REGATRACE

Renewable GAs TRAde Centre in Europe

CONFERENCE

Brussels, 16.11.2022

This project receives funding from the European Union's Horizon 2020 Framework Programme for Research and Innovation under Grant Agreement no. 857796

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Opening speeches

- **Stefano Proietti**, Project Coordinator of REGATRACE and Senior Researcher at ISINNOVA
- **Henrik Dam**, Policy Officer, DG ENER European Commission
- **Anthony Lorin**, Policy Officer, European Biogas Association

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Opening speech

Stefano Proietti

Project Coordinator of REGATRACE

Senior Researcher at ISINNOVA

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The REGATRACE project at a glance

Stefano Proietti,
ISINNOVA
Final Conference
Brussels,
16 November 2022

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Project Summary

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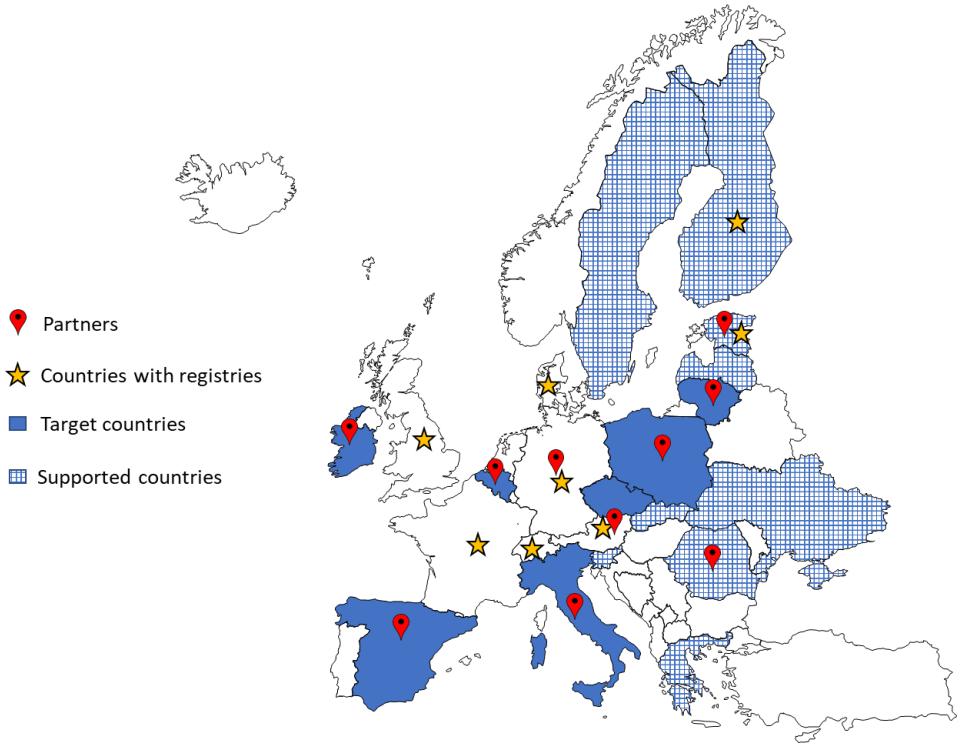
- **REGATRACE**: **RE**newable **GA**s **TRA**de **Ce**ntre in **E**urope **(HORIZON 2020);**
- **42** months (June 2019- November 2022);
- **16** partners in **11** countries: ISINNOVA, CIB (IT), EBA, AIB, ERGaR, Fluxys (BE), RFGI (IE), DENA, DBFZ (DE), AGCS (AT), Elering (EE), UPEBI (PL), ARBIO (RO), NEDGIA (ES), Amber (LT), CzBA (CZ), ARBIO (RO)
- **10** EBA Linked Third Parties + **5** ERGaR Linked Third Parties
- **3.000.485,00** € of EC funding (**100%**);
- The aim is to create an efficient system based on issuing and trading **biomethane/renewable gases certificates** (including GoO and PoS) and to support **market development** (with several guidelines, participatory workshops, etc.).



Pillars of the project

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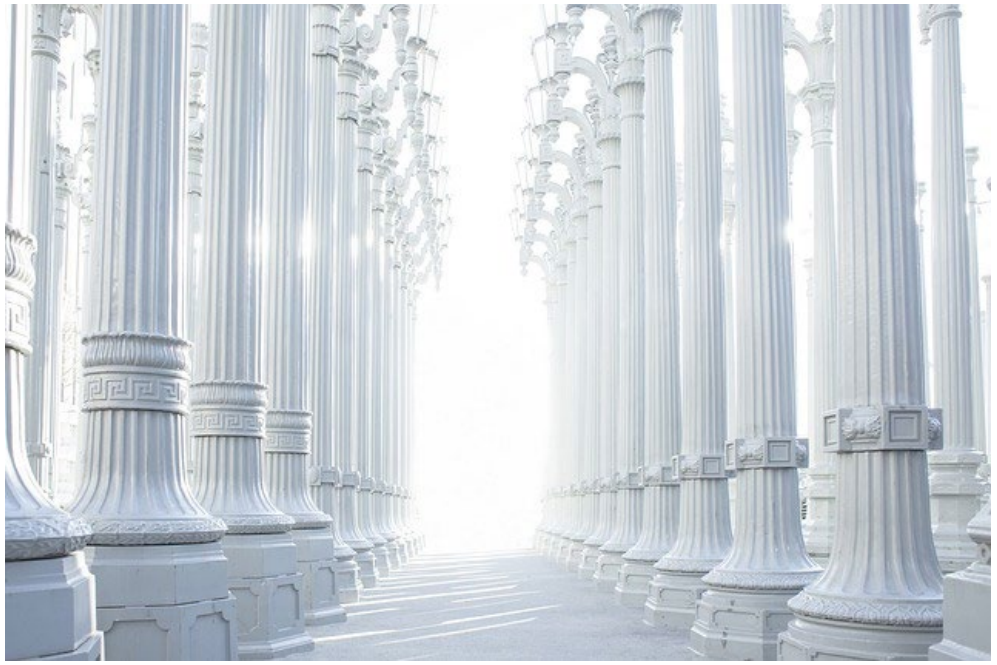
- ✓ **European system** for biomethane/renewable gases **GoO** and **certification**
- ✓ Set-up of national **GoO issuing bodies**
- ✓ **Integration** of **GoO** from different **renewable gas** technologies with **electric** and **hydrogen** GoO systems
- ✓ **Integrated assessment** and **sustainable feedstock mobilisation strategies**
- ✓ Support for **biomethane market uptake**
- ✓ **Transferability** of results beyond the project countries
- ✓ **Dissemination** & **Communication**.



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Thanks for your attention!

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Opening speech

Henrik Dam

Policy Officer,

DG ENER European Commission

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Opening speech

Anthony Lorin

Policy Officer,

European Biogas Association

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17 policy recommendations

for the uptake of biomethane production and cross-border trade

Anthony Lorin
Final Conference
16/11/2022

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17 main policy recommendations for the uptake of biomethane production and cross-border trade

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Increasing relevance of REGATRACE to EU energy policy

Drive for faster increase of domestic production of renewable energy (**Green Deal and REPowerEU ambition**)

Political objective of **35 bcm** of domestic **biomethane production** in 2030

European Commission's **Biomethane Action Plan referencing the REGATRACE Project**

3. Provide further support to innovative solutions and research on barriers and integration of sustainable	This action should focus on integrating results from previous research projects (e.g. Horizon 2020 project REGATRACE on a pan-European methane grid access action plan and project BIOSURF on methodologies and guidelines for certification and registration of biomethane) as well as organising calls on outstanding issues regarding barriers and enablers to the deployment of biomethane. The barriers	EC, MS

17 policy recommendations

"Key take-aways" for EU and national policy-makers

Further elaborated into 44 recommendations in Report D7.3

Different levels of policymaking (strategic choices, legislation, standards, technical arrangement)

Approach to Guarantees of Origin

Sustainability certification

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European system of cross-border transfer of certificates

Renewable gas registries

Scale-up of biomethane markets

Approach to Guarantees of Origin

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1. Implement a European harmonised certification and documentation approach of the renewable value of renewable gases. Allow for the inclusion of sustainability information in the renewable gas certificates so that Guarantees of Origin and Proof of Sustainability can be linked or complement each other.

2. Establish harmonised rules for handling GOs at energy carrier conversion to prevent double counting and different valuation of GOs from different domains.

3. Given the ambitions of linking Guarantees of Origin and Proof of Sustainability, **ensure that the methodologies for energy conversion are harmonised in both rules and standards.**

Renewable gas registries

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4. Enable the set-up of the biomethane registry by creating a domestic biomethane market and providing a timeline for the set-up of the appropriate regulatory framework.

5. Engage in an open dialogue with the biomethane industry to develop national biomethane registries rapidly based on the industry's initiatives and strategic advice.

6. Establish one central registry per Member State for all national and European documentation purposes, covering all types of renewable gases with different certificate attributes.

7. Consider the **operational efficiency gains** of allocating the role of **issuing body** for GOs **for all gases and electricity** with the same organisation per geographical domain.

European system of cross-border transfer of certificates

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8. **Allow transition** from individually acting national renewable gas registries **to a common European renewable gas market with one or several European Scheme(s) of renewable gas certificates for all purposes of certification and issuance.**

9. Implement **a single data format** for **cross-registry transfers** of Guarantees of Origin and other certificates.

10. **Collaborate with** the Association of Issuing Bodies (**AIB**) and the European Renewable Gas Registry (**ERGaR**) to establish a harmonized EU-wide system for cross-border title transfer of renewable gases.

11. **Adopt a flexible approach to the set-up of interfaces** between the Union Database of renewable fuels and national renewable gas registries.

Sustainability certification

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12. Provide additional default values for typical renewable gas value chains to reduce unnecessary efforts of market actors.

Scale-up of biomethane markets

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13. Establish national biomethane **strategies** and **targets for 2030**

14. Give biomethane production momentum by setting-up **investment** support and simplifying **permitting** procedures

15. Establish by the end of 2023 the legislative, regulatory and technical framework for **quick and affordable network connection of biomethane plants**

16. Establish the **appropriate regulatory framework** and **incentives** to **enable increased use of digestate** as an alternative fertilizer

17. Implement **demand incentives** through preferential taxation, fuel supply obligation and rewarding GHG emission reductions enabled by biomethane consumption

Full report of recommendations is available now!

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Downloading Report D7.3

Download it

Share it

Advocate with it

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Thanks for your attention!

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Implementation of gas GOs and renewable gas registries during the REGATRACE project

- **Milenko Matosic**, Senior Expert Renewable Gases, German Energy Agency (dena)
- **Andreas Wolf**, Business Development Manager, AGCS Biomethane Registry Austria
- **Mindaugas Protas**, Renewable energy project manager, Amber Grid
- **Dirk Focroul**, Product Manager Green Gas, Fluxys

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Brussels, 16.11.2022

Design principles for a biomethane Guarantee of Origin

Milenko Matosic

Senior Expert Renewable Gases,

German Energy Agency (dena)

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Renewable Gas Trade Centre in Europe

Design principles for a biomethane guarantee of origin (GO)

Milenko Matosic,
Brussels, Belgium
16 November 2022

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Agenda

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1. Definition and basic principles
2. Minimum attributes
3. Additional information on a biomethane GO
4. Registration and audits
5. Harmonization and cross-border transfers

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Definition & basic principles

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RED II definition:

Electronic document which has the **sole function of providing evidence to a final customer** that a given share or quantity of energy was **produced from renewable sources.**

Concept extension

Initially only for electricity. After RED II publication: **gas, H2**, heating & cooling

Standard value: 1 MWh

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Definition & basic principles

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Who issues a biomethane GO?

Member States at the request of producers of RE

Book & claim principle

A GO can be transferred independently of the energy to which it relates from one holder to another.

Life span of a GO

12 months after the production of the relevant energy unit: transfers allowed

18 months after the production of the energy unit for cancellation

Immutability principle

Registries may not change or delete information/attributes of a GO after issuance.

Exception: error correction

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Minimum attributes

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- Article 19 RED II establishes the minimum information a GO should have:

1. **Energy source from which the energy was produced**
2. **Start & end dates of production**
3. **Energy carrier to which the GO relates to: gas/biomethane**
4. **Identity, location, type and capacity of the production device**
5. **Commissioning date of the production device**
6. **Date & country of issue**
7. **Unique identification number**

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Additional information on a biomethane GO

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- Information on compliance with applicable sustainability requirements (SR):
  - Reference to the legislation that sets the SRs
  - Reference to the relevant sustainability certification scheme
  - Compliance with the SR (yes/no)
  - Reference to the relevant reports, certificates or other documents produced by the sustainability certification scheme(s).
- Information on the inputs, energy source, and their share in the total energy input in case the output was produced from a mixture of inputs.
- Mode of transport / dissemination level

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Registration of a biomethane PD

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- Registration: needed for the issuance of GOs by an Issuing Body with respect to a biomethane production plant. The information to be delivered may include, among others:

1. Applicant's name, address and additional contact details
2. Identification number of the production device
3. Production device location
4. Energy source and technology type used for the biomethane production
5. Nominal capacity of the production device
6. Date when the production device became operational
7. Information on public support

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Audits

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Plant audit

Essential for the registration of a PD

Contains all technical information necessary for assuring that the PD is capable of producing the claimed energy carrier (biomethane)

Production audit

Necessary for the issuance of the biomethane GOs.

Based on metering data and audit reports.

Both audits must show that the biomethane plant is effectively capable of producing the amount of output for which the GO issuance should take place.

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Harmonization & cross border transfers

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➢ Why do we need a harmonized GO system?

- For the uptake of the biomethane market and GO cross-border trade → **confidence to gas producers and consumers**
- Avoid double counting of the same biomethane volume.

- **First attempt for cross-border transfer:** ERGaR CoO Scheme launched in July 2021 with AGCS (AT), dena (DE), GGCS (UK), and Vertogas (NL). In the process of joining: Energinet (DK)
- Gas Scheme from AIB
- Article 19 (6) RED II: issuance, transfer and cancellation of GOs must comply with the CEN Standard EN16325.
- CEN Standard EN16325: in revision since February 2020
  - Includes GOs for electricity, **gas, H2**, heating & cooling
  - Harmonize the content, issuance, transfer and cancellation of GOs in Europe.

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Registry development progress during REGATRACE

Andreas Wolf

Business Development Manager,

AGCS Biomethane Registry Austria

REGATRACE

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Registry development progress during REGATRACE

AGCS

balance group coordinator

AGCS Gas Clearing & Settlement AG

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Target Countries

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Selection criteria

- Biomethane Production or know-how
- Organisation with high potential for documentation obligation

Targets

- Getting used to handling EBGO, master data
- Developing business processes supporting national and international transactions
- Overcoming the complexity burden of IT and implementation of national requirements
- Understanding established registries, their processes and standardisation possibilities

Project Partners

- Target Countries
  - IT - CIB
  - IE - RGFI
  - BE - Fluxys
  - LT - Amber
  - RO - ARBIO
  - ES - Nedgia
  - PL – UPEBI
  - SK - SPP

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AGCS Working Process

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Kick Off

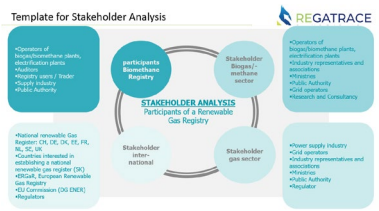
- AGCS: Call for action
- Target Country: main contact person
- Kick-off: telcon for framework definition

Status & Demand Analyses

- Target Country: market analyses, current situation, framework
- AGCS: work plan
  - Goals & Milestones
  - Task definition
- AGCS: demo of IT-system of Biomethane Registry Austria

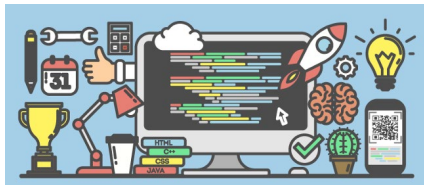
Conceptualisation

- Stakeholder analyses
- AGCS:
  - provisional master data
  - survey on business processes
- Target Country:
  - Define master data
  - Outline of business processes



Development

- smart & AGCS:
  - develop IT-system
  - include master data (accounts and login)
- AGCS: provision of user guides (manual)
- AGCS: Workshop for demo/training



Implementation

- AGCS & smart:
  - test runs
  - deliver IT-system
  - support to operative staff
- Target Country:
  - test and use the IT-system
  - implement „personalised data"

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Application purposes

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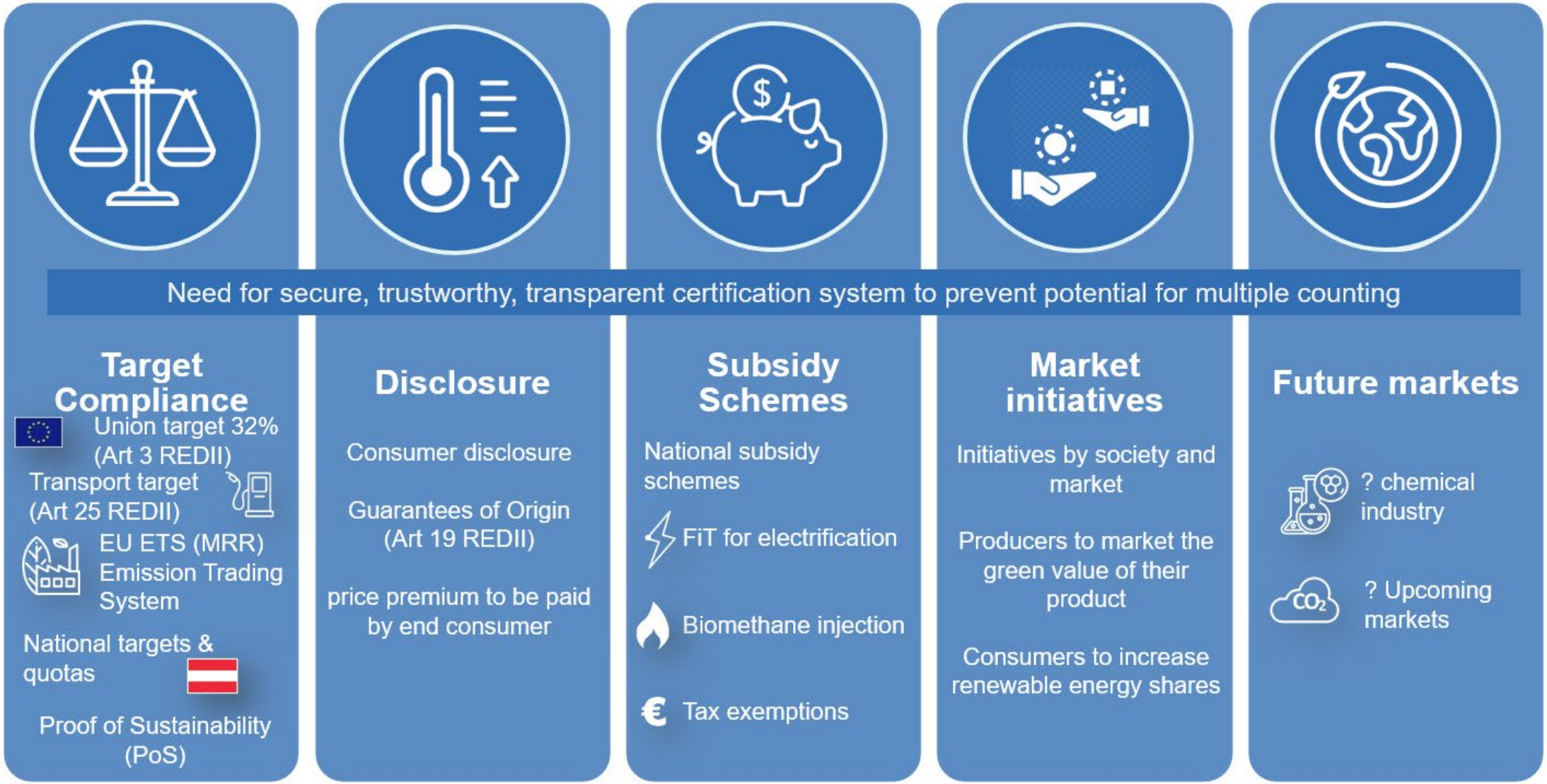

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Active Support

for countries establishing their biomethane market

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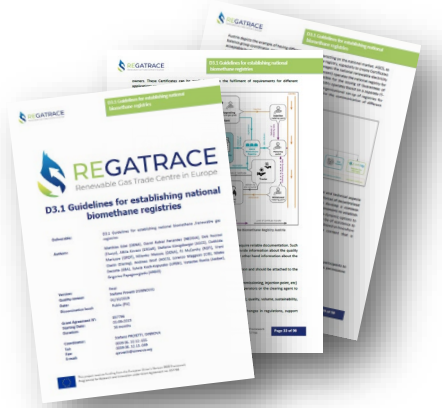
REGATRACE Knowledge Base

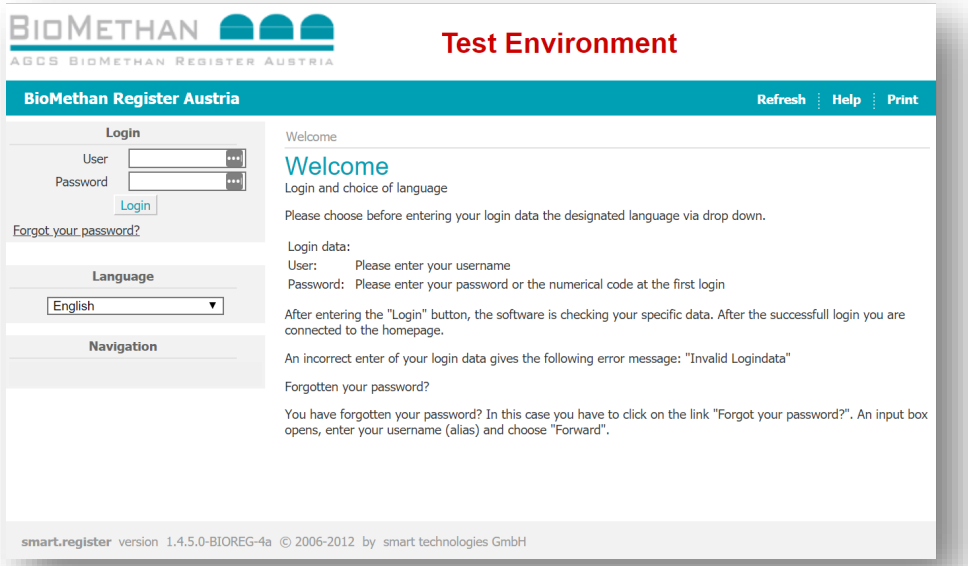
for organisations engaged in establishing the national/regional registries

- ✓ *D3.1 Guidelines for establishing national biomethane /renewable gas registries*
- ✓ *D2.1 Content and attributes of European Biomethane Guarantees of Origin*
- ✓ *D2.2 Report on content of the Guarantees of Origin*
- ✓ *D6.1 Mapping the state of play of renewable gases in Europe*



pilot IT-systems

in English language based on the Austrian application



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Registry Development

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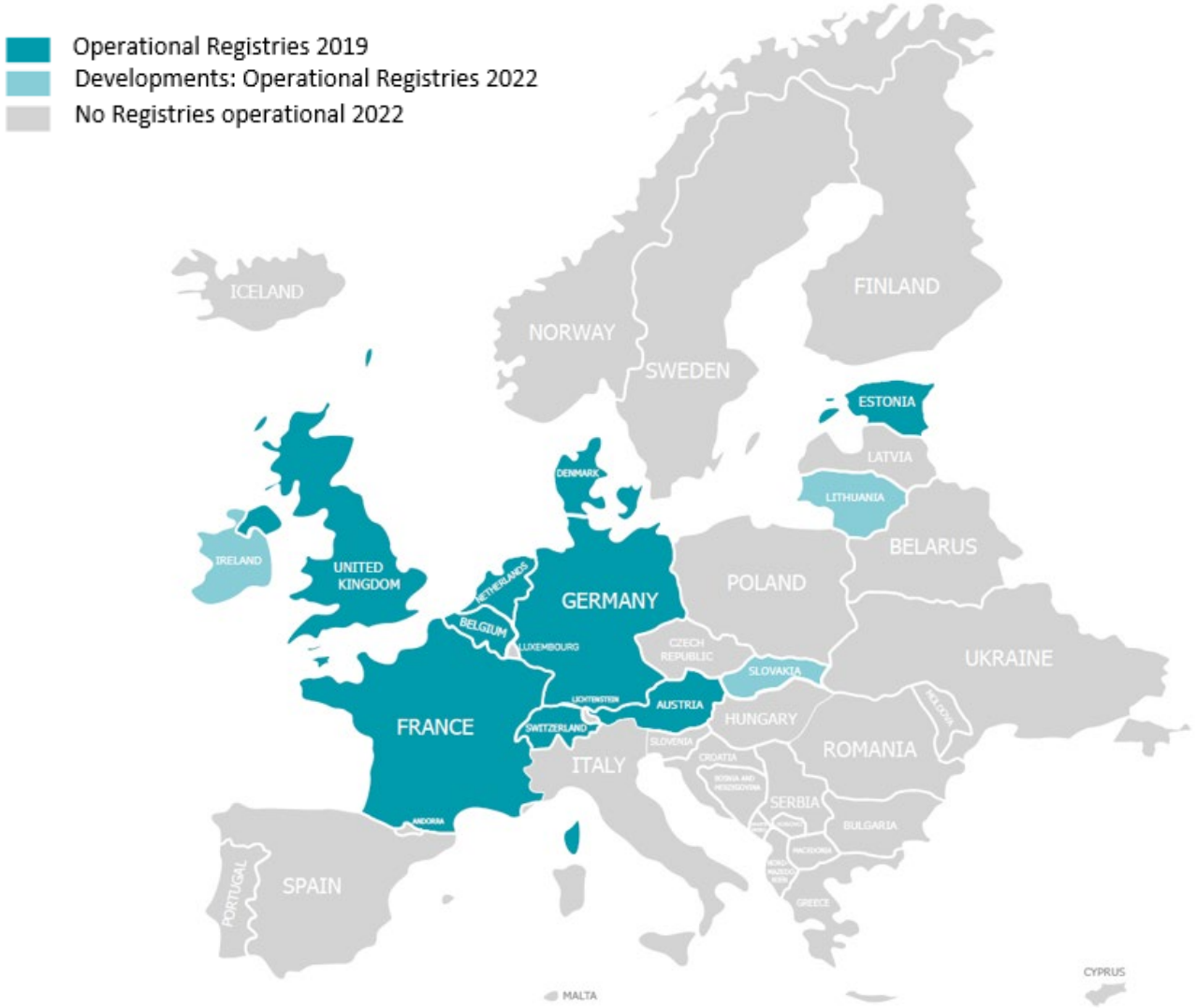

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Upcoming Registry Challenges

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- Target Countries IT, BE, LT, ES, SK have designated an Issuing Body– implementation ongoing (BE implemented)
- Majority of Member States have not assigned registry competence yet
- Ukraine started developing an Issuing Body
- Additional application purposes of renewable gases
  - Emission Trading Sector - MRR (Monitoring Reporting and Regulation)
  - Sustainable Aviation Fuels
- Harmonisation of certificates among application purposes

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Thanks for your attention!

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Implementation of national registries during the REGATRACE project – Lithuania

Mindaugas Protas

Renewable energy project manager,

Amber Grid

REGATRACE

Renewable Gas Trade Centre in Europe

Implementation of Lithuania‘s national registry during the REGATRACE project

Mindaugas Protas,

REGATRACE Final Conference

16 November 2022

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Status in 2019

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At that time:

- No biomethane production;
- No support scheme;
- Low interest and awareness of GO in the national market.

- In 2019 June Amber Grid appointed as national renewable gas issuing body.
- Database to cover GO administration needs was developed as interim solution.
- Amber Grid joined REGATRACE project as a target country in 2019.

Main workstreams of the implementation process

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Stakeholders involvement

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- Stakeholders and their needs/expectations identification regarding development of a biomethane registry
- Close cooperation and discussions with involved stakeholders during all registry implementation process
- At the begining of 2022 joint consultation done together with Latvian and Estonian TSO regarding GO cross border exchange potential in Baltic region.

- National market is interested only in **GO with PoS** that can be **used in transport sector** for national targets counting.
- Market participants have great interest for **GO with PoS cross border exchange** with other EU countries.

Acquisition of knowledge and knowledge sharing

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Knowledge and best practices acquisition:

- REGATRCE project deliverables, meetings, discussions, interviews with project partners.
- Participation in international GOs exchange association (Ergar, AIB);

Knowledge sharing:

- 4 workshops for stakeholders under format of WP6 of REGATRACE project;
  - Special guests and presentations from REGATRACE partners and national experts;
- Consulting national and foreign traders, national potential biomethane producers and other interested parties;
- Advising governmental institutions regarding necessary legal changes.

Legal framework development

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- 2021 March. Alternative fuels law
  - Obligations introduced for natural gas suppliers for transport sector;
  - From 2022 obligation for transport fuel (liquid and gaseous) suppliers to register in Renewable fuels statistics unit system and cover obligations using renewable fuel statistics units
  - GO with PoS can participate in fuel statistics units system. GOs with PoS canceled for the transport is converted into fuel statistics units (MWh to MJ).

- 2021 December. Rules for renewable fuels statistics units system administration.
- 2022 July. Updated rules for GO administration.
  - GOs with PoS included in GO scheme. Criterias for GOs with PoS import added.

IT system set-up

- In 2019 November detailed plan for setting up national registry was prepared.

Main preparation tasks were to:

- Assess market potential;
- Identify stakeholders;
- Develop concept and basic principles of the registry;
  - With regards to REGATRACE T3.3, IT system test environment was created by for target countries. This test environment contributed a lot in understanding registry functions, principles and our needs.

- Identification and selection of the best IT solution from a technical and CB perspective;
  - Analysis showed that in our case best solution is to acquire already existing IT solution from the market.

- At the beginning of 2022 tender was announced and 2022 July contract was signed with the winner of the tender.
  - First stage of implementation and testing is completed however due to recent changes in GO administration rules we requested couple additional functionalities to added.
  - Once this request completed we will be ready to go live.

Status in 2022

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Investment support:

- 2021 from National Climate Change program - 15 million EUR for new 8 biomethane production plants or biogas upgrading facilities;
- 2022 – 2026 from Recovery and Resilience Facility (RRF) - 22 million EUR.

Biomethane production:

- Two biomethane plants will be connected to distribution and transmission network in 2023 Q2;
- It is expected that in 2025 **5 biomethane production plants** will be connected to gas transportation system with annual production around **700 GWh/y.**

GO cross border exchange:

- 2021 August. GOs imported from Dena (Germany) on book and claim principle;
- 2022 November. **Biomethane GOs with PoS was imported into Lithuania from Netherlands.** This biomethane will be used in transport sector to fuel gaseous public transport.

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Thanks for your attention!

Mindaugas
Protas

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Implementation of national registries during the REGATRACE project – Belgium

Dirk Focroul

Product Manager Green Gas,

Fluxys

REGATRACE

Renewable Gas Trade Centre in Europe

Belgium in the framework of the project

Dirk Focroul

Final event

16/11/2022

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Biogas in local CHP *(today)*

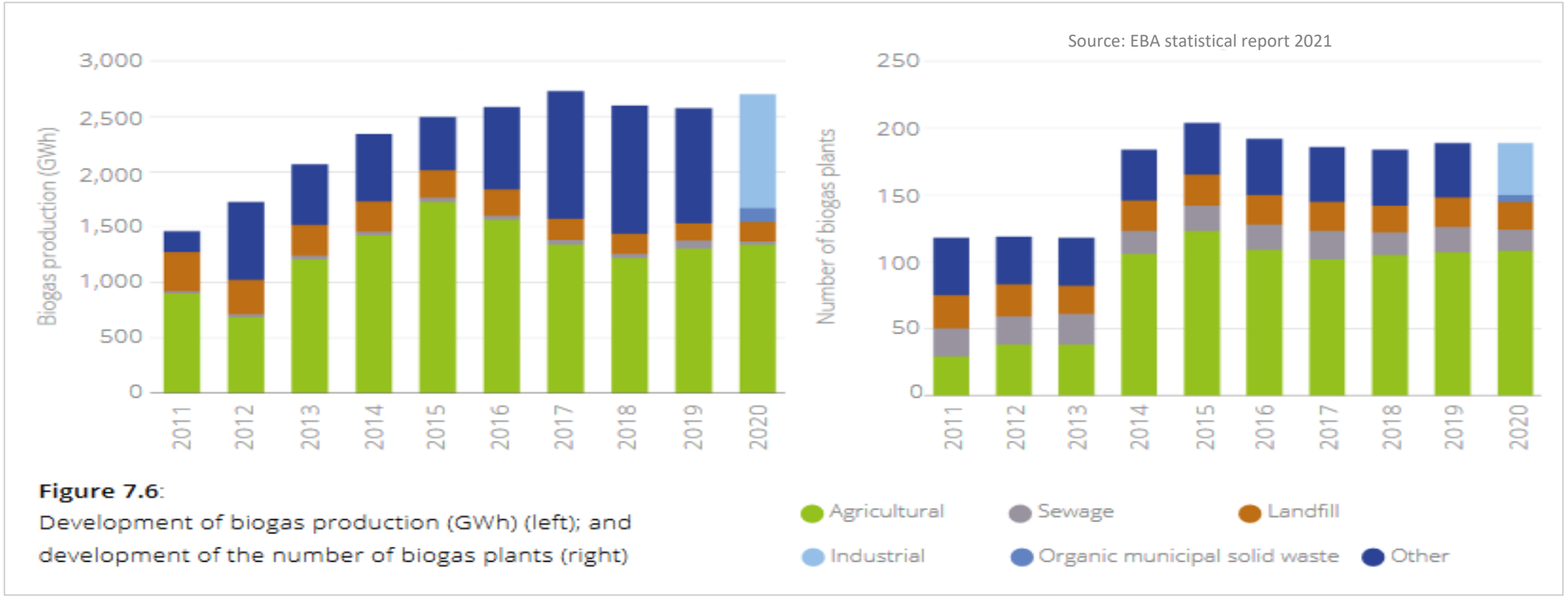


Figure 7.6:
Development of biogas production (GWh) (left); and development of the number of biogas plants (right)

2 TWh/y in Flanders and 0,6 TWh/y in Wallonia producing around 1,1 TWh of green electricity

1,4 TWh of biogas plants in Flanders is at the end of support in 2024

Biomethane *(today)*

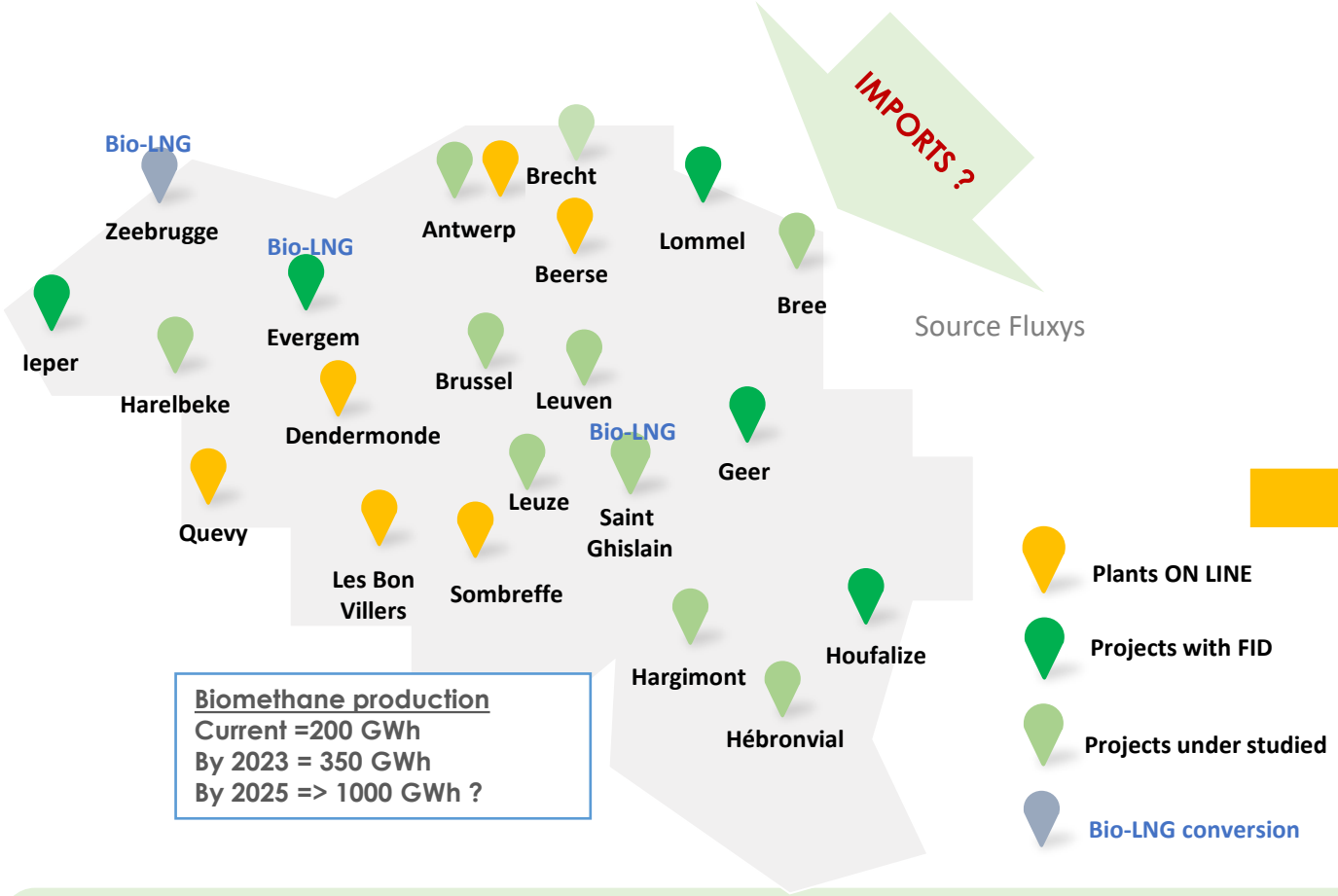
Name / location	Injection *($m^3(n)/h$)*	Region	Start Date	Main Feedstock
IOK Beerse (Beerse – Merksplas)	150	Flanders	01/11/2018	Municipal waste
Cinergie (Sombreffe)	600	Wallonia	01/09/2020	Agro Waste
Biométhane du Bois d'Arnelle (Les Bons Villers)	580	Wallonia	21/08/2021	Agro Waste
Aquafin (Antwerpen Zuid)	350	Flanders	01/10/2021	Sludge, Water
Vanheede Biomass solutions (Quevy)	750	Wallonia	23/06/2021	Agro Waste
VERKO (Dendermonde)	150	Flanders	01/08/2022	Municipal waste
TOTAL capacity 2022	**2.580**	**Belgium**	**end 2022**	
Yearly production 2022 *(in GWh/year)*	**200**	*or 80% of capacity*		

New installaties ?

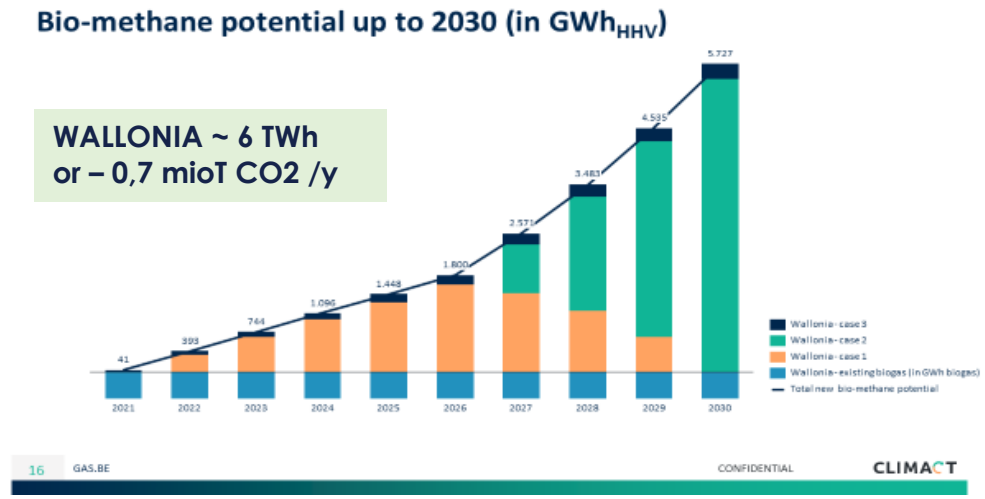
Shift from biogas to biomethaan ?

Production of 200 GWh/year is still limited
in relation to the injectable potential of 15,6 TWh/year

Biomethane deployment in next decade ?



Source Fluxys



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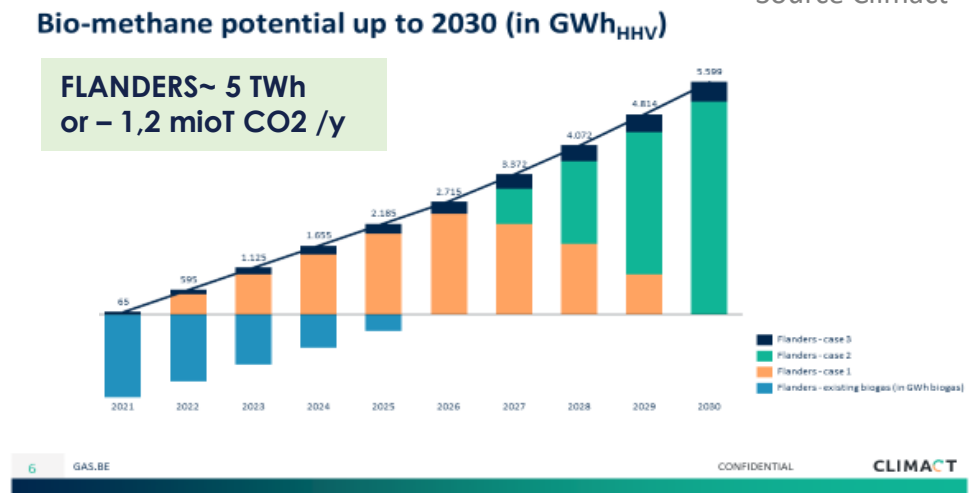


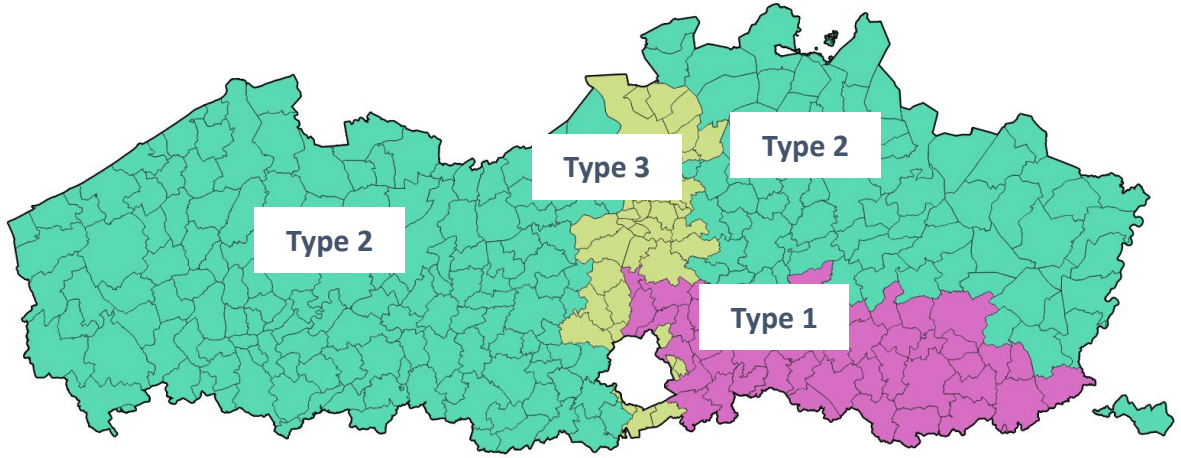
1 TWh/year by 2025 still optimistic

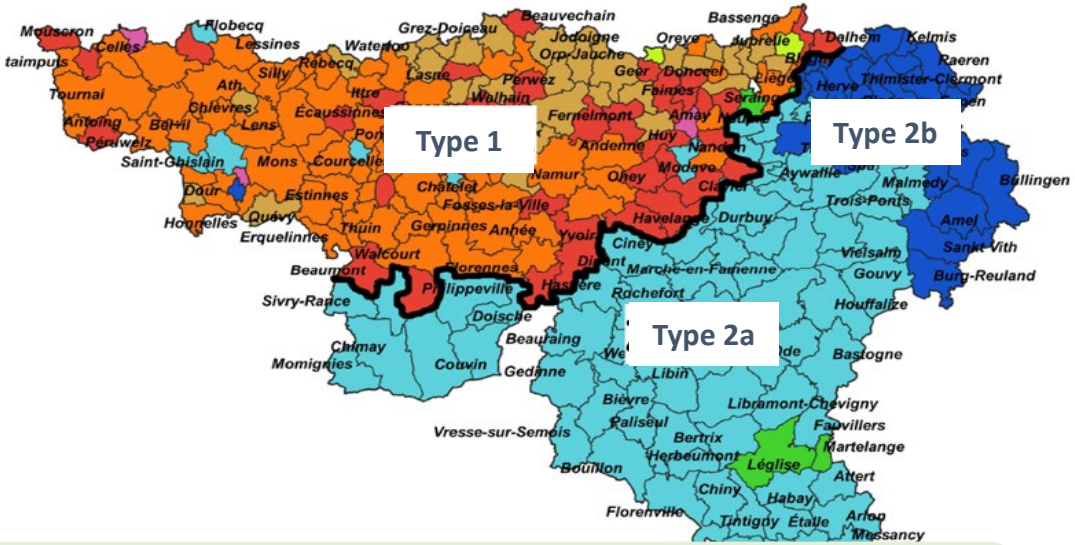
10 TWh by 2032 at 1 TWh/y seems not likely

Type of feedstock ?

Flanders:	
Agro/industrial (type 1)	20%
Manure (type 2)	60%
Municipal/water (type 3)	20%

Wallonia	
Agro/industrial (type 1)	50%
Manure (type 2)	40%
Municipal/water (type 3)	10%

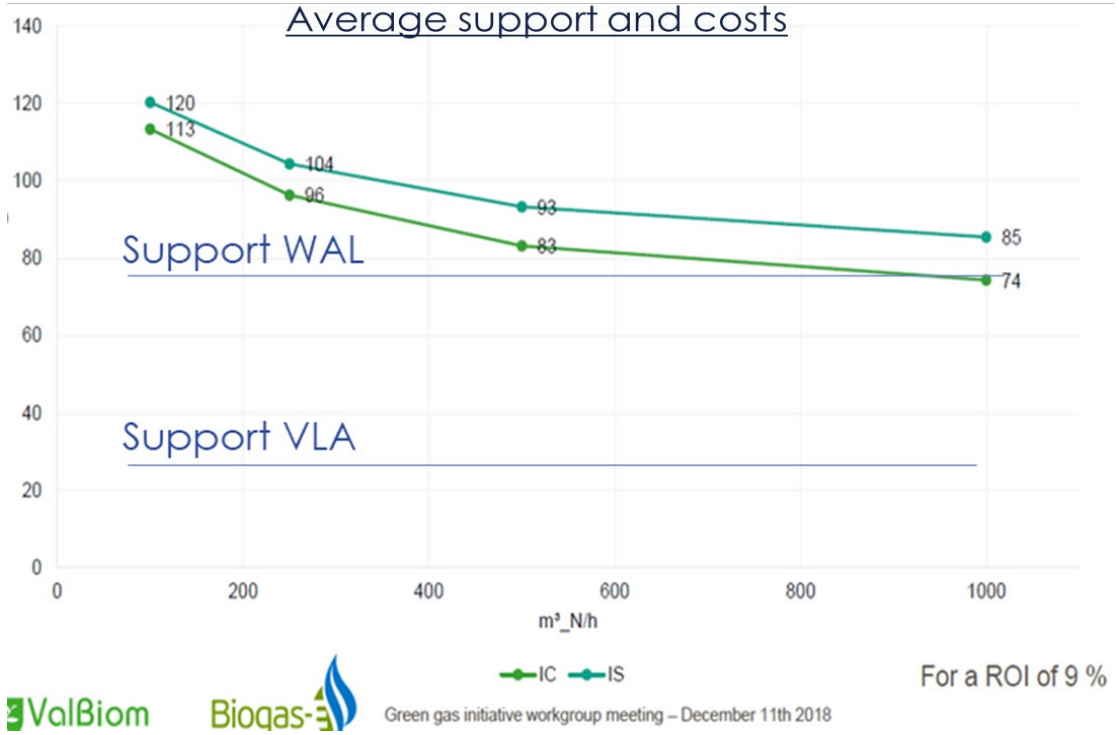




Manure is the main feedstock source for Belgium, while agro/industrial waste is second

Municipal waste and water/sludge is restricted to urban zones

Biomethane support *(today and future)*



WALLONIA:

- Operational support for Walloon CHP buying Walloon Biomethane (20y) → Fading out by 2023 for new plants

FLANDERS:

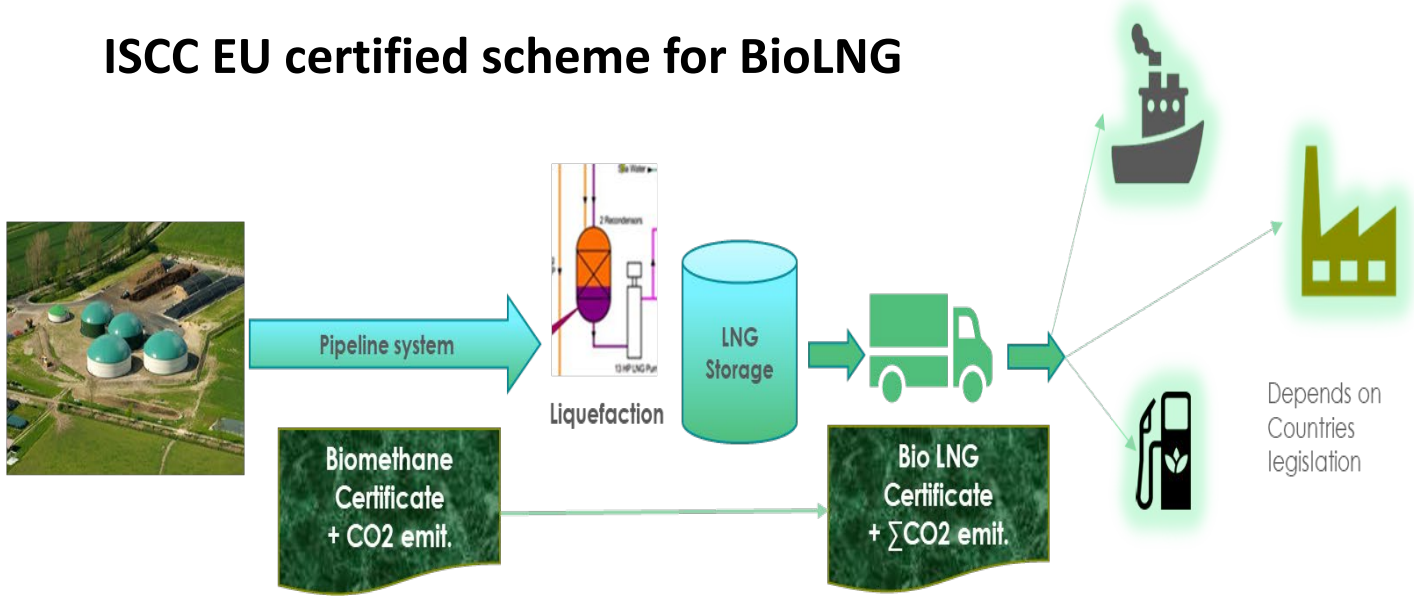
- Support is related to CHP connected to Nat Gas grid (not only biomethane) → fading out by 2025 ?
- Support for Municipal Waste for waste treatment (OVAM) → up to 1,5 mio€ investment

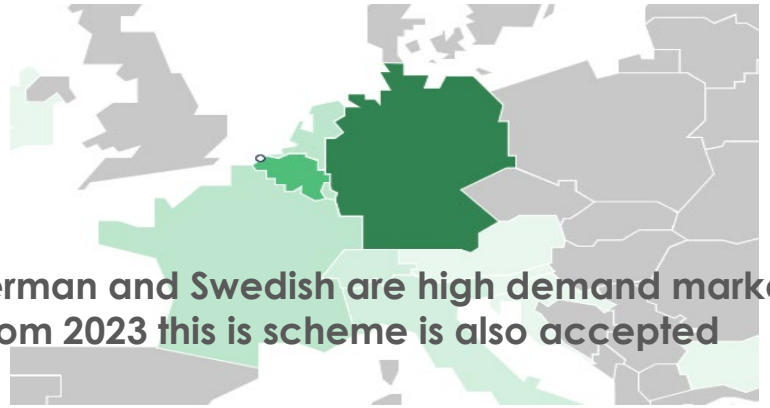
Wallonia: is looking to replace the existing operational support scheme

Flanders: no specific operational support scheme expected for biomethane

BioLNG conversion in Zeebrugge LNG Terminal

ISCC EU certified scheme for BioLNG





Today German and Swedish are high demand markets, in BE as from 2023 this is scheme is also accepted

- Since 2020 Biomethane can be liquefied @ Zeebrugge Terminal (mass balance principal)
- Potential of more than 1TWh/year of bio-LNG conversion
- Price conversion (all in) is around 5€/MWh

- Not recognized in all member states for the RED II quota although compliant with EU certification

Certification for biomethane

Regional or Federal	Type of USE	Competent authority	Compliant RED II (& MRR)	Comment
	Biofuel, RFNBO sustainability	federal public service HEALTH, FOOD CHAIN SAFETY AND ENVIRONMENT	✓	**Royal Decrees (2014, 2018, etc.).** In revision. Sustainibility Ministry Health
	Biofuel, RFNBO quota	economie	~	**Brandstofwet**, FPS Economy (2013). In revision. Ministry Energy (economie)
	Guarantees of Origin	VREG ENERGIE WIJZER	✓	**Energy decree (2019)**, takes into account **all renewable gasses** **Fluxys BE is poduction regtistrar**
	ETS certification	VEKA	✓	**Specific transposition of MRR by VEKA**
	Guarantees of Origin	Wallonie service public SPW	~	**"Arrêté du Gouvernement Wallon relative to certificates and labels of guarantee of origin for gases from renewable sources (2018)**. Only refers to b**iomethane**, not yet fully compliant.
	ETS certification	Wallonie environnement Awac	✗	**Transposition of MRR expected 2023**
	Guarantees of Origin	brugelo	✗	**"Ordonnance gaz" (2004), relative to the gas market organization in the Brussels-Capital Region.** Still need to be adapted
	ETS certification	brugelo	✗	**no transposition of MRR yer**

- Certification very fragmented in BE
- No common rules or centralized system
- Competent authority for Hydrogen under discussion
- Import of GO's is limited

Industry is pleading for

- one BE centralized system approach for both GO's and GO + (=GO's /PoS)
- Large Import possibilities for GO's and PoS

Conclusions

- **Potential of 15,6 TWh** is present in BE but it remains uncertain if it will be developed, due to **uncertainty on support, incentives**

- Due to lack of specific support, the best option for biomethane projects is to **sell on the biofuel market (bio-LNG)**

- A **centralized certification system** integrating both GO and GO + (GO + PoS) for both Renewable methane and Hydrogen is put forward as the adequate solution for Belgium

- **Import** of GO's and GO+ will be key for the Belgian industry (mainly ETS)

#TAGG2022

EXPERT TALKS ABOUT GREEN GAS

5 december 2022 as from 12h
Maison de la Poste – Tour & Taxis

talksaboutgreengas.gasevents.be

REGATRACE
Renewable Gas Trade Centre in Europe

Thanks for your attention!

Dirk Focroul
Dirk.focroul@fluxys.com
www.regatrace.eu

This project receives funding from the European Union's Horizon 2020 Framework Programme for Research and Innovation under Grant Agreement no. 857796

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Brussels, 16.11.2022

Implementation of gas GOs and renewable gas registries during the REGATRACE project

Q&A session

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State of the art of systems for documenting cross-border biomethane transfer

- **Jesse Scharf**, ERGaR President
- **Bram van de Heijde**, Chairman of the EECS Gas Scheme Group, AIB and Senior Adviser, VREG
- **Matthieu Boisson**, Project Coordinator, CertifHy

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How ERGaR Schemes facilitate the cross-border transfer of gas certificates

Jesse Scharf

ERGaR President

How European Renewable Gas Registry (ERGaR) schemes facilitate the cross-border transfer of gas certificates

European Renewable Gas Registry

Jesse Scharf

ERGaR Board, President

Green Gas Certification Scheme (UK), Scheme Director

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European Renewable Gas Registry

About Us

- International non-profit, non-governmental organisation (BE law) established in September 2016

- **Founded by established biomethane registries**

- ERGaR provides a **forum for the collaboration of renewable gas registries and market participants in Europe**

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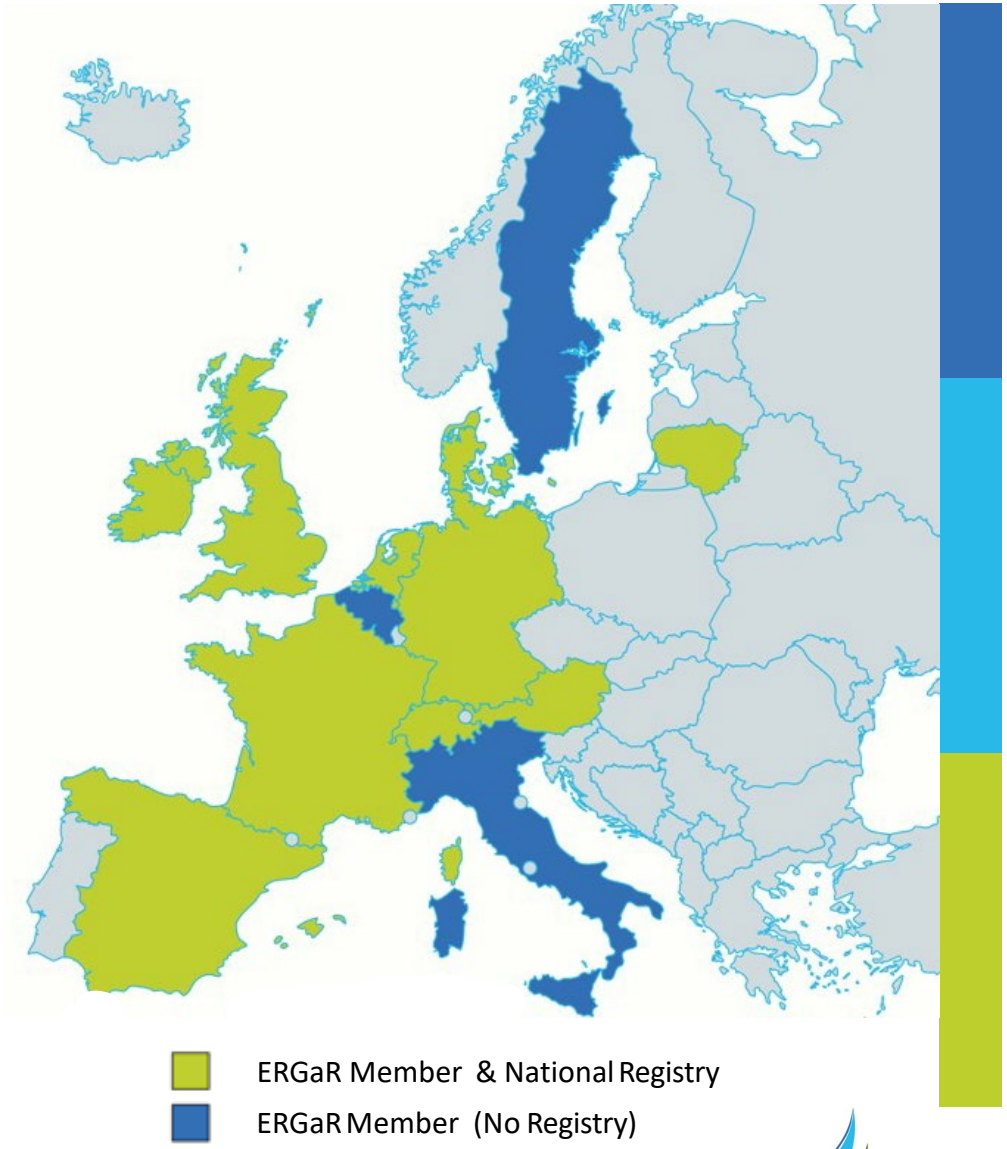
European Renewable Gas Registry

Our Members

34 ERGaR members in 13 European Countries

- Established biomethane / renewable gas registries, appointed issuing bodies
- Gas DSOs & TSOs
- Biogas associations
- Traders
- Other major stakeholders of the European biomethane market



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ERGaR Board & Secretariat

Jesse SCHARF
President, **REAL (UK)**

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AGCS (AT)

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VSG (CH)

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dena (DE)

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Abel ENRIQUEZ
ENAGAS (ES)

Roelf TIKTAK
Vertogas (NL)

Matthias Edel
Secretary General

Katharina Kramer
Assistant Secretary General

European Renewable Gas Registry

ERGaR Members

Full Members

AGCS balance group coordinator

Amber Grid

CIB Consorzio Italiano Biogas

dena German Energy Agency

EBA European Biogas Association

enagas

ENERGINET

Fachverband BIOGAS

gas.be

GRDF Gaz Réseau Distribution France

nedgia grupo Gas Natural Fenosa

NORDION ENERGI

REAL Renewable Energy Assurance Limited

Vertogas

naturemade star

Renewable Gas Forum Irish Green Gas Ltd

gaz energie

Associated Members

ACT

AFS Independent Access to Environmental Markets

bmp greengas biomethanepartner

centrica Energy Trading

DBC DanishBioCom

dc Danske Commodities

energie360°

GO2

LANDWÄRME

NGF nature energy

MET MET International AG

PAVILION ENERGY

Renewable Energy Services

STX

TITAN

uniper

ergar European Renewable Gas Registry

Vision & Mission

The **vision**:

- Renewable gas certificates will be transferred **across borders in an increasingly integrated European market** along the interconnected European gas network, reaching all end customer segments.
- **ERGaR will be the Europe-wide recognised organisation** for administering book & claims and mass balanced volumes of biomethane virtually distributed along the interconnected European gas network.

The **mission**:

- To build on national registries to establish an **independent, transparent and trustworthy documentation scheme** enabling cross border transfer and mass balancing of renewable gas injected into the interconnected European gas network
- Securing the **exclusion of double sale and double counting.**

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Major Activities & Contributions

- > 1TWh of biomethane cross-border transfers documented with the ERGaR CoO Scheme since its launch in June 2021
- ERGaR has been partner of the H2020 REGATRACE project since 2019 (ending in November 2022) www.regatrace.eu
- Is an active partner of the H2020 METHAREN project
- Contributing to the revision of the European standard EN 16325 on guarantees of origin as a liaison member
- Involved as participant of the stakeholder working group on the Union Database on gaseous fuels

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Team Work & Bottom-Up Approaches

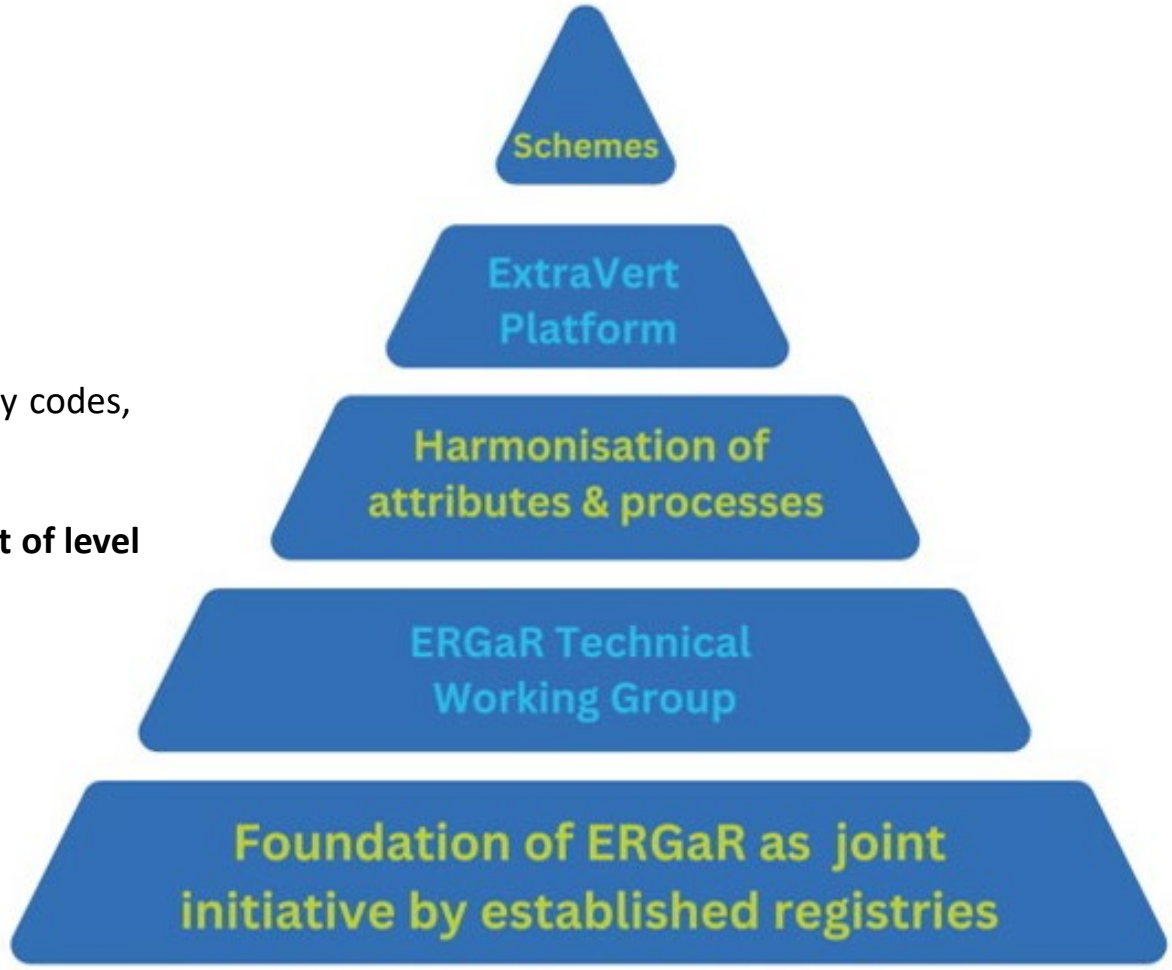
- Development of **Scheme Rules** for the **ERGaR CoO Scheme**
- Development of the Documentation Package for the **ERGaR RED MB Scheme** for recognition process to become voluntary scheme by the European Commission

- Engagement of **Vertogas B.V. as IT-provider**
- Development of the **ExtraVert Platform** as IT-system

- Harmonisation of attributes (list, specification), technology codes, biomass codes
- Harmonisation of business processes
- Finding **common denominator** for countries, **independent of level of advancement**

- Collaboration Tech WG
- **Understanding each other's systems**

- Building on knowledge, expertise and resources of **established registries**



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ERGaR RED MB Scheme

Currently paused, pending final concept of the Union Dabase by the European Commission

Application Purpose	Target compliance transport sector	
Background	Sustainability & Mass Balance Articles 25-31 RED II	
Competent Body	Voluntary Scheme *(recognised by EC)*	Registries via ERGaR RED MB Scheme
Rules & Standards	E.g.: ISCC, REDCert, Better Biomass	ERGaR RED MB Scheme
Document Type	PoS Proof of Sustainability	ERGaR PoO Proof of Origin

Gas Category	Biomethane
Source of Energy	Biomass
Means of Transport	European gas grid
Geographical Scope	EU, EFTA
Supply Chain	European natural gas transmission and distribution systems

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ERGaR CoO Scheme

	GOs	CoO
Application Purpose	Consumer Disclosure	Initiatives by market & society
Background	Article 19 RED II	Market & national legislation rules
Competent Body	Issuing Bodies by government mandate	Registries
Rules & Standards	CEN-EN 16325	ERGaR CoO Scheme
Document Type	GoO Guarantee of Origin	CoO Certificate of Origin

	covered	planned
Gas Category	Biomethane	Hydrogen *(on request & update of Scheme rules)*
Source of Energy	Biomass	RFNBO & RCF *(under consideration)*
Means of Transport	European gas grid	Isolated gas grid
Geographical Scope	Countries connected to Natural Gas Network (per Art. 2.3 2009/73/EC)	
Supply Chain	European natural gas transmission and distribution systems	

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European Renewable Gas Registry

ERGaR CoO Scheme

System Participants:

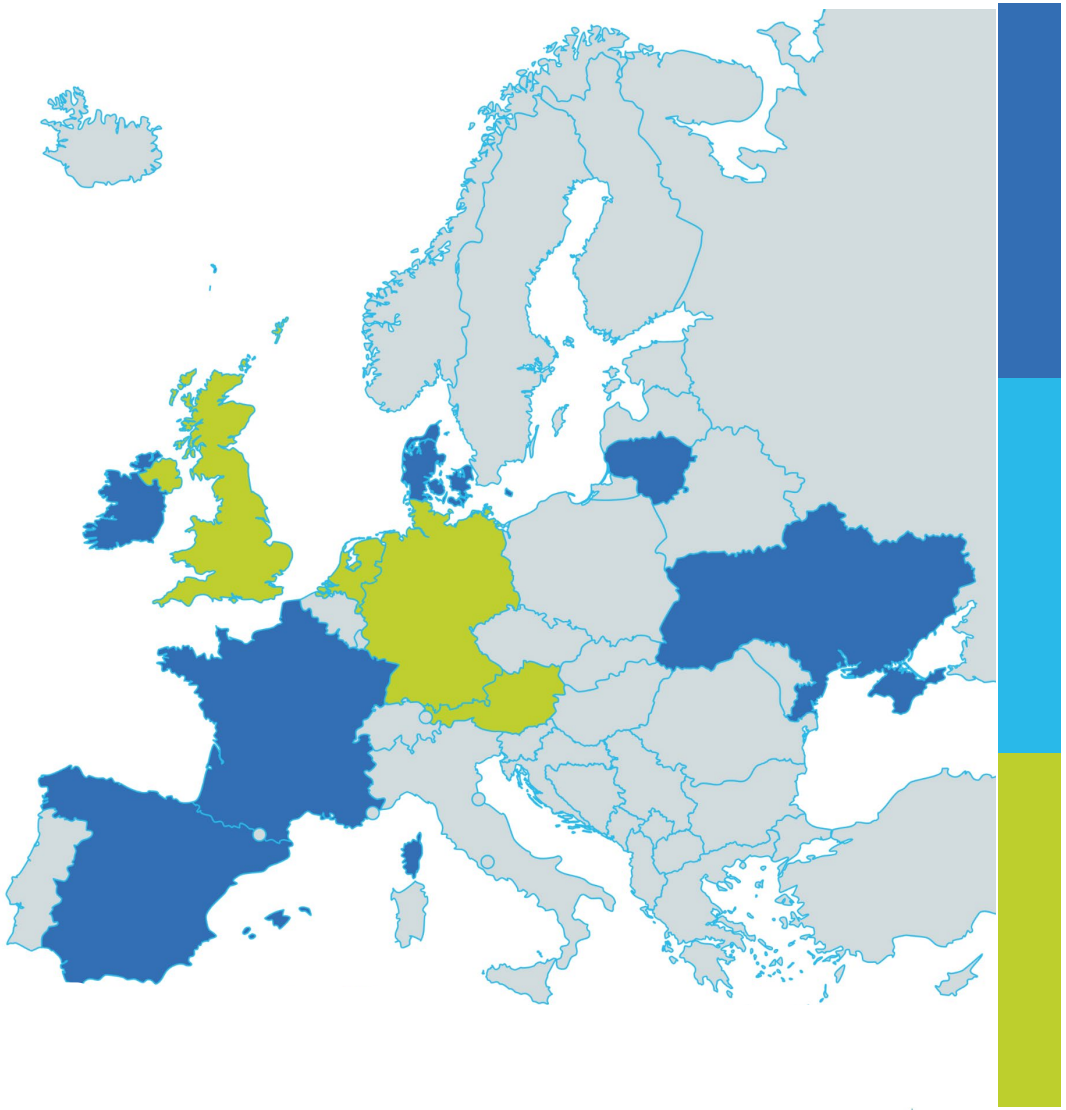
- AGCS (AT)
- Dena (DE)
- GGCS (UK)
- Vertogas (NL) issuing body with government mandate

Interested in joining the CoO Scheme:

- Energinet (DK) issuing body with government mandate
- GRdF (FR) (subject to governmental decision expected for 2023)
- Other issuing bodies (Amber Grid, ENAGAS, SPP-Distribucia, UAEE) showed interest in joining the ERGaR CoO Scheme and will be able to prepare their applications when their IT-systems will have been established.

Market Coverage:

Currently, ERGaR CoO System Participant countries make up approx. 2/3 of total biomethane production in Europe. If France and Denmark join, this will grow to more than 80%.



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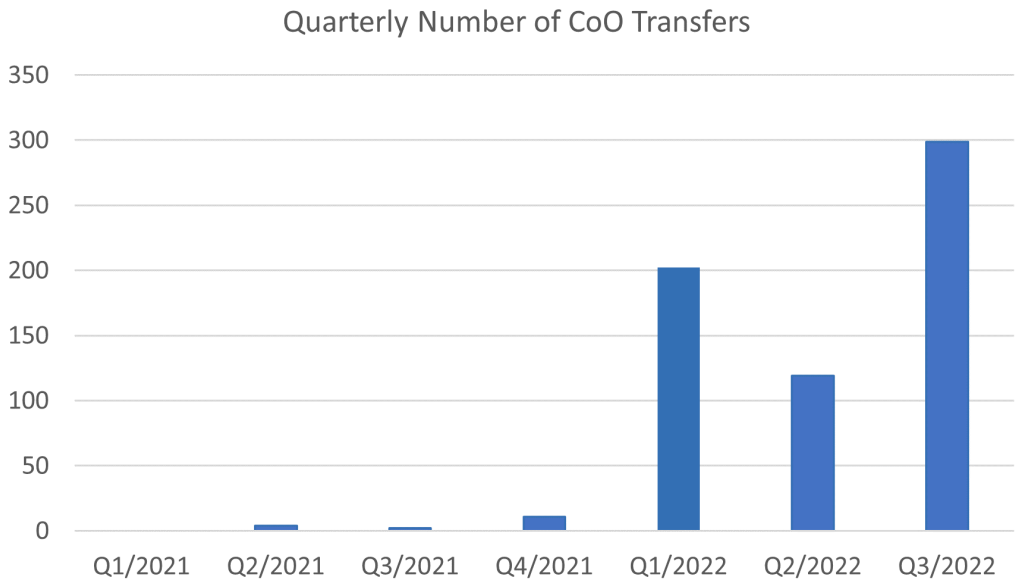
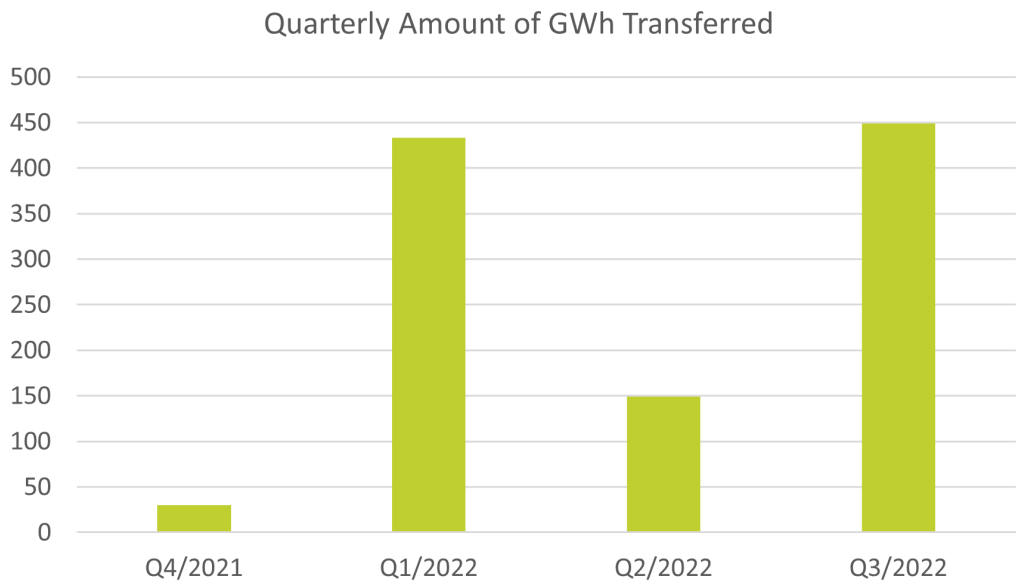
CoO Scheme Statistics





- Number of transfers in Q3 = **229**,
- Amount transfered = **449 GWh**

- All biomethane CoOs were transfered to the **German Biogasregister**
- Highest volume of exports derived from the **UK**
- Further exports were made from **the Netherlands** to **Germany**.

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European Renewable Gas Registry

What does that mean for a UK producers, traders and the GGCS ?

- Improves on the bilateral agreements previously in place by;
  - Opening new markets e.g. NL, AT, with more consumers who can then source UK CoO via their “home registry”
  - Increased trust from producers, traders and consumers e.g. can check the rules and IT infrastructure being used
  - Increases trust from regulators that CoO are not being double counted
  - Reduces the administrative and auditing burden
  - Decreases the transaction times/effort from the registry

- Transaction volumes are still low compared to total biomethane volumes and volumes of electricity GoO
- There is much room to improve the CoO scheme and keep up with increasing sophistication of the market and demands from traders and registries.

Thank You!

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Katharina Kramer, Assistant Secretary General
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www.ergar.org

/company/ergar/

@ERGaR_GreenGas

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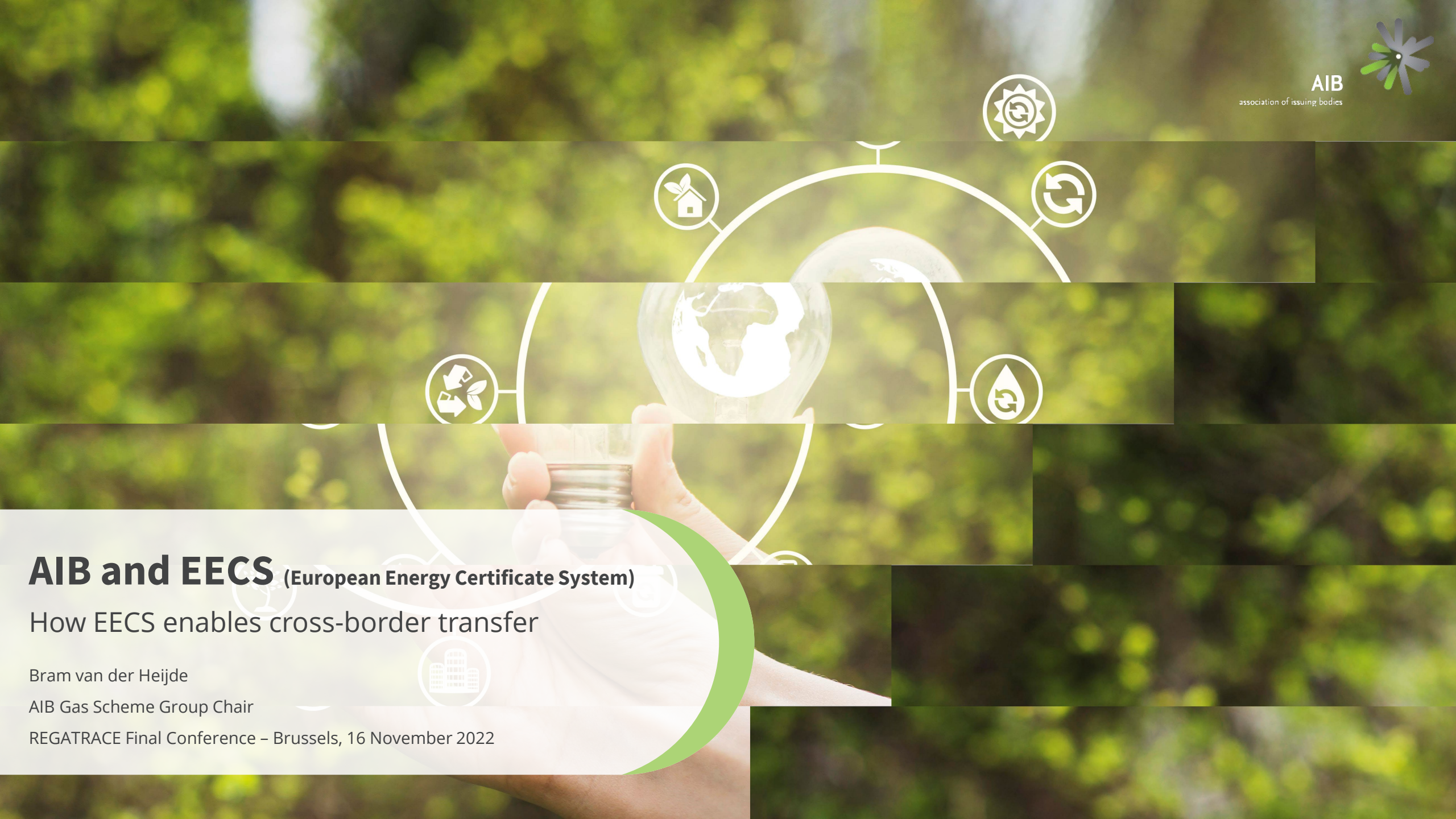
Brussels, 16.11.2022

How the European Energy Certificate System facilitates the cross-border transfer of gas and electricity certificates

Bram van de Heijde

Chairman of the EECS Gas Scheme Group, AIB

Senior Adviser, VREG



AIB
association of issuing bodies

AIB and EECS (European Energy Certificate System)

How EECS enables cross-border transfer

Bram van der Heijde
AIB Gas Scheme Group Chair

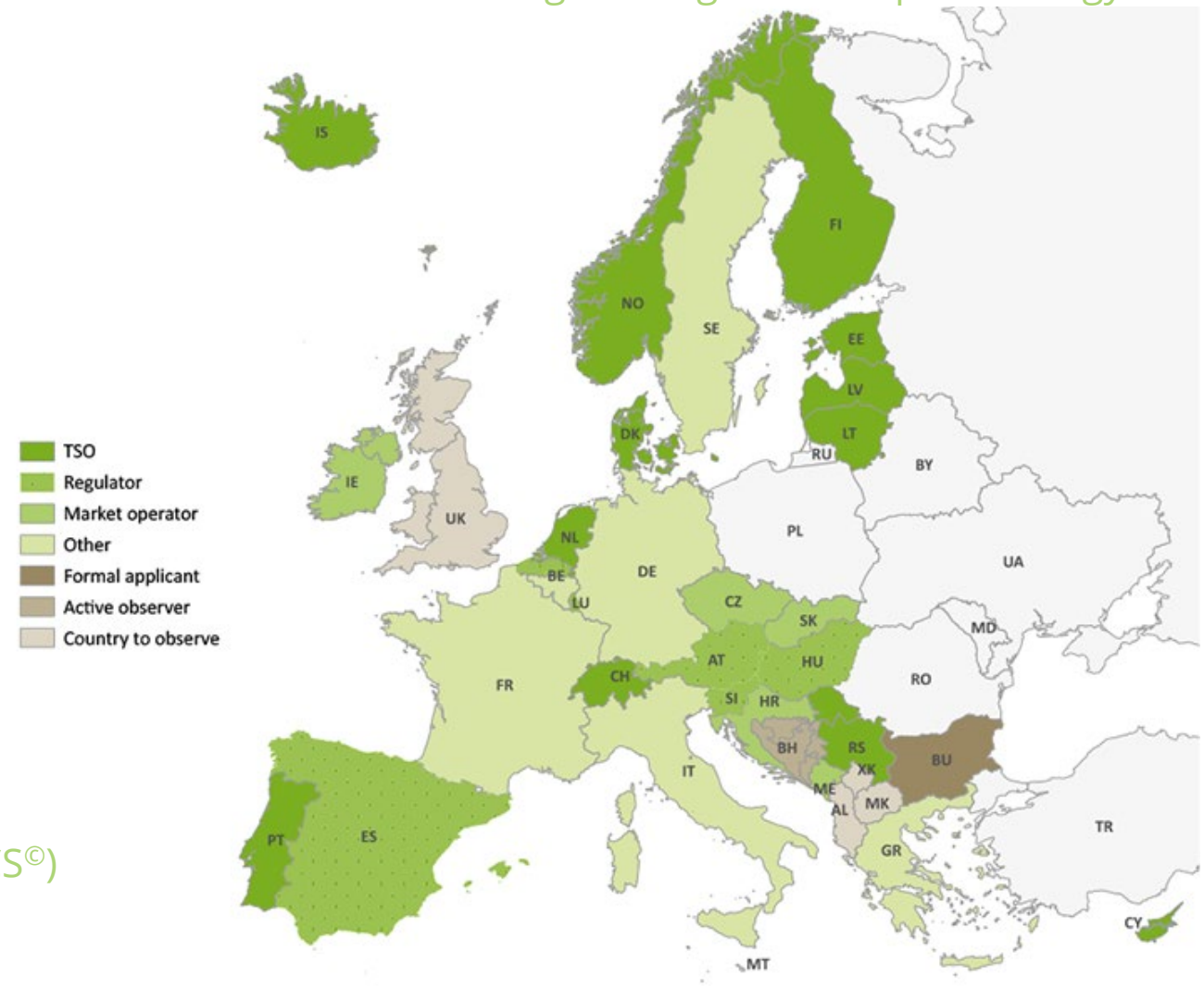
REGATRACE Final Conference – Brussels, 16 November 2022

AIB

The Association of Issuing Bodies - Facts

- → AIB: non-profit association founded in 2002
- → Now 28 countries connected (34 members)
- → Geographical scope: EU - EFTA – Energy Community
- → Issuing Bodies have diverse roles: regulator, market operator, TSO, ministry, power exchange etc.
- → 31 AIB's current members are issuing bodies for electricity GOs
- → About half AIB's members are also competent bodies for the supervision of electricity disclosure
- → 16 AIB members assigned by their government for issuing GOs for gases – more to follow
  - Austria (E-Control), Belgium Brussels (Brugel), Belgium Flanders (VREG), Belgium Wallonia (SPW), Czech Republic (OTE), Energinet (Denmark), Estonia (Elering), Finland (Gasgrid Finland), Greece (Dapeep), Italy (GSE), Latvia (Conexus Baltic Grid), Lithuania (Amber Grid), Portugal (REN), Slovenia (AGEN-RS), Spain (Enagas GTS), Switzerland (Pronovo)

AIB Mission: Guaranteeing the origin of European Energy



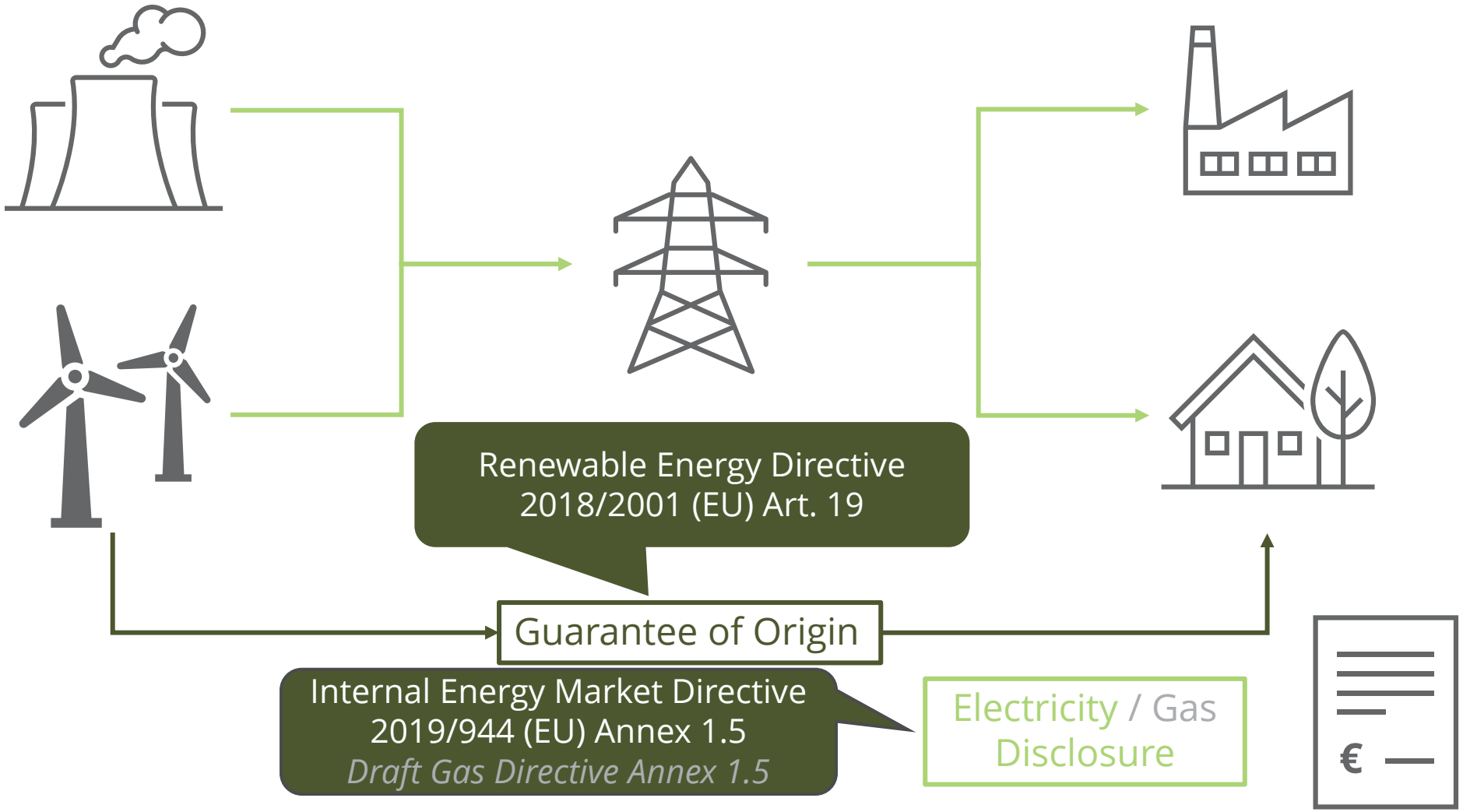
Pillars of the European Energy Certificate System (EECS©)

I. **EECS Rules**: engaging into quality and harmonisation
II. **IT hub**: enables GO transfer between national/regional Domain registries
III. Peer reviews and **audits**

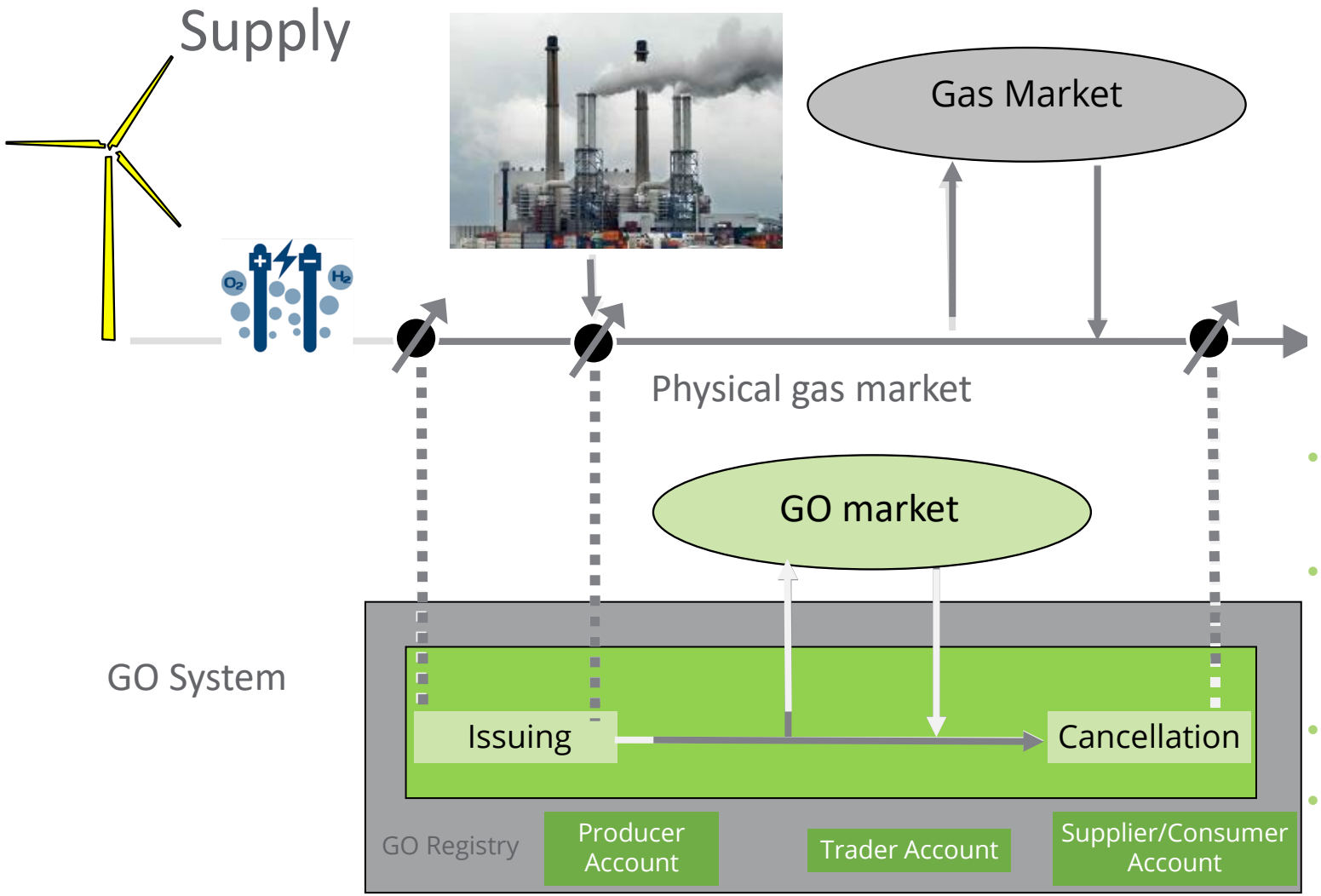
www.aib-net.org

European Legislation

Guarantees of Origin



Book and Claim Certificate System



- Enables consumer choice
- Promotes market efficiency and simplicity
- Protects liquidity
- Supports the internal market

The AIB HUB

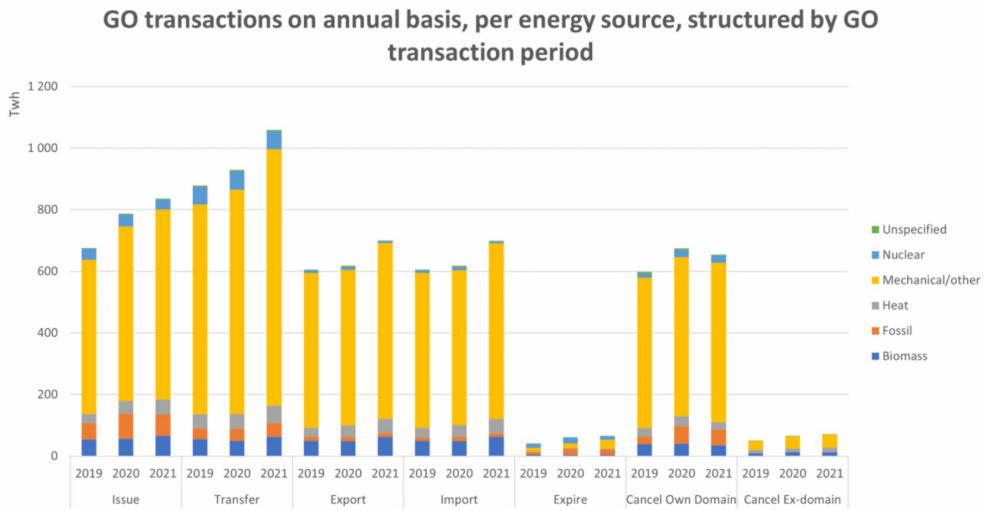
Framework

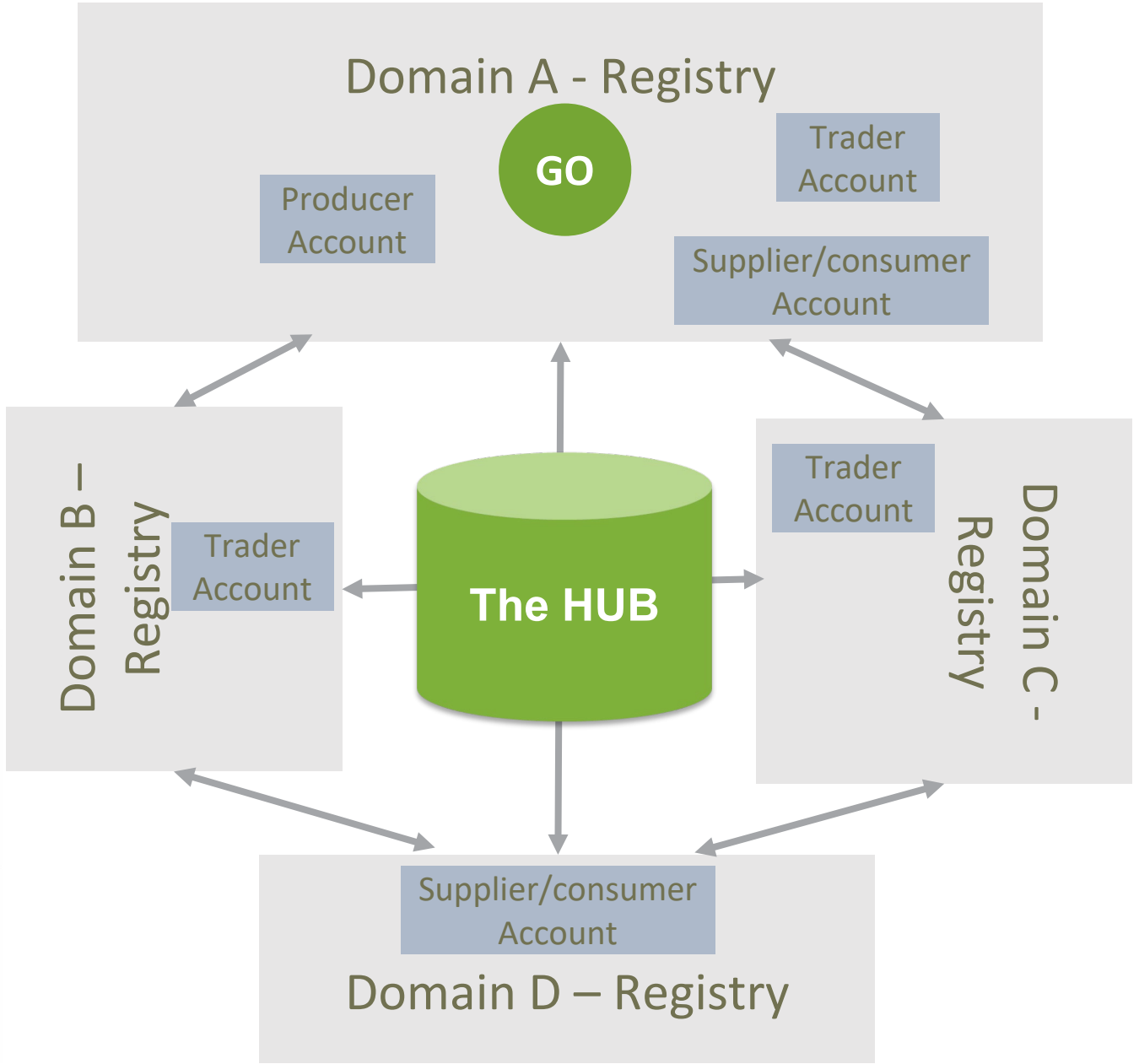
→ **International transfers of electronic documents**

- 2021: 700 million GOs cross border transfer
- 27 Domains

→ **How**

- Standardised
- Automated
- Jointly operated



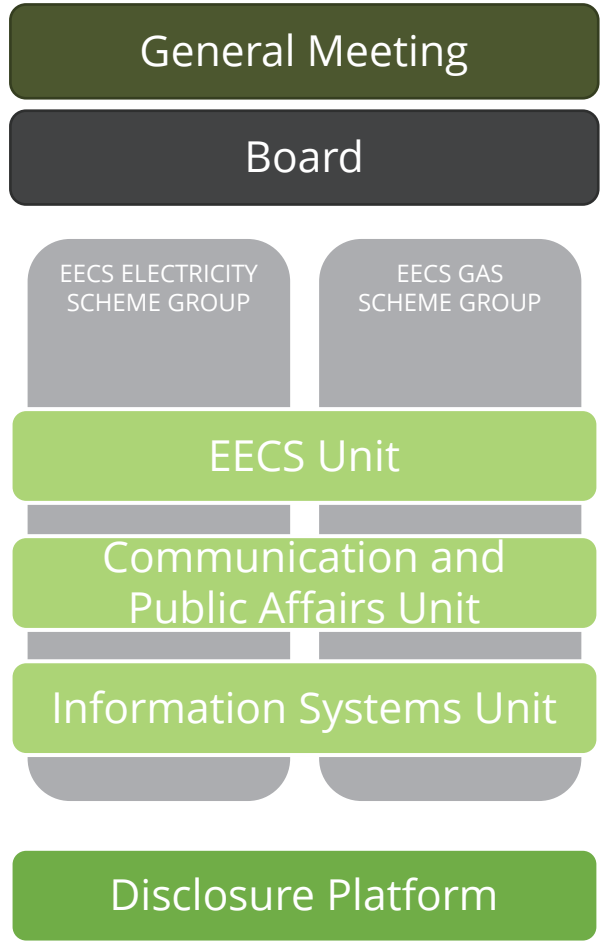


AIB organised to facilitate multi-energy

1. AIB Hub facilitates cross-registry transfer of gas certificates from 2023.
2. EECS Energy Carrier Conversion Rules
   - → Since September 2019
   - → Gas issuing bodies will be enabled to import electricity GOs, Electricity issuing bodies (31) will be enabled to import gas GOs. Issuing EECS Gas GOs requires membership to EECS Gas Scheme Group.
3. Separate decision making for Electricity and Gas specifics
   - → Since February 2020

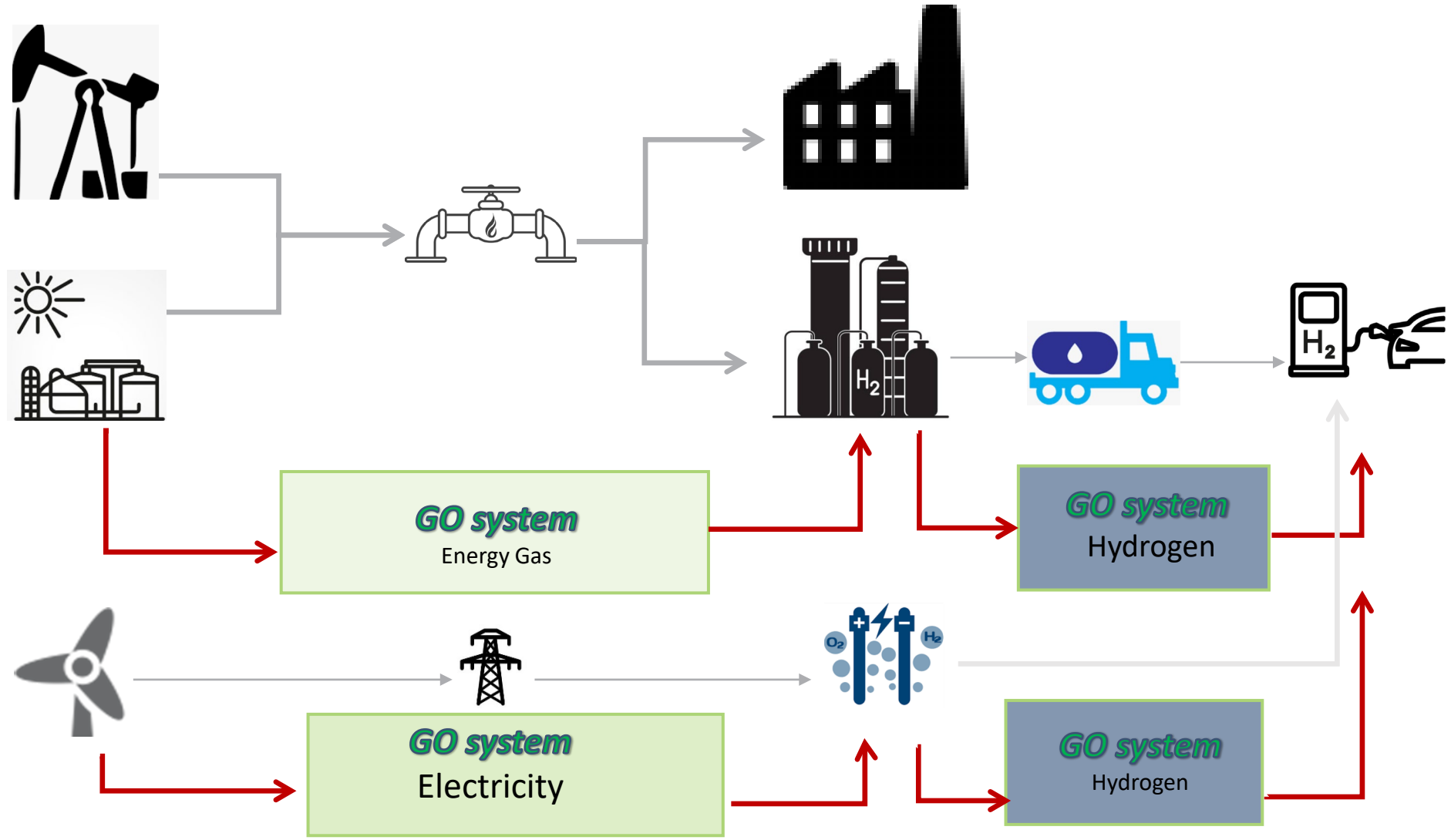
   i. Electricity Scheme Group
      - Electricity Scheme = section N of the EECS Rules
      - Voting members

   ii. Gas Scheme Group
      - Existing members
      - Observer - Scheme co-developer status
      - Forum for discussion and resolution of challenges
      - EECS Gas Scheme: Chapter O of the EECS Rules (since nov 2019)



Why a generic GO system for all energy carriers?

GO Conversion Issuance

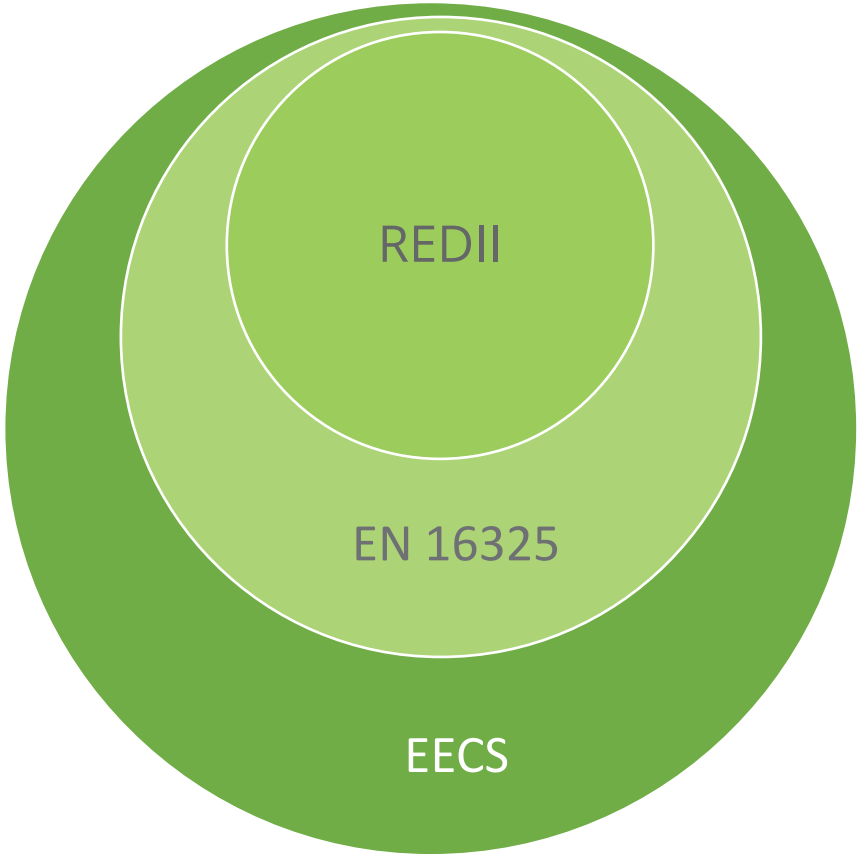


Framework for cross border harmonisation of guarantees of origin

1. GOs are for disclosure – legislation - REDII

2. Reliable GO system – mandatory standard – EN16325

3. Efficient and reliable GO system - voluntary standard -EECS



Note: EECS covers also other products than guarantees of origin

The European Energy Certificate System (EECS)

Framework

EECS Rules

- Certificate Administration
  - ✓Core principles – objectives & aspirations
  - ✓Plant registration
  - ✓Certificate issue, transfer and cancellation
- EECS participation rules
  - ✓Membership, admission, compliance, disputes & change
- Scheme specific rules
  - ✓E.g., electricity, gas …

Mirrored in EN16325, based on EECS

Detail

"subsidiary documents"

- Decision-making – disputes, voting etc
- Registry system & networking standards
- Approval of agents
- Change management
- Assignment of codes
- Audit & periodic reviews

Dynamic information

"fact sheets"

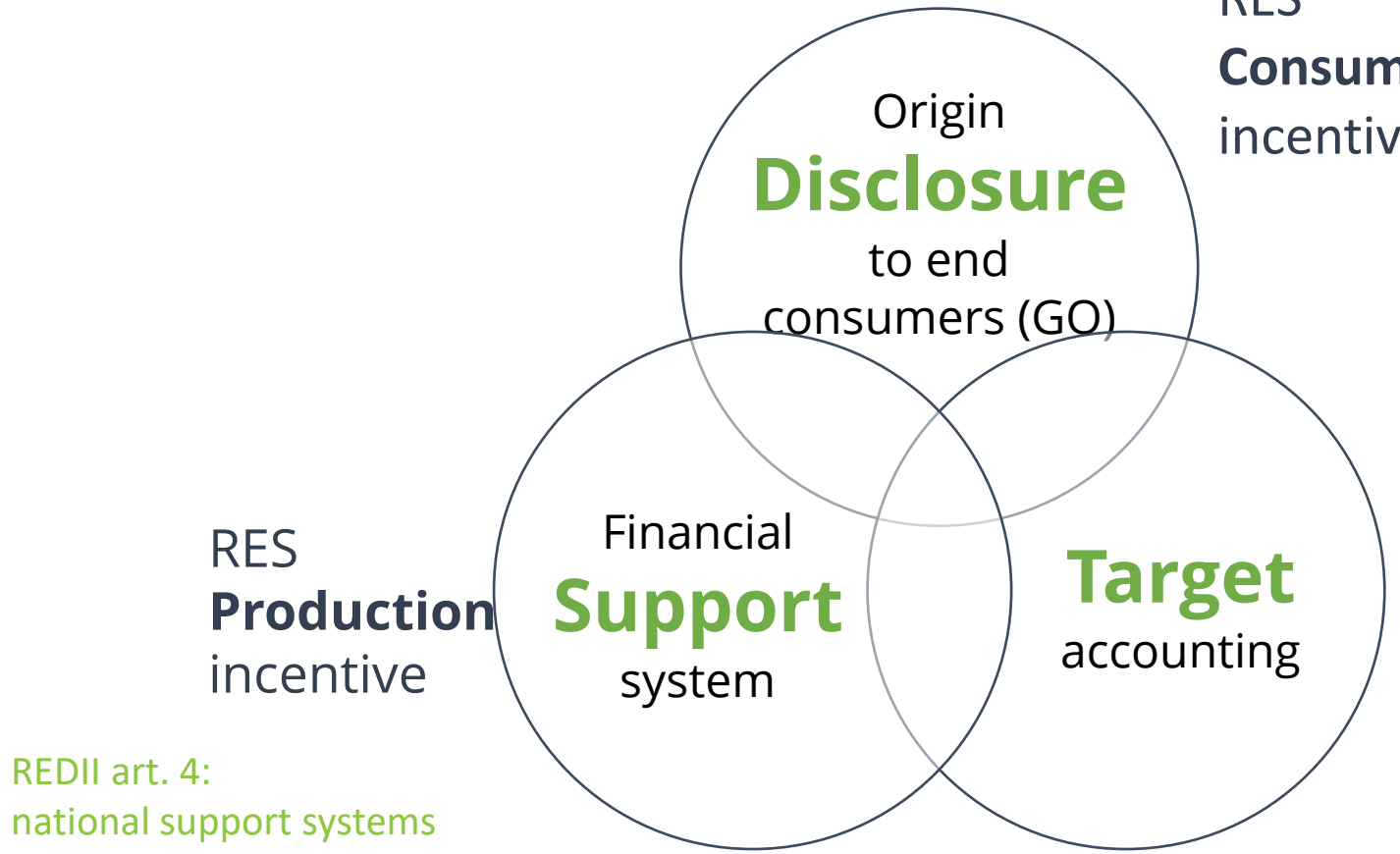
- Addresses, membership details, codes, guidelines …

Domain protocols

- Description of regulations in a specific country

3 regulated systems – 3 purposes

EECS certificate structure enables certifying multiple purposes



REDII art. 19

RES
Consumption
incentive

RES
Production
incentive

REDII art. 4:
national support systems

Production
target based on
overall
consumption
figures

REDII art. 3
REDII art. 25

Certificate system design options

Facilitated by EECS

Single multipurpose certificate?

applicable for Support, Disclosure and Target counting

- Consistency,
- Simpler and
- Cheaper to operate
- Challenge: record additional information
  - Requirements for EU-ETS ?
  - Mass Balancing concept: how is it to be understood?

OR

One certificate for each purpose?

Support | Disclosure| Target counting

- Flexibility
- Duplication of registration work
- Risk of Double Disclosure of the renewable origin to an end consumer (Double Perception)

Thank you for your attention!

You are welcome to become a member of the AIB and we look forward to a pleasant cooperation.

Let’s together continue to strengthen energy tracking!

www.aib-net.org

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Brussels, 16.11.2022

A view from the hydrogen world

Matthieu Boisson

Project Coordinator,

CertifHy

The development of H2 certification for disclosure and target compliance

- CertifHy: a view from the hydrogen world -

Matthieu BOISSON

REGATRACE Conference 16/11/2022, Brussels

An initiative funded by the Clean Hydrogen Partnership

Co-funded by the European Union

Clean Hydrogen Partnership

Multiple purposes for H_2 certification. Each purpose comes with specific certification requirements, governance and recognition procedures

Today …

Voluntary Market

Hydrogen consumers need a solution to make informed decision with regards to their H2 procurement, for CSR and GHG corporate reporting purposes.

Hydrogen producers **need a certification system to disclose environmental information to their customers**.

H_2 Guarantees of Origin

RED2 art. 19

Regulatory market

The European Commission has set binding targets and specific criteria for the development of the renewable hydrogen market.

Fuel suppliers and industrial players **need a certification system to show compliance with the EU target and criteria.**

RFNBO certification

RED2 art. 25 - 30

… and tomorrow?

Other use cases?

Hydrogen certification could become the preferred tool for H2 consumers to claim CO_2 emissions reductions and **mitigate the CO_2 price rise in Europe.**

To be determined

CertifHy has been working on H_2 certification with industry since 2014. From Guarantees of Origin (GOs) … to RFNBO (e-fuel) certification.

2014 | 2016 | 2017 | 2018/9 | 2020s..

Phase 1

1. Define a **widely acceptable definition of green hydrogen**
2. Determine **how to design and implement** a robust **EU wide GO scheme**

Affiliated partners:

TOTAL, MACHIELS, AkzoNobel, colruyt, Shell, AIR PRODUCTS, AREVA H_2Gen, BMW, EDF, AIR LIQUIDE, THE LINDE GROUP, HYDROGENICS, uniper, OMV

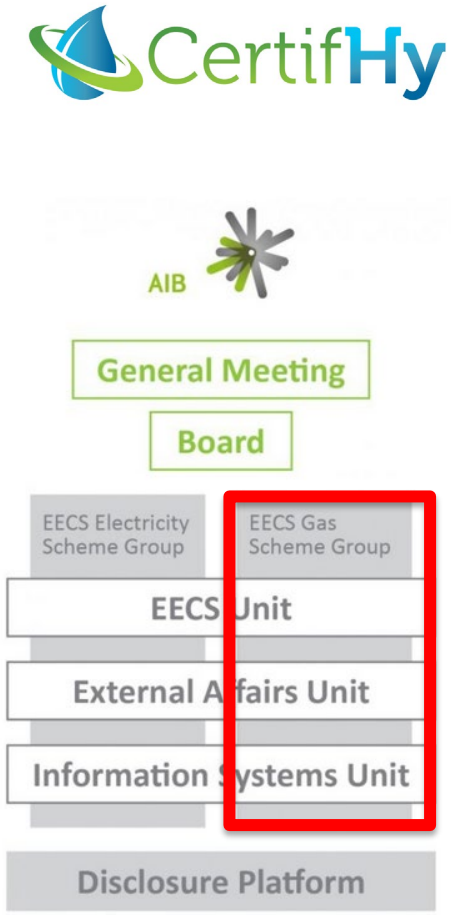
Phase 2

1. Set-up a **hydrogen GO Stakeholder platform**
2. **Finalise the scheme design** ensuring it can be the **main route to guarantee the origin of green & low carbon hydrogen across EU Member States**
3. **Run a pilot scheme** to test the proposed design
4. **Identify actions** which need to be undertaken after the completion of the study **to achieve an EU wide deployment of the scheme**

Phase 3

1. **Prepare EU wide deployment:**
   Implement Scheme:
   - Gas Scheme Group of AIB
   - Voluntary Issuing Body
   - Expand Stakeholder Forum with WG on Issuing Bodies
2. **Expand from GOs towards RFNBO certification**

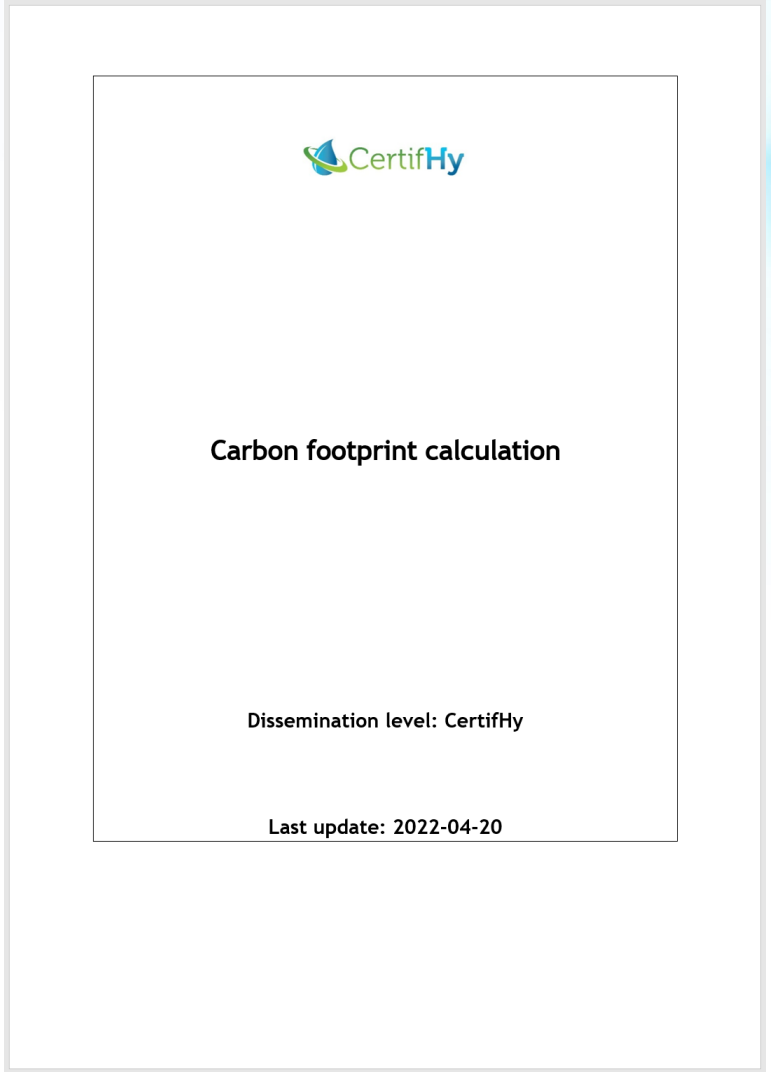
The joint work with AIB Gas Scheme Group will facilitate the development of H2 GO schemes by EU Member States



- Helping Competent Authorities and Issuing Bodies on the design of national H2 GO scheme
  - **Update of AIB EECS Rules to accommodate for Hydrogen**
- Helping Issuing Bodies with the setup of their operational regime (rules, processes)
  - **Update of AIB Domain Protocol Template**
- Allowing market participants to buy & sell renewable and low carbon hydrogen when no national H2 GO scheme is available
  - **Alignment of the CertifHy GO scheme with AIB EECS rules**

CertifHy has been working for years on a main gap that exists in the GO framework: a (well-to-gate) partial GHG calculation methodology

- A living document providing directly applicable and simple footprint calculation methods
- Provides calculation instructions for straightforward generic cases, as well as for the specific situations covered by case studies for which consensus was achieved within CertifHy.
- Current version has been approved by WG2, and checked for consistency with the revised Scheme Documentation (proposed for endorsement) by WG1 and WG2 coordinators, together with WG1 chair.



Vertogas, appointed as H_2 GO Issuing Body in the Netherlands, adopted the CertifHy Scheme for green & low carbon H_2 (renewability & GHG footprint methodology)

It is important that European GOs have a harmonized way of calculating the GHG footprint of H2, which is a key prerogative for customer trust: the same production techniques/pathway should yield the same "hydrogen passport"

Roelf Tiktak, Managing Director Vertogas

From 2022, Vertogas in the Netherlands will be responsible for issuing GoOs for green hydrogen. For example, all energy carriers receive a kind of "energy passport".

It has been 20 years since Groen Certificate Management (now CertiQ) issued its first green certificate. The green certificate system has since been replaced by the Guarantees of Origin (GoO) system. A GoO is the undisputed link to guarantee the sustainable origin of the energy carrier in question. Vertogas (a subsidiary of Gasunie) was established in 2009 to certify renewable gas. Vertogas has received a legal mandate from the Ministry of Economic Affairs and Climate to also issue GoOs for green hydrogen.

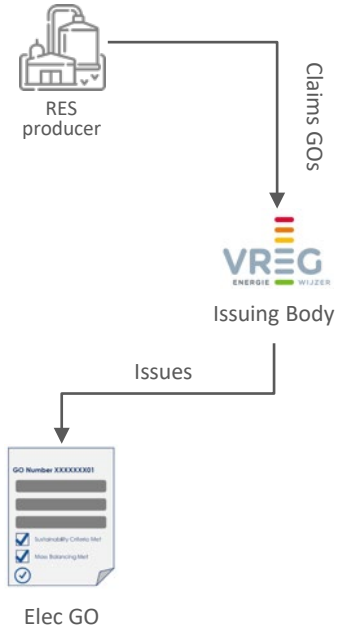
To expand the market for CO_2 Free facilitate hydrogen, is a comprehensive system of guarantees of origin (GoO) and certification required and must be made to definitions agreed. Under the Renewable Energy Directive (RED-II), the development of a GoO system is mandatory and the RED II provides a framework for this. In the FCH project CertifHy , the European rules and measurement methodology are determined. As a CertifHy member, Vertogas is involved in setting up the hydrogen certification scheme and will develop a framework for the Dutch hydrogen GoOs.

Source: Vertogas

https://allesoverwaterstof.nl/certificaat-garanties-van-oorsprong-groene-waterstof/

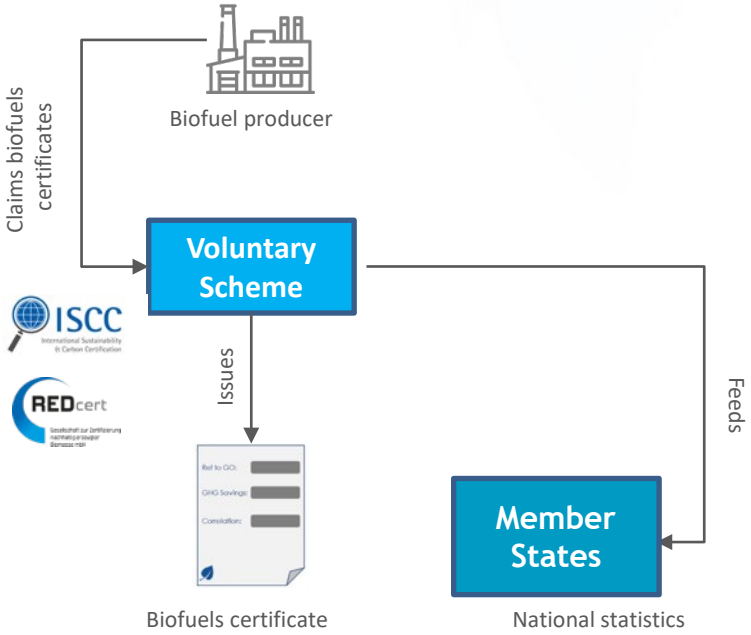
Whereas historically, renewable electricity GOs (voluntary market) and biofuel certification (compliance markets) operated in silo's …

Guarantees of origin for electricity



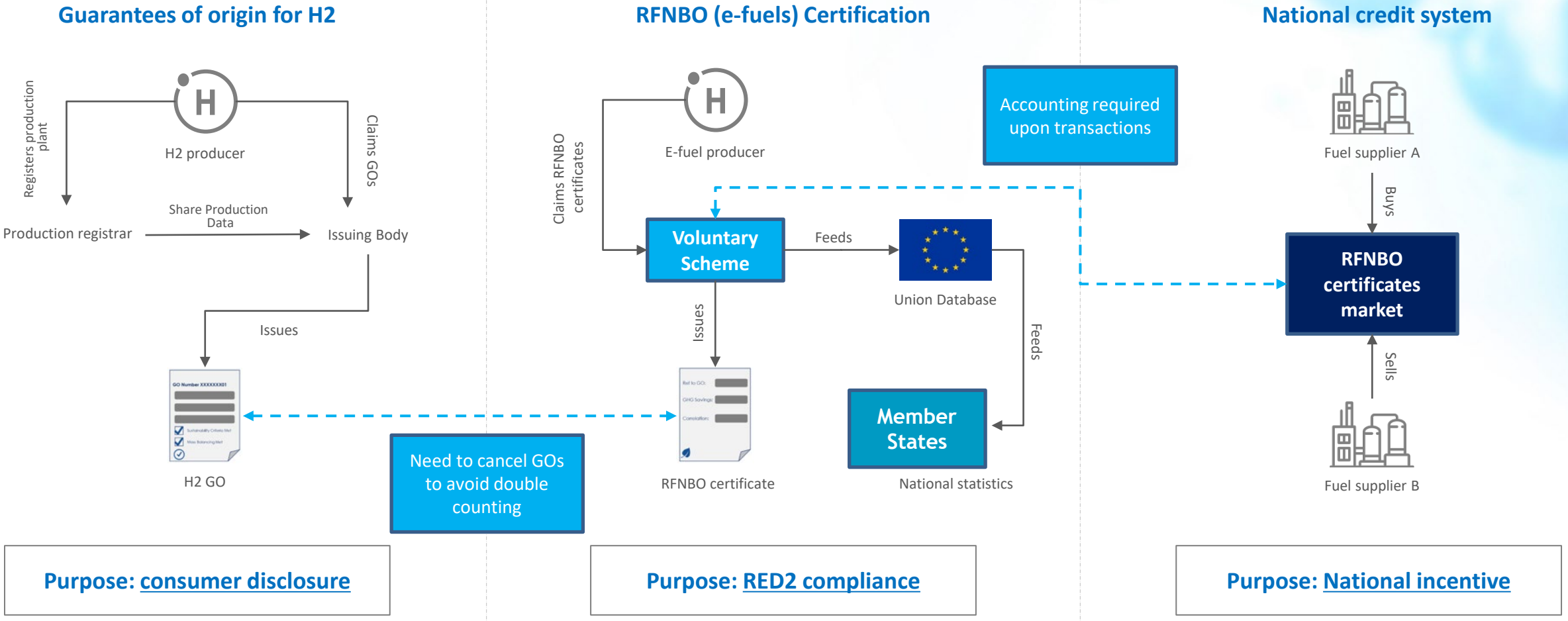
Purpose: consumer disclosure

Biofuels Certification

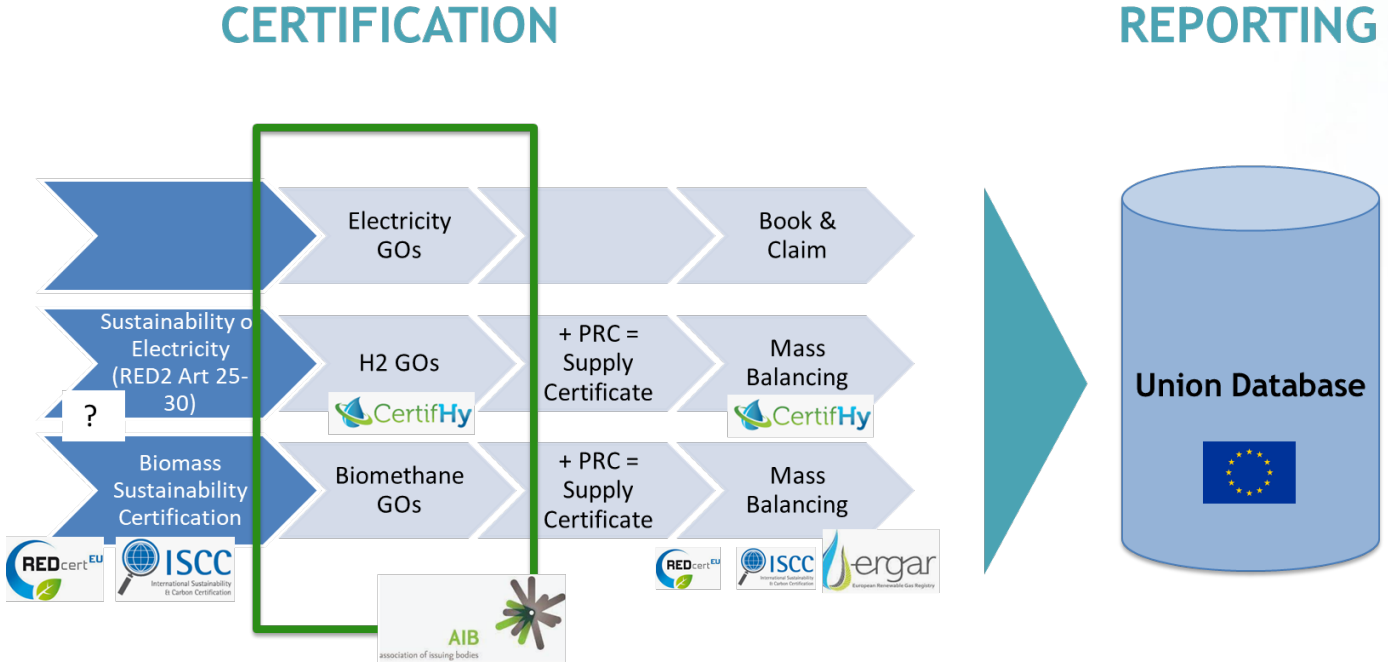


Purpose: RED compliance

… e-fuels in general and RFNBOs in particular, necessitate GO Issuing Bodies and EC approved RFNBO schemes to become (sector) coupled in order to avoid double claims



CertifHy 3 has developed an architecture fit for the complexity of hydrogen certification



CertifHy proposes a certification architecture where sectoral experts (EU Voluntary Schemes) facilitate reporting in the Union Database

- The Energy Attribute Tracking System (EATS) architecture designed by CertifHy 3 allows for the **combination of book & claim (GOs) and mass balance (RFNBOs)**
- **Guarantees of Origin should participate to the improvement of RFNBO certification** by providing further evidence to Voluntary Schemes
- **Maximum flexibility should be provided to economic operators** by keeping GOs « alive » until the consumption of the H2 molecule

Thank you for your attention!

For questions:

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www.certifhy.com

An initiative funded by the Clean Hydrogen Partnership

Co-funded by the European Union

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State of the art of systems for documenting cross-border biomethane transfer

Q&A session

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Developments for documenting cross-border transfer of renewable gas

- **Matthias Edel**, Secretary General, ERGaR
- **Katrien Verwimp**, Programme Manager Energy Sector Integration, AIB
- **Zuzana Vrbova**, Strategist - Energy & Carbon Markets, ACT Commodities
- **Tatiana Demeusy**, Senior Green Gas Manager, Bmp greengas/EnBW
- **Victor Bernabeu**, Director, Eurogas

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Introductory speech

Matthias Edel

Secretary General,

ERGaR

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Making registries of Guarantees of Origin fit for all renewable gases

REGATRACE Final Conference 16/11/2022

Matthias Edel – European Renewable Gas Registry (ERGaR)

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Key elements of the European regulatory framework

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Energy source of gas product

- **Biogas / Biomethane**
- **Renewable Fuels of Non-Biological Origin (RFNBO)**
- **Recycled Carbon Fuels (RCF)**

Requirements for demonstrating compliance with

- **Sustainability**
  Sustainability criteria
  GHG emission saving thresholds
- **Renewable energy content**
  Additionality of energy
  Temporal correlation
  Geographic correlation
- **Mass balancing**

Requirements and options for verification and documentation

- **Certificates**
  Proof of Sustainability (PoS)
  Guarantee of Origin (GO)
- **Entities for documentation**
  Issuing bodies
  Mass balancing systems
  Union Database
- **Voluntary and National Schemes**
- **European Schemes for cross-border transfers**
  AIB
  CertifHy
  ERGaR

Purpose of gas certification

- **RED II targets** (union, transport, heating)
- **Disclosure renewable & low carbon energy carriers**
- **EU-ETS** (zero CO2-emissions for biomass)
- **Fuel Quality Directive**
- **Taxonomy Regulation sustainable finance**
- **Gas Directive**
- **Others** (e.g. national support schemes, labelling)

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European Systems

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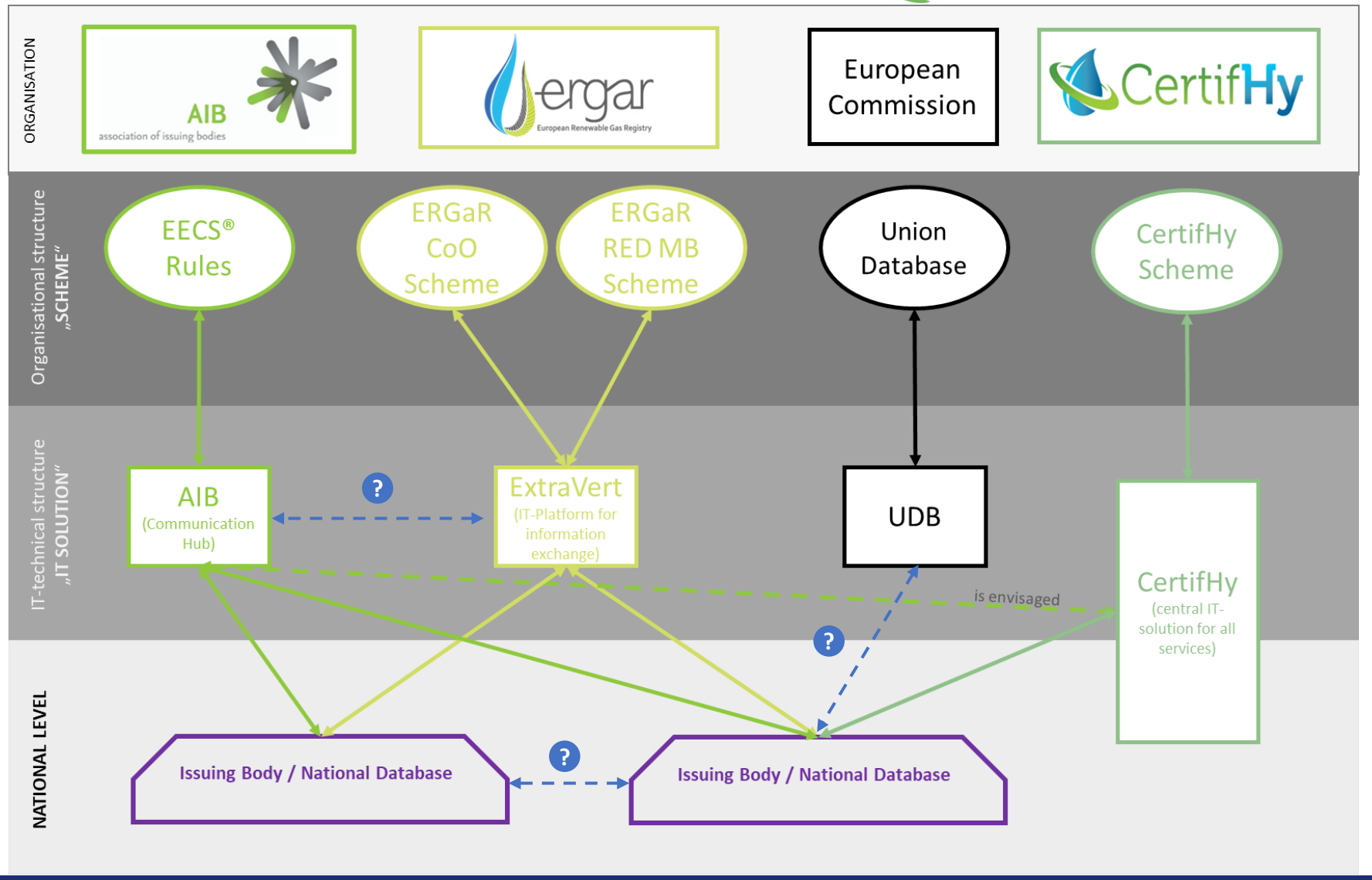
1. **More than one national organization** for the issuance /documentation of renewable gases (hydrogen,biomethane, GO, other certificates and purposes, etc.)
2. **Linking/integrating AIB and ERGaR Schemes**
3. **Linking GOs and PoS** in the context of the **Union Database**



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Linking GOs and PoS

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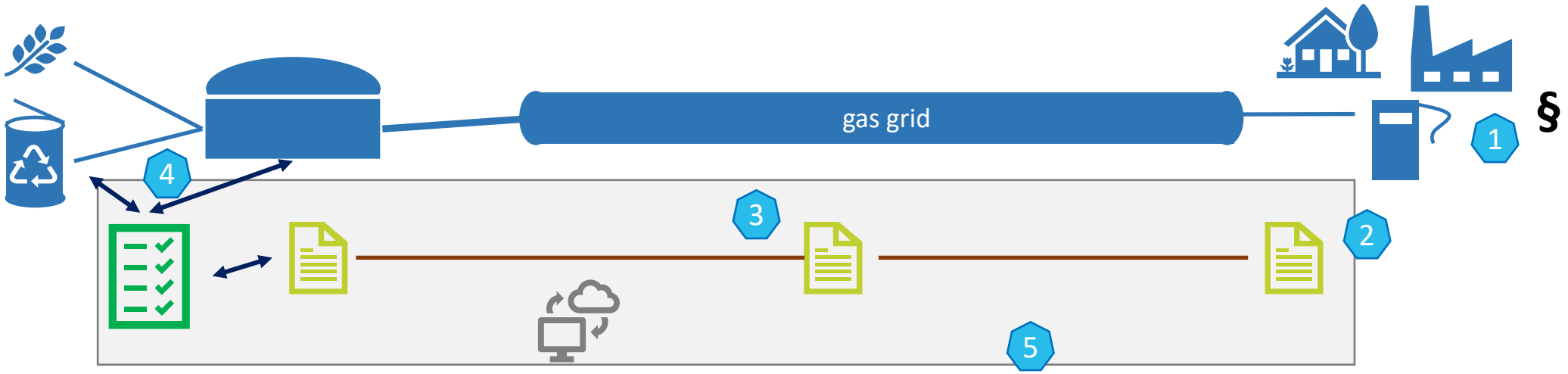

	Elements	Disclosure (GO)	Target Compliance (PoS)
1	Purpose	Disclosure to final customer (art. 19 RED II)	Target compliance (art. 25-31 RED II)
2	Certificate	Guarantee of Origin (GO)	Proof of Sustainability
3	Tracing principle	Book & claim	Mass balancing
4	Verification rules	CEN standard 16325	Recognised Voluntary Schemes
5	Databases	Issuing bodies	National registries, Union Database

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Linking/integrating AIB and ERGaR

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- **On the short-run**: allow individual IT-options (bilateral agreements between Issuing Bodies) to serve upcoming requests for exchanging gas GOs with other Issuing Bodies
- **In the longer term:** consider a phased implementation of a central-IT solution for renewable gas exchanges and make the appropriate legislative reform. Keep national IT systems for fulfilling national requirements and non-governmental certificates.

Assessed IT-options

- Exchange of certificates between Issuing Bodies ("Bilateral Agreements")
- Issuing Bodies are connected to both European Schemes ("Interfaces to 2 Schemes")
- Interface between the IT-solutions of both European Schemes ("AIB-ERGaR interface")
- Integration of Schemes ("Integration of Schemes")
  - Integration of ERGaR Schemes into EECS Schemes
  - Integration of EECS Gas Scheme into ERGaR CoO Scheme

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Linking/integrating AIB and ERGaR

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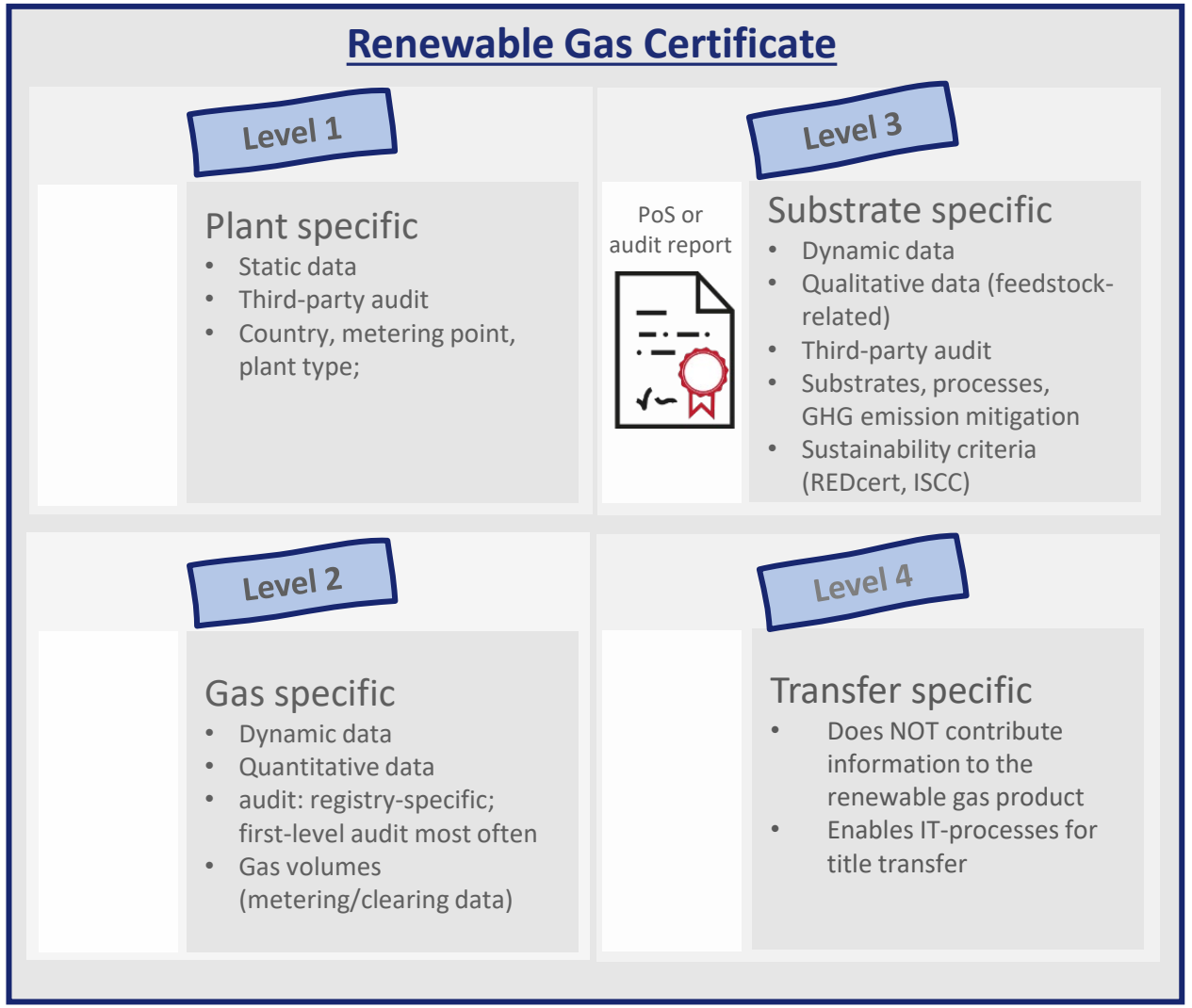
- Establish a **single transfer protocol** with generic data formatting and common data field specifications for all certificate/GO transfers, as well as a joint quality assurance framework:
  - Harmonised business processes for the exchange of GOs/other certificates
  - Definition of format, content and structure of exchanged data



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Linking GOs and PoS / Union Database

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- To avoid double counting of the same renewable attributes, linking of GOs (Issuing Bodies) and PoS (Union Database) is crucial.
- Single transfer protocol: Synchronisation of the management of the various systems, especially issuance timelines of GOs and PoS, net and gross energy content.
- The set-up of the interface with each database should provide enough flexibility to reflect the individual situation in each Member State with regards to transfer volumes.

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Thank you for your attention!

Matthias Edel

European Renewable Gas Registry (ERGaR)

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Introductory speech

Katrien Verwimp

Programme Manager Energy Sector Integration, AIB

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Integrating Guarantees of Origin for multiple energy carriers

REGATRACE Final Conference 16/11/2022

Katrien Verwimp - Association of Issuing Bodies

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Why coordinate certificate schemes of different energy carriers?

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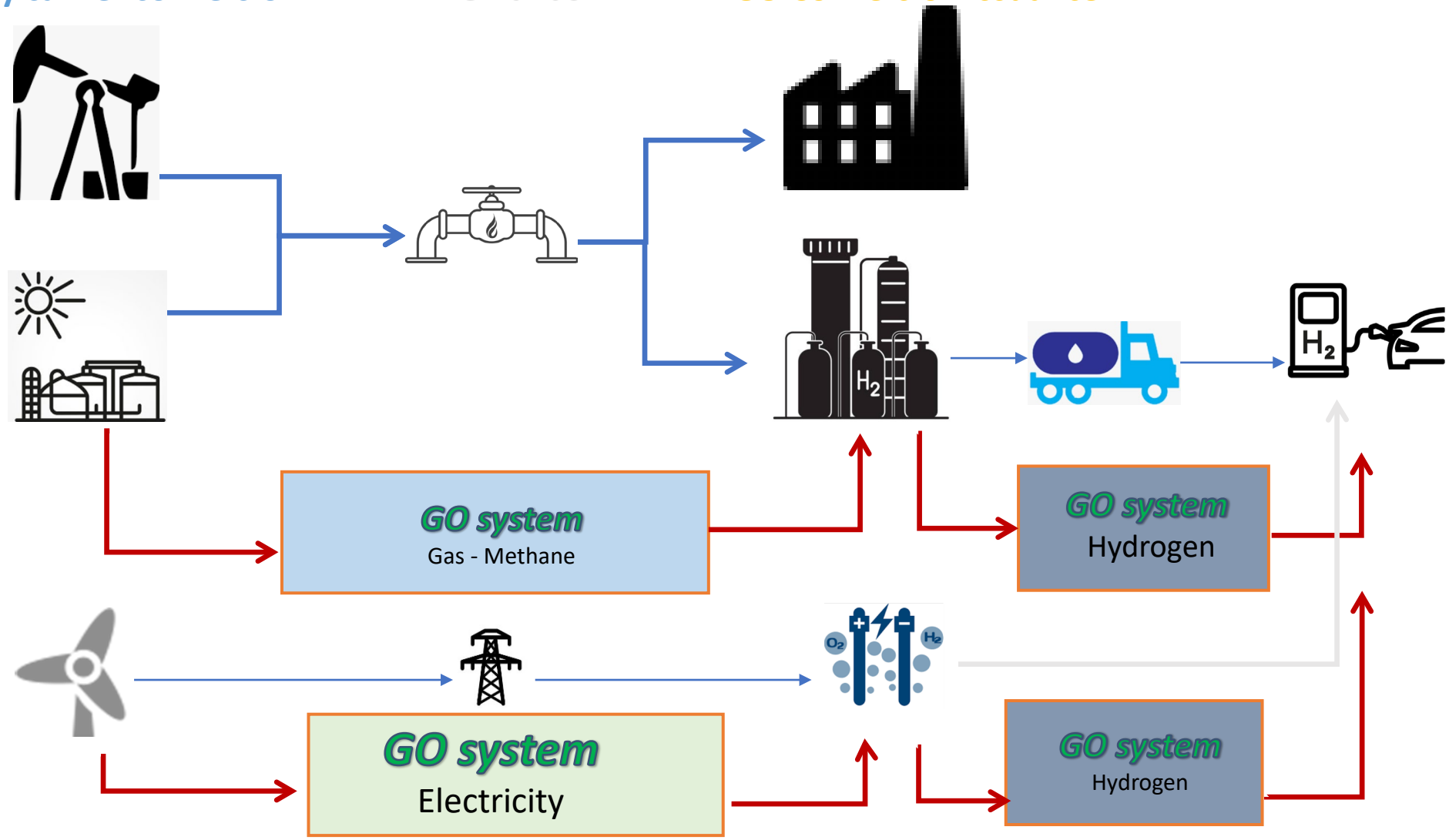

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Recommended rules

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For certificate handling in relation with conversion

- Conversion Issuance Rules
  - Cancel GOs for (measured) input energy carrier
  - Issue new GOs for measured output energy carrier
  - GO conversion Issuance is subject to physical conversion
  - Convey Energy Source from input GOs proportionally to output GOs
  - Auditable track (Data in registry, Information on cancellation statement)
  - Data on output GOs (source, purpose, conversion tag, label, carbon footprint: from input GO, rest from conversion device)
- Recognition of input GOs
  - Publish national Domain Scheme rules
  - Import criteria for avoiding double counting
  - Liability allocation
- Cancellation check
  - Preferably Ex ante, Ex post only defendable with high fraud detection measures
  - Classify cancellation ‘for Conversion’ purpose

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Kick-off recommendations

Benefitting from evaluation while gaining experience in the market

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- New GO validity period after conversion
- Plausibility check of input-output flows
- Limitative description of data format of GOs
- Pre-conversion info on public support: balance complexity with information value

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GO Conversion Issuance Process

Identified challenges

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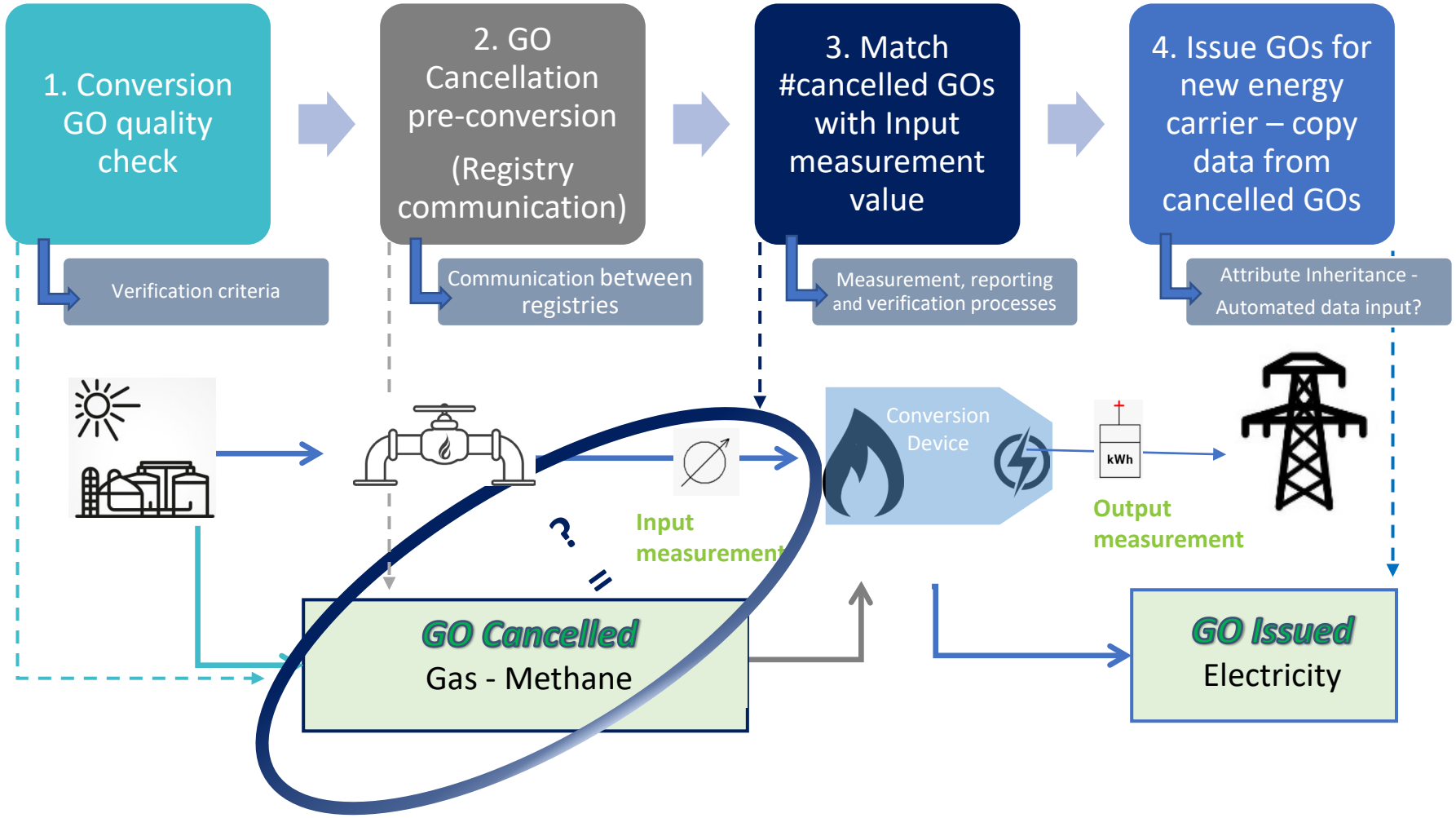

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Smoothening the Conversion Issuance Process

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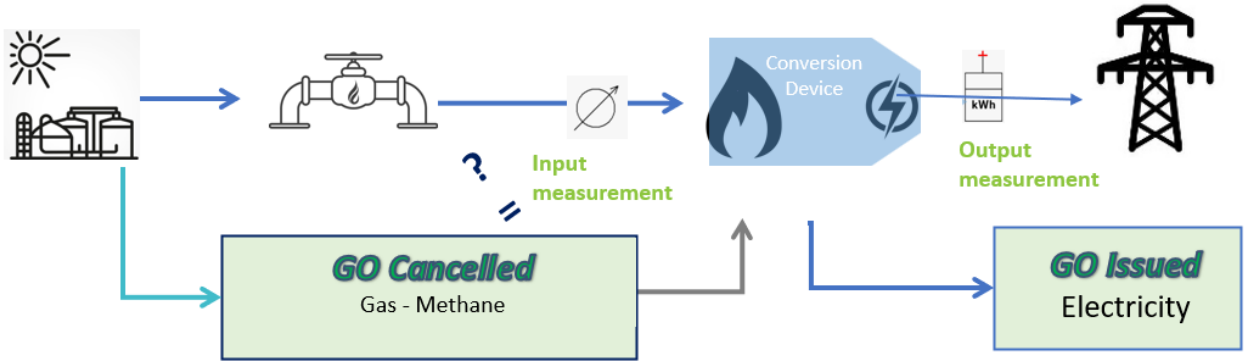
1. Determining the quantity of the Attributes of the Input for Conversion and matching Input to Output:
   - Measurement reporting goes to Conversion Issuance registry => here it can be determined how many GOs to cancel
   - Easier to automate if GO Cancellation (for Input) and Conversion Issuance (for Output) are in same registry



2. Proving the Input Attributes:
   - Cancelling GOs in the Conversion registry after Importing them

3. Attribute Inheritance on GOs after Conversion Issuance:
   - Balance simplicity with information relevance

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Determining Quantity of Input Attributes

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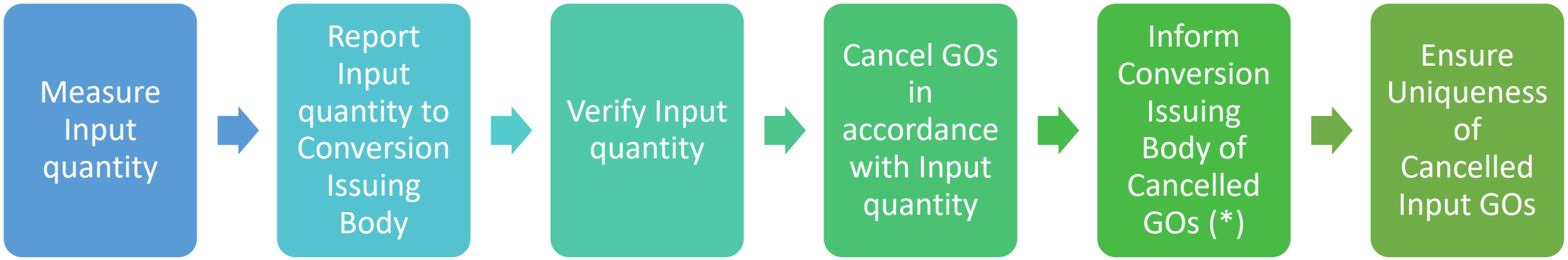

(*) Only a relevant step if the Conversion Issuing Body is another party then the Issuing Body who cancels the GOs

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Verifying Quality of Input Attributes

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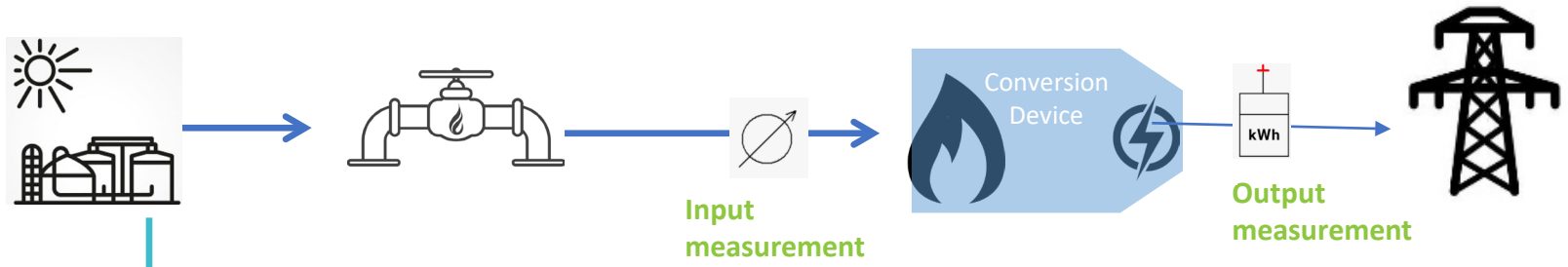

GO Cancelled
Gas - Methane

GO Issued
Electricity

Cancellation data

- Verification:
  - Conversion Device
  - Consumption period
  - 'For Conversion'
- Attributes
  - Energy Source
  - …

Attributes on Conversion GOs

- Confirmed by cancellation data:
  - Production Device = Conversion Device
  - Production period = Consumption Period
  - 'Cancellation For Conversion' -> Conversion Tag
- Inherited Attributes
  - Energy Source
  - …

Conversion GOs Issued = (cancelled GOs / Input measurement) x Output measurement

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Attribute Inheritance

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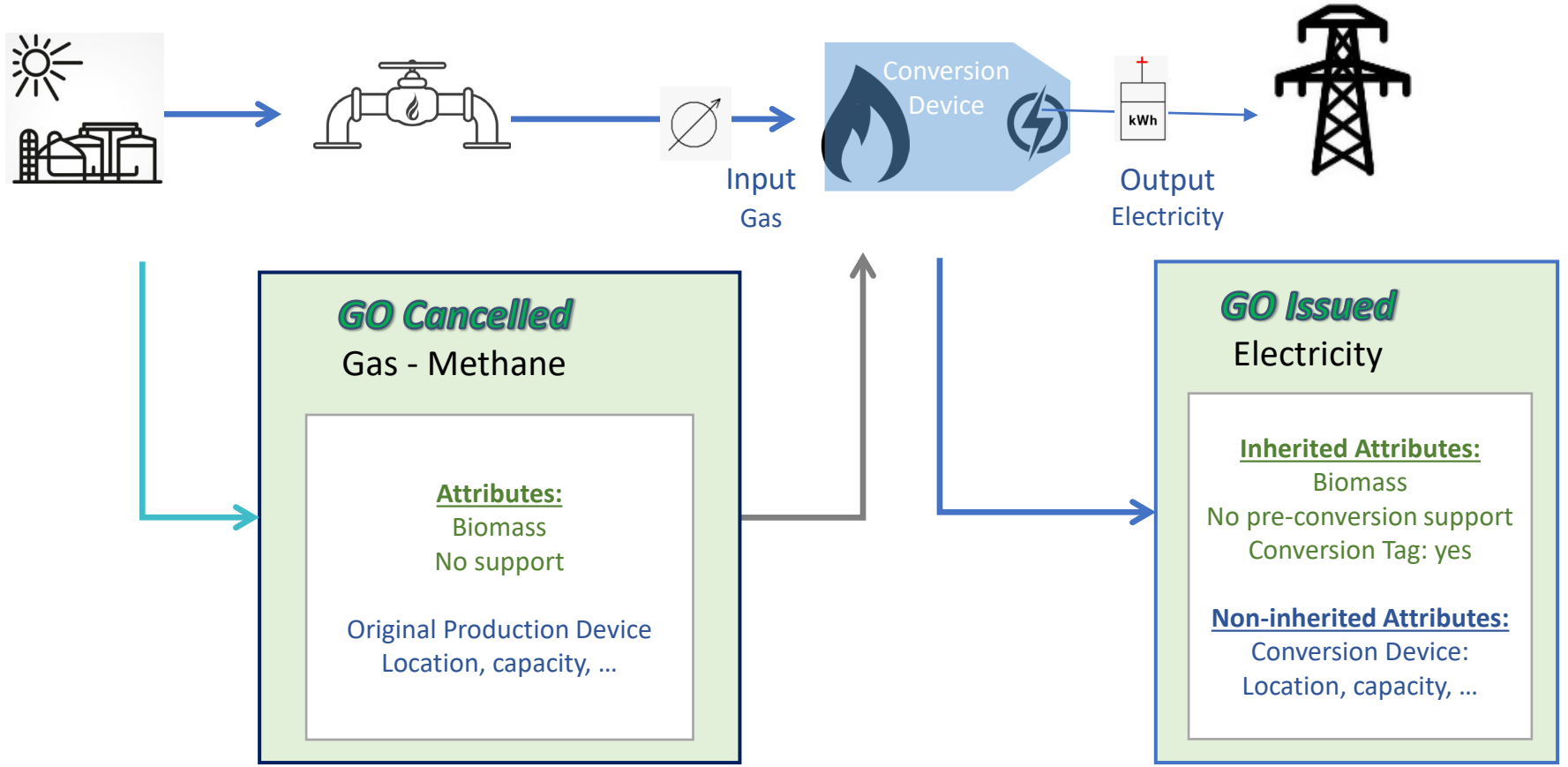
Balance simplicity with information relevance

- Technically easiest: only Energy Source is carried forward
- Cut-off residue Attributes at some point.

  Given proportional allocation of Input Attributes to the Output Attributes: challenging when a residue (<MWh) of Input Attributes goes to next production period
- Conversion Tag
- Keep complete information from cancelled GOs within the Conversion registry
  - This ensures verifiability but keeps the tradeable GO instrument lean and its data format standardised.
  - The issued certificate after Conversion could link to the cancellation information where more information can be obtained from the cancelled certificates



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Let's lay solid grounds for the future of energy certification

Thank you for your attention!

Katrien Verwimp

Association of Issuing Bodies

katrien@aib-net.org

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Panel discussion



- **Zuzana Vrbova**, Strategist - Energy & Carbon Markets, ACT Commodities
- **Tatiana Demeusy**, Senior Green Gas Manager, Bmp greengas/EnBW
- **Victor Bernabeu**, Director, Eurogas

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Developments for documenting cross-border transfer of renewable gas





- **Matthias Edel**, Secretary General, ERGaR
- **Katrien Verwimp**, Programme Manager Energy Sector Integration, AIB
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Lunch break

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Outcomes of the REGATRACE project

- **Stefan Majer**, Working group leader “Applied sustainability assessment”, DBFZ German Biomass Research Center gGmbH
- **Lorenzo Maggioni**, Head of R&D, Consorzio Italiano Biogas (CIB)
- **David Fernández Rubial**, New Business Drive Manager, Nedgia
- **Magdalena Rogulska**, Project manager, UPEBI
- **Lada Uskobová**, Senior Technologist, NovaEnergo
- **Stefano Proietti**, Project Coordinator of REGATRACE

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Guidelines on renewable gas sustainability certification

Stefan Majer

Working group leader “Applied sustainability assessment”,

DBFZ German Biomass Research Center

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Guidelines on renewable gas sustainability certification

Stefan Majer,

REGATRACE Final Conference,
16.11.2022

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Why care about sustainability certification?

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- **demand for** transparent **sustainability information increases** in all EU economy sectors

- relevant **requirements for renewable gas** for energy production are defined in the RED II framework
  - type of land (and site history) for biomass production
  - sustainable use of agricultural residues
  - GHG mitigation criteria

Which requirements do exist?

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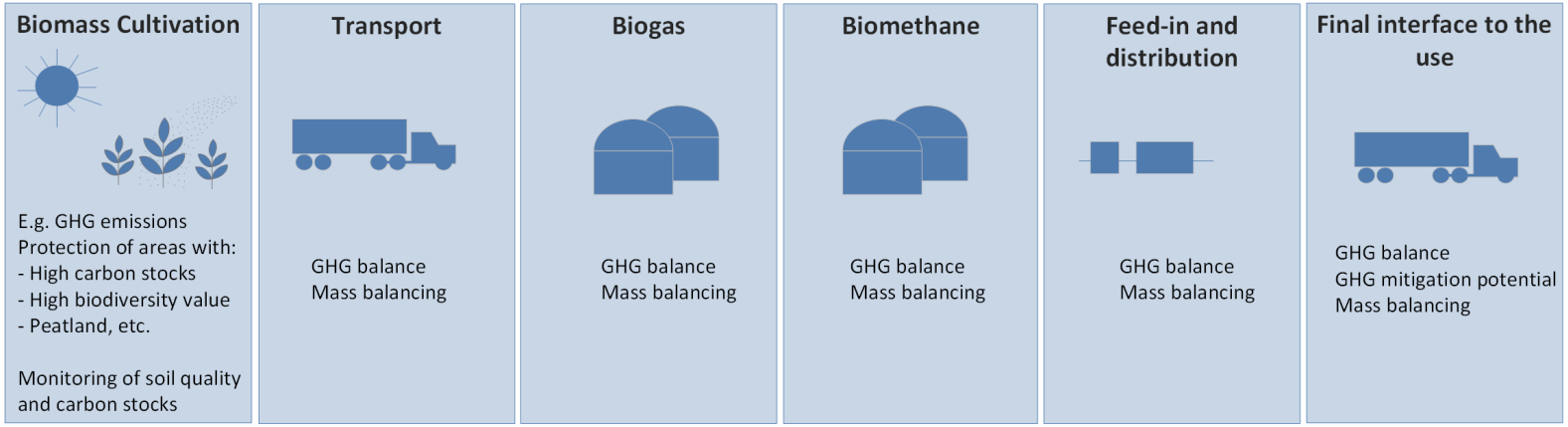
- specific requirements for the reduction of GHG emissions from the use of renewable gas for transport, heat and power

- **compliance** with GHG reduction criteria, land use change history and sustainability criteria for the use of agricultural biomass will be **verified by an independent third party certification**

Year of start of operations[1]	Necessary GHG reduction	
	Transport	Electricity, heating and cooling
≤ 05.10.2015	≥ 50%	
06.10.2015 – 31.12.2020	≥ 60%	
≥ 01.01.2021	≥ 65%	
01.01.2021 – 31.12.2025		≥ 70%
≥ 01.01.2026		≥ 80%

RED II GHG reduction requirements



Exemplary criteria and requirements along the supply chain

How to show compliance?

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Approaching the GHG criterion

Regatrace D5.3 includes an overview on:

- Existing calculators for GHG emission calculations / N_2O calc.
- databases and sources for relevant parameters and emission factors for the GHG calculation of biogas and biomethane
- project reports, studies and methodological documents relevant to the GHG balancing of biogas and biomethane

available here:

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D5.3. Guidelines on renewable gas certification

Biograce II	Based on COM(2010)112 and SWD(2014)259	Electricity, Heating, Cooling from solid and gaseous biomass	Yes	excel tool	Free
GHG calculator (German)	IPCC GWP 100	Feedstock provision, biogas production, CHP	Yes	Web application Focus on biogas production in Bavaria	Free
GHG calculator (German)	Based on RED II proposal COM(2016) 767 final	Biogas production, CHP combination of feedstocks from agricultural biomass, manure, waste, residues	Yes	excel tool	Free
Agricultural GHG calculator V 4.0	Based on RED I	Emissions from biomass cultivation		excel tool	Free
Global Nitrous Oxide Calculator (GNOC)	Based on IPCC Guidelines (Tier 2)	N_2O emissions from biomass cultivation	Yes	Web application	Free

REGATRACE D5.3

How to show compliance?

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Renewable Gas Trade Centre in Europe

Approaching the GHG criterion

Regatrace D5.3 includes an overview on:

- The general logic of the GHG calculation methodology for biogas/biomethane
- An exemplary calculation for a biogas/biomethane example

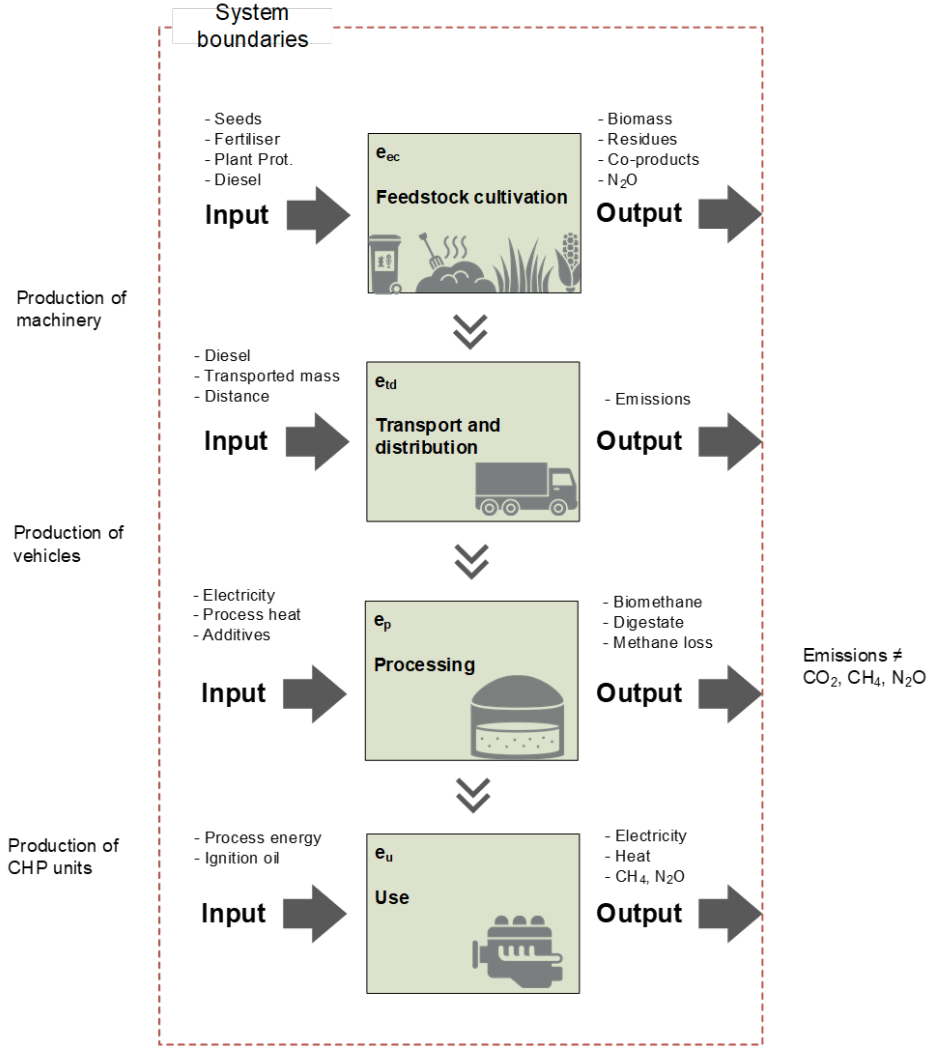
Table 11 main parameters biogas upgrading

Parameter	Value and unit	Emission factor	Emissions, in kg CO_2eq/ a
Electricity demand	448,468 kWh/a	0.47 kg CO_2eq/kWh	210,780
Methane slippage	734 kg/a	25 kg CO_2eq/kg	18,350
Sum			**229,130**

The calculation of emissions for both processing steps per functional unit of biomethane is conducted considering the specific biomethane yield:

$$e_{p2} = \frac{(364{,}234 + 229{,}130)\ \frac{kgCO_2eq}{yr}}{40{,}080{,}919\ \frac{MJ\ \ Biomethane}{yr}} \times 1000 = \mathbf{14.8}\ \frac{g\ CO_2eq}{MJBiomethane}$$

REGATRACE D5.3



REGATRACE D5.1

What are open questions and challenges?

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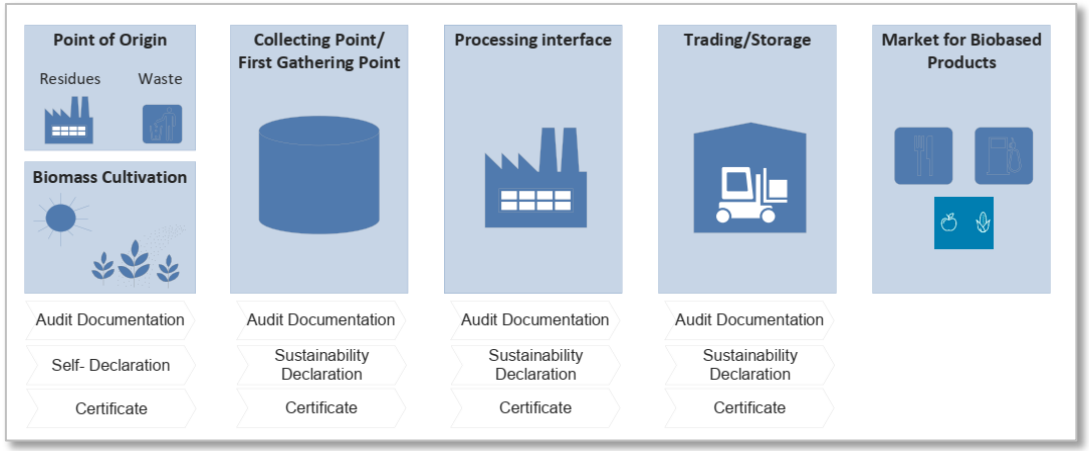
For Biogas/Biomethane:

- default values
- harmonisation of approaches
- simplifications (e.g. group certification)

Open questions related to other RG

- additionality criteria (and their practical implementation)
- compliance with GHG mitigation thresholds (e.g. emissions from rigid inputs, ex use & fate, etc.)
- traceability of sustainability information



REGATRACE D5.3

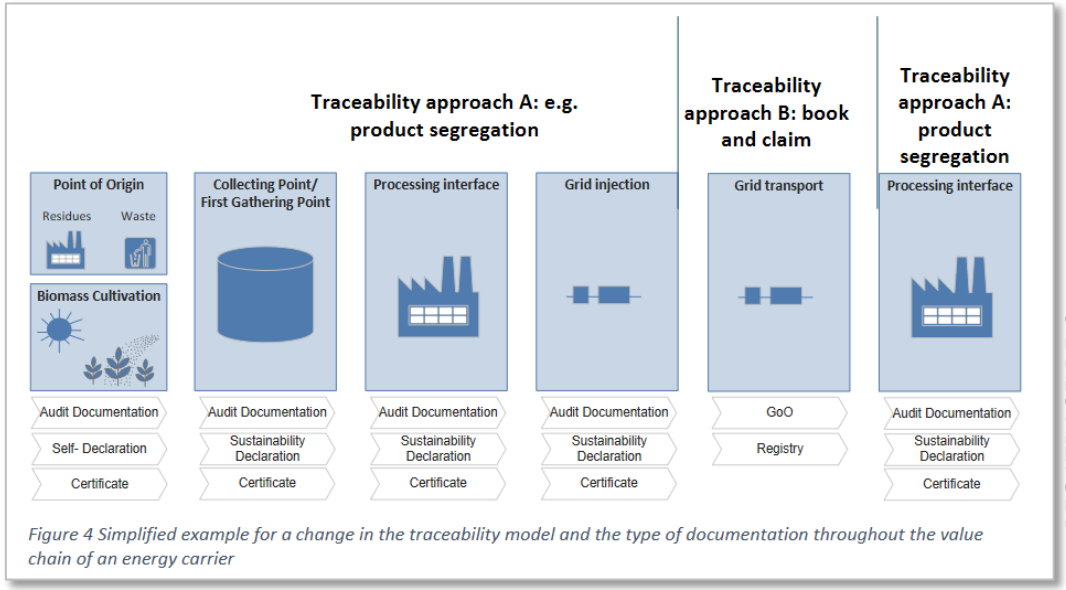


Figure 4 Simplified example for a change in the traceability model and the type of documentation throughout the value chain of an energy carrier

REGATRACE D5.3

An overview on REGATRACE results

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Assessment of integrated concepts and identification of key factors and drivers:

- GHG emission calculation in the RED II
- GHG emissions and costs; influencing factors for

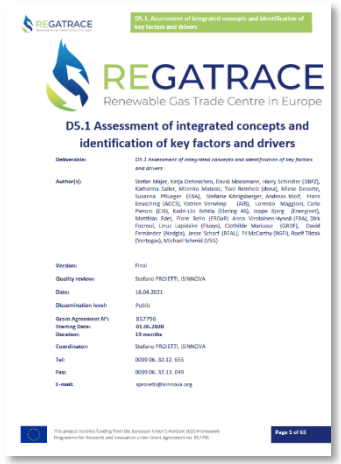
Identification of hot-spot regions:

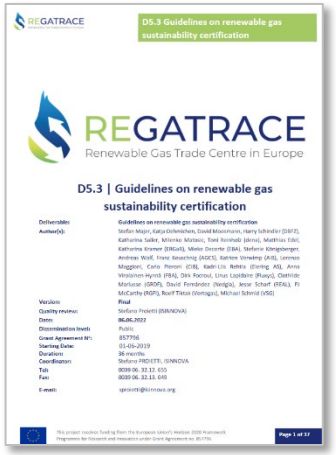
- Existing pre-conditions and future targets for RG production
- potential hot-spots for target countries

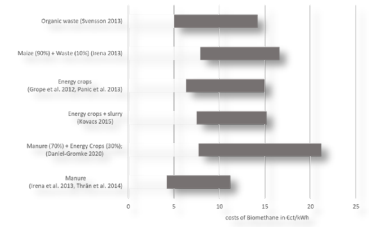
Guidelines on renewable gas sustainability certification

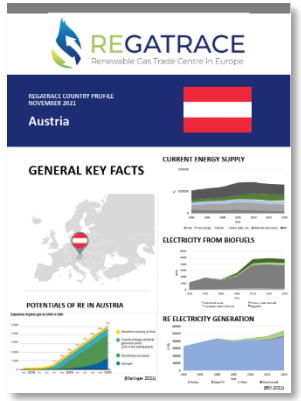
- existing tools and methodologies
- open questions and potential barriers for renewable gas certification

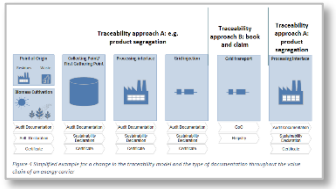
All available here:

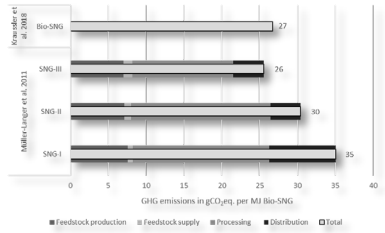


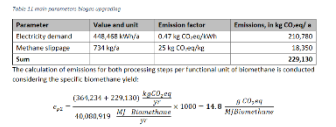












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Thanks for your attention!

Stefan Majer, DBFZ
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This project receives funding from the European Union's Horizon 2020 Framework Programme for Research and Innovation under Grant Agreement no. 857796

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CONFERENCE
Brussels, 16.11.2022

Support for biomethane market uptake - Guidance for feasibility

Lorenzo Maggioni

Head of R&D,

Consorzio Italiano Biogas (CIB)

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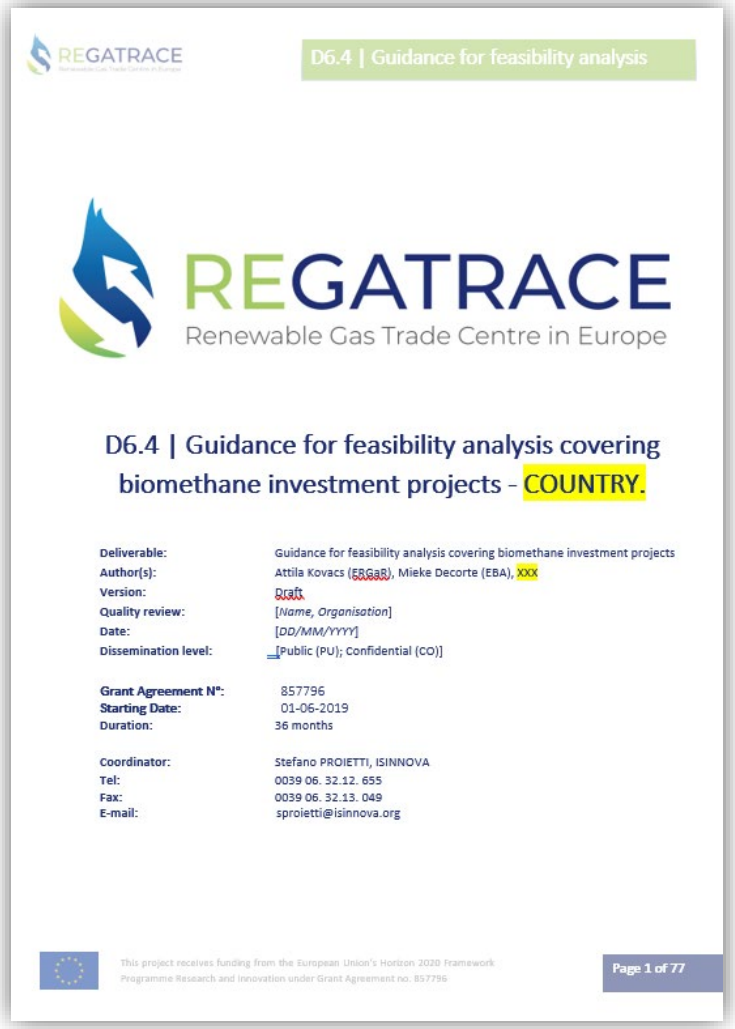
Renewable Gas Trade Centre in Europe

Country tailored guidance for feasibility analysis

Lorenzo Maggioni, Consorzio Italiano Biogas - CIB

This project receives funding from the European Union's Horizon 2020 Framework Programme Research and Innovation under Grant Agreement no. 857796

Objective

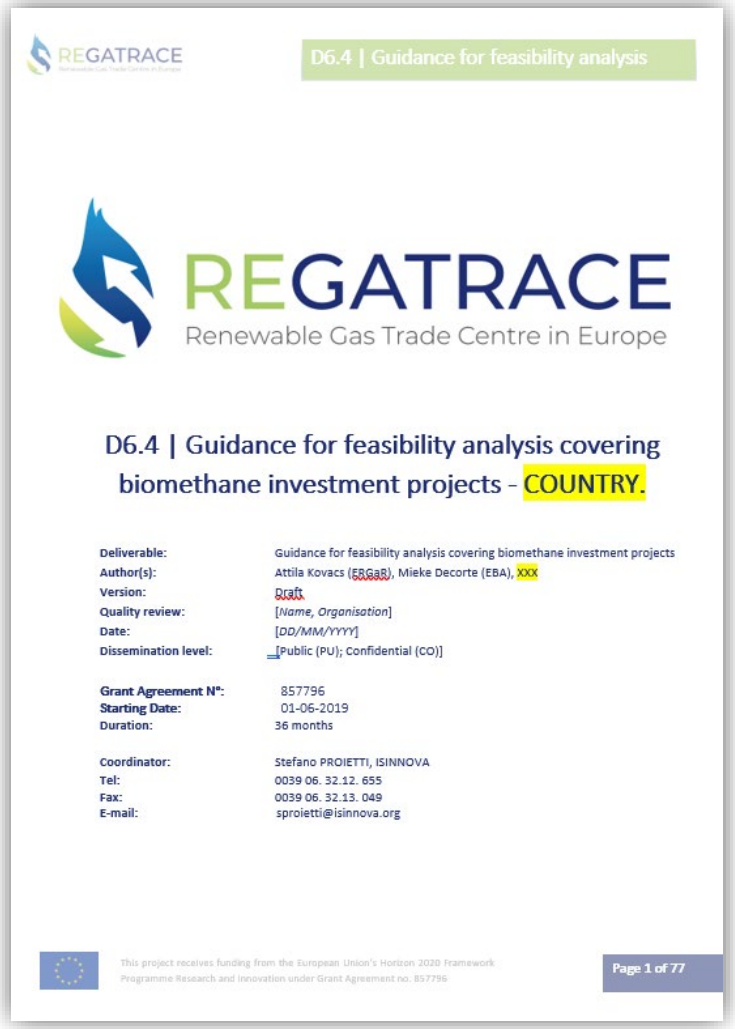


Producing country tailored guidance on feasibility analysis

- Based on a general guidance on European level
- Through a participatory process

The guidance for feasibility analysis is designed to assist project developers in realising biomethane investment projects based on political, economical, technical, environmental, route to market, optimal scale and financial factors influencing the feasibility of the biomethane investment projects.

Country tailored


REGATRACE

D6.4 | Guidance for feasibility analysis

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D6.4 | Guidance for feasibility analysis covering biomethane investment projects - COUNTRY.

Deliverable:	Guidance for feasibility analysis covering biomethane investment projects
Author(s):	Attila Kovacs (ERGaR), Mieke Decorte (EBA), xxx
Version:	Draft
Quality review:	[Name, Organisation]
Date:	[DD/MM/YYYY]
Dissemination level:	[Public (PU); Confidential (CO)]
Grant Agreement N°:	857796
Starting Date:	01-06-2019
Duration:	36 months
Coordinator:	Stefano PROIETTI, ISINNOVA
Tel:	0039 06. 32.12. 655
Fax:	0039 06. 32.13. 049
E-mail:	sproietti@isinnova.org

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The general guidance on European level is tailored with country specific information by the national biogas associations.

- In view of specific circumstances prevailing in the country.
- Adapted to local circumstances for enabling direct usage by interested parties in the country.
- The paper contain The Example of cash flow calculations for an imaginary biomethane plant with imaginary numbers.

Third participatory workshop: presentation of the draft results
Fourth participatory workshop: presentation of consolidated guidance for feasibility analysis

What is the feasibility study?

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The feasibility analysis is used to **determine the viability** of a project idea, ensuring the project is legally and technically feasible as well as economicall justifiable.

The feasibility study answers the basic question whether the project is **worth the investment**.

A feasibility analysis evaluates the project's **potential for succes**. Its perceived objectivity is an essential factor for the credibility of the study both for potential investors and lending institutions.

Should we proceed with the specific investment project?

Where can de Feasibility study be used for?

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Two types of invesments are covered.

- ✓ The guidance focuses on the feasibilty of a **«green-field» biomethane investment project**
- ✓ Nevertheless, it can be used as well to **convert an electricity generating AD plant to a biomethane producer**

Based upon the analysis, the project developers can approach potential investors and financing institutions.

The study will also assist the project developers in their communication with the respective authorities and politicians in securing their support for the project.

Core elements of the Feasibility study

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TECHNICAL FEASIBILITY

- ✓ *What raw materials (substrates) are available at what conditions for the anaerobic digestion unit?*
- ✓ *Sustainability of agri feedstock substrate?*
- ✓ *What is the most appropriate technology to process the raw materials (yields, material balances, etc.)?*
- ✓ *What will be the volumes and characteristics of the main product (biomethane) and the by-products (digestate, carbon dioxide, etc)?*
- ✓ *What are the regulatory standards surrounding the main product, the by-products, and their use?*
- ✓ *What investments are needed for realising the production?*
- ✓ *How will the energy consumption of the facility be covered (energy balances, etc.)?*
- ✓ *What are the technical conditions for grid connection?*
- ✓ *What are the considerations and conditions for the site selection?*

Core elements of the Feasibility study

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MARKET FEASIBILITY

- *What are the market segments targeted (transport fuel, heating, industry)?*
- *Who are the potential customers and how many of them are there?*
- *How will biomethane and the by-products be sold?*
- *What are the available support schemes and what are the conditions for participating?*
- *Are there realistic export possibilities?*
- *What are the prices and conditions for external energy supplies?*
- *What are the costs of raw material supplies, is there a competition for raw materials?*

Core elements of the Feasibility study

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COMMERCIAL FEASIBILITY

- *What are the potential sales volumes in different segments?*
- *What is the pricing structure applicable on the market?*
- *How far is the feasibility dependent on state aid (financial support)?*
- *What are the sensitivity points for the business in terms of revenues?*
- *What are the expected financial indicators of the investment project (IRR, NPV, PI, DSCR)?*
- *How much own funds are required to realise the investment and start operating?*
- *What are the conditions for securing external finance?*

Core elements of the Feasibility study

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OVERALL RISK ASSESMENT

- *What are the major risks associated with the operation?*
- *What is the survival outlook for each of the risks?*
- *How sensitive are the profits?*
- *What are the best ways to minimize these risks?*

Key factors for successful project development

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- ✓Stable, long-term political commitment
- ✓Cost of raw material supplies have a decisive importance
- ✓Technologies which have the needed flexibility to adjust to changes in raw material composition
- ✓Location offering guaranteed long-term sustainable substrate supplies
- ✓Selection of proven an reliable technology
- ✓Long-term placement of the produced biomethane must be secured from the start
- ✓The placement of the fermentation residue [digestate or bio fertilisers]
- ✓Good communication to local stakeholders is key

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Renewable Gas Trade Centre in Europe

Thanks for your attention!

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This project receives funding from the European Union's Horizon 2020 Framework Programme for Research and Innovation under Grant Agreement no. 857796

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Brussels, 16.11.2022

Support for biomethane market uptake
Case study: Italy

Lorenzo Maggioni

Head of R&D,

Consorzio Italiano Biogas (CIB)

REGATRACE

Renewable Gas Trade Centre in Europe

Country tailored guidance for feasibility analysis

Case study: Italy

Lorenzo Maggioni, Consorzio Italiano Biogas - CIB

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Italy: current situation

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- **2nd European market after Germany**
- **> 1.900 biogas plants built *(agriculture + sewage + waste + industrial) dedicated to renewable electricity production***
- **> 1.300 $MW_{installed\ electrical\ power}$**
- **35 biomethane plants with a production of ~ 320 Mm^3/y** *(rapidly growing)*
- **8 bioLNG plants** *(rapidly growing)*

Italy: current situation

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Decree
02 March 2018

SERIE GENERALE

Spediz. abb. post. - art. 1, comma 1
Legge 27-02-2004, n. 46 - Filiale di Roma

Anno 159° - Numero 65

GAZZETTA UFFICIALE

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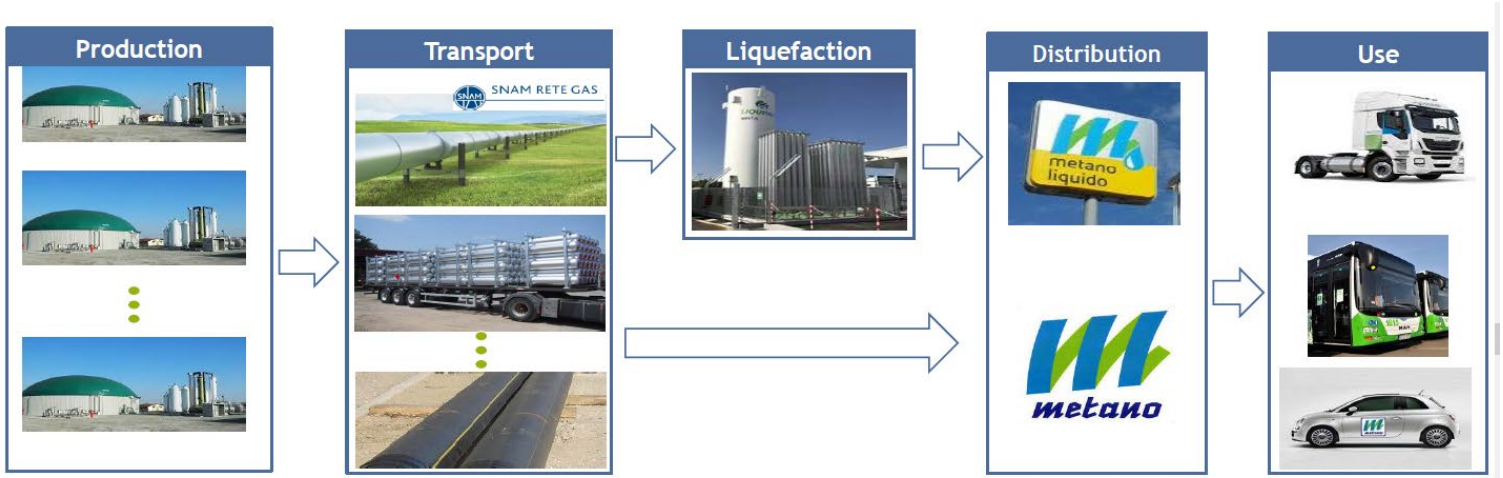
La **Gazzetta Ufficiale, Parte Seconda,** *"Foglio delle inserzioni", è pubblicata il martedì, il giovedì e il sabato*

Maximum biomethane production with subsidies: 1,1 billion m^3/year

100% in the transport sector



Objective

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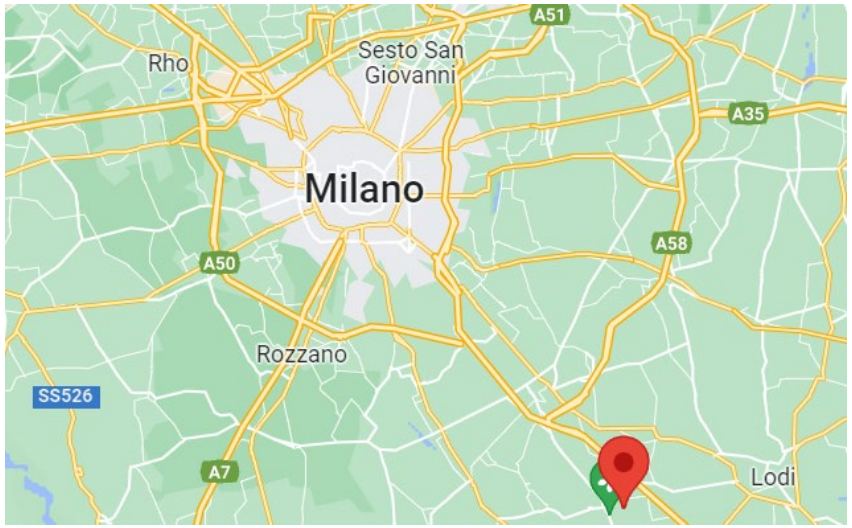
Biogas plant "Besozzi Luigi ed Ernesto"

- Location of the plant: Salerano sul Lambro (LO)
- Electric installed power: 990 KW.
- Entry in operation: 23/05/2010
- Subsidies duration: 15 anni
- End of the subsidies: 22/05/2025
- Agricultural area: 250 ha.
- Presence of breeding: no
- Current availability of animal manure: no
- Distance fron SNAM natural gas grid: around 450 meters
- Current feedstock:
  - Mais silage
  - Barley silage
  - Triticale silage



New diet and sustainability criteria

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Tipo	Nome	Sostanza secca reale (%)	Peso (t)
Effluenti Zootecnici Umido	Liquame bovino	8	25
Colture	Sorgo insilato	32	12.5
Colture	Triticale insilato	34	12.5
Residui	Stocchi di mais	35	20
Residui	Vinacce	34	0.3
Effluenti Zootecnici Asciutto	Pollina	60	8

At least -65% GHG emissions compared to a Fossil Fuel Comparator (FFC: 94 g CO2eq./MJ)

	Senza combustione off-gas	Upgrading a basse perdite (<1% perdite metano) senza combustione off-gas	Upgrading avanzato (<0.2% perdite metano) senza combustione off-gas	Con combustione off-gas
Calcolo Emissioni gCO_2eq /MJ	41,61	28,60	24,62	23,69
Risparmio % rispetto al Fossil Fuel Comparator (FFC)	50,35%	65,87%	70,62%	71,73%

Possible configurations

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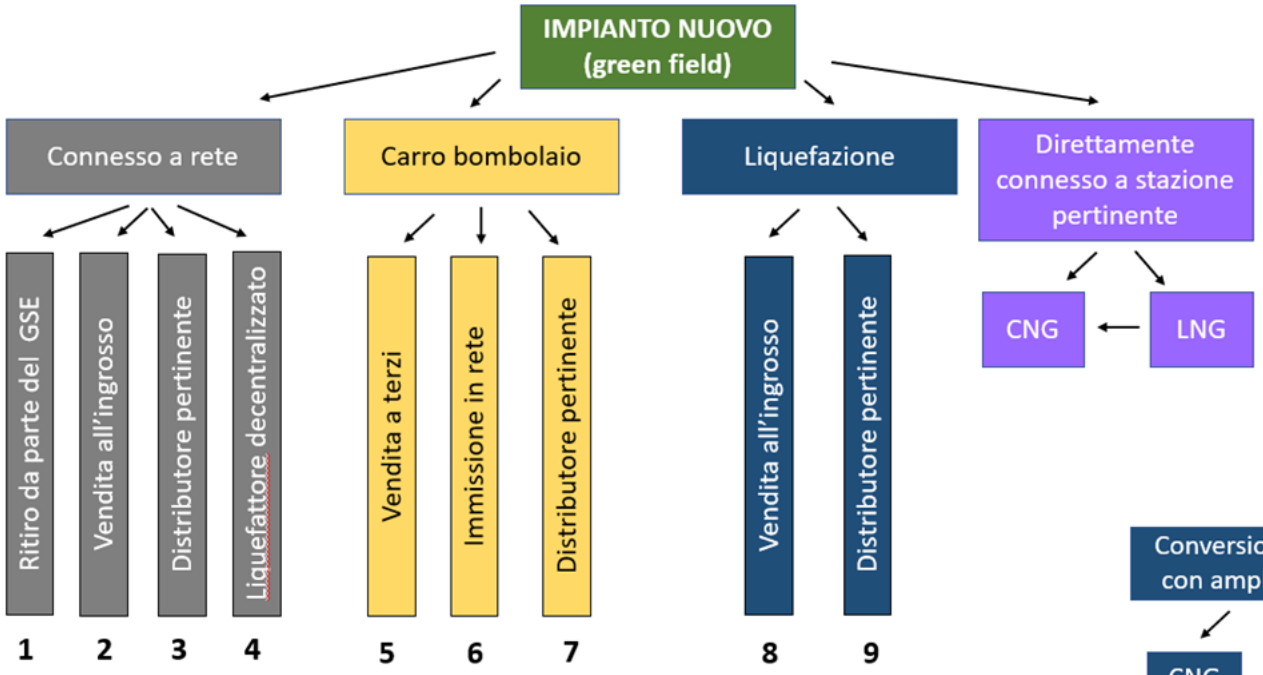

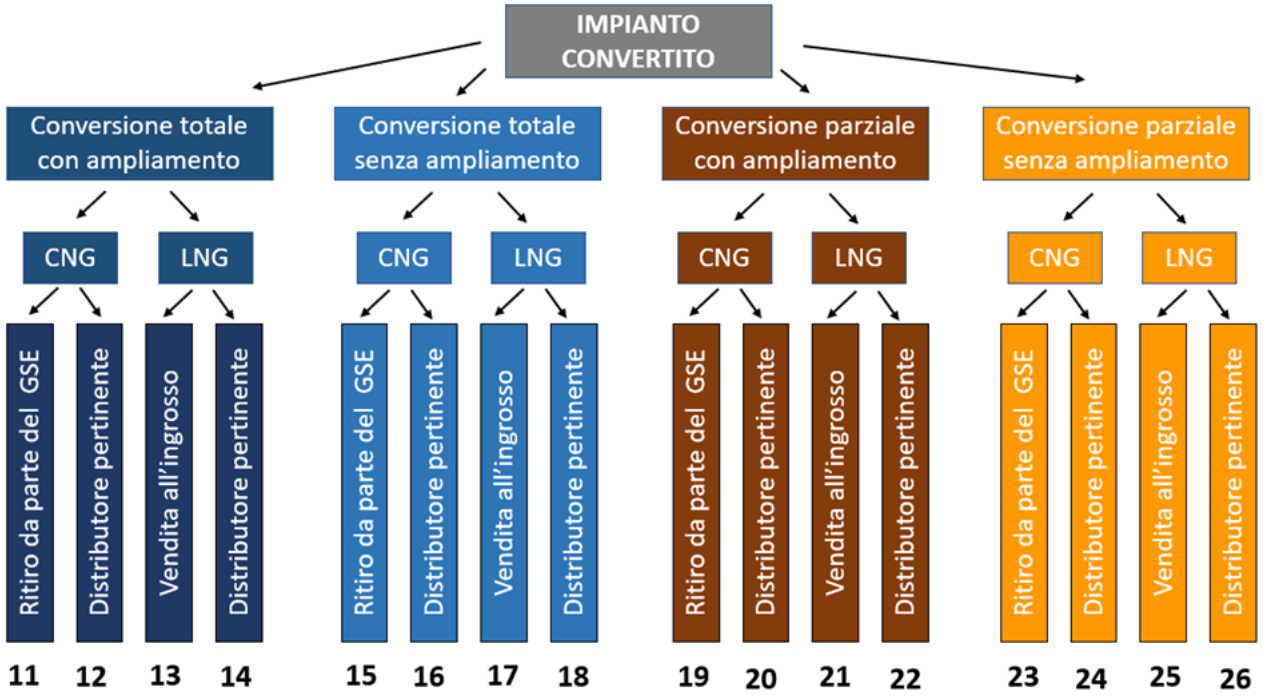

Initial assumptions (CAPEX and OPEX)

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Assumptions related to production

• Ore di funzionamento	8.500 ore/a
• Produzione biogas	4.250.000 m^3/a
• Produzione biogas	500 Nm^3/h
• Produzione biogas	528 Sm^3/h
• Contenuto CH4 nel biogas	52%
• Produzione biometano	2.033.200 Nm^3/a
• Produzione biometano	239 Nm^3/h
• Produzione biometano	252 Sm^3/h
• Produzione anidride carbonica	437 kg/h
• Produzione anidride carbonica	1.876.800 Nm^3/a
• Produzione anidride carbonica	3.716 t/a
• Valore CIC primi 10 anni	€ 375
• Valore CIC, secondo decennio	€ 280
• Numero CIC assegnati (*double counting*)	3.484
• Incentivi biometano (primo decennio)	1.306.382 euro/anno
• Bonus per distributore pertinente	€ 600.000
• Bonus per liquefattore pertinente	€ 1.200.000

Cost-related assumptions

• Costi operativi totali digestore* (escluso matrici)	280.000 €/a
• Costi matrici	1.300.000 €/a
• Costo acqua industriale	20 €/m^3

Assumptions related to financial data

• Ammortamento	10 anni
• Equity	30%
• Tasso d'interesse	1,5%
• Periodo di finanziamento	10 anni

•	Scenario prezzi bassi	Scenario prezzi alti
• Adeguamento costi biomassa	0,5%	3%
• Adeguamento costi manutenzione	0,5%	3%
• Adeguamento costi energia (carburanti, lubrificanti, energia elettrica, metano di rete, ecc.)	1%	3%
• Inflazione generale (applicabile a tutte le altre voci di costo)	1%	3%

1. "Low price" scenario. Average price of natural gas equal to 0.2 €/m^3; average price of electricity equal to € 0.18/KWh, inflation rate of 0.5%.
2. "High prices" scenario. Average price of natural gas equal to 1.5 €/m^3; average price of electricity equal to 0.5 €/KWh, inflation rate of 5%.

Initial assumptions (OPEX)

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PRODUZIONE BIOMETANO	1.080.000
pretrattamento biogas	175.000
• *altro*	*90.000*
• *serbatoi H2S e prima carica*	*45.000*
• *serbatoi VOC e prima carica*	*40.000*
upgrading biogas	905.000
• *impianto*	*831.400*
• *supervisione montaggi*	*21.800*
• *collaudo e avviamento*	*16.800*
• *montaggi pretrattamento e upgrading*	*35.000*

IMMISSIONE IN RETE	570.000
costi connessione rete gas per immissione biometano gassoso	200.000
compressore biometano fino a 50 bar	120.000
cabina REMI	150.000

STOCCAGGIO	200.000
tank e sistema di carico cisterne	200.000

COGENERATORE	400.000
cogeneratore	*400.000*

COSTI AGGIUNTIVI	300.000
Autorizzazione, qualifica, consulenze	100.000
Allaccio rete Snam per prelievo gas (PDR)	200.000

		Prezzi bassi	Prezzi alti
SEZIONE BIODIGESTIONE		1.100.000	1.500.000
BIOMASSE	€/anno	900.000	1.200.000
COSTI OPERATIVI TOTALI	€/anno	200.000	300.000
Energia elettrica	*€/anno*		
assicurazioni	*€/anno*		
altro (amministrazione)	*€/anno*		
Manutenzione	*€/anno*		
Personale su impianto	*€/anno*		

PRODUZIONE BIOMETANO			
ENERGIA ELETTRICA	€/KWh	0,18	0,5
ACQUA INDUSTRIALE	€/anno	1.700	
Carboni per H2S	€/anno	13.500	
Carboni per COV	€/anno	7.000	
MANUTENZIONE	€/anno	55.000	

IMMISSIONE IN RETE			
ENERGIA ELETTRICA	€/KWh	0,18	0,5
MANUTENZIONE TOTALE	€/anno	45.000	
compressore	*€/anno*	*(25.000)*	
cabina remi	*€/anno*	*(20.000)*	

"Low price" and "high prices" scenario

Cash flow ("Low prices scenario")

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FLUSSO DI CASSA PER BIOCNG - scenario "prezzi bassi"

ANNI	RICAVI			COSTI OPERATIVI					CASH FLOW (MOL)	AMMORTAMENTO	EBIT	GESTIONE FINANZIARIA	MARGINE OPERATIVO PRIMA DELLE TASSE
	RICAVI DA VENDITA CIC	RICAVI DA VENDITA BIOMETANO	TOTALE RICAVI	COSTO BIOMASSA	COSTO MANUTENZIONE	COSTI ENERGIA ELETTRICA	ALTRI COSTI	TOTALE COSTI	TOTALE RICAVI - TOTALE COSTI			RATA FINANZIAMENTO	
2022	0	0	0	0	0	0	0	0	0		0	-139843	-139843
2023	1306382	429005	1735387	-900000	-170000	-225328	-2200	-1297528	437859		437859	-139843	298016
2024	1306382	433295	1739677	-904500	-170850	-227581	-2222	-1305153	434524	-187000	247524	-139843	107681
2025	1306382	437628	1744010	-909023	-171704	-229857	-2244	-1312828	431182	-187000	244182	-139843	104339
2026	1306382	442004	1748386	-913568	-172563	-232155	-2267	-1320552	427834	-187000	240834	-139843	100991
2027	1306382	446425	1752806	-918135	-173426	-234477	-2289	-1328327	424479	-187000	237479	-139843	97636
2028	1306382	450889	1757270	-922726	-174293	-236822	-2312	-1336153	421118	-187000	234118	-139843	94275
2029	1306382	455398	1761779	-927340	-175164	-239190	-2335	-1344029	417750	-187000	230750	-139843	90907
2030	1306382	459952	1766333	-931976	-176040	-241582	-2359	-1351957	414376	-187000	227376	-139843	87534
2031	1306382	464551	1770933	-936636	-176920	-243998	-2382	-1359936	410996	-187000	223996	-139843	84154
2032	1306382	469197	1775578	-941320	-177805	-246438	-2406	-1367968	407610	-187000	220610		220610
2033	975432	473889	1449320	-946026	-178694	-248902	-2430	-1376052	73268	-187000	-113732		-113732
2034	975432	478628	1454059	-950756	-179587	-251391	-2454	-1384189	69870	-187000	-117130		-117130
2035	975432	483414	1458845	-955510	-180485	-253905	-2479	-1392379	66466	-187000	-120534		-120534
2036	975432	488248	1463680	-960288	-181388	-256444	-2504	-1400623	63057	-187000	-123943		-123943
2037	975432	493130	1468562	-965089	-182295	-259008	-2529	-1408921	59641	-187000	-127359		-127359
2038	975432	498062	1473493	-969914	-183206	-261599	-2554	-1417273	56220	-187000	-130780		-130780
2039	975432	503042	1478474	-974764	-184122	-264215	-2580	-1425680	52794	-187000	-134206		-134206
2040	975432	508073	1483504	-979638	-185043	-266857	-2605	-1434143	49362	-187000	-137638		-137638
2041	975432	513153	1488585	-984536	-185968	-269525	-2632	-1442661	45924	-187000	-141076		-141076
2042	975432	518285	1493717	-989459	-186898	-272220	-2658	-1451235	42482	-187000	-144518		-144518
	22818134	9446267											
TOTALE RICAVI			32264401					-27457588	4806813	-3553000		TOTALE	-144614

Gross operating margin

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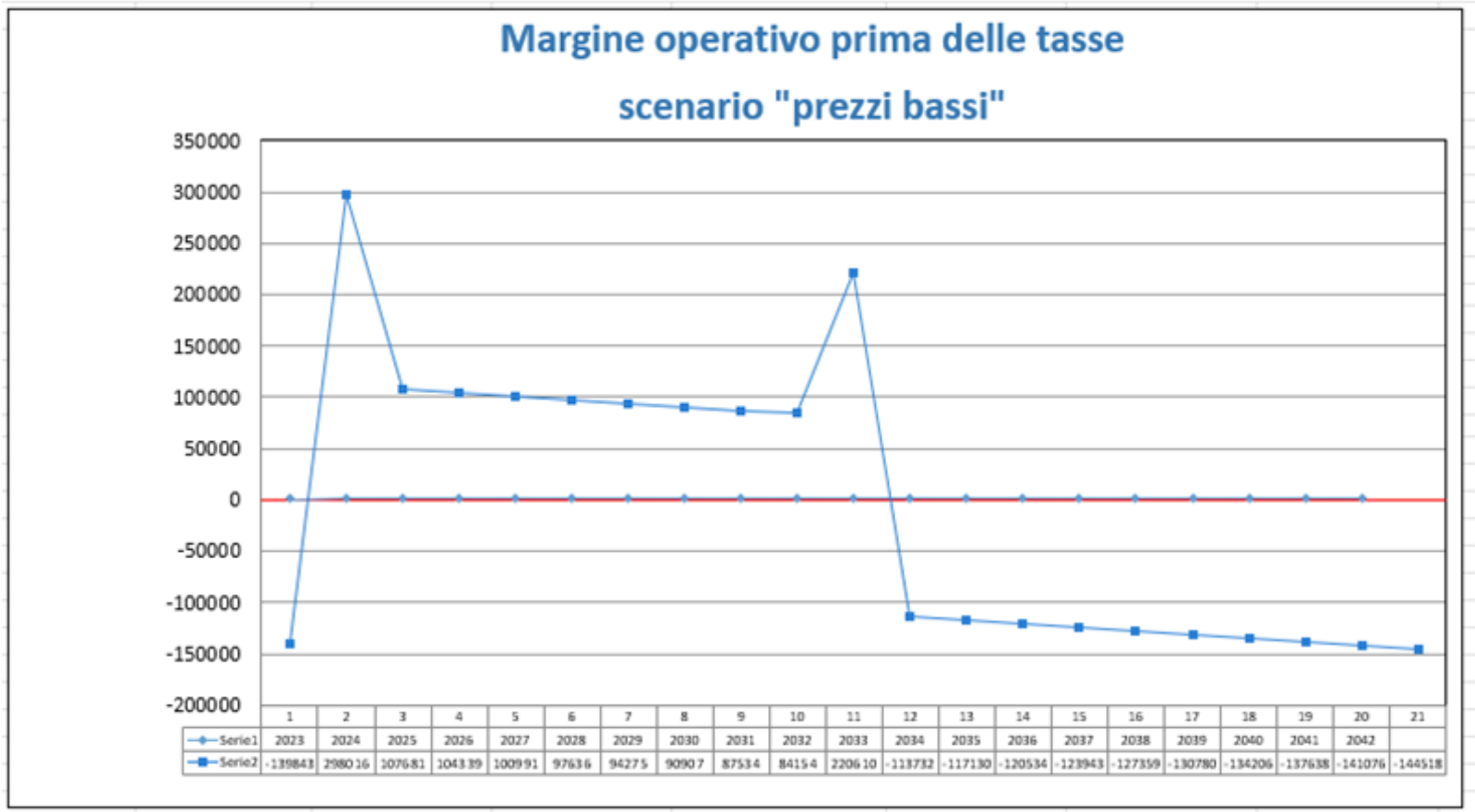
“Low prices” scenario



Cash flow ("High prices scenario")

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FLUSSO DI CASSA PER BIOCNG - scenario "prezzi alti"

ANNI	RICAVI			COSTI OPERATIVI					CASH FLOW (MOL)	AMMORTAMENTO	EBIT	GESTIONE FINANZIARIA	MARGINE OPERATIVO PRIMA DELLE TASSE
	RICAVI DA VENDITA CIC	RICAVI DA VENDITA BIOMETANO	TOTALE RICAVI	COSTO BIOMASSA	COSTO MANUTENZIONE	COSTI ENERGIA ELETTRICA	ALTRI COSTI	TOTALE COSTI	TOTALE RICAVI - TOTALE COSTI			RATA FINANZIAMENTO	
2022	0	0	0	0	0	0	0	0	0		0	-139843	-139843
2023	1306382	3217539	4523921	-1400000	-170000	-665367	-202200	-2437567	2086354		2086354	-139843	1946511
2024	1306382	3233627	4540008	-1442000	-175100	-685328	-208266	-2510694	2029315	-187000	1842315	-139843	1702472
2025	1306382	3249795	4556177	-1485260	-180353	-705888	-214514	-2586015	1970162	-187000	1783162	-139843	1643319
2026	1306382	3266044	4572426	-1529818	-185764	-727064	-220949	-2663595	1908830	-187000	1721830	-139843	1581988
2027	1306382	3282374	4588756	-1575712	-191336	-748876	-227578	-2743503	1845253	-187000	1658253	-139843	1518410
2028	1306382	3298786	4605168	-1622984	-197077	-771343	-234405	-2825808	1779360	-187000	1592360	-139843	1452517
2029	1306382	3315280	4621662	-1671673	-202989	-794483	-241437	-2910582	1711079	-187000	1524079	-139843	1384237
2030	1306382	3331856	4638238	-1721823	-209079	-818317	-248680	-2997900	1640338	-187000	1453338	-139843	1313495
2031	1306382	3348516	4654897	-1773478	-215351	-842867	-256141	-3087837	1567060	-187000	1380060	-139843	1240218
2032	1306382	3365258	4671640	-1826682	-221811	-868153	-263825	-3180472	1491168	-187000	1304168		1304168
2033	975432	3382084	4357516	-1881483	-228466	-894197	-271740	-3275886	1081630	-187000	894630		894630
2034	975432	3398995	4374426	-1937927	-235320	-921023	-279892	-3374163	1000264	-187000	813264		813264
2035	975432	3415990	4391421	-1996065	-242379	-948654	-288289	-3475387	916034	-187000	729034		729034
2036	975432	3433070	4408501	-2055947	-249651	-977114	-296938	-3579649	828852	-187000	641852		641852
2037	975432	3450235	4425667	-2117626	-257140	-1006427	-305846	-3687039	738628	-187000	551628		551628
2038	975432	3467486	4442918	-2181154	-264854	-1036620	-315021	-3797650	645268	-187000	458268		458268
2039	975432	3484824	4460255	-2246589	-272800	-1067718	-324472	-3911579	548676	-187000	361676		361676
2040	975432	3502248	4477679	-2313987	-280984	-1099750	-334206	-4028927	448753	-187000	261753		261753
2041	975432	3519759	4495191	-2383406	-289414	-1132742	-344232	-4149794	345396	-187000	158396		158396
2042	975432	3537358	4512789	-2454908	-298096	-1166725	-354559	-4274288	238501	-187000	51501		51501
	22818134	67501122											
TOTALE RICAVI			90319256					-65498334	24820922	-3553000		TOTALE	19869495

Gross operating margin

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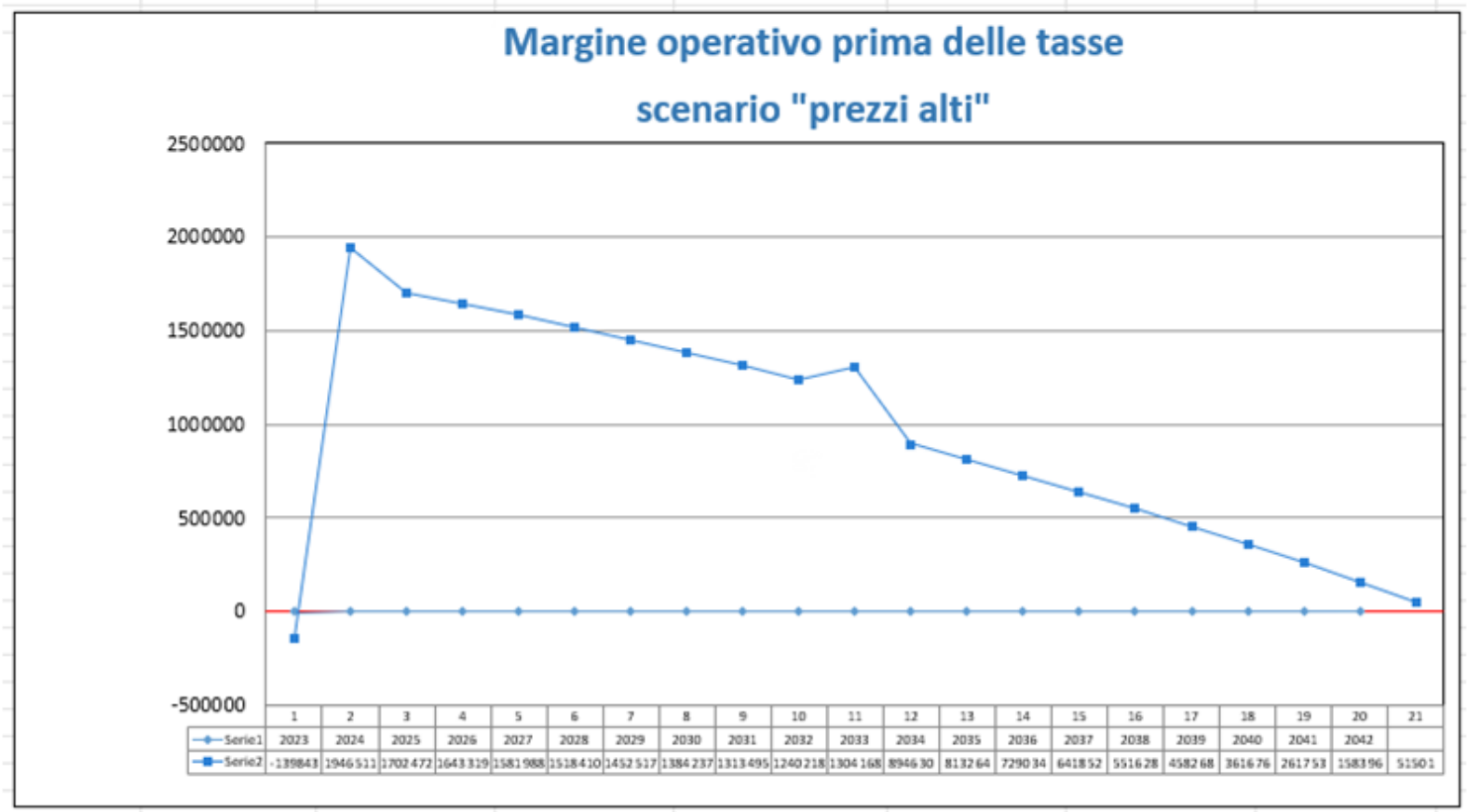
“High prices” scenario



	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Serie1	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	
Serie2	-139843	1946511	1702472	1643319	1581988	1518410	1452517	1384237	1313495	1240218	1304168	894630	813264	729034	641852	551628	458268	361676	261753	158396	51501

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Thanks for your attention!

Lorenzo Maggioni

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Support for biomethane market uptake
Case study: Spain

David Fernández Rubial

New Business Drive Manager,

Nedgia

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Support for biomethane market uptake
Guidance for feasibility analysis
Case Study: Spain

David Fernández
Manager - New Business Drive
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Brussels
16-NOV-2022

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Typical Spanish example

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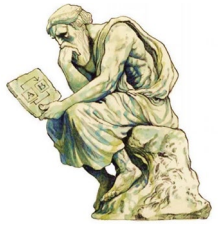
Plant for the treatment of:

- alperujos > olive oil production residues
- slurry > pork waste
- and animal by-products

In Spain, currently there is a big problem related to the correct management of livestock and agri-food by-products, especially in relation to those.

- These residues are intended for direct use in agriculture, relevant issues: such as health problems, odors, methane emissions,…



The main objective of this installation is the production of:

- Biomethane, as renewable energy.
- Digestate, as stabilized material resulting from the anaerobic digestion process whose direct application in the field does not cause the aforementioned problems.

Elements determining feasibility: Legal

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Legal aspects

- Environmental protection regulations
- Urban regulations
- Animal by-products regulations
- Electrical regulation
- Biomethane regulations
- Additional Industry Regulations

BOLETÍN OFICIAL DEL ESTADO

Elements determining feasibility: Technical

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What raw materials (substrates) are available?

Initial substrates for digestion	Tons (t/year)	MS	SV	biogas
Alperujo (olive waste)	25,000	28%	92%	600
pork slurry	12,000	4%	90%	450
Glycerin	3,000	fifty%	90%	900
Cow dung	2,000	22%	85%	400
chicken manure	5,000	30%	90%	550
Digestate liquid fraction	12,000	two%	90%	200
Total	59,000			

Biogas production: 594 Nm3/h, with 58.7% methane.

Biomethane potential energy: 31 GWh/y.

Elements determining feasibility: Technical

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What is the most appropriate technology to process raw materials?

Choice of technology

- 1 x Thermophilic digester
- 2 x Mesophilic digester)

Digestors		
Daily input volume	132	t/d
Amount of daily volatiles	23,914	kg SV/d
Units	two	You
Diameter	24	m
Total height	8	m
Guard height	0.8	m
Volume	8000	m3
Organic load	3.5	kgSV/(m^3*d)
Holding time	fifty	d
Biogas production	594	Nm^3/h

Elements determining feasibility: Technical

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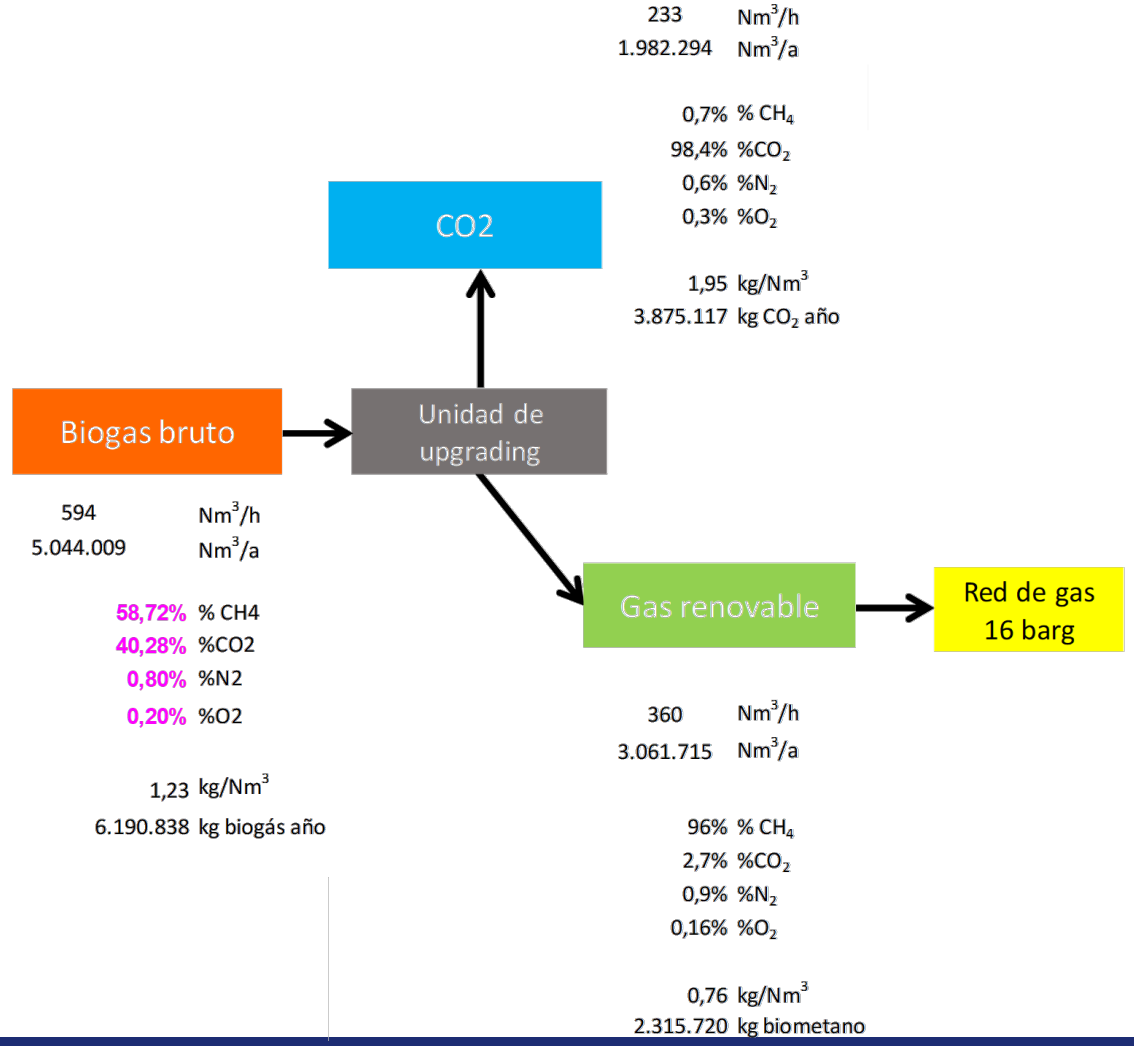
What will be the volumes and characteristics of the biomethane and of the by-products (carbon dioxide, …)?



Elements determining feasibility: Technical

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What will be the volumes and characteristics of the digestate?

- Waste typology
- Saturation level of the territory
- Nutrient Balance
- Agriculture of the territory
- Water availability
- Climate
- Orography
- Local and national legislation
- Territory planning
- Economy of scale

Elements determining feasibility: Market

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Investment in the installation

1. STORAGE OF SUBSTRATES	250,000
2. SOLIDS LOADING SYSTEM	220,000
3. ANAEROBIC DIGESTERS	1,550,000
4. SUBSTRATE PUMPING SYSTEM	210,000
5. BIOGAS PIPING, CONDITIONING AND STORAGE	120,000
6. BIOGAS UPGRADING UNIT	1,700,000
7. HEAT DISTRIBUTION SYSTEM	350,000
8. CONTROL PANEL, AUTOMATION AND ELECTRICAL INSTALLATIONS	300,000
9. STORAGE OF THE DIGEST AND POST-TREATMENT DIGEST	350,000
10. CRANE, DEBRIS CONTAINER, WORK TOOLS	40,000
11. START-UP	30,000
12. SUPERVISION OF THE WORK	325,000
13. HEALTH AND SAFETY ELEMENTS	20,000
14. INTERCONNECTIONS	600,000
15. GROUNDS	250,000
16. PROCESSING AND DEVELOPMENT	250,000
Total price of the biogas plant	6,565,000

Elements determining feasibility: Market

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Operating cost of the installation

	EXPLOITATION OF PLANTS	
Insurance, analytics, management expenses	20,000.00	year
External technical assistance	30,000.00	year
plant manager	65,000.00	year
operators	120,000.00	year
TOTAL OPERATING COSTS	235,000.00	year

	ELECTRICAL COST	
anaerobic digestion	649,000.00	kWh/year
Upgrading	1,765,000.00	kWh/year
digestates	36,000.00	kWh/year
TOTAL ELECTRICAL CONSUMPTION	2,450,000.00	kWh/year
TOTAL ELECTRICAL COST	245,000.00	year

	REPAIRS AND CONSUMABLES	
DA maintenance and repairs	45,000.00	year
consumables	27,840.00	year
Maintenance	59,300.00	year
digestate maintenance	8,500.00	year
TOTAL CONSUMABLES	140,640.00	year

	THERMAL COST	
anaerobic digestion	2,000,000.00	kWh/year
	80,000.00	year

	MISCELLANEOUS EXPENSE	
Reagents for digestate treatment	93,380.00	year
Digestate Liquid Application	299,440.40	year
TOTAL OTHER COSTS	392,820.40	year

Elements determining feasibility: Market

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Plant income

- Waste income

Waste management	y/y	€/t	Total
Alperujo (olive waste)	25,000	two	50,000
pork slurry	12,000	two	24,000
Glycerin	3,000	-twenty	-60,000
Cow dung	2,000	-10	-20,000
chicken manure	5,000	-fifteen	-75,000
Entry			-81,000

Subscription income	y/y	€/t	Total
solid fraction	9,185	10	91,854
Entry			91,854

- Biomethane income

Biomethane Purchase Agreement with an trader energy company: i) fixed value for the certificate + % of natural gas value; ii) based on contract of 10 years duration; iii) Carbon footprint gr CO2/MJ

	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Estimated value of NG	70	60	40	25	26	28	29	30	32	3. 4	35
Certificate	40	40	40	40	40	40	40	40	40	40	40
Total	75	70	60	53	53	54	54	55	56	57	58

Elements determining feasibility: Market

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Overall Return

	AÑO	-	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ingreso																	
	Desperdicio		(81.000)	(81.810)	(82.628)	(83.454)	(84.289)	(85.132)	(85.983)	(86.843)	(87.711)	(88.589)	(89.474)	(90.369)	(91.273)	(92.186)	(93.107)
	Energía		2.179.815	2.214.009	2.051.591	1.795.142	1.816.513	1.838.952	1.862.513	1.887.253	1.913.229	1.940.504	1.969.143	1.988.834	2.008.723	2.028.810	2.049.098
	Fertilizantes		36.742	41.334	45.927	45.927	45.927	45.927	45.927	45.927	45.927	45.927	45.927	45.927	45.927	45.927	45.927
	Total		2.098.815	2.132.199	1.968.963	1.711.688	1.732.224	1.753.820	1.776.530	1.800.410	1.825.517	1.851.915	1.879.668	1.898.465	1.917.450	1.936.624	1.955.990
Facturas																	
	Costos operativos		1.093.460	1.107.129	1.120.968	1.134.980	1.149.167	1.163.532	1.178.076	1.192.802	1.207.712	1.222.808	1.238.093	1.253.569	1.269.239	1.285.105	1.301.168
	Costos totales		1.093.460	1.107.129	1.120.968	1.134.980	1.149.167	1.163.532	1.178.076	1.192.802	1.207.712	1.222.808	1.238.093	1.253.569	1.269.239	1.285.105	1.301.168
EBITDA			1.005.355	1.025.070	847.995	576.708	583.057	590.289	598.454	607.608	617.806	629.107	641.575	644.896	648.211	651.520	654.822
	Amortización (10 años)		700.261	700.261	700.261	700.261	700.261	700.261	700.261	700.261	700.261	700.261					
	Subvenciones		-														
EBIT			305.094	324.808	147.734	(123.554)	(117.205)	(109.973)	(101.807)	(92.654)	(82.456)	(71.154)	641.575	644.896	648.211	651.520	654.822
	Gastos financieros		(131.299)	(118.169)	(105.039)	(91.909)	(78.779)	(65.650)	(52.520)	(39.390)	(26.260)	(13.130)	-	-	-	-	-
Ingresos antes de impuestos			173.795	206.639	42.694	(215.463)	(195.984)	(175.622)	(154.327)	(132.043)	(108.716)	(84.284)	641.575	644.896	648.211	651.520	654.822
	Impuestos a las ganancias corp		43.449	51.660	10.674	-	-	-	-	-	-	-	160.394	161.224	162.053	162.880	163.706
resultado neto			130.346	154.980	32.021	(215.463)	(195.984)	(175.622)	(154.327)	(132.043)	(108.716)	(84.284)	481.181	483.672	486.158	488.640	491.117
	EBITDA-IMPUESTO	(6.565.000)	961.906	973.410	837.321	576.708	583.057	590.289	598.454	607.608	617.806	629.107	641.575	483.672	486.158	488.640	491.117

Internal Rate of Return	IRR 15 years	5.85%
	IRR 10 years	1.23%
Net Present Value	NPV 15 years	3,001,827
	NPV 10 years	410,666

Risk management

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Strategies to ensure the availability and price of biomass:

- Long-term contracts

  Establishment of supply contracts with producers + Communication local agents
- Put the partners in the SPC

  Incorporate the waste generator into society, single producer model or waste management model
- Development of indirect trade agreements

  More complex deals, involving digestates/fertilizers + Logistics agreements
- Ensure the sale of biomethane

  Legal advice on PPA contract + Confidence and guarantees of the producer
- Ensure plant production

  Technologist Warranties + Incorporate the technologist into society
- Ensuring the ability to operate

  Permissions + Gas network

Keys to success

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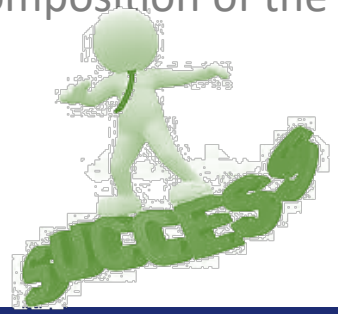
- **Raw material supply costs**: decisive importance among the operating costs. Developers must assess present and future possibilities for raw material supply and develop plans.
- **Owners of raw materials participate in the projects as shareholders**: to guarantee their long-term interest.
- **Locations that offer a guaranteed supply on the long-term sustainable substrate and near to an existing gas network**. The best opportunities are in places where the raw material is located together with the infrastructure and a deep integration to the respective agriculture.
- The **long-term placement** [Biomethane Purchase Agreement – BPA] of the biomethane produced must be secured.
- Developers should
  - **never assume that supply patterns they will remain unchanged** during the 15-20-25 year life of the project.
  - **install technologies that have the flexibility necessary** to adapt to changes in the composition of the raw material.
  - select **proven and reliable technology**, to avoid future operational difficulties
- **Digestate management** is a key issue.



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Thanks for your attention!

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Support for biomethane market uptake
Case study: Poland

Magdalena Rogulska

Project manager,

UPEBI

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Renewable Gas Trade Centre in Europe

Case study - Poland

Magdalena Rogulska
Brussels
16-11-2022

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Actual legal situation

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- **Polish Energy Policy PEP 2040** - 10% of gaseous fuels transported via gas grids should be renewable and low-emission ones in 2030.
- National Framework for Alternative Fuel Infrastructure Development Policy (*2017)*
  - Definition of alternative fuels including natural gas CNG (biomethane), LNG, LPG, hydrogen etc.
  - Requirements concerning location of alternative fuels infrastructure
- The Act on electromobility and alternative fuels (*2018*), *amendment 2021- introduced requirements for local municipalities to ensure defined share of* ***zero-emission buses or buses powered by biomethane*** *in the vehicle fleet in use in next years;*
- The Act on biocomponents and liquid biofuels(BIO Act) – *amendment* ***19-07-2019*** *introduced new biofuels – biomethane and biohydrogen for fulfillment of national indicative target (NIT; in Polish NCW)*
- Energy Law – ***planned changes***
- **RES Act** – ***planned changes***

Numbers on biomethane

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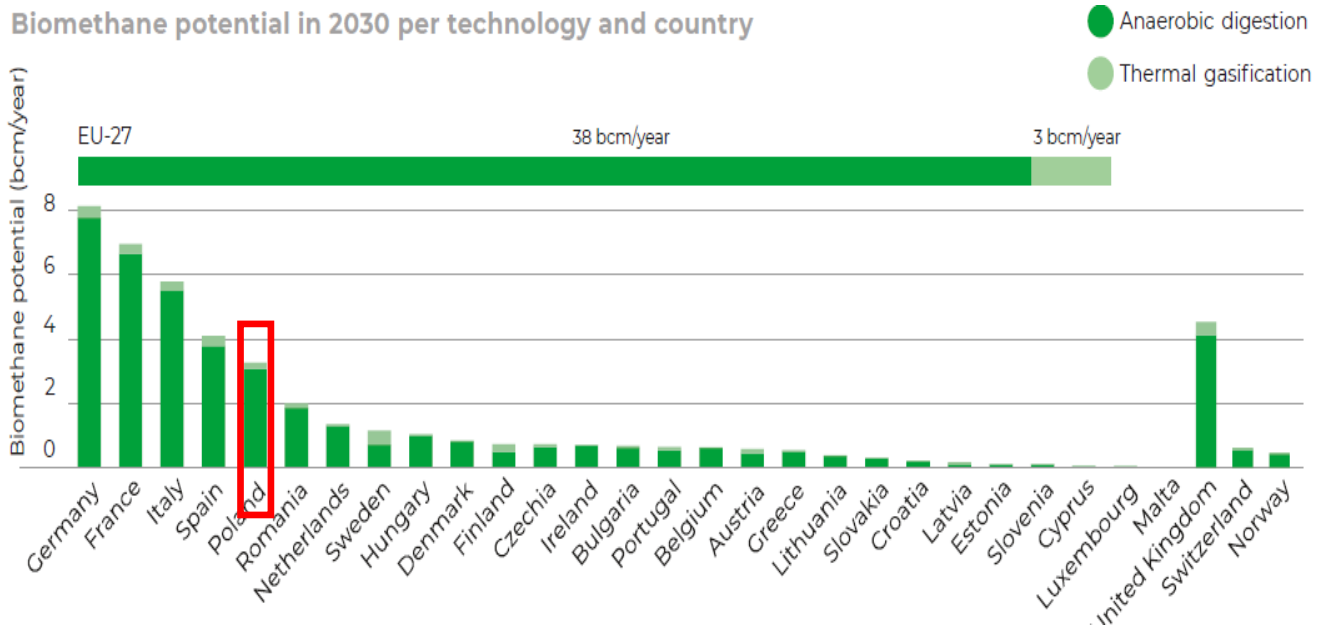
- ❑ At the end of 2021, there were **346 biogas installations** in PL with installed capacity of 257 MWe, of which 128 were agricultural biogas plants.
- ❑ Presently, **there is no biomethane production** in Poland. However, the country has a large potential resulting (agriculture, agri-food industry, in future the selective collection of the biodegradable fraction).

- ➢ NGV vehicles - ca. 8 000 (in that 848 CNG/LNG buses)
- ➢ Filling stations - LNG 16 CNG- 25
- ➢ Projects – several under development (at least 3 in final stage), PSG (OSD) has received more than 100 applications for biogas connection to their distribution network



Source: Gas for Climate report 2022

Vision

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- In **2030**, **0.7** to **1 billion m3** of biomethane (as an advanced fuel produced from the raw materials listed in Appendix 1 to the BIO Act) for transport could be produced (as bioCNG, bioLNG and component for bio-hydrogen production).
- More specifically:
  - **2030** targets:
    - **10%** biomethane share in the gaseous fuels market, with a **100** biomethane installations.
  - **2050** targets:
    - **30%** share of biomethane in the gaseous fuels market, with **300** biomethane installations.

To achieve goals defined in the vision, cooperation among all market participants is needed, i.e., the regulator, ministries, politicians, state-owned companies, system operators, energy companies, local governments, and consumers, as well as entities interested in the production of biomethane. „**Agreement on cooperation for the development of the biogas and biomethane sector**" was signed in November 2021.

Barriers and drivers PL

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Drivers:

- ❑ EU and national climate and energy policy.
- ❑ Positive impact on the environment - fitting into a **circular economy**
- ❑ **Problem with decarbonisation of transport**
- ❑ Uncertain support system for "green energy„ from biogas CHP
- ❑ Changes in waste management - a chance to obtain energy raw material (circular economy)
- ❑ **Actual geopolitical situation (war in Ukraine, gas and energy prices).**

Barriers:

- ❑ Lack of support systems for biomethane / **significant delays in the introduction of regulations**
- ❑ Problems with obtaining administrative permissions
- ❑ Problems with obtaining conditions for connection to the electricity and gas grids
- ❑ **Lack of knowledge in the society** about the importance, potential and environmental and economic impact of this type of plant

Summary

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WHAT IS **URGENTLY** NEEDED TO HAVE BIOMETHANE PLANTS IN PL ???

- **Transparent and reliable legislation**
- Support and incentive scheme
- Close and friendly cooperation with gas network operators
- Promotion and raising awareness among decision makers and potential investors
- **Education on all levels**

Till now nothing has changed within legal regulations – sector is preparing biomethane projects and waiting for introduction of already discussed changes in RES Act, Biofuel Act and Energy Act.

Finalisation of national legislation is planned for the 1st of January 2023. There are over a dozen projects ready for implementation, but investors are waiting for the support system. **It is necessary to adopt and implement the support system as soon as possible!**

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Thanks for your attention!

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Brussels, 16.11.2022

Support for biomethane market uptake
Case study: the Czech Republic

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Renewable Gas Trade Centre in Europe

Case Study – the Czech Republic

Lada Uskobová,
Brussels,
16th November 2022

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The Czech Republic

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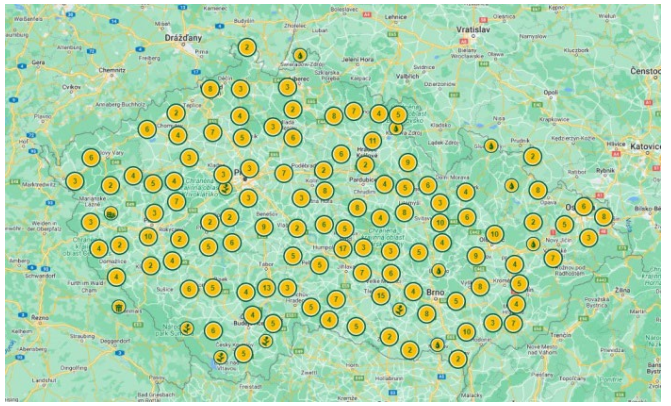
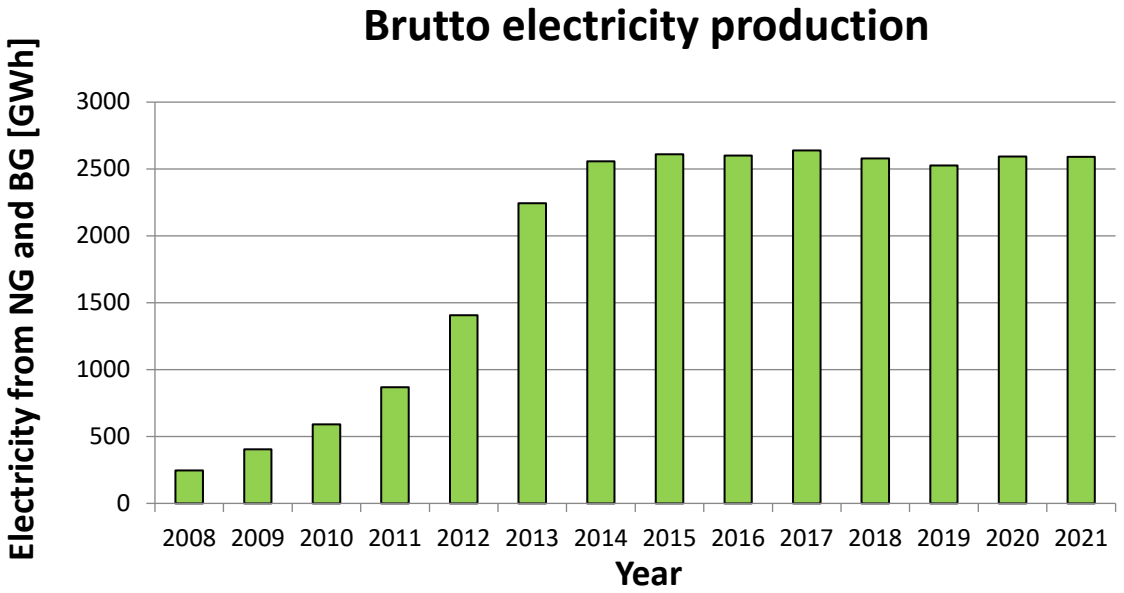
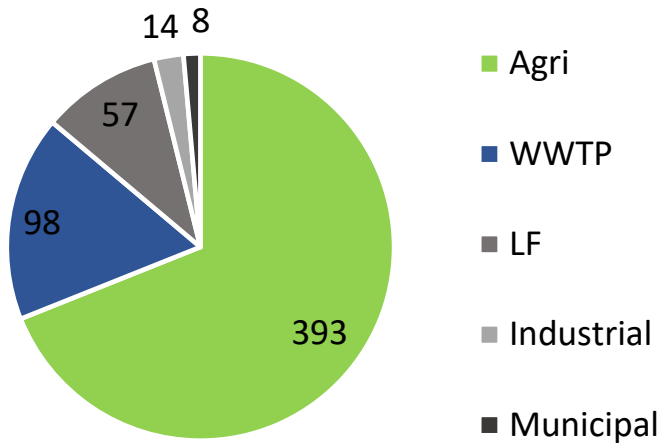
Total of **570 AD plants** with installed capacity of **366 MW_{el}**

1 biomethane production site (ca 12 GWh in 2021)
(2nd is in the test operation atm)







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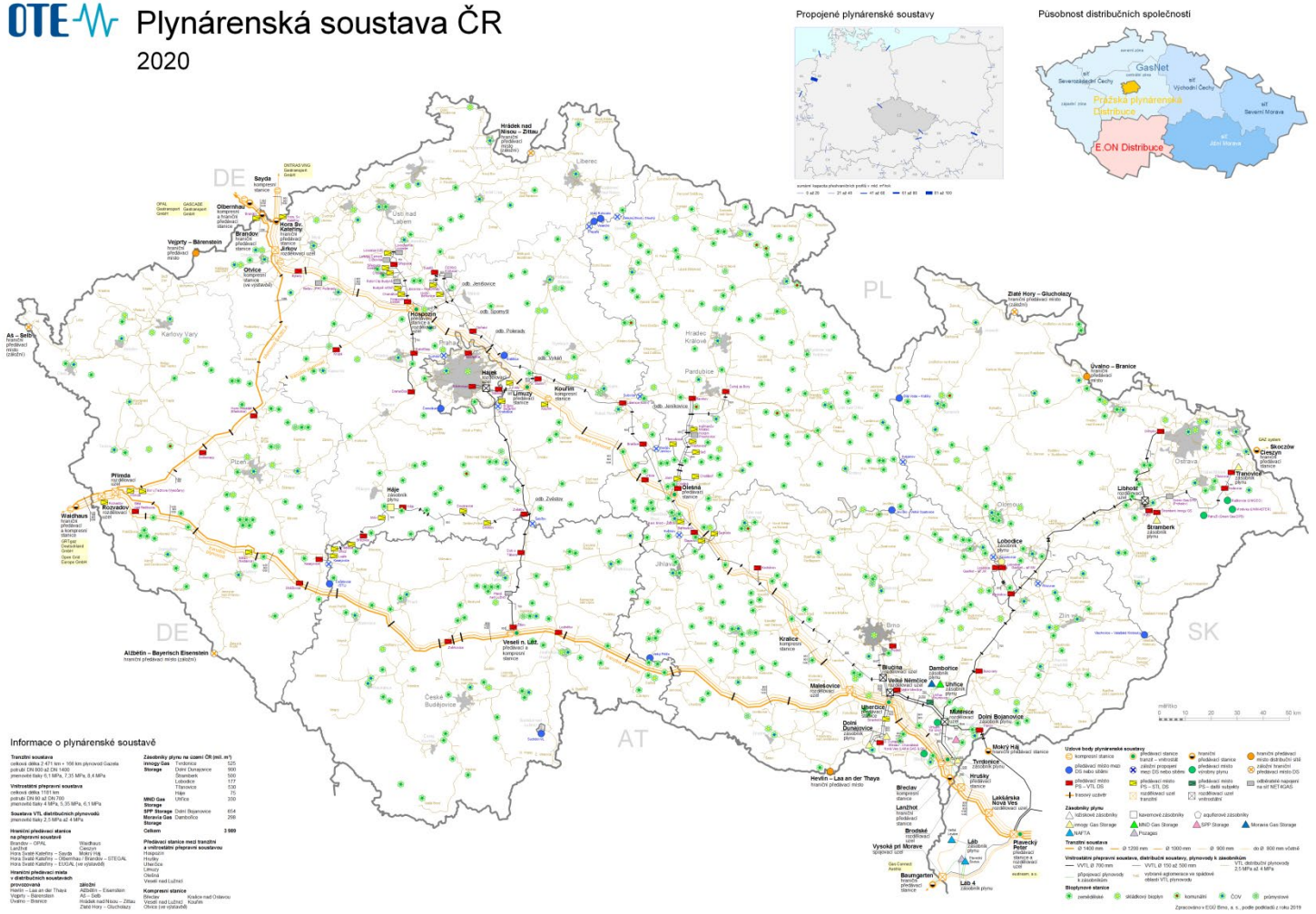
Gas Network in CZ



- transit system 2,471 km
- distribution system 1,181 km
- gas storage 3,989 mil. m^3

BWG meetings

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- Meetings of the biomethane work group
- Participants:
  Ministries (Industry & Trade, Environment, Agriculture, Members of Parliament, **ERO**, **OTE**, innogy, EFG Green Gas, EGÚ Brno, CzBA, CGOA

  - Market mapping
  - Legislation mapping
  - Practical experience shared
  - Targets and Barriers
  - Vision and Roadmap
  - National Guidance for Feasibility Analyses

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Biomethane support in CZ

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Name	Type	Description
Act no. 458/2000 Coll. Energy Act	-	Introducing **an obligation to purchase of the production pipeline by the distribution system operator** from the manufacturer of biomethane – under the condition of a tender for a building contractor
Act no. 165/2012 Coll. on Supported Energy Sources	**Green Bonus, Guarantees of Origin**	▪ The Act introduces a Green Bonus for advanced biomethane; ○ The Amount of **Green Bonus will be determined by ERO** (no more than five times the average market price of gas on the intraday gas market organised by the market operator, determined as the average of the annual weighted average prices for each completed calendar year over the last three years.) ▪ **Guarantees of Origin (from 1st January 2023)** ○ Will be eligible for producers that do not receive Green Bonus ○ **Issuing body - OTE, a.s. (Operator of Energy Market)** ○ **only for biomethane injected into the NG DS**
Operational Programme Technology and Applications for Competitiveness	Investment support	Support for the **transformation of existing biogas power plants into biomethane plants** and the construction of new biomethane plants (purification of biogas to natural gas quality, its carburation, measurement of biomethane quality, compression and data transmission), including their connection to gas networks and/or local infrastructure
State Environmental Fund	Investment support	▪ Operational Programme Fair Transformation ○ Development of clean energy and energy savings ○ In the regions affected by heavy industry and mining ▪ Operational Programme Environment ○ Increase the share of material and energy recovery of waste

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GO Legislation

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<u>Act on Supported Energy Sources</u> (165/2012 Sb.) **amended in 2021**

- until then only electricity GO
- Implementation of RED II
- introduced **GO for biomethane, hydrogen and heat**
- GOs **from 1st January 2023**
- **OTE** appointed as an Issuing Body and GO Registry
- still in the notification process by the EC

- Registry should be operational in May 2023 (and will issue GO from January retrospectively)

- on 24th October 2022 **Decree on Guarantees of Energy Origin** has been released (from 1st January 2023) – therefore all the legislation needed is in place

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Biomethane requirements

§ 27f Act on Supported Energy Sources (165/2012 Sb.)

Requirements for biomethane production and its application

- (1) Biomethane produced in biomethane plants resulting from **the modification of biogas-fired power plants** must be produced from **at least 35%** of **the raw materials defining advanced biomethane** specified in the implementing legislation.
- (2) Biomethane produced in biomethane production plants not resulting from the modification of biogas-fired electricity production plants must be produced from at least **45% of the proportion of raw materials defining advanced biomethane** specified in the implementing legislation.

Substrates

- Annex No. 1 to Decree No. 110/2022 Coll. (identical to Annex 9 of RED II)

Biomethane quality

- Decree no. 108/2011 Coll. (on Gas Metering and on the Method of Determining Compensation for Unauthorised Taking, Unauthorised Delivery, Unauthorised Storage, Unauthorised Transportation or Unauthorised Distribution of Gas)

Targets

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Act on RES

- Energy share of advanced biomethane in natural gas and biomethane delivered to filling stations for transport purposes.

  - from 1st January 2023 → 0.5 %
  - from 1st January 2025 → 2 %
  - from 1st January 2030 → 40 %

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National Energy and Climate Plan

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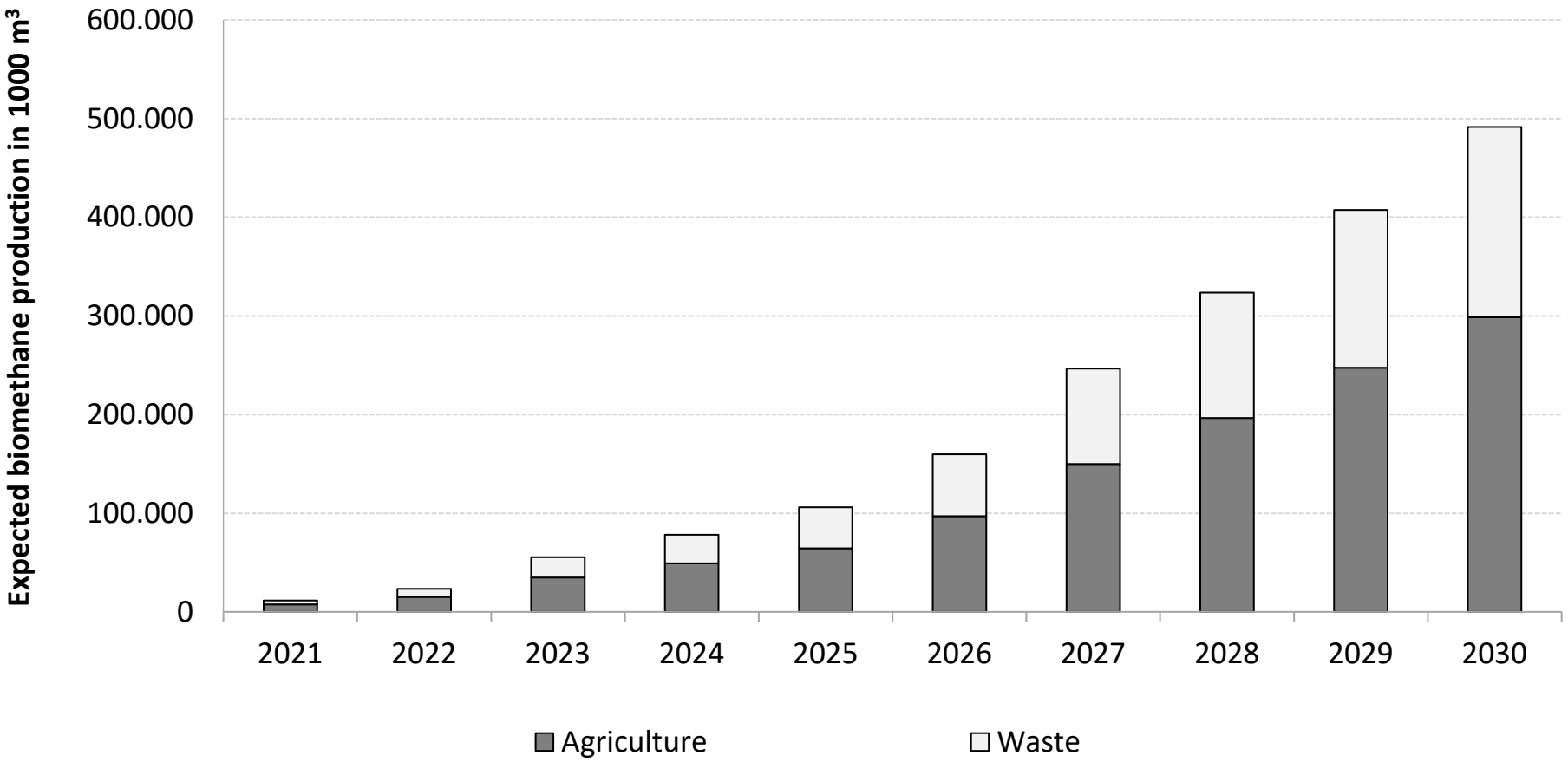

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Long-term visions and roadmaps

Stefano Proietti

Project Coordinator of REGATRACE

Senior Researcher at ISINNOVA

REGATRACE

Renewable Gas Trade Centre in Europe

Long-term visions and roadmaps

Stefano Proietti,
ISINNOVA
Final Conference
Brussels,
16 November 2022

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Objectives

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Elaborating, through a **participatory process**, strategic **visions** and national **roadmaps**, including **recommendations** for legislative and market changes and including the activities aimed at achieving the required development in production, trade and consumption.

Approach and activities

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- Visionniong and roadmaping were centered around **4** participatory workshops in each of the **13** countries: **target** ones (BE, ES, IE, IT, LT, and PL) and in **supported** ones (CZ, EL, EE, FI, LV, UA and SI).

- The workshops followed a common sequence in all countries and the rationale behind was:
  - The first workshop aimed to define a **vision**;
  - The second workshop aimed to define a **roadmap**;
  - The third workshop aimed to define a **country-tailored guidance on feasibility analysis**;
  - The fourth workshop aimed to **sum up** the entire process with **final results** and **lessons learned**.

Barriers

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- **Low profitability** of biogas/biomethane production;
- **Technical and administrative** constraints;
- Lack of a **common quality standard** and of cross-border certificate trade;
- Lack of a Guarantee of Origin (GO) **system**;
- Large availability of **low-cost fossil fuels**;
- Lack of a **stable and long-term** regulatory and legal **framework**;
- Lack of **long-term incentive** schemes;
- No **natural gas infrastructure** for transport;
- Lack or limited number of **methane vehicles**.

Drivers

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- Closing **nutrient loops**;
- Interest for innovative **nutrients**;
- Improving **soil management** and **health**;
- Need of **biofertilisers** in the market;
- Carbon **neutrality** targets;
- National energy **self-sufficiency** and **security of supply**;
- Vitality of **rural areas**;
- Large or increasing number of **filling stations** and **methane vehicles**;
- **Versatility** of biomethane as a solution for different domains, i.e., agriculture, environment, agriculture, transport, employment.

Commonalities of roadmaps

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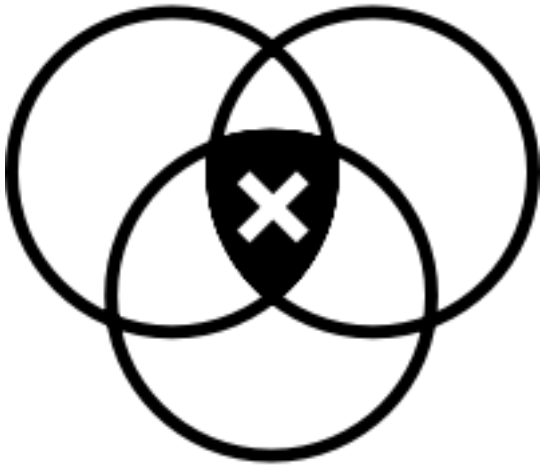
- Implementation of several **incentive schemes**;
- Setting up of a **GO and certification system**;
- Appropriate **legislation** on waste management, nutrient recycling and energy;
- Supply network with distinct biomethane **distribution points**;
- **Development/adaptation** of **gas distribution networks** to inject biomethane and other renewable gases
- Adjusting the **electricity grid** and integration with the energy systems, especially where **electrification is not possible**.
- Strong role of **public procurement policies**;
- Increased **research** on **innovative technologies.**



Conclusions and way forward

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- REPowerEU Biomethane Action Plan (BAP) calls for **national biomethane strategies** in NECP by June 2023
- Task 1 of newly established **BIP** (Biomethane Industrial Partnership) is about **national biomethane targets, strategies and policies**
- **Long-term Visions** and **Roadmaps** of REGATRACE perfectly in line with and paving the way for those activities and outcomes of BAP

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Thanks for your attention!

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Outcomes of the REGATRACE project

Q&A session

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Closing and wrap-up

Stefano Proietti

Project Coordinator of REGATRACE

Senior Researcher at ISINNOVA

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Thanks for your attention!

Any questions?

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