

BIOMETHANE

A VERSATILE TOOL TO ACHIEVE
COMPLIANCE AND CO₂
REDUCTION

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AGENDA

1

MAIN DRIVERS OF MOL GROUP IN THE BIOMETHANE MARKET

2

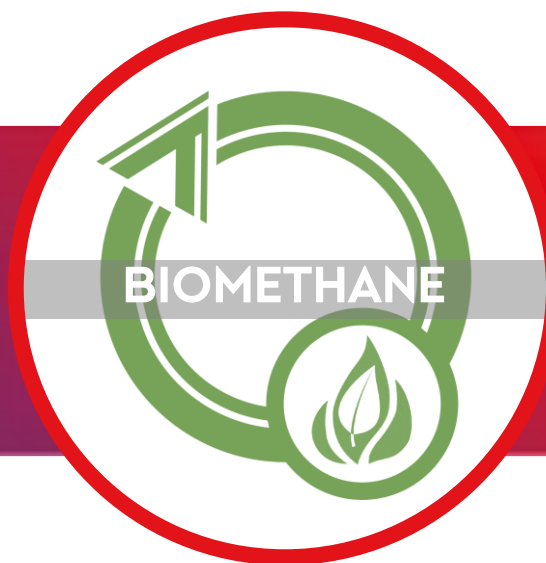
ROLE OF BIOMETHANE IN THE EUROPEAN ECONOMY

3

PLANS AND UTILIZATION OF BIOMETHANE IN MOL GROUP

4

BY-PRODUCTS OF BIOMETHANE PRODUCTION



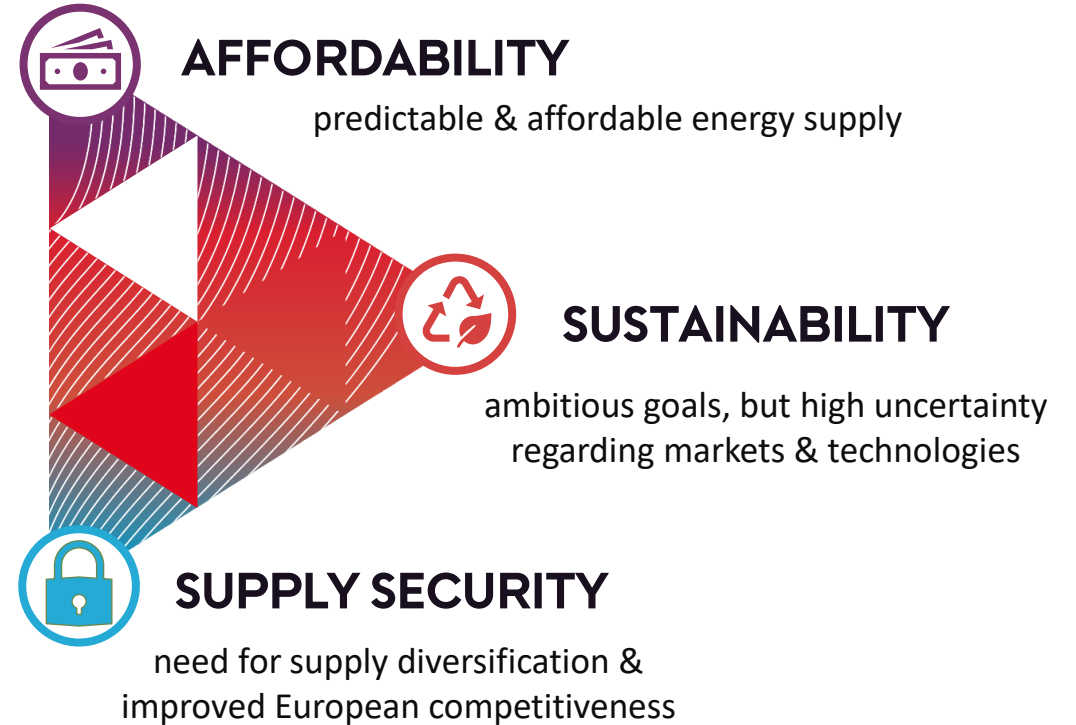
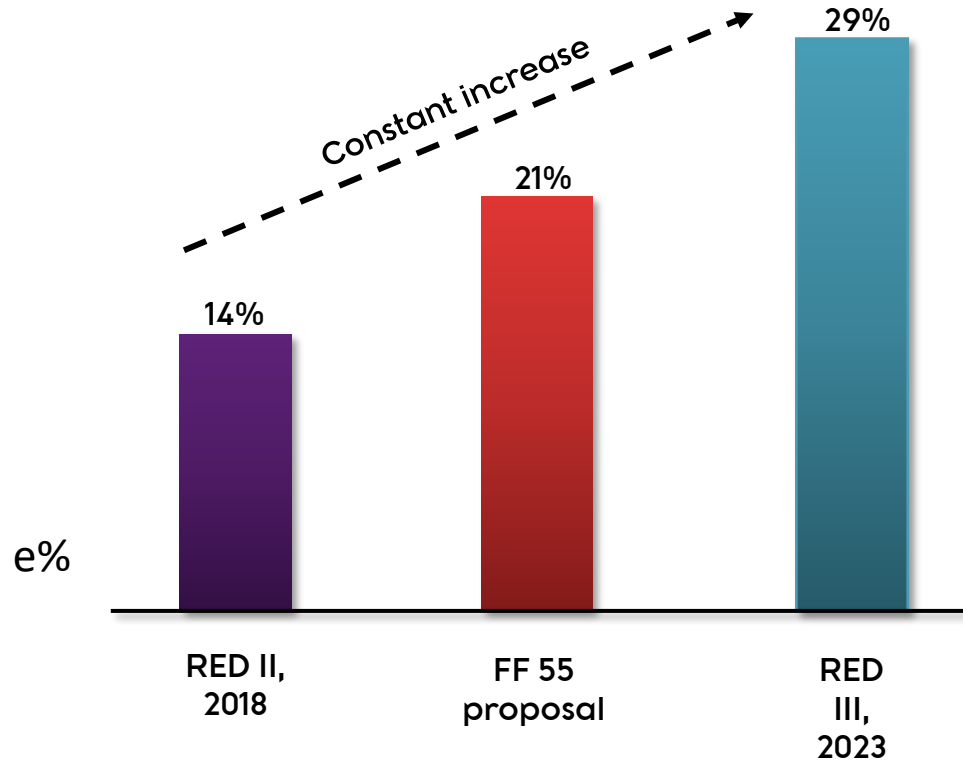
MAIN DRIVERS OF MOL GROUP IN THE BIOMETHANE MARKET

NAVIGATING THE COMPLEXITIES OF ENERGY TRANSITION

CHALLENGES AND OPPORTUNITIES IN A SHIFTING LANDSCAPE

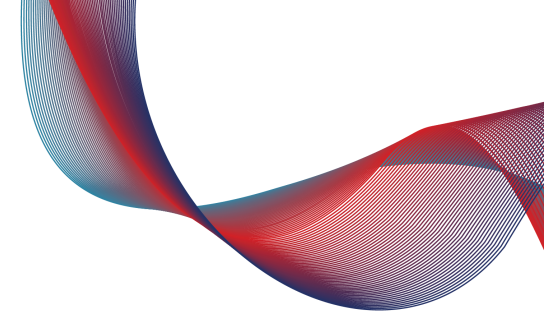
Increasing EU ambition regarding decarbonization was accelerated by the Fit for 55 Package and the Ukraine war...

...but energy trilemma provides obstacles for industrial green transition.

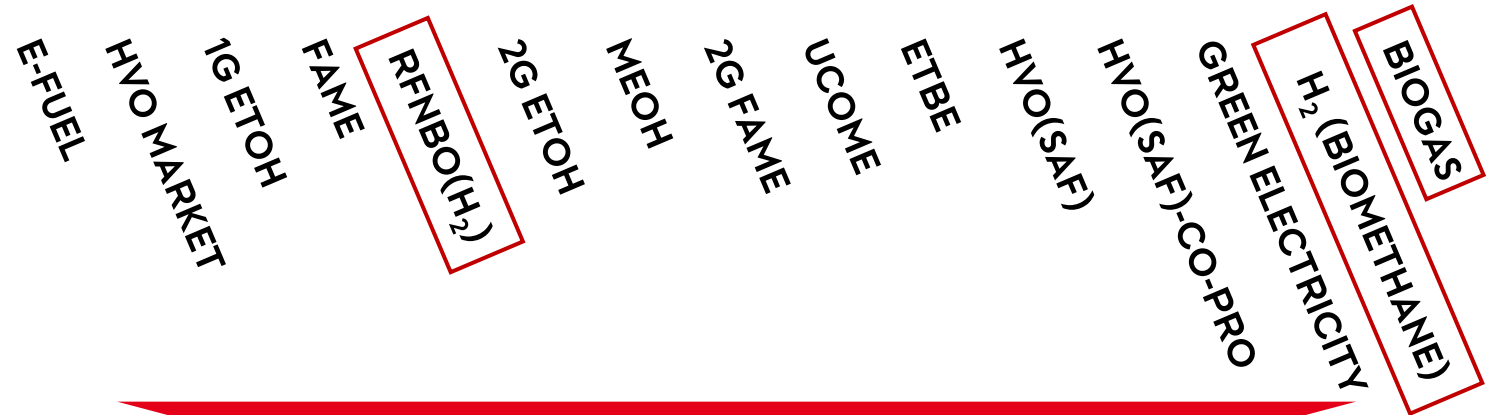


BREAKDOWN OF TRANSPORT TARGET

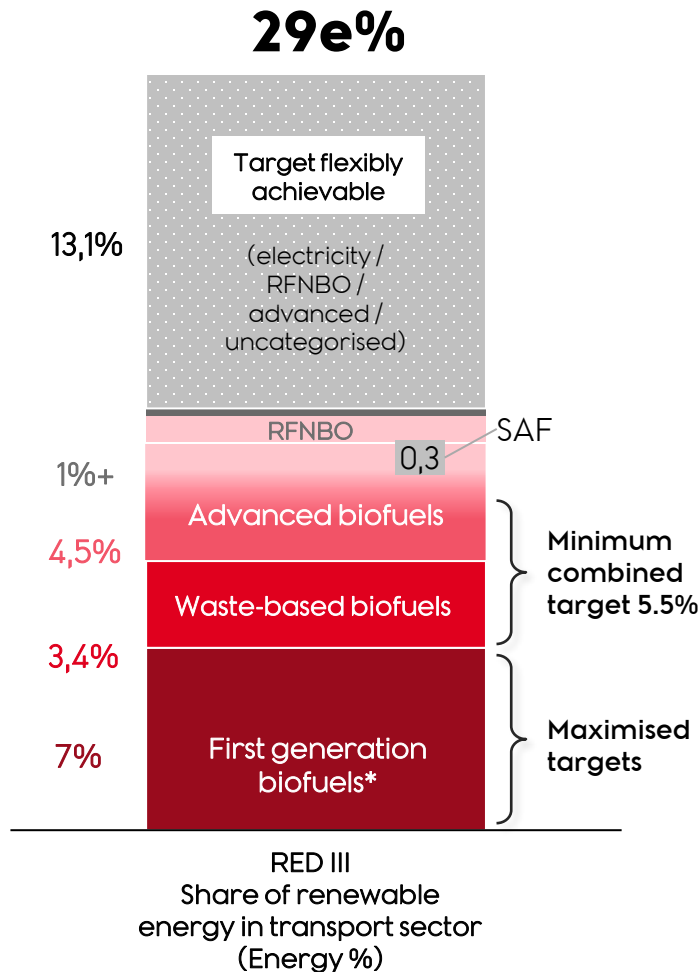
BASED ON TECHNOLOGICAL, FEEDSTOCK & MARKET POTENTIAL, INVESTMENT NEED & OUR FINANCIAL RESOURCES



Variable elements of compliance



MAJOR CONTRIBUTORS TO DECARBONIZATION



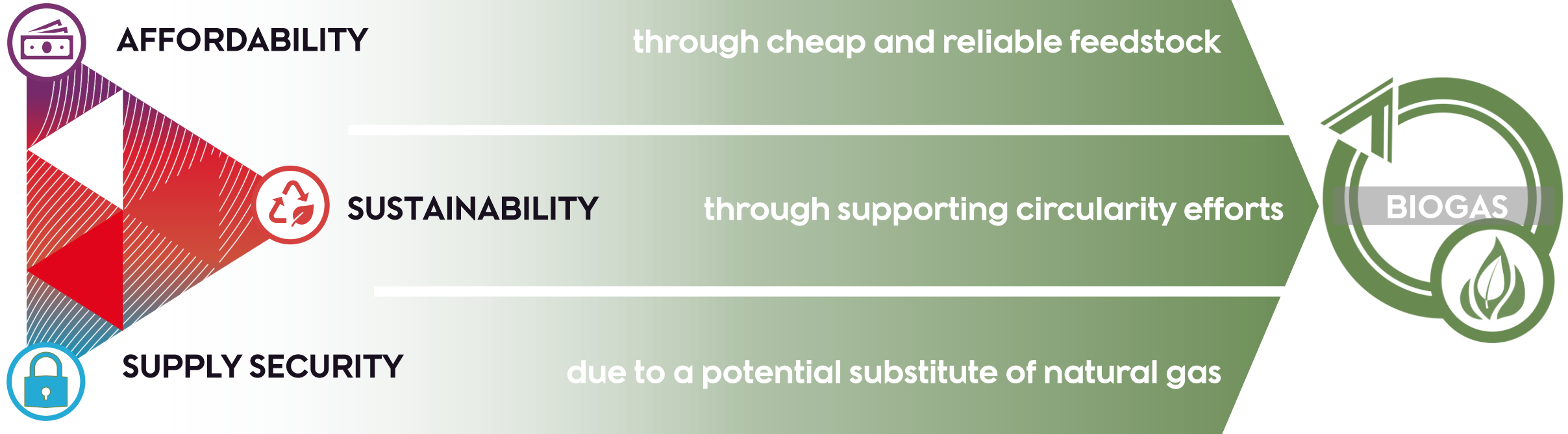
BIOGAS
Versatile compliance tool

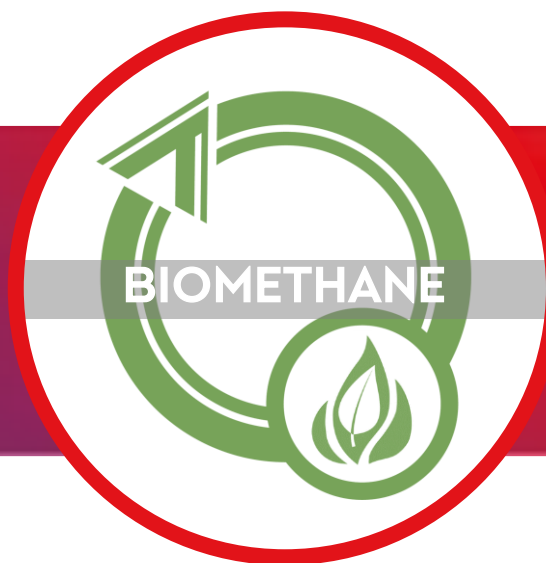


GREEN H₂
Needed to reach 1% RFNBO target, significant CO₂ reduction potential

BIOGAS/BIOMETHANE

STRONGLY SUPPORTS THE SOLUTIONS OF THE ENERGY TRILEMMA



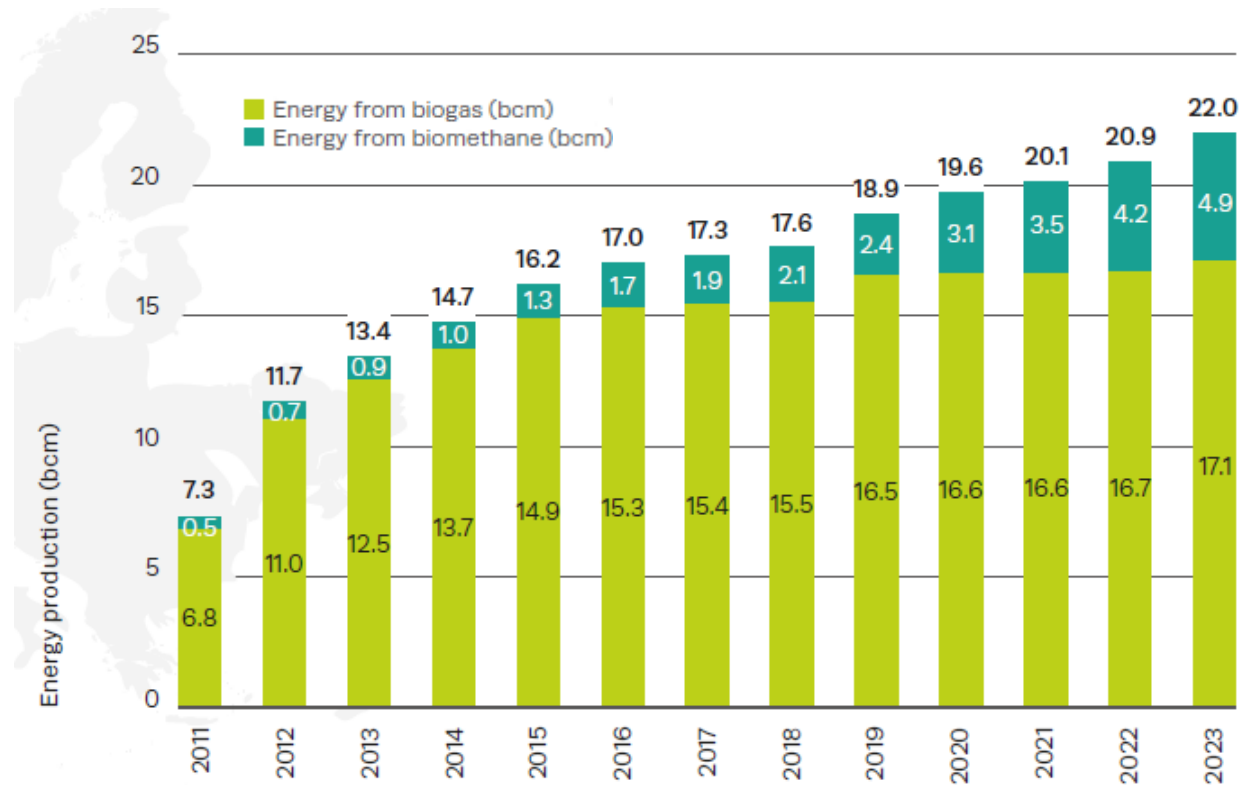


ROLE OF BIOMETHANE IN THE EUROPEAN ECONOMY

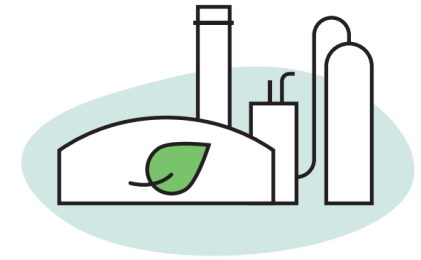
RENEWABLE GASES PLAY A CRUCIAL ROLE TO ACHIEVE CARBON-NEUTRALITY IN THE EU BY 2050

BIOGAS MARKET STAGNATES AND FOCUS ON ELECTRICITY & HEAT GENERATION DUE TO THE STRONG SHIFT FROM BIOGAS TOWARDS BIOMETHANE, LATTER PRODUCTION IS DYNAMICALLY INCREASING

Combined biomethane and biogas production in Europe (billion m³)



Europe's combined biogas and biomethane production in **2023** amounted to **22 000** million m³



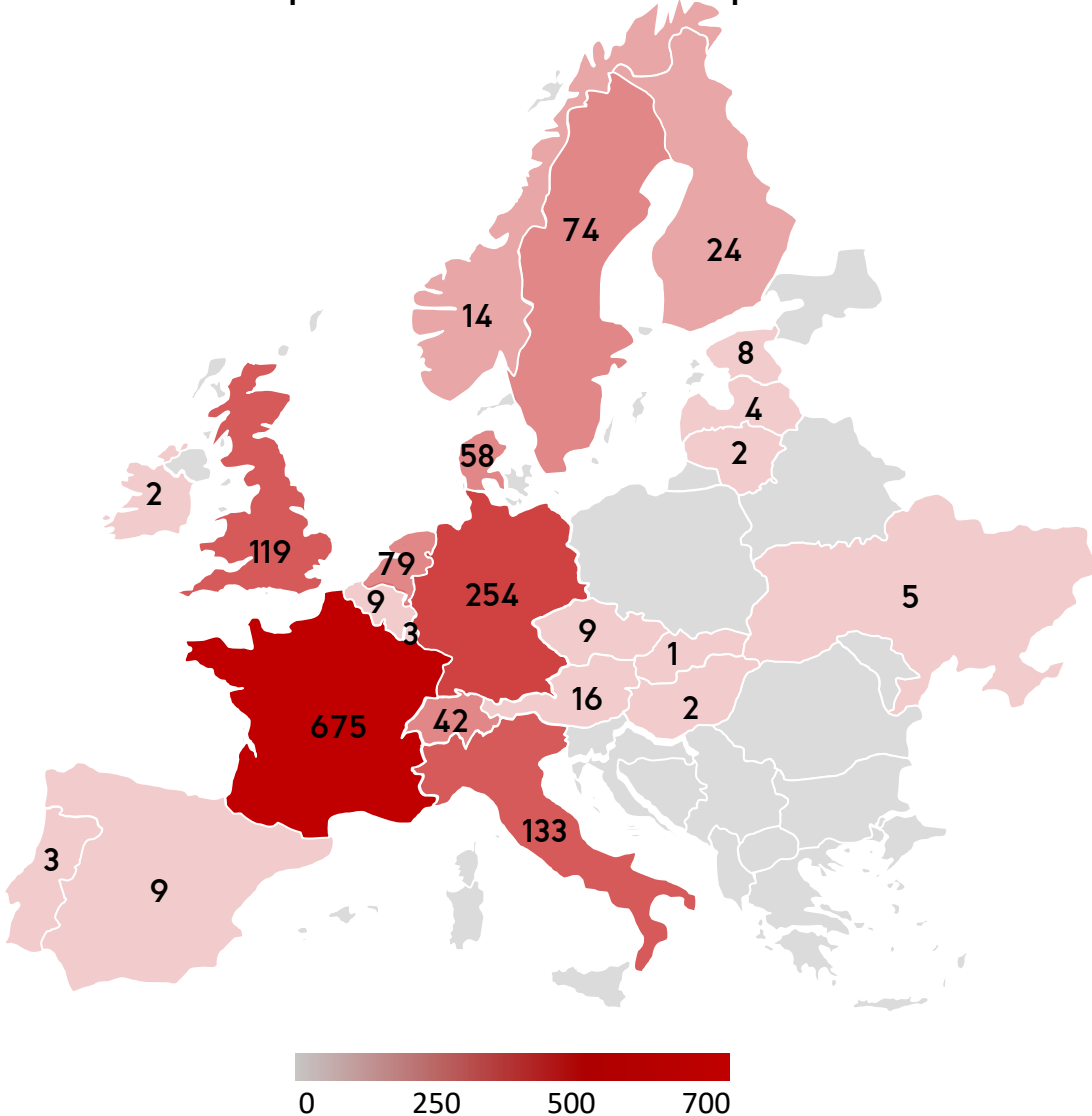
This represents ~ **6,5%** of the natural gas consumption of the EU

4 900 million m³ of biomethane produced in **2023**

RENEWABLE GASES PRODUCTION IN EUROPE

FRANCE IS LEADING THE EUROPEAN BIOMETHANE PRODUCTION WITH 675 ACTIVE BIOMETHANE PLANTS, FOLLOWING BY GERMANY AND ITALY

Number of operational biomethane plants in 2024



> 1 500

biomethane-producing facilities in Europe

950

biomethane plants to enter operation in the next 5 years

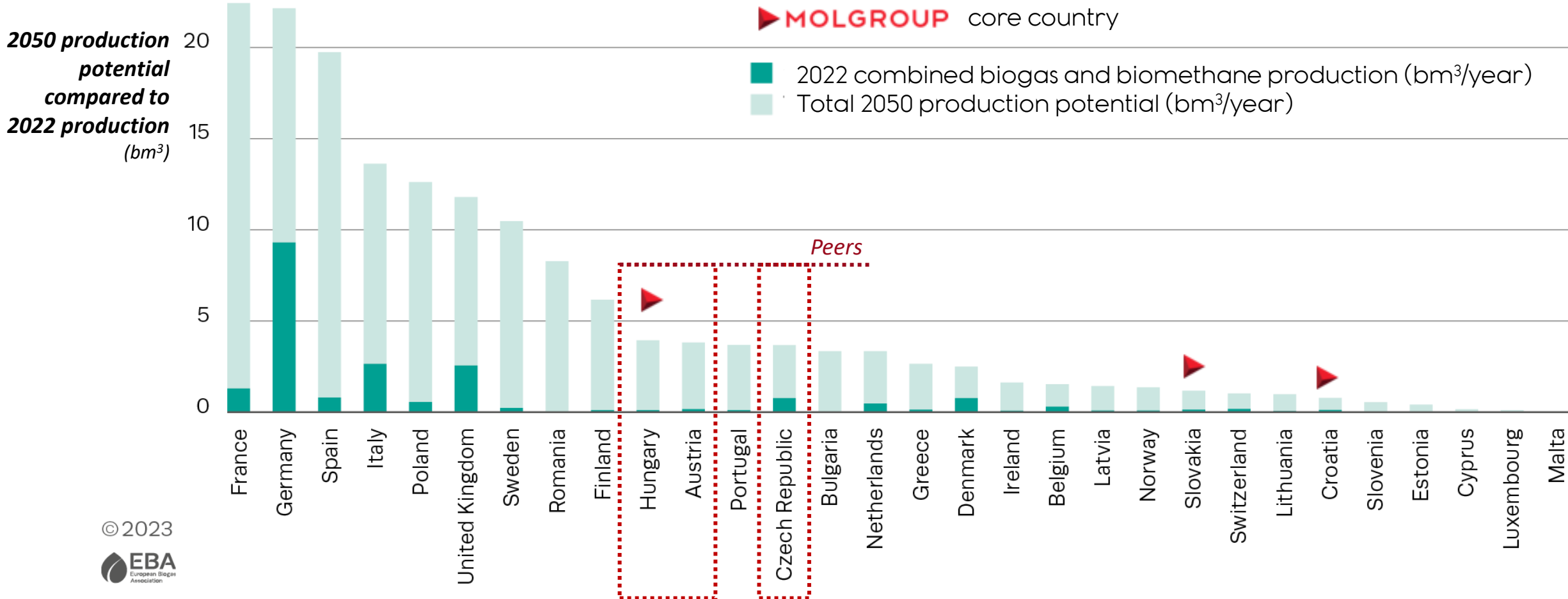
6 300 million m³ capacity addition with

€ 24.5 billion investment planned in Europe by 2030

- ▶ Around 20 000 biogas plants operating in Europe.
- ▶ The CEE region can exchange ~30% of its NG consumption with biogas.
- ▶ The total number of biomethane plants has grown from 1 174 to 1 548 between 2022 and 2024.
- ▶ The CEE region is lagging behind compared to the much more progressed Western European countries.

Source: EBA 2023 statistical outlook; Biomethane scale-up webinar; 2023 activity report

THERE IS STILL A PLENTY OF ROOM TO INCREASE RENEWABLE GAS PRODUCTION CAPACITIES TO MEET ESTIMATED 2050 GROWTH POTENTIAL



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Analyses is based on industry figures on secured investments for biomethane production, a review on national targets for biomethane and renewable gas in EU, as well as insights into the progress made in respect of the Biomethane Action Plan in REPowerEU, together with an analysis of novel feedstocks and technologies.

Source: EBA 2023 Statistical Report

EFFECTIVE INCENTIVES IN EUROPE: GOOD PRACTICES FOR SUBSIDIES

SCALING-UP BIOMETHANE INVESTMENTS IN NEW MARKETS REQUIRES CLOSING THE GAP BETWEEN BIOMETHANE PRODUCTION COSTS PLUS MARGIN, AND THE (FLUCTUATING) PRICE OF ITS FOSSIL FUEL ALTERNATIVE INCLUDING THE COST OF CARBON

SUPPORT SCHEMES IN EUROPE

DIRECT

Investment support (CAPEX)

- facility construction



- grid connection



Operational support (OPEX)

- Feed-in tariffs / premiums



- Contracts for Difference



INDIRECT

Demand subsidies (for using biomethane)



GHG reduction obligations / biomethane quotas e.g. heating, transport, energy suppliers (DE, DK, FR)

Tax exemptions (for producers or end-users)



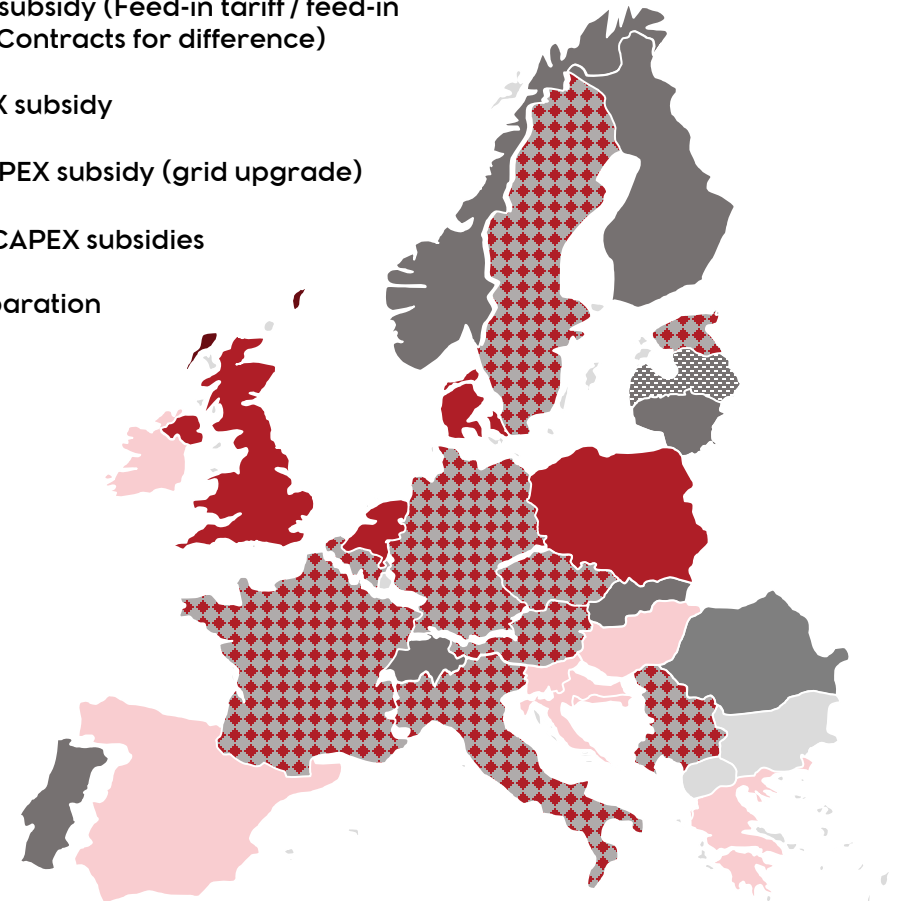
Incentivizing agro players to provide feedstocks



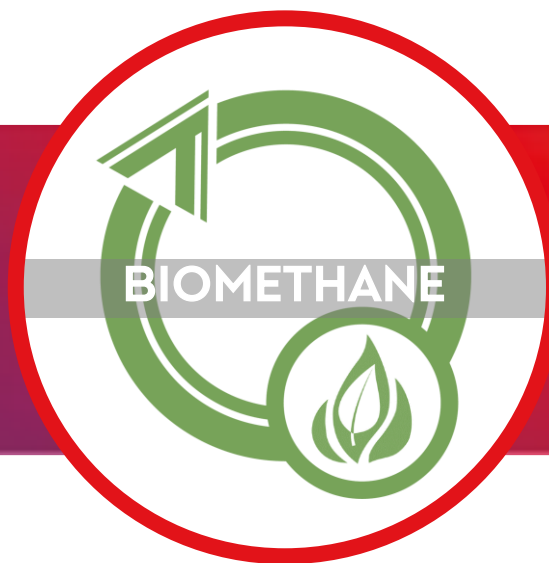
Incentivizing the use of by-products (e.g. digestate)



- Only OPEX subsidy (Feed-in tariff / feed-in premium / Contracts for difference)
- Only CAPEX subsidy
- Indirect CAPEX subsidy (grid upgrade)
- OPEX and CAPEX subsidies
- Under preparation



Biomethane business cases vary across the EU, also because of a patchwork of regulatory approaches.

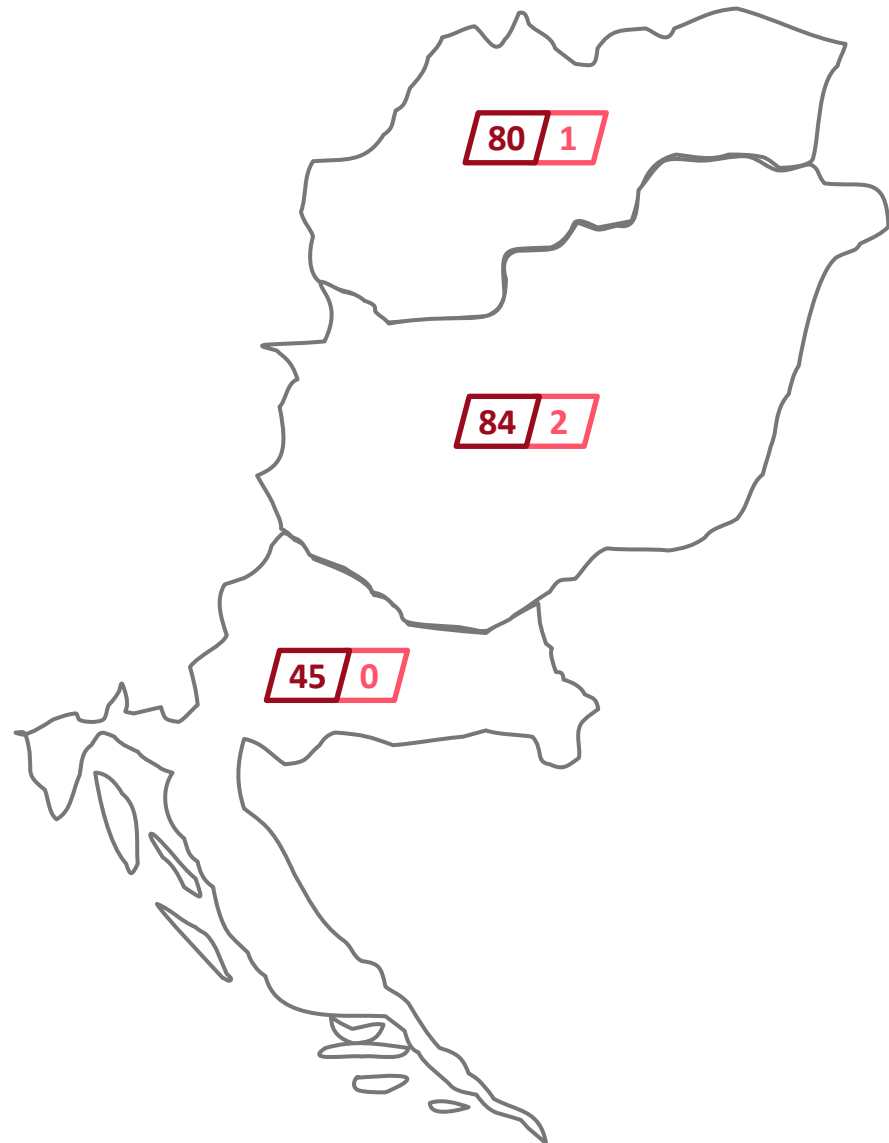


PLANS AND UTILIZATION OF BIOMETHANE IN MOL GROUP

MOL CORE COUNTRIES OUTLOOK

HUNGARY'S BIOMETHAN MARKET IS IN EMERGING PHASE

Number of operational biomethane plants in 2024



~210 biogas plants produced around **560** million m³ biogas in 2022.

3 biomethane plants are currently operating and with an annual **50** million m³ production.

2 under construction (Szarvas & Sisak).

 Number of biogas plants in operation

 Number of biomethane plants in operation

MOL core countries biomethane market is relatively underdeveloped compared to its potential and to Western European countries .

Current focus on power (and heat) generation thanks to the previous and current support schemes.

2030 target biogas production is triple the 2024 production, therefore should be 600 million m³.

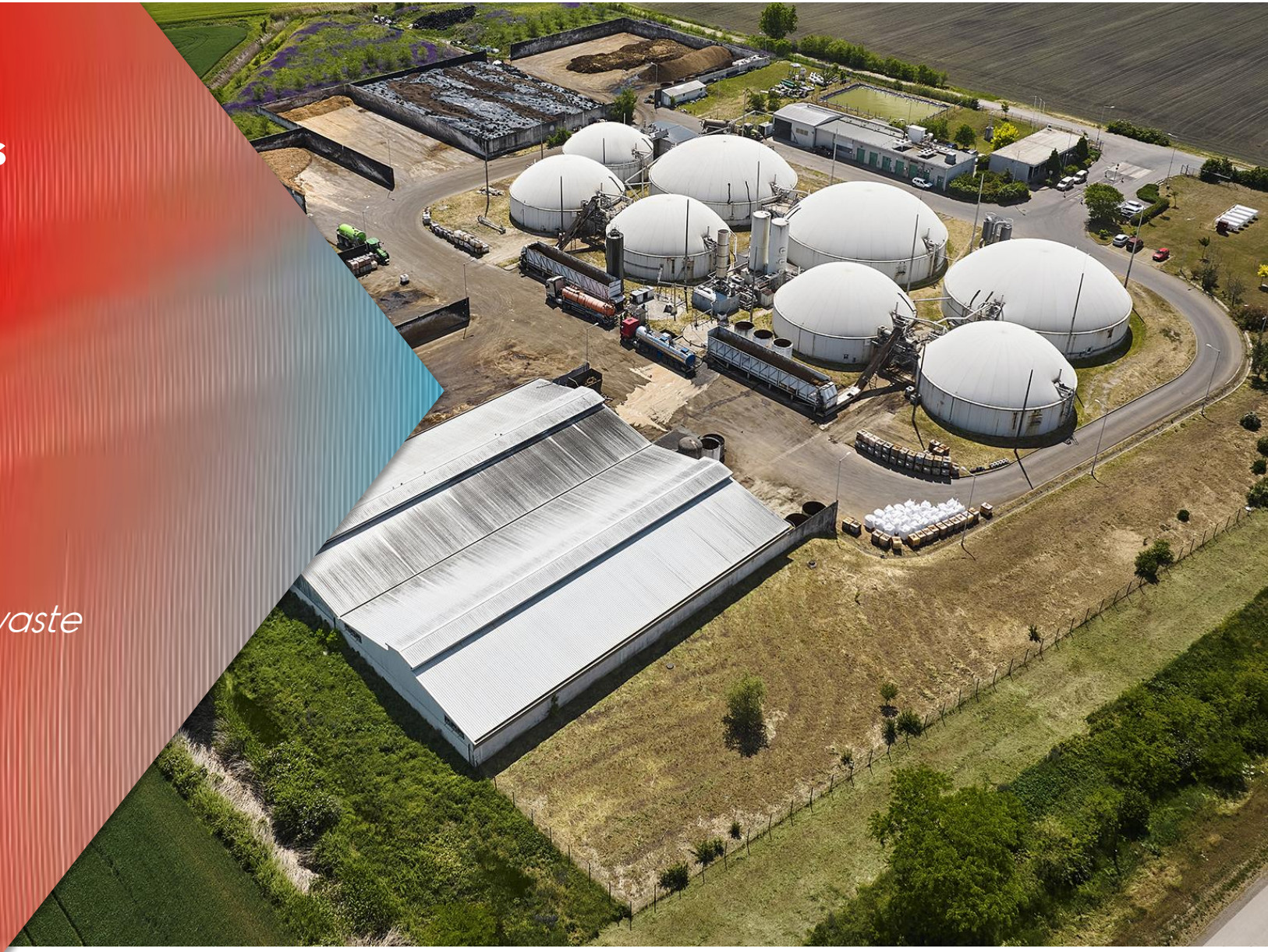
The Hungarian Biomethane Action Plan released in 2024 with the target biomethane production of 184 million m³ by 2030.

Source: EBA 2023-24 Statistical Report; 2023 Activity Report; MOL biogas roadmap Support schemes for biogas and biomethane

SZARVAS BIOGAS PLANT

MOL GROUP'S FIRST STEP IN THE SCALE-UP OF BIOMETHANE PRODUCTION IN HUNGARY

- ▶ Annually **12.5 mn m³ biogas** production
- ▶ Plant with **4 MWp** capacity
- ▶ Utilization of **110 000 t** waste annually
 - ▶ *40 000 t pig manure*
 - ▶ *15 000 t other manure*
 - ▶ *18 000 t agricultural plant waste*
 - ▶ *25 000 t whey*
 - ▶ *12 000 t other*



SZARVAS BIOGAS PLANT PLANNED UPGRADE

SIMILAR PROJECTS WILL BE OBLIGATORY IN FUTURE INVESTMENTS AS WELL



- ▶ To upgrade the biogas plant of Szarvas to biomethane with **7.1 mn m³/y** biomethane production.
- ▶ Opportunity to **inject it to the local DSO system**, close from the plant.



- ▶ One of the main elements of Renewable Fuels Strategy.
- ▶ The project will help to **fulfil advanced fuel target**.



- ▶ On-site upgrade, pressure boosting and injection to the local DSO system.

SISAK BIOMETHANE PLANT

FIRST ORGANIC PLAN TO PRODUCE BIOMETHANE & FIRST LEG OF MOL GROUP EXPANSION OUTSIDE HUNGARY IN THE BIOGAS VALUE-CHAIN



AIM

- ▶ Annually **4.2 mn m³ biomethane** production
- ▶ Utilization of **75 kt various feedstock annually**
- ▶ **Expected MC: 2026 Q3**



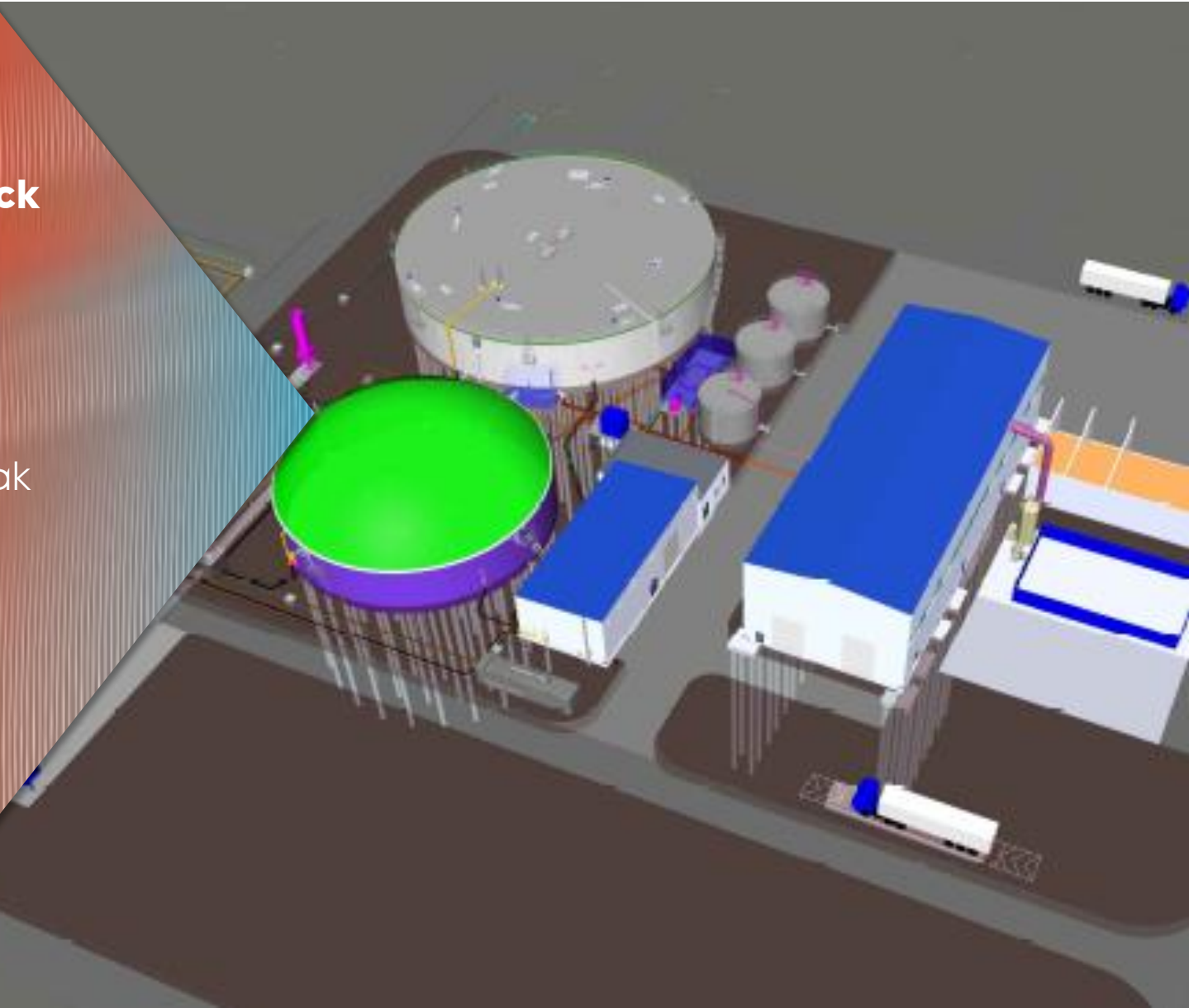
WHY

- ▶ Advance biofuel production
- ▶ Sustainable industrial activity in Sisak



CHALLENGES

- ▶ Future of biomethane demand
- ▶ Insufficient feedstock quantities
- ▶ Demand of liquid fertilizer
- ▶ Availability & allocation of RRF



HUNGARIAN ORGANIC PROJECTS

SIGNIFICANT AMOUNT OF INDUSTRIAL FEEDSTOCK POTENTIAL IN HUNGARY, WITH HIGH CONCENTRATION OF NORTH-EASTERN AND SOUTH-EASTERN SIDE OF THE COUNTRY

CRITERIA FOR SITE SELECTION

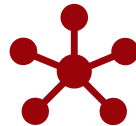
FEEDSTOCK

- Near proximity of the plant
- Composition of biogas yield potential
- Favorable GHG value



GAS GRID INJECTION

- Near proximity of the plant
- High consumption capacity



BY-PRODUCT

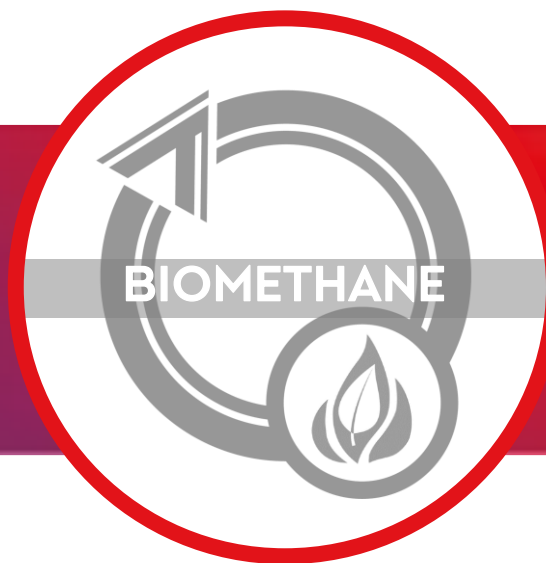
Cultivated agricultural lands



REGULATORY ENVIRONMENT KEY POINTS

- Incentive systems Capex & Opex
- Feedstock acceptance of advanced / waste feedstocks (RED III Annex 9)
- Permitting process speed-up
- Clear operative rules of trading (GO, PoS, ETS)
- By-product supporting regulations

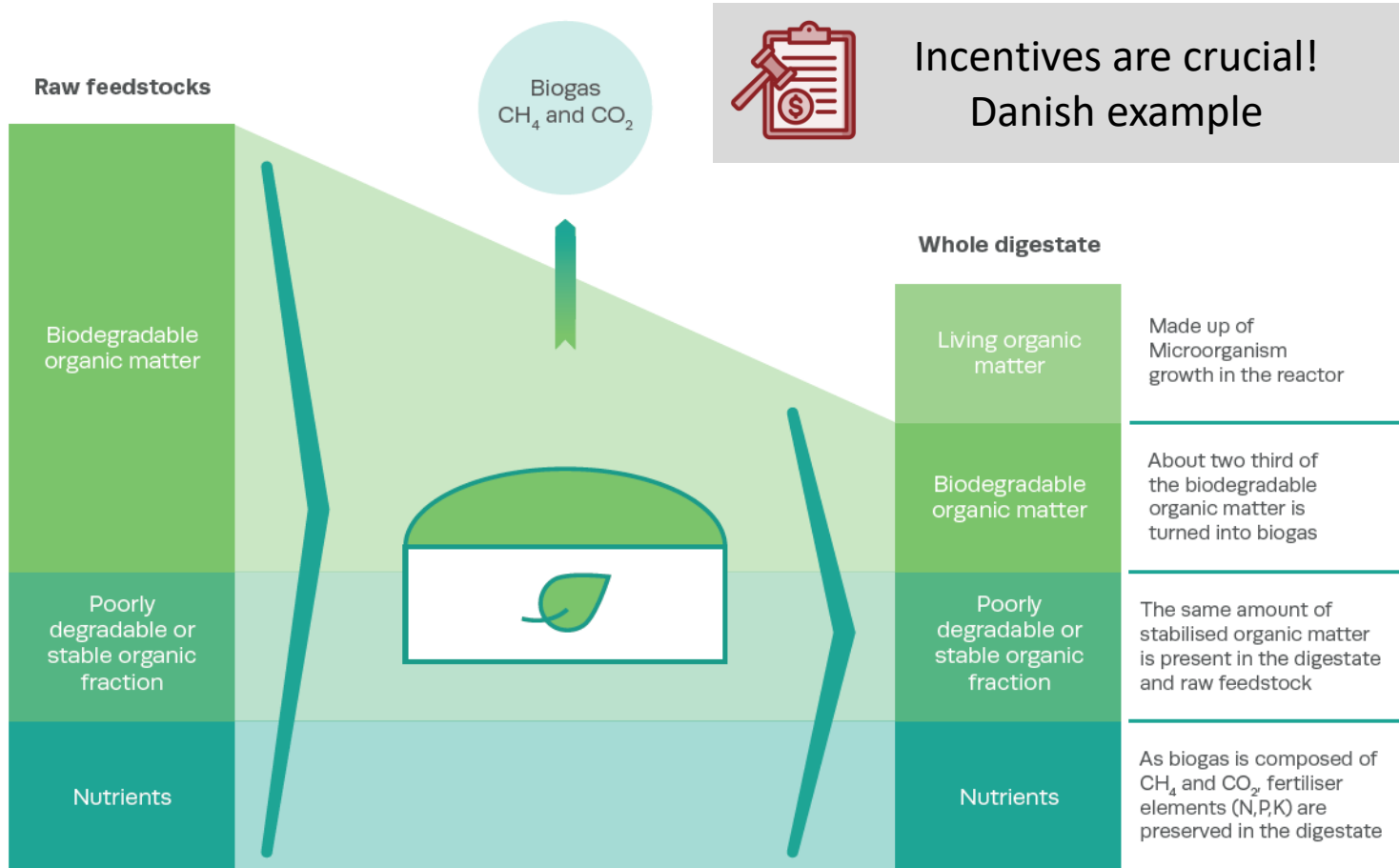




BY-PRODUCTS OF BIOMETHANE PRODUCTION

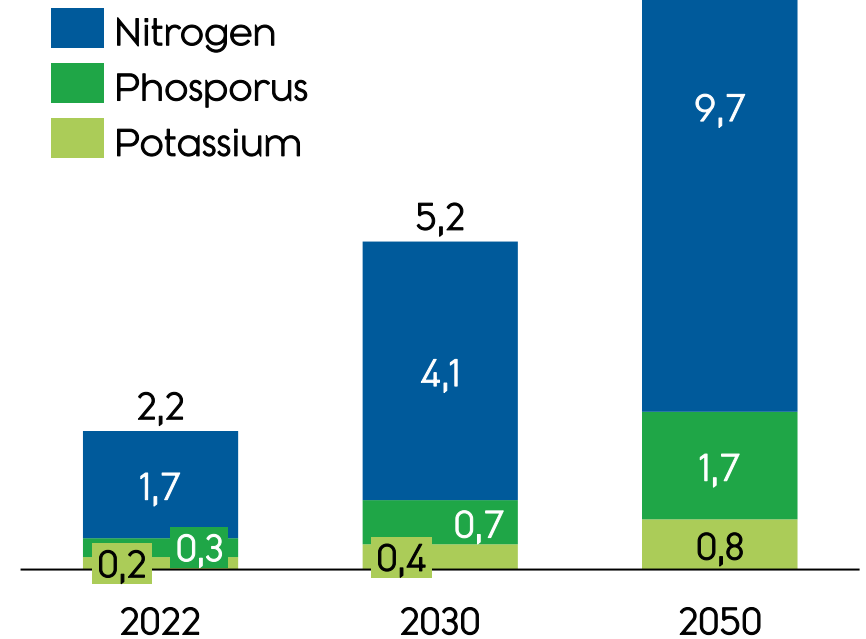
DIGESTATE IS A VALUABLE BY-PRODUCT WHICH HAS TO BE VALORIZED

Digestate obtained from the production of biogases has the promising business potential to replace a portion of the N-, P- and K- synthetic fertilisers used within the EU.



Incentives are crucial!
Danish example

Total digestate production volumes [Mt dry matter] and nutrient content (Mt) in 2022, 2030 and 2050



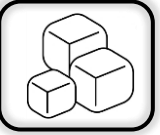


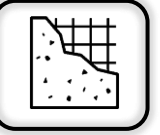









Regulatory framework for digestate treatment at EU level (including fermentation juice soil conditioner certification) is currently being developed.

Source: EBA, Exploring digestate's contribution to healthy soils 2024.04.11

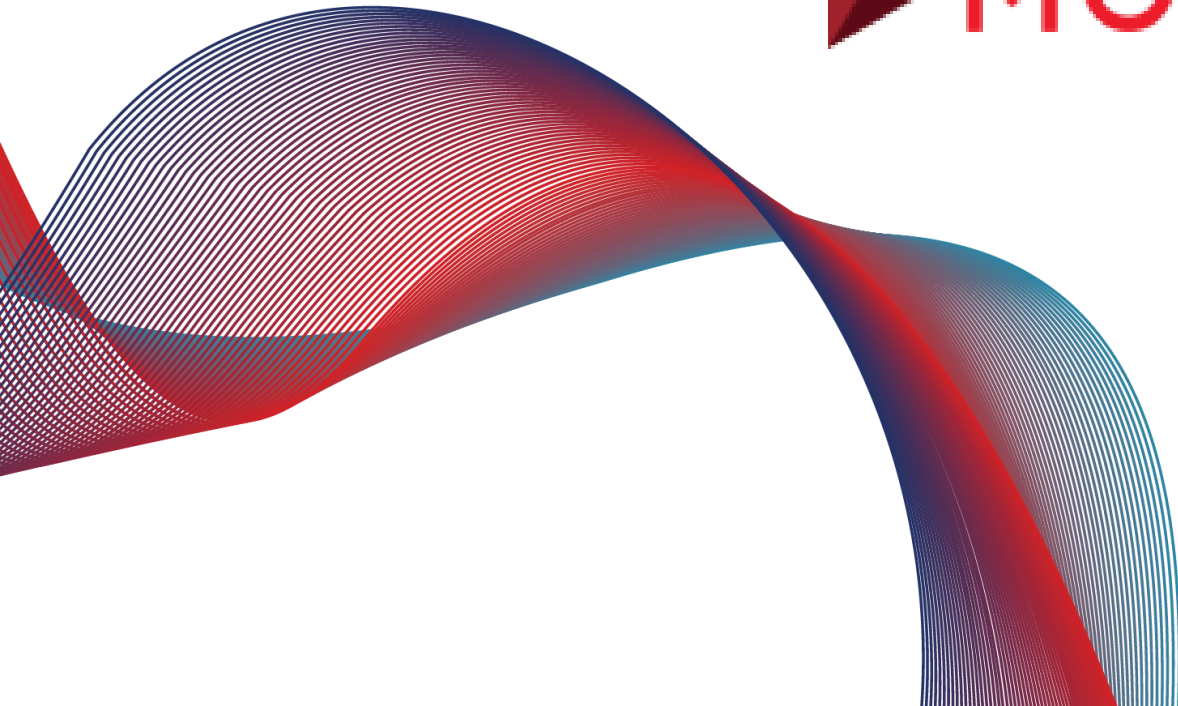
HARNESSING BIOGENIC CO₂ – PATHWAYS TO UTILIZATION

Side product from biogas plant keeps all pathways open

									
	GREEN-HOUSE	FOOD & BEVERAGE	DRY ICE	WELDING	CCS	CEMENT	E-FUEL	BIO-PLASTIC	OTHER
TRADITIONAL CO₂									
 MINING	✓	✓	✓	✓	✗	✗	✗	✗	✓
 INDUSTRIAL	✓	✓	✓	✓	✓	✓	✗	✗	✓
BIOGENIC CO₂									
 FERMENTATION	✓	✓	✓	✓	✓	✓	✓	✓	✓
 BIOGAS PLANT	✓	✓	✓	✓	✓	✓	✓	✓	✓

Regulatory environment

- Mutual cooperation needed from both state and corporate side to develop stimulating domestic regulatory environment
- Common initiatives are needed at European level



 **MOLGROUP**