7. INCREASED SOIL FERTILITY
ADOPT DOUBLE CROPS TO INCREASE CO_2 CAPTURE AND SOIL FERTILITY

8. AGROFORESTRY
INTEGRATE TREES IN CULTIVATED FIELDS TO INCREASE PHOTOSYNTHESIS AND ORGANIC MATTER IN SOILS

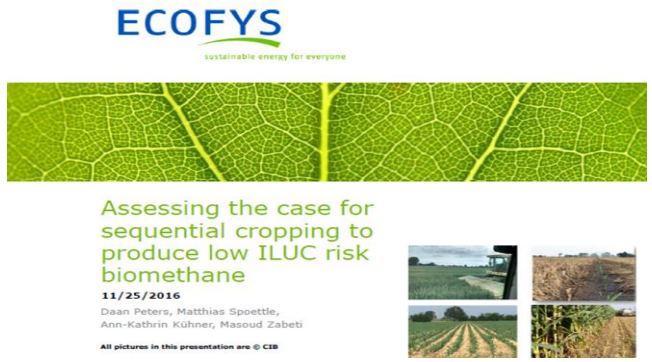
9. PRODUCTION AND USE OF BIOMATERIALS
DEVELOP AND USE ORGANIC, NATURAL AND RENEWABLE MATERIALS

10. BIOGAS AND OTHER RENEWABLE GASES
PRODUCE METHANE AND HYDROGEN RENEWABLE FROM AGRICULTURAL BIOGAS

EBA European Biogas Association

Sequential cropping: beyond waste to energy

2016 **Ecofys Assessment of Innovative Biogas Production Concept**



2024 - "The potential for sequential & rotational cropping for sustainable biomethane production across Europe" – Task Force 3 , June 2024

EBA European Biogas Association

The role of sequential cropping in Europe

Each MS applies sequential cropping according to its specific climate and agriculture

Energy: Generate additional biomethane

+ Improve energy security
+ Decarbonise gas sector
+ Reduced citizens' exposure to market volatility
+ Present opportunities for BECCS
+ Reduce dependence on seasonality of by-products obtained from agri-food supply chains

Agricultural: Support the transition to sustainable arable farming

+ Cut on-farm GHG emissions
+ Diversify agricultural income
+ Create jobs in the rural economy
+ Enrich biodiversity
+ Increase carbon sequestration in soils
+ Improve soil health
+ Reduce soil erosion
+ Maintain and improve food security
+ Protect natural environments
+ Increase water content in soils

FIGURE 1 KEY BENEFITS OF SUSTAINABLE NOVEL CROP ROTATIONS WITHIN ENERGY AND AGRICULTURAL SECTORS

Source: BIP "The potential for sequential & rotational cropping for sustainable biomethane production across Europe" – Task Force 3 , June 2024

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Investments in agroecological practices thanks to AD

EBA
European Biogas Association

Thank you for your attention!

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Session 1

Unlocking future potential at the nexus of sustainable biomass and agroecological practices

Q&A session

Moderated by Annette Kroll, Board Member
European Biogas Association (EBA)

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BREAK

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Session 2

Renewable molecules and the interplay between hydrogen and biomethane

Jeremiah Murphy

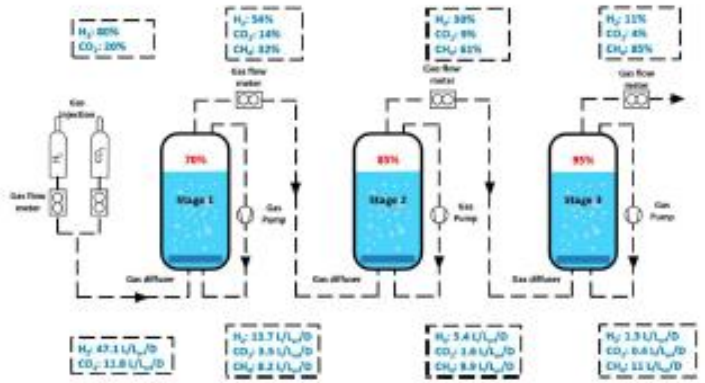
Director MaREI Centre
University College Cork (UCC)

UCC
Coláiste na hOllscoile Corcaigh
University College Cork, Ireland

IEA Bioenergy
Technology Collaboration Programme

Circular economy approaches to integration of anaerobic digestion with Power to X technologies

IEA Bioenergy: Task 37 January 2024



Murphy, J.D., Rusmanis, D., Gray, N., O'Shea, R. (2024) Circular economy approaches to integration of anaerobic digestion with Power to X technologies, Liebetrau, J. (Ed.) IEA Bioenergy Task 37, 2024:1.

Technology Collaboration Programme
by IEA

X = 1 Hydrogen (H_2):

- We need renewable hydrogen to replace fossil hydrogen. The hydrogen molecule is ubiquitous. EU and US use up to twice as much energy from gas grid than electricity grid

X = 2 Methane (CH_4): $CO_2 + 4H_2 \rightarrow CH_4 + 2H_2O$

- Energy consumed from natural gas grid is up to twice that from electricity grid in EU and USA

X = 3 Methanol (CH_3OH): $CO_2 + 3H_2 \rightarrow CH_3OH + H_2O$

- Worldwide production of 110 million tonnes in 2021 used to make plastics, paints, cosmetics and fuels

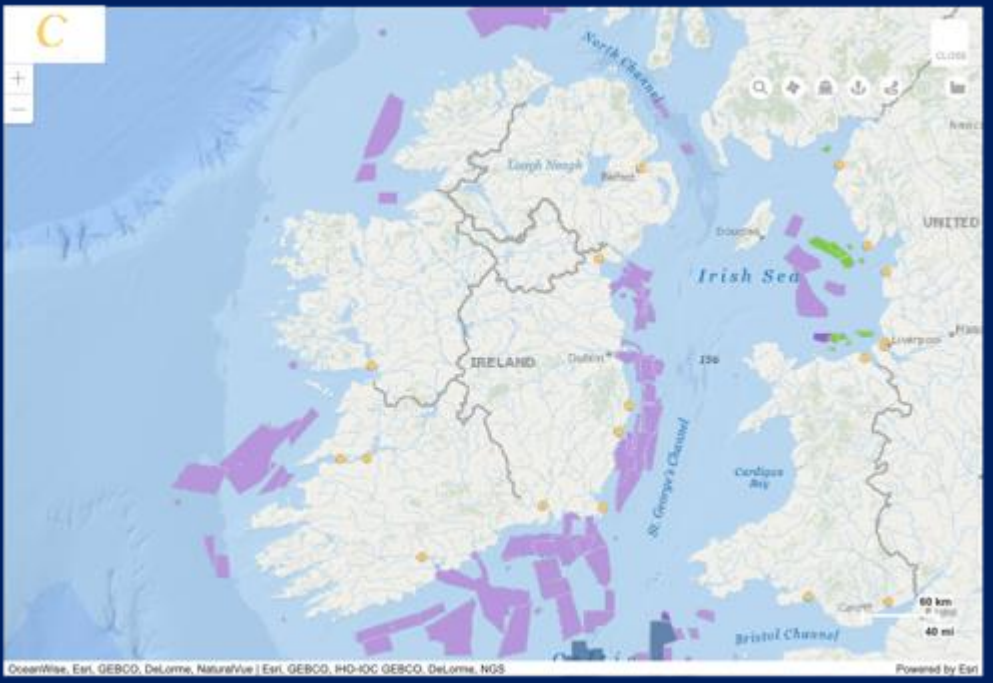
X = 4 Ammonia (NH_3): $N_2 + 3H_2 \rightarrow 2NH_3$

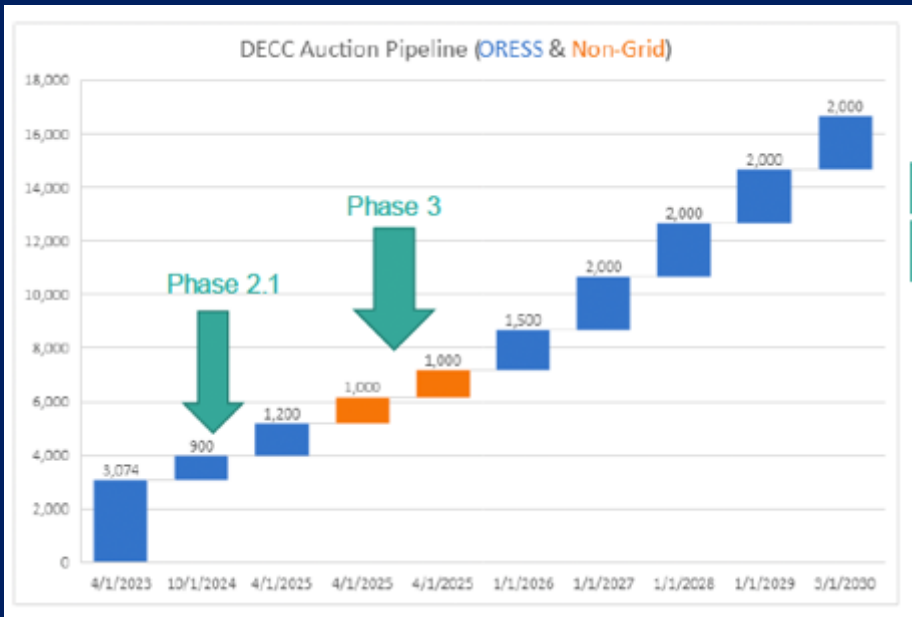
- World production 150 million tonnes; 80% used for fertiliser, 20% for plastics, fibres, explosives, nitric acid

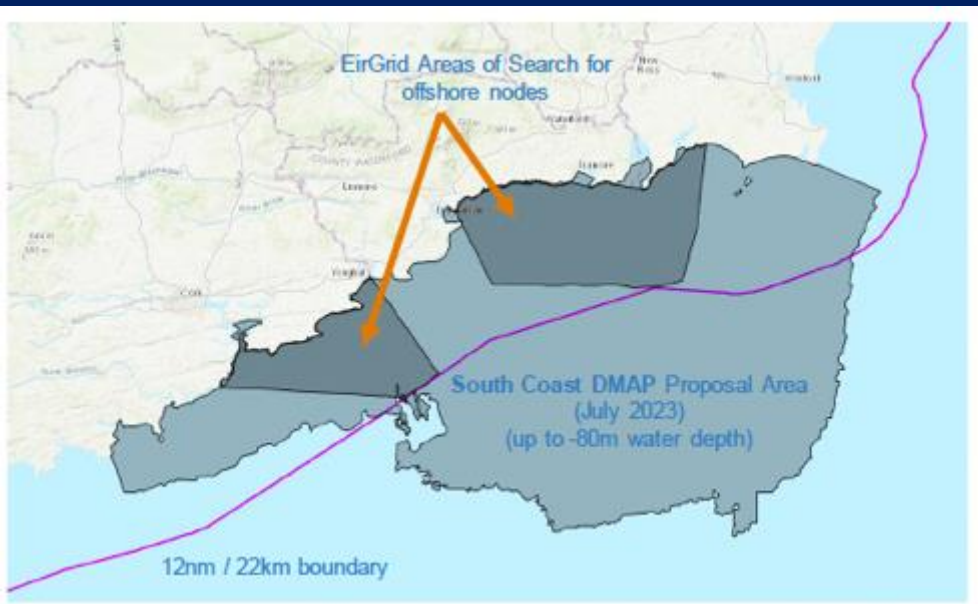
X = 5 Fischer Tropsch Fuels and Sustainable Aviation Fuel

- $CO_2 + H_2 \rightarrow CO + H_2O$
- $2nH_2 + nCO \rightarrow -(CH_2)-n + nH_2O$

OFFSHORE RENEWABLE ENERGY SUPPLY SCHEME (ORESS)







Plans for 17 GW of offshore wind to be auctioned by 2030 for a country that has rarely used more than 7 GW. Ireland targets 5 GW of offshore wind in operation by 2030 leading to 80% RES-E.

Ireland's electricity grid has **already** experienced some of the highest system nonsynchronous penetration (SNSP) in any national electricity grid.

$$SNSP = \frac{Wind\ \ generation + Imports}{System\ \ demand + Exports}$$

World's largest flywheel: 130 t synchronous condenser in Moneypoint.

X = 1 Hydrogen

2 GW of private wire/hydrogen (Phase 3). Likely 1 GW to Cork

BIOLOGICAL CONVERSION OF H_2 TO CH_4

Bioresource Technology 225 (2017) 308–315

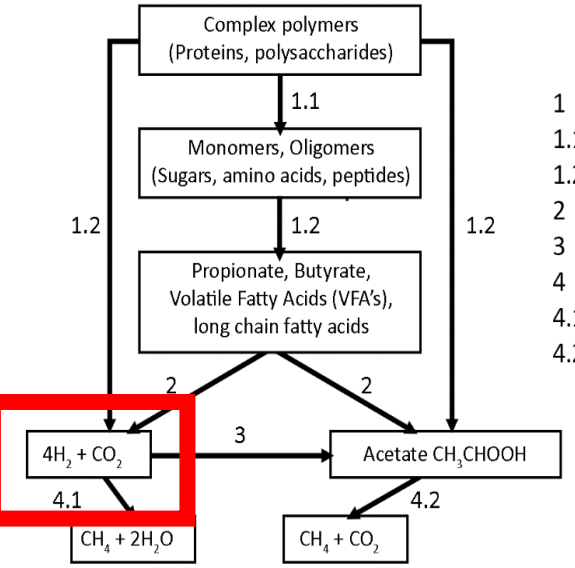
Contents lists available at ScienceDirect

Bioresource Technology

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

Study of the performance of a thermophilic biological methanation system

Amita Jacob Guneratnam [a], Eoin Ahern [a], Jamie A. FitzGerald [a,d], Stephen A. Jackson [d], Ao Xia [c], Alan D.W. Dobson [d], Jerry D. Murphy [a,b,*]



1	Acidogenic bacteria
1.1	Hydrolytic bacteria
1.2	Fermentative bacteria
2	Acetogenic bacteria
3	Homoacetogenic bacteria
4	Methanogenic archaea
4.1	Hydrogenotrophic Methanogenic archaea
4.2	Acetoclastic Methanogenic archaea

			ΔG (kJ/reaction)
Species 2	$CH_3CH_2OH + H_2O$	$= CH_3COO^- + H^+ + 2H_2$	+5.95
Species 4.1	$2H_2 + 0.5CO_2$	$= 0.5CH_4 + H_2O$	−65.45
Species 4.2	$CH_3COO^- + H^+$	$= CH_4 + CO_2$	−28.55
Net	CH_3CH_2OH	$= 1.5CH_4 + 0.5CO_2$	−87.85

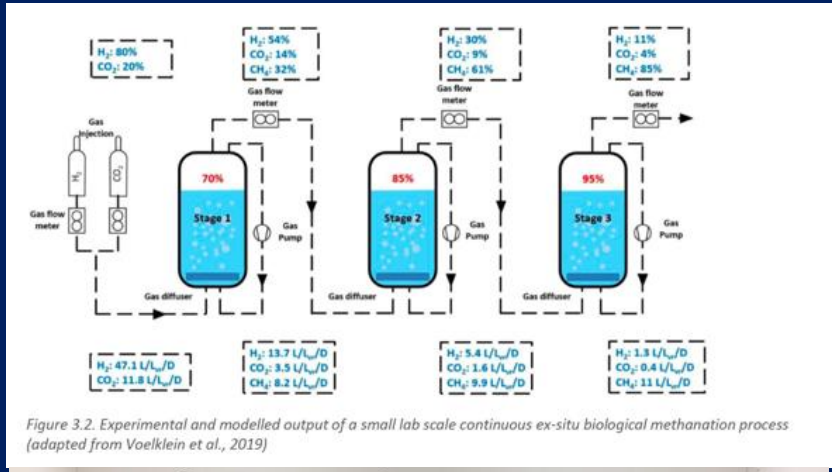
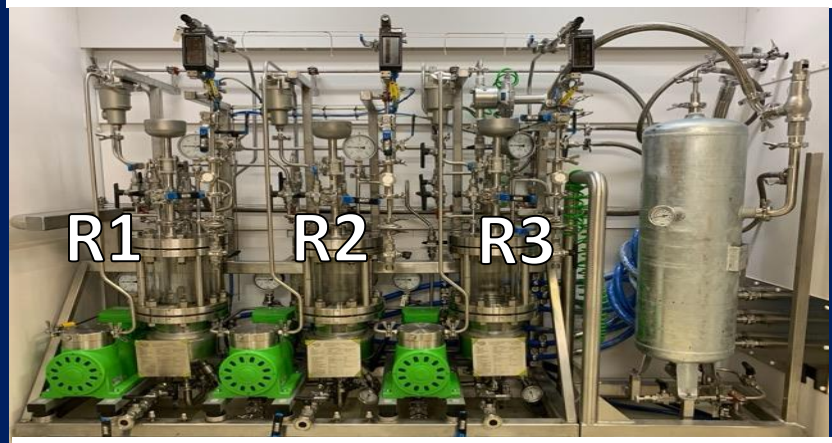
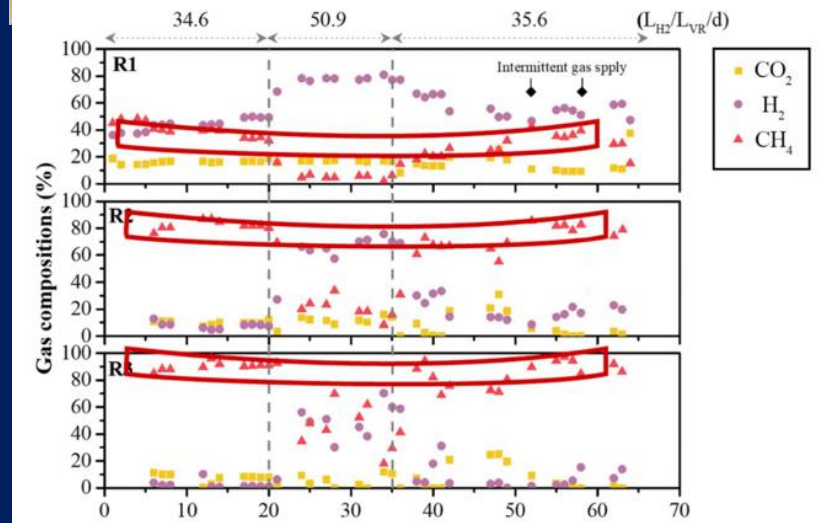


Figure 3.2. Experimental and modelled output of a small lab scale continuous ex-situ biological methanation process (adapted from Voelklein et al., 2019)





CASE STORY: BIOCAT, AVEDØRE, DENMARK

	Alkaline Electrolysis Cell Electrolyser	Methanation reactor
Theory	$2H_2O = 2H_2 + O_2$ H_2 LHV of 3kWh/m³ or 33.33kWh/kg	$4H_2 + CO_2 =$ $CH_4 + 2H_2O$
Input	1 MW electrolyser using 1000 kWh of electricity per hour	125 m³ raw biogas/h 75 m³ CH_4/h & 50 m³ CO_2/h
Output	1000 kW_eh at 60% capacity = 600 kWh = 200 m³ H_2 /h	75 m³ CH_4 from biogas plus 50 m³ CH_4 from biological methanation facility

$$4H_2 + CO_2 \rightarrow CH_4 + 2H_2O \quad \Delta H_R = -165\ kJ/mol$$

X = 3: POWER TO METHANOL (CH_3OH)

Worldwide production of methanol is 110 million tonnes

We need renewable hydrogen (such as from offshore wind) and “climate neutral” CO_2

Direct Air Capture of CO_2 is expensive (450€/t)

We need biogenic CO_2 (from biogas or distilleries) which costs c. 30€/t

Reforming biomethane to biomethanol

$3CH_4 + CO_2 + 2\ H_2O = 4\ CH_3OH$

E-Methanol

$CO_2 + H_2 \rightarrow CO + H_2O$

$CO + 2\ H_2 = CH_3OH$

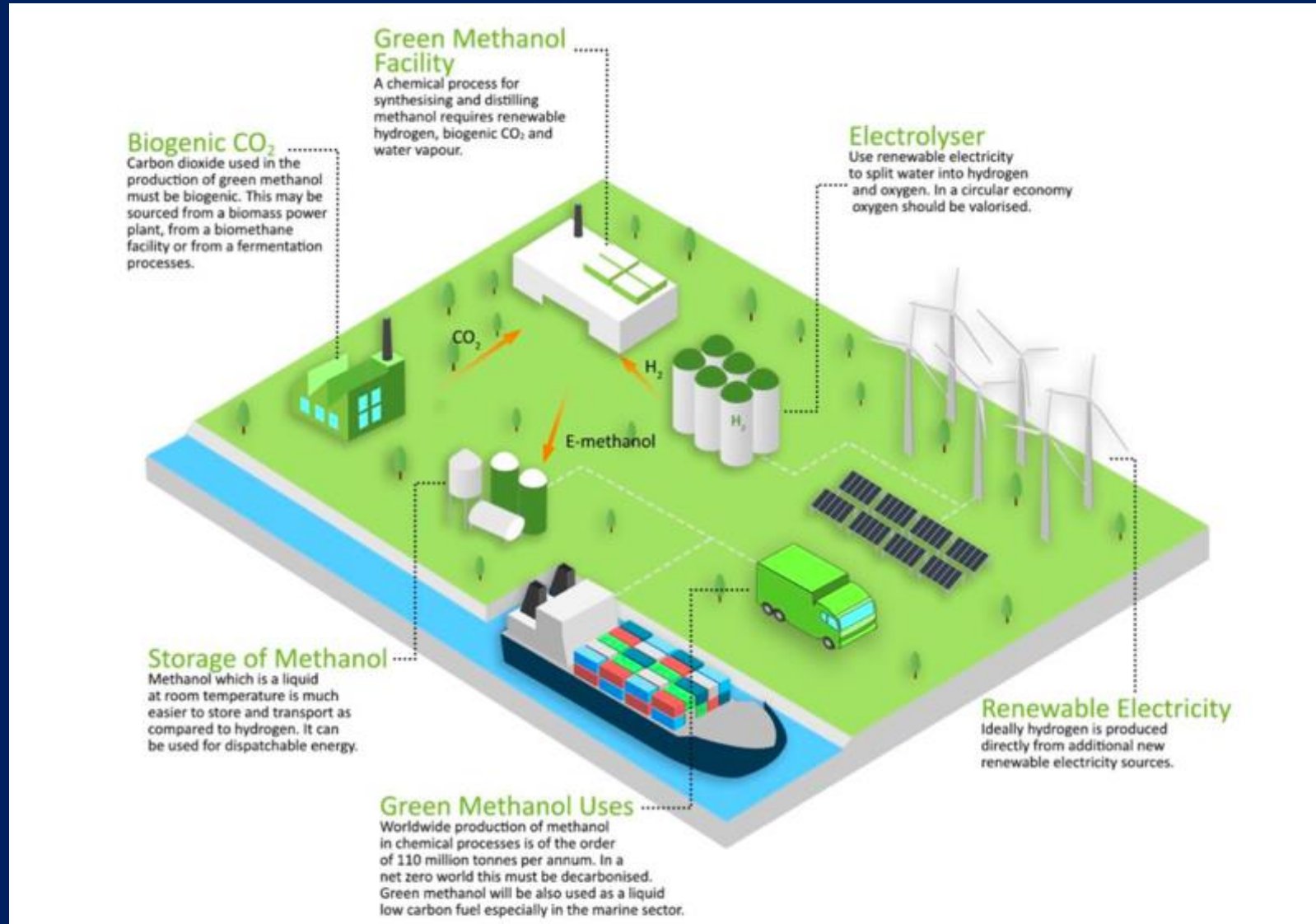


Figure 5.1. Green Methanol production system, adapted from:
https://www.iberdrola.com/documents/20125/2056775/metanol-verde-infografia-EN.pdf

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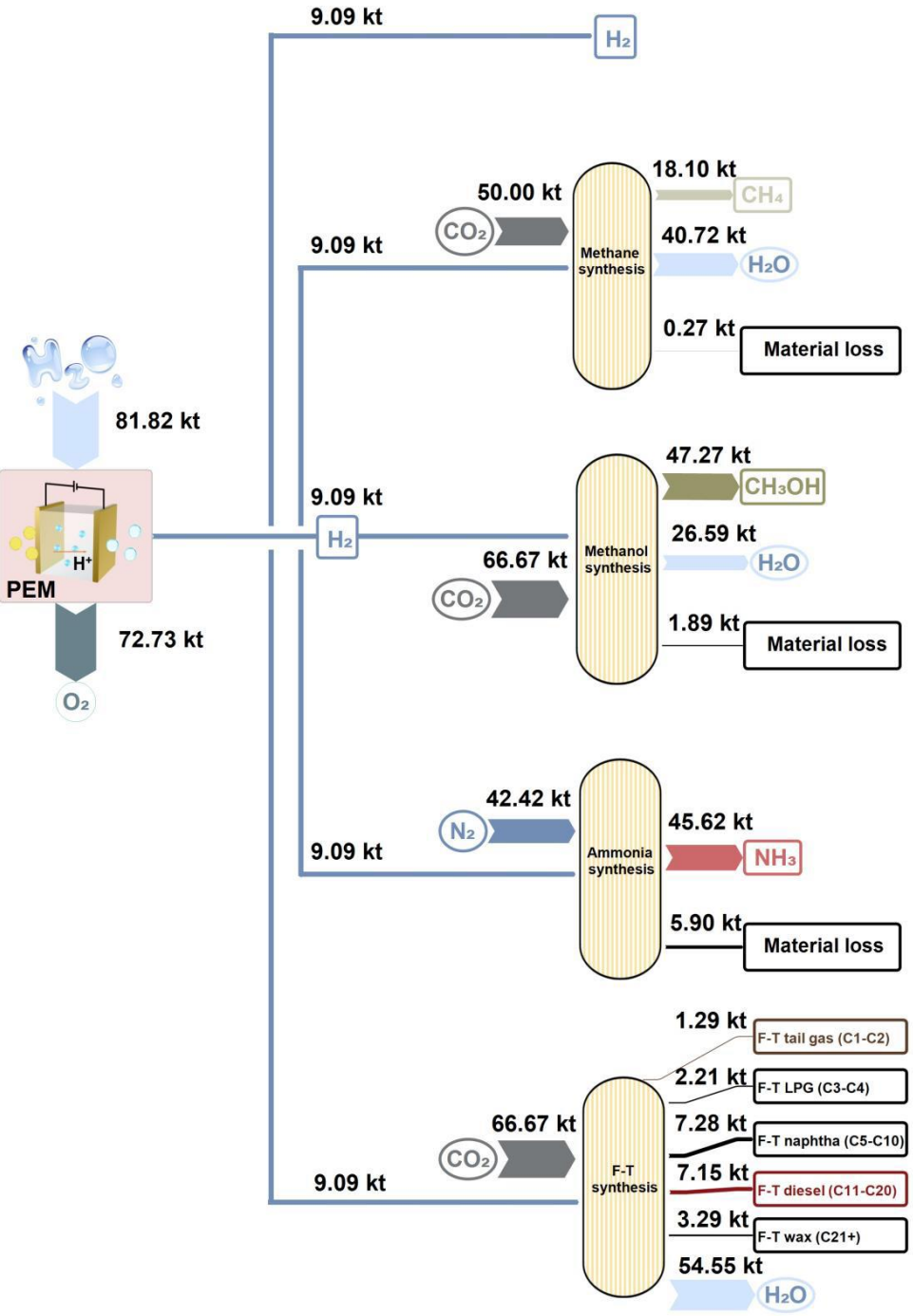


MASS AND ENERGY FLOW OF POWER TO X PATHWAYS

Irish Distillers produces 50,000 t biogenic CO_2/a

POWER TO METHANE

- $CO_2 + 4H_2 \rightarrow CH_4 + 2H_2O$

50,000 t $CO_{2\,/a}$ needs a 70 MW ELECTROLYSER (54% ENERGY RETURN)

POWER TO METHANOL

- $CO_2 + 3H_2 \rightarrow CH_3OH + H_2O$ (

70 MW ELECTROLYSER REQUIRES 66,670 t $CO_{2/a}$ (55% ENERGY RETURN)

POWER TO AMMONIA

- $N_2 + 3H_2 \rightarrow 2NH_3$

70 MW ELECTROLYSER NO BIOGENIC CO_2 (50% ENERGY RETURN)

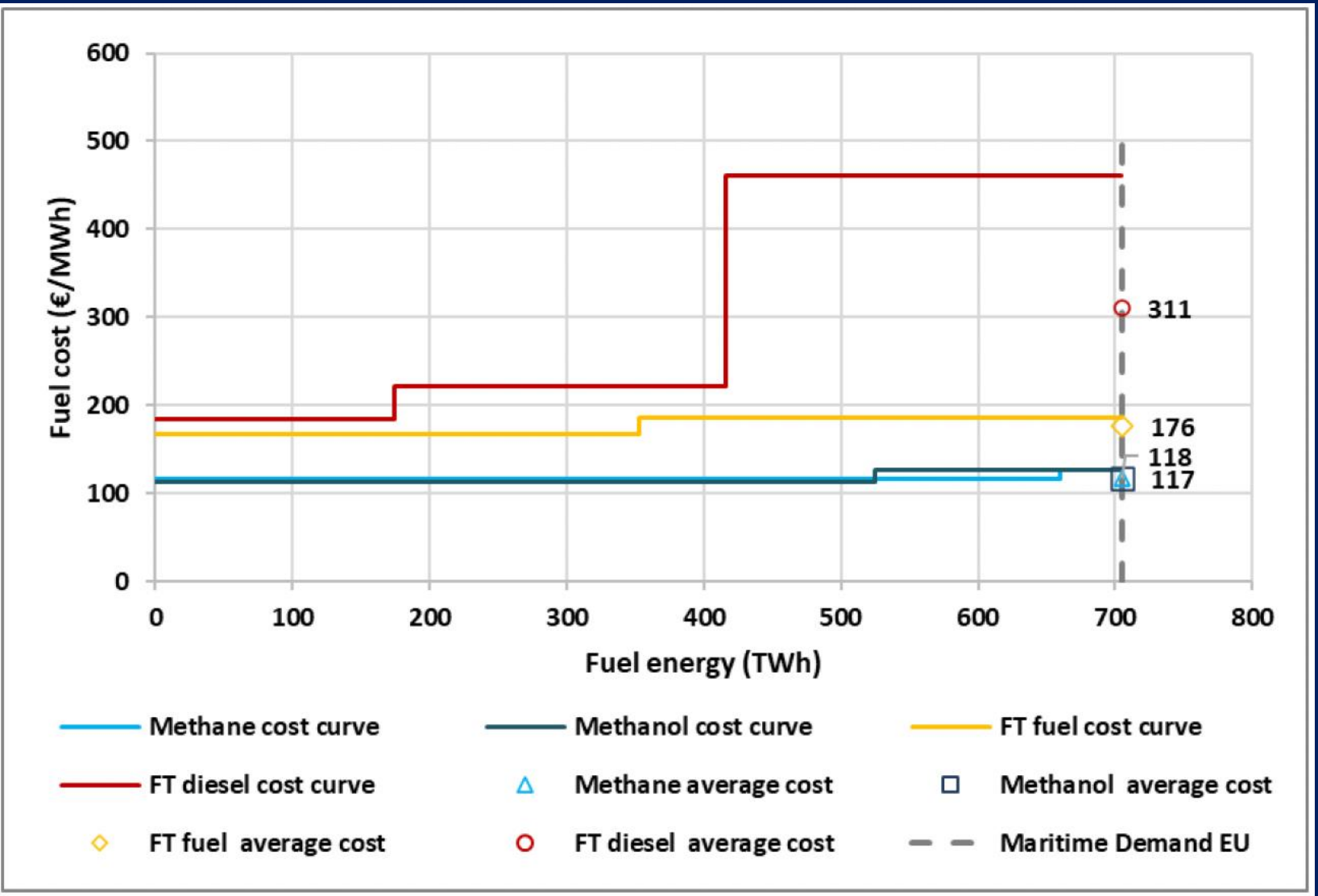
POWER TO FISCHER TROPSCH FUEL

- $CO_2 + H_2 \rightarrow CO + H_2O$
- $2nH_2 + nCO \rightarrow -(CH_2)-n + nH_2O$

70 MW ELECTROLYSER REQUIRES 67,670 t $CO_{2/a}$ (18% ENERGY RETURN)

Assessing impact of biogenic carbon dioxide resource for production of four synthetic e-fuels to decarbonise shipping in the EU and Ireland

Asif Tanvir Bhuiya[a,b], Anga Hackula[a, b] Nathan Gray[a,b] , Archishman Bose [a,c] , Richard O'Shea[a,b] , David M. Wall[a,b,*], Jerry D. Murphy[a,b]



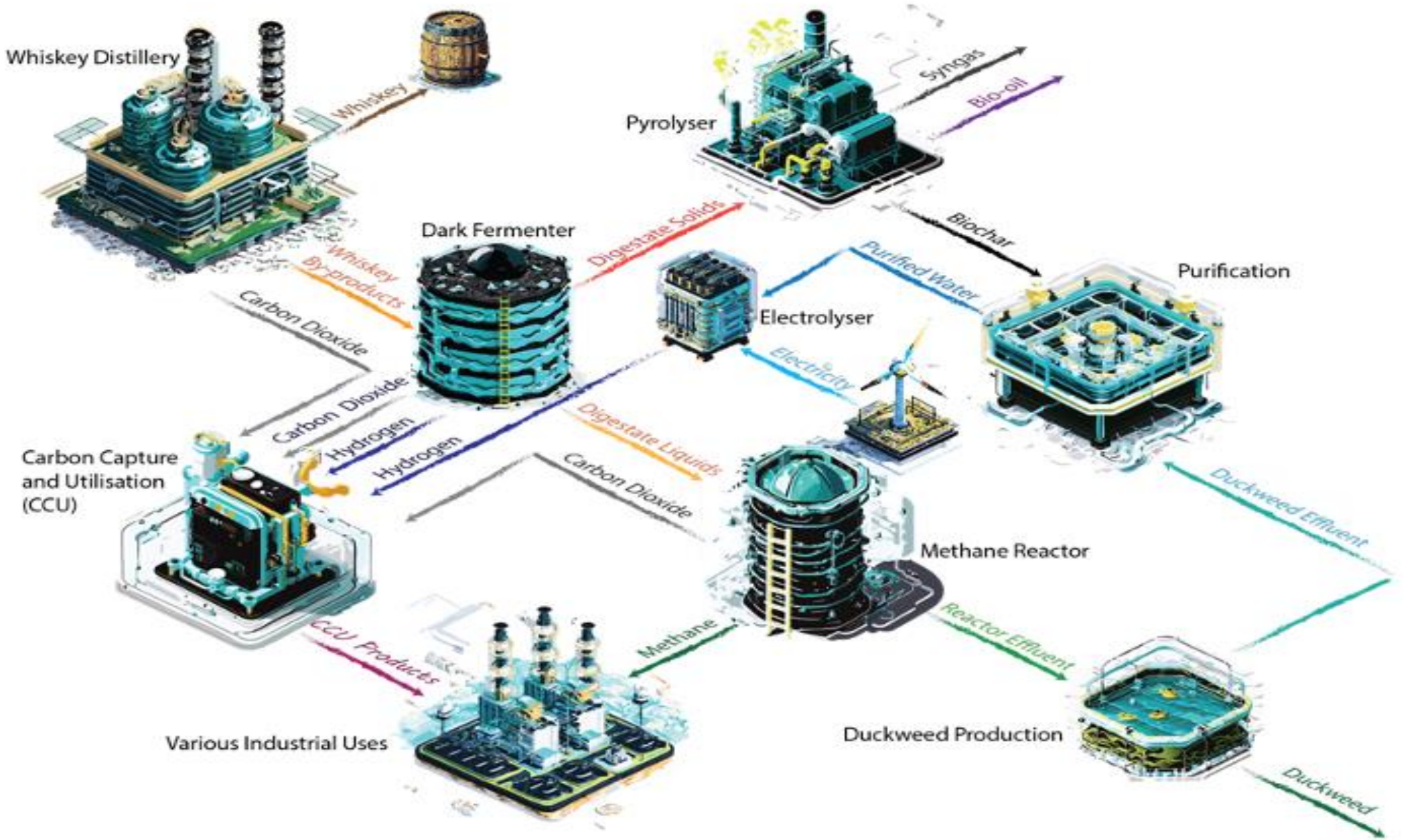
Neat concentrated streams of biogenic CO_2 cost c. 30€/t. Biogenic CO_2 from biomass combustion costs c. 90 €/t. Direct Air Carbon Capture costs c. 450€/t

FT synthesis was modelled to yield 68% liquid fuel, and 34% diesel. FT diesel requires twice the CO_2 input to produce the same quantity of fuel as FT liquid fuels.

Costs for 2050 in the EU to meet the 705 TWh of maritime energy are modelled at 176€/MWh for FT liquid fuels, while FT diesel is costed at 311€/MWh due to the requirement to source more CO_2 from direct air carbon capture.

Results indicate that e-methanol recorded the lowest levelised cost in 2050: 113€/MWh in Ireland and 117€/MWh in the EU.

BIOFUEL, BIOREFINERY, E-FUEL, E-REFINERY



Session 2

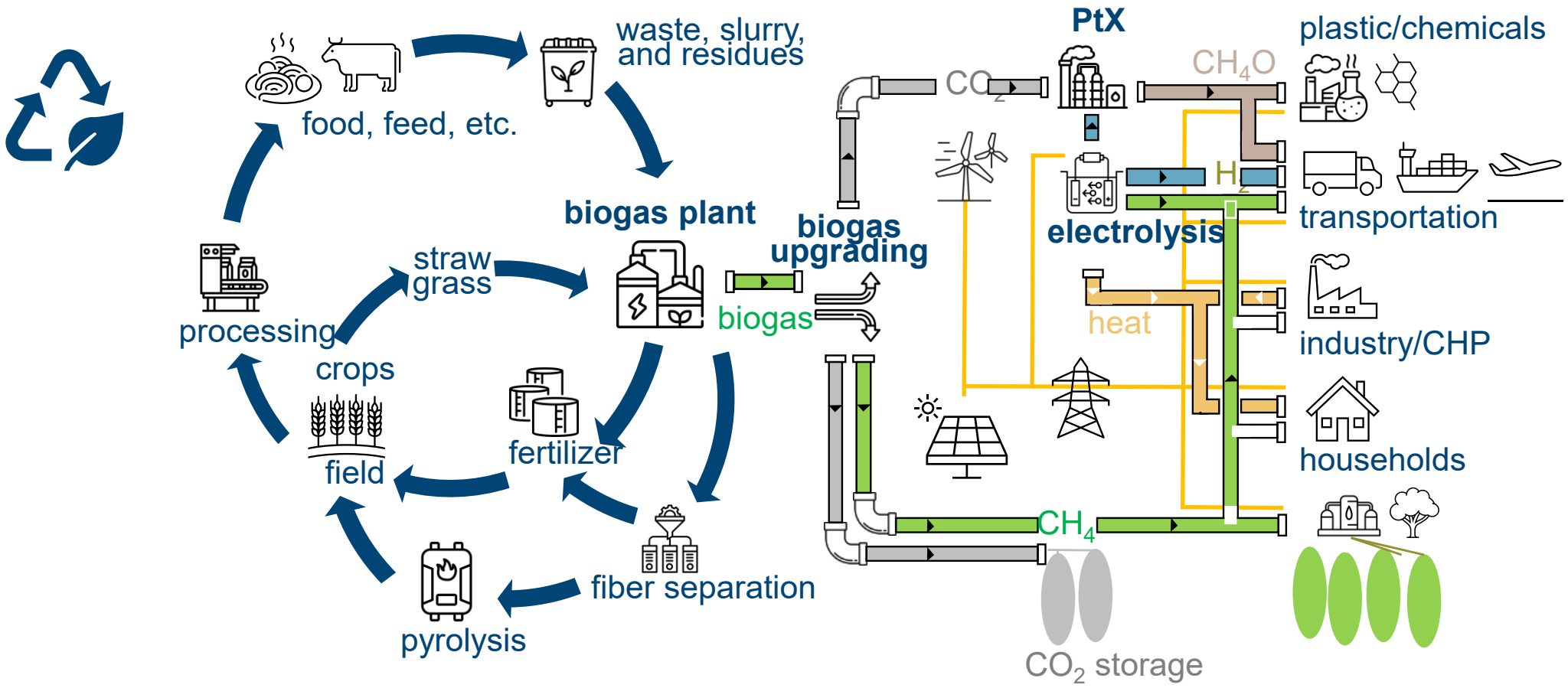
Renewable molecules and the interplay between hydrogen and biomethane

Ilaria Conti

Coordinator for Strategy and Development, **Florence School of Regulation (FSR)**
GEG Vice-Chair, **United Nations Economic Commission for Europe (UNECE)**

The role of biogas in decarbonization and sector integration

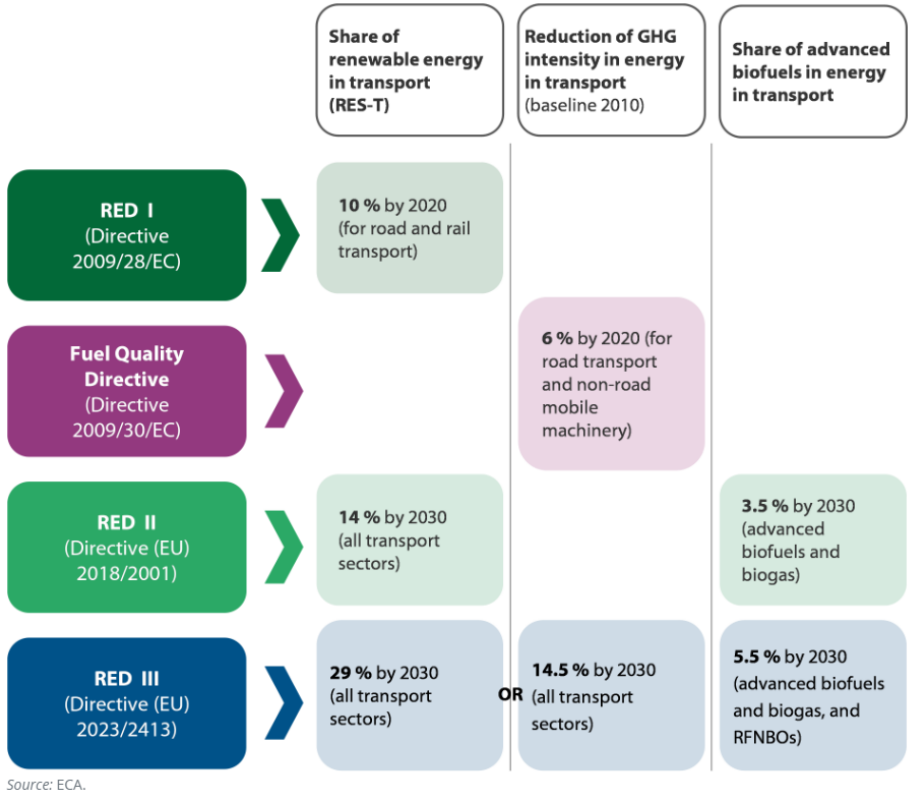
Biogas production reduces emissions from agriculture
Biomethane replaces fossil methane, carbon is used in methanol production (from hydrogen) or stored



Source: Copenhagen School of Energy Infrastructure

Co-funded by the Erasmus+ Programme of the European Union

Policy and support (EU RED)



Source: ECA.

Source: https://www.eca.europa.eu/en/publications?ref=SR-2023-29

The EU introduced various regulatory frameworks, financial incentives, and certification mechanisms to support biomethane's scale-up to 35 bcm of production per year by 2030, from 4.9 bcm in 2023.

However, fragmented policies and inconsistent certification systems threatens to undermine these efforts.

One key issue is the **misalignment** of national subsidy schemes, which vary significantly in eligibility criteria, financial support levels, and policy objectives.
Many of these schemes prioritize domestic production over cross-border trade, creating market distortions that limit efficiency and competitiveness within the EU.

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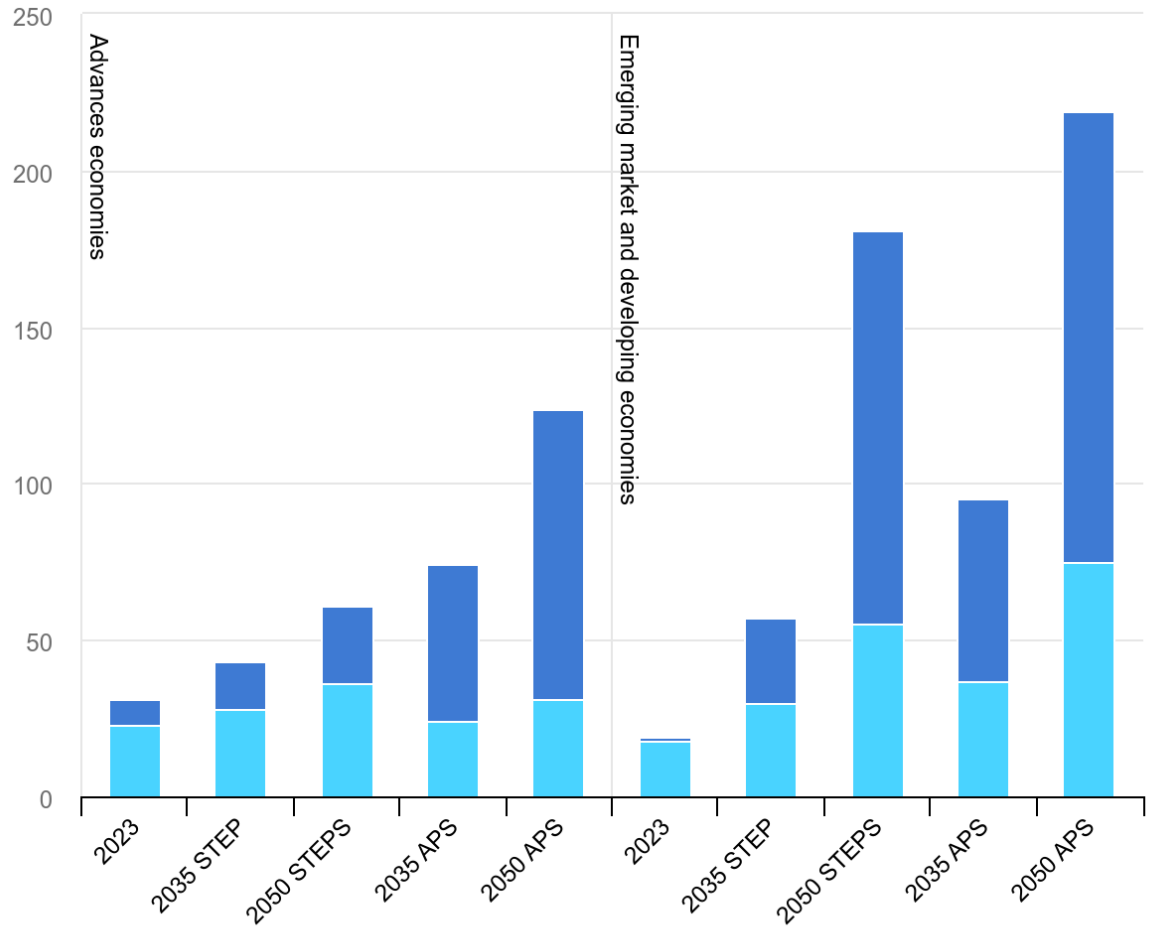
Looking at the future

- The IEA projects significant future growth, with annual global demand for biogases (biogas and biomethane) expected to exceed 200 bcm by 2050 in the Stated Policies Scenario (STEPS) and 300 bcm in the Announced Pledges Scenario (APS). Biomethane is projected to make up a growing share of this total, increasing from about 20% in 2023 to 40% in 2035 (STEPS) and 60% in 2035 (APS).



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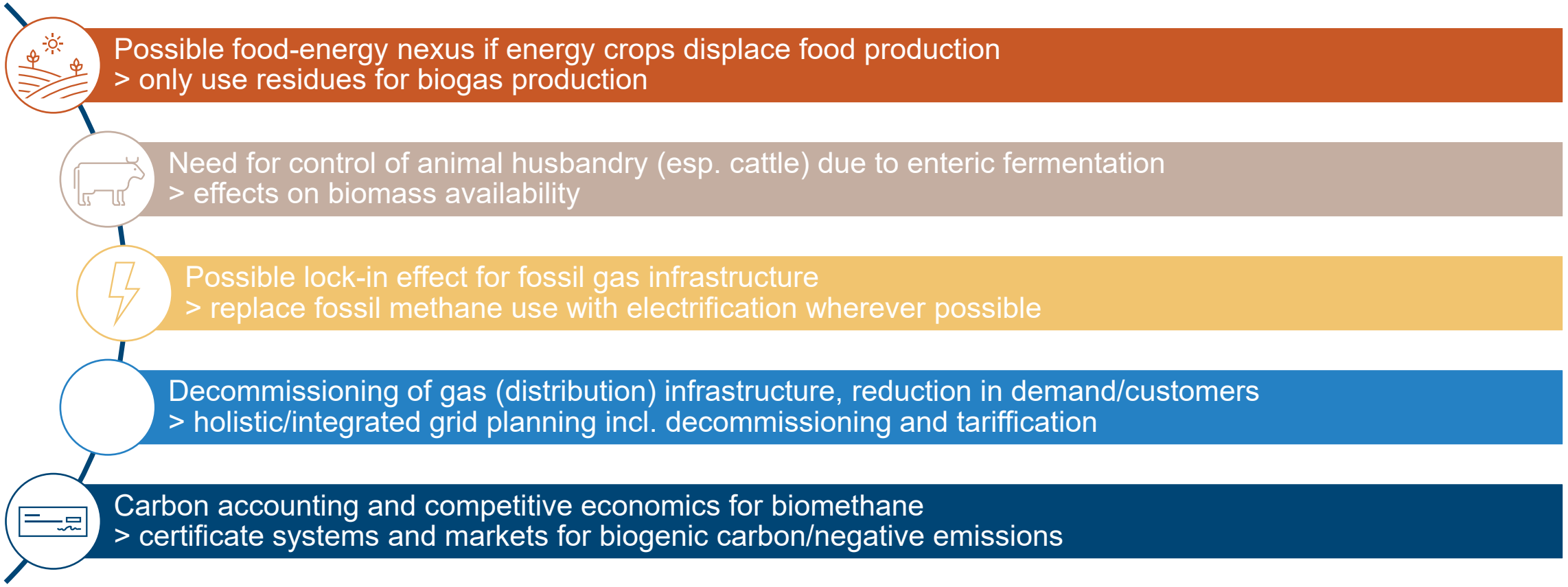
Biogas and biomethane in the whole energy system perspective



Source: CBS presentation at UNECE GEG meeting, March 2025

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Thank you for your attention!

Session 2

Renewable molecules and the interplay between hydrogen and biomethane

Gerard Ostheimer

CEO

Molecule Group

Belém 4x Commitment for Sustainable Fuels

The "Belém Commitment for Sustainable Fuels," or "Belém 4x," was launched 14 October 2025 during the pre-COP in Brasília.

The initiative, to be endorsed at the Climate Summit on November 6 and 7, aims to provide high-level political support for the global goal of at least quadrupling the production and use of sustainable fuels by 2035.

The text is being negotiated by Brazil with partner countries such as India, Italy, and Japan and will be published in the coming days.

The goal of quadrupling the production of sustainable fuels is based on a report by the International Energy Agency entitled “Delivering Sustainable Fuels - Pathways to 2035”.

The Belém 4x commitment aims to promote the global adoption of more clean and sustainable energy sources, such as hydrogen and its derivatives, biogases, biofuels and synthetic fuels, which can be substitutes for fossil fuels, as part of the gradual effort to decarbonize energy systems and combat climate change.

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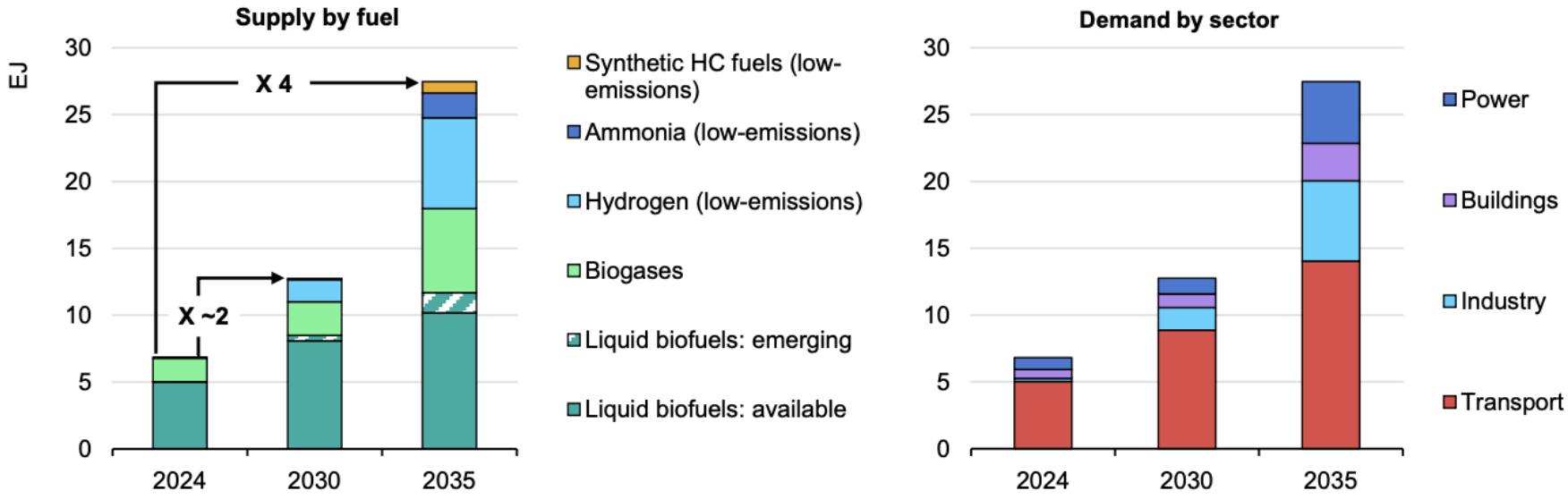
Belém 4x is based on IEA Analysis

Delivering Sustainable Fuels

Pathways to 2035

Sustainable fuel supply by fuel and demand by sector in the accelerated case, 2024-2035



If existing and announced policies are implemented, a fourfold increase in the global use of sustainable fuels by 2035 is ambitious yet achievable.

- Between 2010 and 2024, global demand for sustainable liquid and gaseous fuels doubled.
- Current trends and barriers point to continued gradual progress in this decade.
- Policy holds the key for more accelerated growth: full implementation of existing and announced policies and targets, plus the removal of market barriers, could lead to a near-doubling of sustainable fuel use in just six years.

https://www.iea.org/reports/delivering-sustainable-fuels

Molecule Group encouraged International Ambition

SUSTAINABLE INDUSTRIES LETTER TO THE COP30 PRESIDENCY

Delivered 23 September 2025 to incoming COP30 President André Côrrea do Lago.

Endorsements still be recruited:

https://www.molecule-group.com/cop30industryletter

MOLECULE GROUP

An Engine to power progress toward Belém 4X

Molecule Group enables Sustainable Industries Leaders to engage and shape the international, multilateral dialogs on advancing Sustainable Fuels, Chemicals, and Materials.

Please join us!

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AMBITION

ACTION

EVIDENCE

CLEAN ENERGY MINISTERIAL
Advancing Clean Energy Together

IEA International Energy Agency

CEM Action Plan to Accelerate Future Fuels

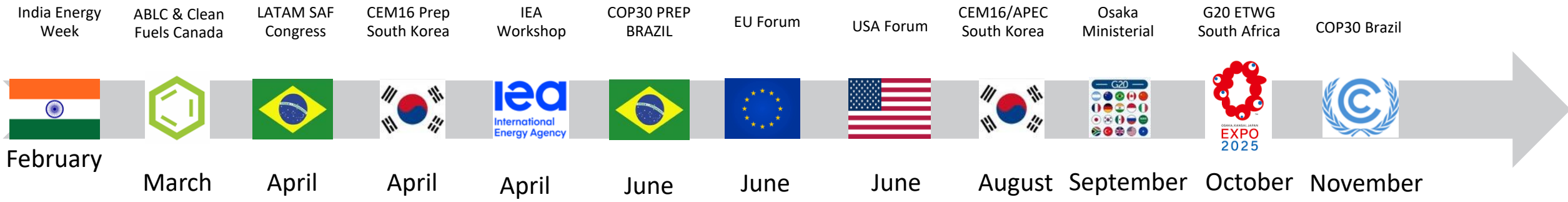
High-Level Event on Achieving the Belém 4X Target

The Clean Energy Ministerial is convening a High-Level Dialog on how to meet the Belém 4X Target on 08 November 2025 in Sáo Paulo, Brazil.

Stakeholders from Hydrogen, Biofuels, E-Fuels, CCUS, Aviation, Maritime, Industry and Chemicals sectors will participate.

A major moment to galvanize support immediately following launch of Belém 4x by President Lula on 7 November.

Setting the stage for coordination with the COP30 Action Agenda.



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Session 2

Renewable molecules and the interplay between hydrogen and biomethane

Q&A session

Moderated by Annette Kroll, Board Member
European Biogas Association (EBA)

Conclusion and wrap up

Francisco de la Flor

Director, **Enagás**

GEG Chair, **United Nations Economic Commission for Europe (UNECE)**

Closure

Annette Kroll

Board Member
European Biogas Association (EBA)

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