REGATRACE

Renewable Gas Trade Centre in Europe

D2.1
Updated Guidelines for creating the European Biomethane GoO

Deliverable:	D2.1 Updated Guidelines for creating the European Biomethane GoO
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REGATRACE in a nutshell

REGATRACE (REnewable GAs TRAde Centre in Europe) aims to create an efficient trade system based on issuing and trading biomethane/renewable gases Guarantees of Origin (GO) with exclusion of double sale.

This objective will be achieved through the following founding pillars:

- European biomethane/renewablegases GO system
- Set-up of national GO issuing bodies Integration of GO from different renewable gas technologies with electric and hydrogen GO systems
- Integrated assessment and sustainable feedstock mobilisation strategies and technology synergies
- Support for biomethane market uptake Transferability of results beyond the project's countries

The network of issuing bodies will be established by including existing national biomethane registries (Austria, Denmark, Estonia, Finland, France, Germany, The Netherlands, Switzerland and UK) and by creating issuing bodies in the Target countries of the project (Belgium, Ireland, Italy, Lithuania, Poland, Romania and Spain).

Moreover, REGATRACE will prepare the ground for setting-up national biomethane registries in other 7 Supported countries (Croatia, Czech Republic, Greece, Latvia, Slovenia, Sweden and Ukraine).

Using a participatory process involving several stakeholders, REGATRACE will develop strategic visions and national roadmaps to boost the biomethane market.

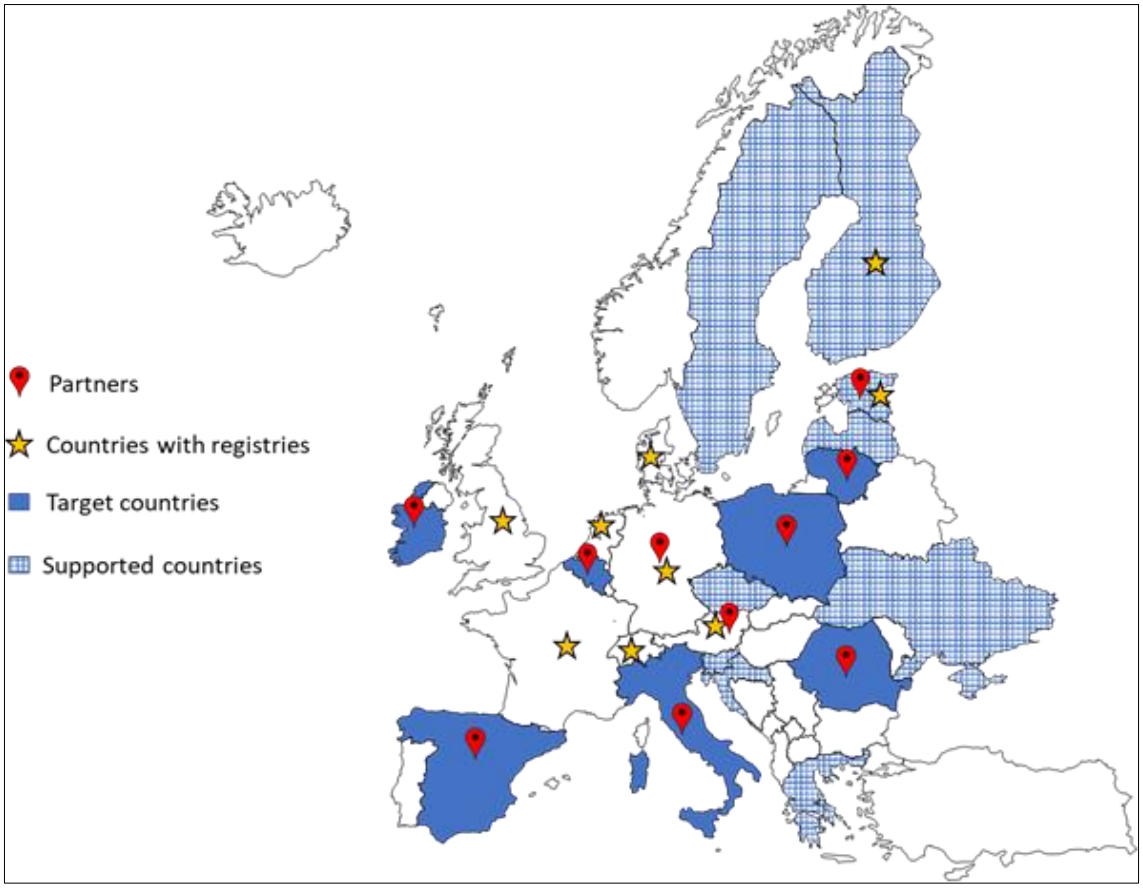

Figure 1 : REGATRACE countries and partners

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1 Purpose of the Document

1.1 Executive Summary

Biomethane, with its characteristics of being a flexible energy carrier, can be applied for a broad set of marketing paths (renewable electricity, renewable gas for heating and cooling, transportation sector, etc). Such different marketing paths require specific characteristics from the product biomethane. Not only the different end uses, also the different types of renewable gases (biomethane, bio-syngas, green hydrogen) will be part of an integrated renewable gas market and should thus be considered in the specification of the renewable gas product.

The development of a biomethane market is complex and requires professional experts and tools in order to not only establish trust in the market but also expand production. Some of these requirements include but are not limited to the construction of further production facilities, increase of biomethane production, tracking of biomethane via a renewable gas registry and bringing the product to market level.

The definition of the origin, quality and quantity of renewable gases have not been requested by European legislation before the publication of the Renewable Energy Directive recast in detail, which extends the purpose of Guarantees of Origin also to gas according to Article 19. However, the green, intrinsic value of biomethane had to be specified and tracked already. Thus, in several European countries, national Renewable Gas Registries have been established, some on voluntary basis, others with government mandate. Their main purpose is creating Renewable Gas Certificates specifying the installation, quantity and quality of renewable gases injected into the national gas grids. Such registries have responsibility towards market participants for being a neutral and trustworthy platform for Biomethane/Renewable Gas Certificates. REGATRACE Deliverable 3.1 “Guidelines for establishing biomethane registries” explains their roles and purpose in detail.

The most important instrument to proof the installation, quantity and quality of a renewable gas product is the Renewable Gas Certificate. The centrepiece of such a certificate is its attribute list which provides information about the renewable gas product on three levels (installation, quantity and quality). In order to develop a competitive renewable gas market which tackles the challenges of climate change and not only provides a solution of the administrative issues of a national and European certificate scheme, the registry system must be able to provide comprehensive and flexible attribute lists. They can provide necessary information for the respective type of renewable gas and their marketing pathway.

1.2 Introduction

This report belongs to the series of Deliverables produced within the REGATRACE project as part of Work Package 2 in relation to cross-border biomethane trade. It is a further development of the report D 3.3 under the BIOSURF project (www.biosurf.eu) . Since its publication in 2016, the European renewable gas market has developed further: new registries were established; bi-lateral agreements have been signed between registries to allow for trustworthy and transparent title transfer of renewable gas certificates; ERGaR, the European Renewable Gas Registry aisbl has been established. ERGaR further developed BIOSURF results and has established a Technical Working Group of existing Renewable Gas Registries; The AIB, the Association of Issuing Bodies has further developed its EECS scheme on the issuing of power GoOs and their cross-border transfer. Many changes have happened on political level, such as the publication of the Renewable Energy Directive recast which requests the

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extension of GoOs also for renewable gases and mandated complying with the CEN-EN 16325 standard. Despite the respectable endeavours of the stakeholders and involved parties, there is not yet a common European renewable gas market and biomethane is not yet solidly integrated in national gas markets.

This report reflect the progress that was made over the past years, based on the experiences and knowhow built by AIB, ERGaR and their members, the established renewable gas registries (most of them project partners or involved in the REGATRACE project as third linked parties to ERGaR) and the REGATRACE project consortium. This report aims at defining the content and attributes of the European Biomethane Guarantees of Origin (further EBGOs) assisting the cross-border trade in Europe.

The authors note at this point of the report, that this document has been written in relation to biomethane for simplicity reasons, although it is supporting the market uptake of all sorts of renewable gases. However, biomethane is the type which is closest to market-readiness and will thus be used to explain necessary procedures and technical requirements. Most of the attributes of a European Biomethane Guarantee of Origin can be directly or indirectly applied to other renewable gases, such as renewable methane of non-biological origin.

1.3 Renewable gas certificates and attributes

RED I does not regulate GOs for renewable gases, so presently not only government designated bodies but bodies operating on voluntary basis can issue such GOs. Due to the fact of missing legislation on renewable gases, existing national renewable gas registries have developed their own rules for issuing biomethane certificates or Guarantees of Origin, respectively, according to national legislation and market requirements.

These certificates are created by the national/domestic renewable gas registries. The domestic certificates are used for various purposes depending on the needs of the domestic market, national subsidy schemes and end-consumer expectations. These “certificates” cannot be called Guarantees of Origin with reference to Article 19 of the RED II unless issued by a government designated body.

With RED II entering into force latest 01 July 2021, the term “Guarantee of Origin” is extended to cover renewable gases. This implies that only those certificates can be called GOs which are issued in accordance with the RED II Article 19, i.e. under the supervision by governments or by government designated bodies. in this document, the term ‘Biomethane Guarantee of Origin’ is used based on the experience gained from issuing biomethane certificates by existing renewable gas registries and complemented with information and experiences provided by AIB on the operation of the EECS scheme.

There are pieces of information in the domestic certificates which are already harmonised or just identical. Examples are injected volume or plant name and address. Several bilateral agreements have been signed between registries to allow for trustworthy and transparent title transfer of renewable gas certificates, but Europe-wide harmonisation and collaboration is necessary in order to allow for an all-European renewable gas market. Some details have not yet been harmonised between established renewable gas registries, for example: production capacity, network connection, share of injected volume in total production, materials used for biogas production, use of different coding structures etc.

For the exchange between registries over national borders, the harmonisation of GOs is needed – this report aims exactly at promoting such a harmonisation and includes proposals for the

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data/information needed and for the attributes to be incorporated into the European Biomethane Guarantee of Origin (EBGOs) for the sole purpose of providing a common base for cross-border transfer.

It is recognised that several European organisations have been involved in developing GO schemes for renewable gases. The members of the REGATRACE consortium, the authors of this paper, are convinced that the EBGOs should have the same content and attributes for all schemes. Such harmonisation is essential for providing clear information to the customers and is the pre-requisite for connecting these schemes in the future in order to allow a harmonised and integrated, Europe-wide European renewable gas market with the clear goal to tackle the challenges of climate change.

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2 Glossary

Attribute

Information field within the electronic document (Certificate), representing different types of information related to the installation, quantity and quality of the renewable gas product. Attributes are essential to the overall value of the renewable gas as different characteristics generate different monetary values for renewable gas producers. Attributes shall be harmonised from organisational (audited attributes) and technically (content option of field) point of view to enable Europe-wide integration.

Association of Issuing Bodies (AIB)

AIB is registered in Belgium as aisbl with office in Koning Albert II-laan 20 v bus 19 B-1000 Brussels.

The purpose of AIB is to develop, use and promote a standardised system: the European Energy Certificate System - "EECS". EECS is based on structures and procedures which ensure the reliable operation of international certificate schemes. These schemes satisfy the criteria of objectivity, non-discrimination, transparency and costs effectiveness, in order to facilitate the international exchange of Guarantees of Origin. In order to further facilitate this, the AIB operates an inter-registry communications hub.

Book and claim

A GO can be transferred, independently of the energy to which it relates, from one holder to another, trade in physical products is completely decoupled from the transfer of sustainability certificates. The key difference with a mass balance system is that it can only be claimed that the sustainable feedstock has been added to the overall market. It cannot be claimed that sustainable feedstock has been added to the biofuel supply chain.

Certificate

General term for all kind of electronic documents verifying the characteristics of renewable gas consignments. Certificates may have different functions, application and relevance in different legislations but all of them serve as a proof of certain quality and quantity of the produced renewable gas volume.

Chain of Custody

The methodology by which a connection is made between information or claims concerning feedstocks or intermediate products and claims concerning final products. The chain of custody should cover all stages from feedstock production up to the release of fuels for consumption.

Economic operator

A company, corporation or municipality having title to biomethane consignments, respectively GOs (producers, traders, consumers, etc.).

ERGaR aisbl

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International non-profit organisation established under Belgian law with its registered seat in 1040 Brussels, Rue d'Arlon 63-65.

European[1] Biomethane Guarantee of Origin (EBGO)

Guarantee of Origin with harmonised content and attributes to be used for cross-border exchange of GOs in relation to biomethane/renewable gas consignments. At the time of composing this Deliverable, before RED II entering into force EBGOs can be issued both by government designated bodies and biomethane registries established and operated on voluntary basis. Nevertheless, under RED II only governments and government designated bodies will supervise the issuance of renewable gas GOs. (RED II Art.19.5 "*Member States or designated competent bodies shall supervise the issuance, transfer and cancellation of guarantees of origin. The designated competent bodies shall not have overlapping geographical responsibilities and shall be independent of production, trade and supply activities*".)

External audit/inspection

External audits/inspections are carried out by independent, third party professionals who perform an impartial audit/inspection. The external auditors/inspectors do not have a developed relationship with the organisation that they are reviewing, they are not biased in any way and they can be objective throughout their audit/inspection. External audits are specifically conducted to prove qualitative attributes of renewable gas volumes produced, upgraded to natural gas quality and injected into the natural gas network. An audit in general results in additional information added to the biomethane consignment such as usage of substrates, acknowledgement of volumes and calculation of emissions.

Fuel Quality Directive (FQD)

Directive 2009/30/EC of the European Parliament and of the Council of 23 April 2009, amending Directive 98/70/EC as regards the specification of petrol, diesel and gas-oil; introducing a mechanism to monitor and reduce greenhouse gas emissions; amending Council Directive 1999/32/EC as regards the specification of fuel used by inland waterway vessels; and repealing Directive 93/12/EEC.

Greenhouse gas emission

The sum of greenhouse gas (GHG) emissions caused along the whole biomethane/renewable gas supply chain, including all relevant emissions from biomass production and conversion processes, up to delivery to the final user. The GHG emission resulting from forwarding biomethane/renewable gas in the natural gas pipeline system is to be included in the calculation[2]. The generated GHG emission value is expressed in CO_2 equivalent in grams per MJ of Low Heating Value.

Government designated body

A government agency or any other organisation or company appointed by the national Government as issuing body for Guarantees of Origin in accordance with RED II (see quote from RED II: Whereas 59. in 3. below.)

[1] "*European" stands for harmonised on the European level*

[2] *The default value for GHG emission during pipeline transportation is to be determined as corresponding to the average methane loss factor in the European natural gas transmission system, as soon as such an average loss factor has been fully defined by Marcogaz, the Technical Association of the European natural gas industry and through further consultation with the natural gas transportation industry*

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Guarantee of Origin (GoO or GO)

The RED I[3] defines "Guarantee of origin" as follows:

"*Guarantee of origin means an electronic document which has the sole function of providing proof to a final customer that a given share or quantity of energy was produced from renewable sources*".

The RED II[4] maintains the same definition for the function for GOs:

"*Guarantees of origin issued for the purposes of this Directive have the sole function of showing to a final customer that a given share or quantity of energy was produced from renewable sources."*

Generally, a GO is an electronic document which has the sole function of providing proof to a final customer that a given share or quantity of energy was produced from energy source to which the GO relates. REGATRACE covers GOs issued for gases of renewable origin.

According to the **EECS Rules** a Guarantee of Origin is a certificate issued by (a) a Competent Authority; or (b) by a Member acting as the duly authorised agent on behalf of a Competent Authority, under the laws of a State as a guarantee of the nature and origin of energy for the purpose of providing proof to the final consumer of energy that a given share or quantity of energy, as the case may be:

(i) was produced from the energy source to which the guarantee relates; and/or
(ii) was produced by the specified technology type to which the guarantee relates; and/or
(iii) has, or the Production Device(s) which produced it has (or have), other attributes to which the guarantee relates;

Higher Heating Value (HHV)

The higher heating value, HHV – also known as the gross calorific value (GCV) or higher calorific value (HCV) of a fuel – is defined as the amount of heat released by combusting a specific quantity and returning the temperature of the combustion products to 25°C, which assumes that the latent heat of vaporization of water in the combustion products is recovered.

Internal audit

Internal audits, sometimes called first-party audits, are limited in scope to a single organisational unit and are conducted for management review and other internal purposes and are carried out by, or on behalf of, the organisation itself. Upon conclusions by internal audits external audits may be ordered.

Issuing Body

A Member in a GO scheme duly accepted and admitted by the operator of the GO scheme upon meeting the authorisation criteria with respect to the GO scheme.

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[3] *Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources, amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC of the European Commission, as amended by Directive (EU) 2015/1513 of the European Parliament and of the Council of 9 September 2015.*

[4] *The Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources (recast)*

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Lower Heating Value (LHV)

Lower heating value, LHV, also known as the net calorific value (NCV) or lower calorific value (LCV) of a fuel, is defined as the amount of heat released by combusting a specified quantity and returning the temperature of the combustion products to 150°C, i.e. assuming that the latent heat of vaporization of water in the combustion products is not recovered.

Mass balancing

Mass balancing is a calculation technique allowing to calculate the amount of mass (or energy) in process and waste streams. Mass and energy cannot be created or destroyed, correspondingly anything which goes into a system (or process step) must come out or be stored in it. Mass and energy balancing may be applied over an entire organisation, plant or factory, over an individual process step or item of plant/equipment, or anything else within determined boundaries.

Multiple counting

Multiple counting relates to accounting more than once for the same quantity of energy with specific attributes. It may result in or be due to multiple issuing of a certificate, multiple selling of such certificate, multiple use of such certificate, or in the claim of the use of the energy with the attributes as mentioned on the GO, without actually cancelling such GO.

Multiple target counting

Multiple target counting concerns the meeting of national renewable energy consumption quota targets. If a biomethane/renewable gas consignment has been counted towards meeting the national biofuel/renewable energy consumption quota target in its country of production, then such biomethane/renewable gas consignment is not eligible for counting towards meeting the national biofuel/renewable energy consumption quota targets in the importing country.

Multiple registration

The registration of biomethane/renewable gas producers and production volumes at the national biomethane/renewable gas registries includes the admission as system user and the allocation of an account. The principle requirement for excluding the multiple registration is that any biomethane producer can only be connected to the European cross-border GO transfer scheme through one GO issuing body.

Normal m^3 (Nm^3)

The volume of any gaseous material at temperature: 0 °C, and pressure: 1.01325 barA.

Renewable Gas Registry

The functions and performed tasks by a national biomethane/renewable gas registry depend on the domestic regulatory and business environment and may differ from country to country. Generally, the key functions of the registries are

- Providing harmonised and transparent electronic documentation of biomethane/renewable gas consignments

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- generate confirmations for the volumes of renewable gas included in the scope of their activities and document the final consumption by providing a proof of withdrawal
- Participating in the European network of national biomethane/renewable gas registries with the purpose of promoting the cross-border trade and the development of this sector in Europe

REGATRACE Deliverable 3.1 "Guidelines for establishing biomethane registries" are explaining their roles and purpose in detail (www.ergar.eu).

Renewable Energy Directive (recast) – RED II

Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources (recast)

Renewable gas

Combustible gas produced from renewable non-fossil sources, including

- biogas/sewage gas/landfill gas upgraded to natural gas quality;
- methane produced through methanation of syngas from gasification of solid biomass;
- methane produced from other renewable sources, such as synthesis of hydrogen (using renewable electricity) with carbon dioxide of biogenic or non-biogenic origin).

Renewable gaseous transport fuel of non-biological origin

According to RED II, renewable transport fuels are gaseous fuels which are used in the transport sector other than biofuels or biogas, and the energy content of which is derived from renewable sources other than biomass.

Sustainability characteristics

The sustainability characteristics of individual biomethane consignments – defined and documented in accordance with Article 17 of RED I, respectively in accordance with Articles 27-30 of RED II – are transferred cross-border via the application of a mass balancing methodology.

System user at a GO issuing body

Users who are admitted to participating in the GO scheme. Any natural or legal person complying with the rules, regulations and requirements on the respective GO system is entitled to use the scheme, all systems users are treated equally.

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3 Composition of an EBGO

3.1 Background Information

The production of biomethane and the generation of Certificates require reliable documentation. Such Certificates contain various attributes, which on the one hand provide information about the quality of injected biomethane, its sources, auditor statement and on the other hand information about the biomethane production plant.

The following attributes play a primary role in the product information and should be attached to the biomethane Certificate:

- biomethane plant specific information (production facility, commissioning, injection point, etc)
- metering data (e.g. data on biomethane quantity from grid operators or the clearing agent to fulfil mass balancing)
- audited data (used/treated substrates incl. details on processing, quality, volume, sustainability, GHG characteristics, etc).

The list of information can be expanded or reduced reflecting the changes in regulations, support systems and market requirements.

Due to blending of fossil and renewable gas molecules, the issuance and administration of Certificates provide the only solution to differentiate between biomethane/renewable gas and natural gas. The Certificates reflect the special value of "green" gases, as compared to the fossil equivalents. This special value is related to being renewable and environmental-friendly to support climate protection and circular economy.

Tracking biomethane consignments is especially challenging in case of transportation through the natural gas pipelines. After biomethane and other renewable gases are injected into the gas grid, the molecules blend with natural gas molecules and cannot to be traced physically anymore. The biomethane/renewable Gas Certificates contain all information/data concerning the injected biomethane/renewable gas volumes. They document the respective produced, distributed and consumed volumes.

The renewable gas registry/issuing body model separates the intrinsic green value of renewable gas from all physical elements of the gas chain (commodity, capacity, and transport) and opens the path to the European biomethane market. Nevertheless, the physical tracking can be done along the transfer of Gas Certificates, but not together yet due to insufficient market development. For example, only natural gas can be moved within pipelines without specific options to declare it as renewable gas during transport, specifically cross-border, using gas networks. But the withdrawal of gas can be documented to close a mass-balance between injected and withdrawn volume if required by market participants. By adding gas certificates to this documentation, a fully closed mass-balance of renewable gases can be achieved even with cross-border trades.

Each European country shall have at least one national biomethane/renewable gas registry or a dedicated contact point for the generation and the exchange of certificates. This does not exclude the possibility that more than one registry in a country exist. Since there are many different purposes and renewable gases, more than one registry can exist in one country or region. In this regard a well-functioning exchange of information is required in order to avoid double counting and double sale of renewable gases. Hence, different registries are existing mainly for various purposes of renewable gas

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use such as labelling, transport or industry. Still, it should be avoided to create such certificates based on information only provided by the owner of the certificate or the producer.

3.2 Definition of EBGO

3.2.1 Recitals from RED I and RED II

RED I[5] defines "Guarantee of origin" as follows:

"*Guarantee of origin means an electronic document which has the sole function of providing proof to a final customer that a given share or quantity of energy was produced from renewable sources*".

The RED II[6] maintains the same definition for the function for GOs:
"Guarantees of origin issued for the purposes of this Directive have the sole function of showing to a final customer that a given share or quantity of energy was produced from renewable sources."
The principally important addition in RED II (as compared with RED I) is to extend the system of GOs to renewable gases:

Recital (59) "*Guarantees of origin which are currently in place for renewable electricity should be extended to cover renewable gas. …… This would provide a consistent means of proving to final customers the origin of renewable gas such as biomethane and would facilitate greater cross-border trade in such gas. It would also enable the creation of guarantees of origin for other renewable gas such as hydrogen.*"

RED II specifies the "*book and claim" approach in relation to the GOs with the wording: "A guarantee of origin can be transferred, independently of the energy to which it relates, from one holder to another."*

3.2.2 Definition of EBGO by REGATRACE

In the spirit of RED I and RED II the term *"European Biomethane Guarantee of Origin (**EBGO**)*" is used in this report with the following meaning:

*"EBGO is an electronic dataset including Europe-wide harmonised information and attributes related to a specified biomethane consignment. **EBGOs** may have documents attached to them - like auditor's reports, sustainability certificates, etc. – to confirm the information contained. It shall be of the minimum standard size of 1 MWh."*

EBGOs can be issued for biomethane consignments produced in any Member State of the European Union, the EFTA and the European Economic Community or in a third country. [7]

[5] *Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources, amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC of the European Commission, as amended by Directive (EU) 2015/1513 of the European Parliament and of the Council of 9 September 2015.*
[6] *The Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources (recast)*
[7] *Article 19 para 11. „Member States shall not recognise guarantees of origins issued by a third country except where the Union has concluded an agreement with that third country on mutual recognition of guarantees of origin issued in the Union and compatible guarantees of origin systems established in that country, and only where there is direct import or export of energy."*

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Biomethane represented by an **EBGO** can be delivered to customers in any of the forms listed below:

- compressed biomethane injected into the interlinked European natural gas network,
- compressed biomethane injected into the national natural gas network of any Member State of the European Union, the EFTA, the European Economic Community (and in a third country – see footnote 7), independently whether the national natural gas networks are interlinked or not,
- compressed biomethane delivered to customers in road or rail tanks, or
- liquified biomethane delivered to customers in road and/or rail and/or ship tanks."

3.3 Minimum content of a European Biomethane GOs

According to Article 19 para 7. of RED II, the Guarantees of Origin must specify at least:

- "*the energy source from which the energy was produced and the start and end dates of production;*
- *whether it relates to: (i) electricity; (ii) gas, including hydrogen; or (iii) heating or cooling;*
- *the identity, location, type and capacity of the installation where the energy was produced;*
- *whether the installation has benefited from investment support and whether the unit of energy has benefited in any other way from a national support scheme, and the type of support scheme;*
- *the date on which the installation became operational; and*
- *the date and country of issue and*
- *a unique identification number".*

RED II stipulates only the minimum content of the energy GOs. In relation to biomethane (and other renewable gases) the GO should be extended with additional attributes as they provide essential insight for transparency reasons and potentially increase monetary incomes. However, such data fields could be filled in optionally to provide corresponding information such as:

- Mode of transport from the production unit,
- Information on the share of each processed biomass feedstock,
- GHG emissions caused by the [8]production of the consignments ("carbon intensity" or GHG emission intensity").

In view of the universal applications of renewable gas, the EBGOs will not provide all information meeting all potential requirements in all potential countries of destination and all potential ways of using biomethane. Correspondingly, the information content of the EBGOs may not be sufficient in certain cases. On the other hand, still national attributes can be used on national Renewable Gas GOs beyond the EBGO attributes. However, European attributes should be harmonised to allow smooth and faultless handling by all market participants across Europe.

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[8] *Note: The German/Austrian registries do not issue a unique identifier for each GO (meaning 1 MWh = 1 GO, as specified in RED-II). A unique identifier for the overall amount of energy (MWh) contained in the transfer (mass balance and/or book & claim) is issued. When the total amount is divided, both subsets are getting a new own ID which refers always to the origin. To have one ID for every MWh is not practical as the bulk of the biomethane volumes will be traded with more than 1 MWh. Further discussions on harmonisation should be encouraged within the framework of WP2 within the REGATRACE project life span.*

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3.4 General, technical and organisational requirements for Europe-wide harmonised EBGOs

3.4.1 General requirements and introduction to attributes

The EBGO is an electronic document, providing information about the green, intrinsic value of the respective renewable gas product. It allows to differentiate fossil from renewable gas as it provides different types of information related to the installation, quantity and quality of the renewable gas product. The centrepiece of an EBGO is the list of attributes which hold the beforementioned information. Attributes are essential to the overall value of the renewable gas as different characteristics may generate different monetary values for renewable gas producers.

From technical and organisational point of view, attributes are considered data fields within an IT-database of the registry/issuing body, holding the relevant information about the installation, quantity and quality of the renewable gas product within. The respective attributes may differ in their characteristics, importance and significance, information value. Some attributes may be obligatory, others optional and the information presented within an attribute may be provided by different parties who contribute to the issuing of the EBGO.

To reach harmonisation between existing registries and allow easy connection to and communication with newly established issuing bodies within a broader network, technical requirements of the EBGOs have to be harmonised and clearly specified. The list of necessary attributes of an EBGO are explained in the Chapter 4 Those attributes need to be enhanced with additional **technical and organisational specifications** for better market integration across other registries and Europe as a whole.

3.4.2 Technical requirements

From a technical point of view, the following characteristics of an attribute are possible among others:

- Dropdown menu providing to choose from a predefined selection
  - Example attribute is “substrates and source materials”: the substrates used to produce the respective renewable gas product of the EBGO shall selected from a list, which had been pre-defined (harmonised) by the relevant stakeholders.
  - Technically this can be solved via deciding on a dropdown menu for this attribute a so-called enumeration. The IT-processes behind, in order to map the information provided by the attribute into the domestic database are complex. Without providing harmonised pre-defined selections, no (semi-)automatic IT-processes will be feasible.
  - See also chapter ‘4.2.7 Type of substrate(s) processed in the biogas plant’
- Dropdown menu providing a yes/no or true/false selection
  - Example attribute is “national subsidy”: the receiving party shall be informed if national subsidies had been used to produce the respective renewable gas product of the EBGO
  - Technically this can be solved via a boolean-field, which is a ‘yes/no’ or ‘true/false’ dropdown menu (with two options) for this attribute.
  - See also chapter ‘4.2.9 Financial support granted to producer’
- Data field referring to date and time
  - Example attributes are “start of injection period” and “end of injection period”: the exact date (and time) of start and end of the respective injection period when the respective renewable gas product of the EBGO was produced, has to be stated.
  - Technically this can be solved via a data field referring to date and time for this attribute.

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- See also chapter '4.2.5 Injecting period'

- Free character sequence
  - Example attributes are "name of installation", "address of installation" when text is inserted into a data field. Other examples attributes are ID numbers such as "metering point" or "EBGO ID in the registry". Such information is necessary to provide transparency on the respective renewable gas product of the EBGO.
  - Technically this can be solved via a data field providing free character sequences to be inserted. There might be more detailed definitions necessary, e.g. definition of maximum number of characters or definition of types of characters used to avoid non-translatable characters (e.g. ä, ö, ü from German language might not be accepted/translatable in IT-systems of non-German-speaking countries).
  - See also chapters '4.2.2 Name and address of producing installation' and '4.2.6 Quantity injected'

- Other technical requirements are:
  - Data fields of some attributes may also be defined as obligatory or optional.
  - It has to be defined, how to deal with the possibility of information not being made available. Can the information be left out of an attribute, meaning a data field is left empty, or should an information such as 'not applicable/n.a.' be provided as information for the attribute?

3.4.3 Organisational requirements

As this report is meant to support the harmonisation across different countries and different types of renewable gases, it provides a possible categorisation of the attribute list of an EBGO and divides the composition of an EBGO into four different attribute levels which will be described in detail in the following subchapters of '3.5 Composition of an EBGOs on attribute level'. Figure 2 illustrates the four attribute levels on the example of a Renewable Gas Certificate issued by the Biomethane Registry Austria. The information presented within an attribute may be provided by different parties who contribute to the issuing of the EBGO. The main purpose of the graphic illustration is to explain the separated information flows which merge within the attribute list in order to create a viable and robust EBGO holding all necessary information on the respective renewable gas product.

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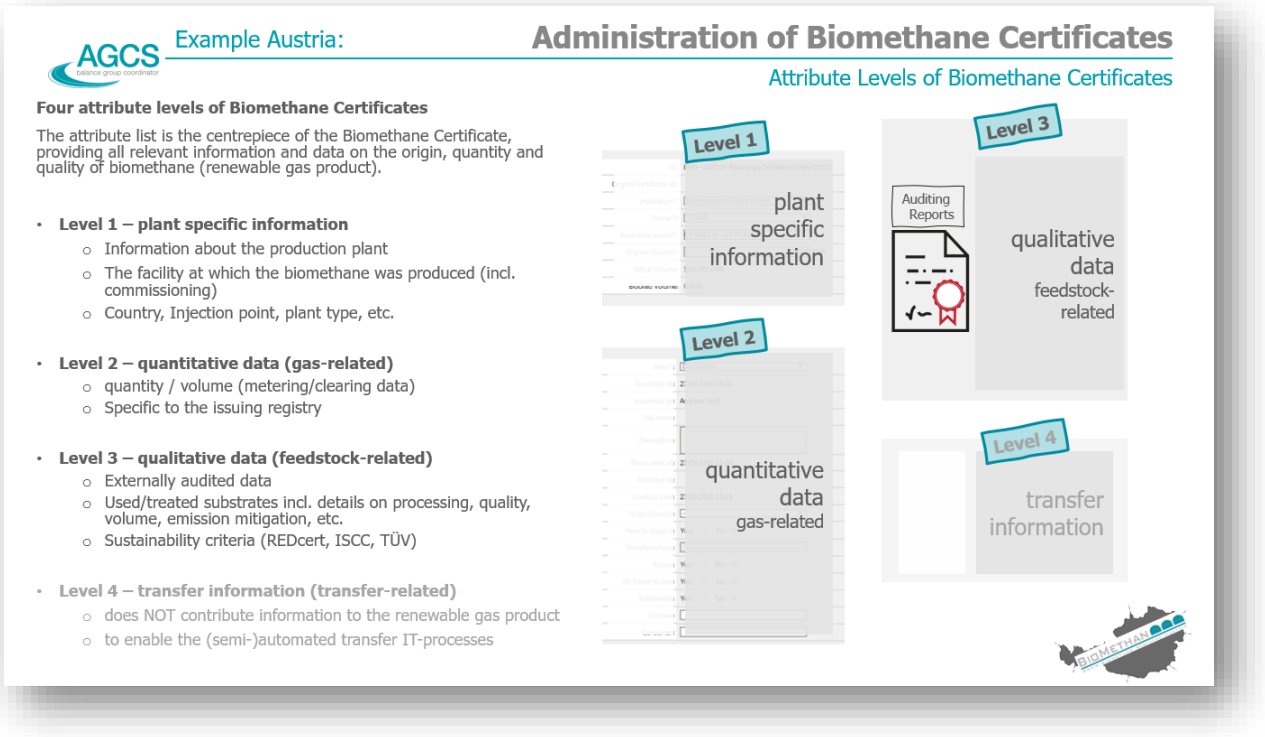

Figure 2: Illustration of the four attribute levels of a Biomethane Certificate by Biomethane Registry Austria (example provided by AGCS)

3.5 Composition of an EBGOs on attribute level

3.5.1 Attribute level 1 – plant/installation-specific information (master database)

At the moment of issuing the EBGO, it will be automatically assigned to the renewable gas producer. Information on the installation at which the renewable gas product of the EBGO was produced, represents the first attribute level. This type of information is static, considered to be constant information unless constructional adaptations of the plant, e.g. production capacity, are performed. Thus, each Renewable Gas Registry / Issuing Body should prepare a master database including all relevant information and data on the producing installation. Example attributes are “production facility”, “commissioning”, “injection point”, etc; details on the type of information are described in chapter ‘4.2.2 Name and address of producing installation’.

3.5.2 Attribute level 2 – quantitative information (renewable gas injection volumes)

The second attribute level contains quantitative data and information on the renewable gas product of the EBGO. If the generation is done by the national clearing authority (examples AT, DK, NL), the EBGO is created based on metered injection data directly provided from the clearing system, without the influence of external auditors. This method provides for a simple option from a technical point of view and highest security level concerning the correctness of data from organisational and technical point of view. Another option is to provide data manually by the registry user or by authorised external auditor.

Attribute level 2 includes basic information on the volume and production period. The moment of making information of attribute level 2 available, is equivalent to the issuing time of the EBGO.

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3.5.3 Attribute level 3 – qualitative information (third-party information, substrate and process data)

Attribute level 3 includes attributes which are created by external auditors after validation of the plant has been performed or at least qualitative checks of data of level 1 and 2 have been performed. Usually this level represents audited information dedicated to the substrates - including details on processing, quality, volume – as well as GHG emission volumes and characteristics of the renewable gas produced.

3.5.4 Attribute level 4 – transfer-specific information

Attribute level 4 has a special ranking within the four attribute levels, as it is the only one, which does NOT contribute any information on the renewable gas product per se. Attribute level 4 contains information which is specific to the transfer and/or trade only. Although it is not related to the quantity and quality of the renewable gas product, it provides essential information to enable the (semi-)automated IT-processes necessary to conduct the cross-border transfer of the EBGO, for example information on target registry or receiving entity and transfer identification time including time stamps.

3.5.5 Conclusion on attributes

The already established renewable gas registries, the mandated renewable gas GO Issuing Bodies and the to be established new registries and Issuing Bodies will have to align and harmonise their attribute lists and the respective technical and organisational requirements of those attributes. A minimum consensus for their attributes to be harmonised is a pre-requisite in order to provide smooth and faultless cross-border transactions and trade of EBGOs within Europe.

3.6 Handling of EBGOs

3.6.1 Issuing an EBGO

Information of attribute level 1 is provided by the plant operator itself via self-declaration during the registration process at the Registry and the information is validated by an authorised auditor. Biomethane injection facilities will be inspected by experts/auditors before operation begins and as a consequence of any facility changes (for example repowering). In the case that a subsidy agency conducts their own inspection, the expert/auditor will conduct the inspection in accordance with the criteria of that agency. After that, the information is considered static unless any constructional changes are performed at the plant.

The moment of making information of attribute level 2 available, is equivalent to the issuing time of the EBGO.

Information on attribute level 3 are also provided by an external expert/auditor who has access to the issued EBGOs for a dedicated plant (declaration has to be submitted) via their own dedicated account in the registry. This way, the national biomethane registry administrator allows inspectors to grant approvals/reports for certain biomethane batches of each injection period. The approval remarks for each partial quantity and certificate generated by the facilities are automatically transmitted. The registry itself does not add the data of the participants or inspectors, remove anything or evaluate anything. The registry merely takes the data provided and documents the results. The registry also offers the account holders a report so that they may see and understand what has taken place.

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Information on attribute level 3 is thus made available AFTER the EBGO (including information of attribute levels 1 and 2) have already been issued.

3.6.2 Size of EBGOs

According to the RED II, the GO standard size is 1 MWh. However, an EBGO is generated for a certain period of renewable gas production and consequently injection into the domestic gas grid.

The issuing body works only on the level of EBGO creation and transfer and not on level of transportation of physical volumes. EBGO can be transferred between participants and deactivated by the respective owner. The issuing body records the corresponding EBGO transfers for each participant.

For efficiency, GOs can be bundled in certificate sets, which are further handled in the way described in this document. On the other hand, an EBGO can be split to provide for different recipients. However, it is important to stress, that only the attribute "renewable gas volume" of an EBGO can be split. All the other attributes of an EBGO (attribute levels 1, 2 and 3) remain unchanged especially characteristics about substrates (attribute level 3).

3.6.3 Splitting of a set of EBGO

The following paragraphs explain a suitable method and the respective organisational and technical requirements, e.g. the ID scheme, for splitting a "mother EBGO" into several "child EBGOs" while not losing or adding any information of the original "mother EBGO".

The relevant "mother" GO, which was created based on the information initially provided for the production period must be able to split. Hence, the split part will be split from the "mother" GO and two certificates will exist.

In general, two options exist to split GO technically. The first option is to create a new ID for the split certificate part of the GO whereby this ID is generated according to an agreed scheme to ensure the uniqueness of each GO. The attributes of the "mother" GO are copied to the split GO and two individual GO will exist after the split which can't be put together anymore. They are individual GO with their own rights and permissions.

The second option is to define the GO as a set which is identified by the ID of the first and the last GO in the set whereby each step is defined as 1 MWh. Thus, splitting of the set is simple as no new ID will be generated due to its identification of the volume amount. For example, a GO with the production volume of 1,800 MWh for the period 2019/11/01 to 2019/12/01 will be created as one batch but with 1,800 IDs. In case of a split for example 500 MWh, one additional batch will be created. In sum two batches one with 1,300 IDs and one with 500 IDs will exist.

After a split of a GO, the original injected volume may still be of importance and therefore this information should not get lost because of a split or transfer. The GO may carry other volume information generated during injection with it. The ratio of the actual volume of a GO and the original volume could be of relevance for determining the actual value of other volume attributes. So, a GO holds two volumes – the actual volume and also provides additional information on the original renewable gas volume.

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3.6.4 Withdrawal/Cancellation of an EBGO

The documentation on withdrawal is not mandatory under the "book and claim" approach. Individual biomethane registries may still elect to establish the link between the imported **EBGO** and the physical gas consumption due to national requirements on auditing.

3.6.5 Specifics on cross-border transactions

To raise biomethane/renewable gas from the domestic to the European level, it is necessary that standardised interfaces are in place between domestic registries and harmonised certificate composition and structures are established to execute the transfer of EBGOs between European registries. The cross-border transfer process has to follow a standardised and clearly defined procedure which has to be based on a harmonised structure and technical requirements of the applied attributes. This transfer process must facilitate the cross-border transfer of Certificates even if the legal framework and the organisational processes and IT-systems of national registries are different.

The exchange of GOs between European registries requires a common identification and attribute scheme for GOs. Different identification schemes and attributes would hinder the exchange of GOs among European registries. The aim of this document is to describe the attributes, GO identification scheme and the requirements that a GO should meet to be fit for European exchange.

Requirements for the translation of a national GO into a European GO and its cross-border transaction:

- Whatever the GO transaction may be, no information must get lost.
- Registries do not change and do not delete attributes of a GO.
- When a GO is transferred, all attributes and documentation of a GO is transferred, and no information gets lost during transfer.
- The sending registry flags the GO as deactivated "because of transfer" but does not delete anything. In fact, the registry just adds information to the biomethane database (attribute level 4), if the registry overwrites information it is maybe only a status field.
- At any point in time registries should be able to trace the lifespan of a GO, including all transactions and all authorized persons involved.

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4 Content of an EBGO

4.1 Standardised GO Identification in Europe

4.1.1 Background information on GO identification

A standard unique identifier for every single issued European Biomethane Guarantee of Origin is required to enable the identification of GOs through cross-border transfers/trades along the chain of custody. This uniqueness is guaranteed by the way the ID for a GO is constructed. This identifier may differ from the identifiers applied by the national biomethane registries on the domestic market.

Where a domestic GO has been already issued for a given biomethane consignment, then this must be deactivated simultaneously with the issuance of the European GO (the national biomethane registry marks the original GO as "replaced by **EBGO"**). The competent national registry should keep clear records linking the deactivated domestic GO with the related issued European GO. The attributes of the original GO cannot be claimed any more. The original GO will no longer be available for further actions in the outgoing registry after the transfer is successfully completed. To make the content of the GO available to authorities or auditors, a 'cancellation document' is issued which is attached to the deactivated GO.

4.1.2 Alternative 1: example ID from EECS

Regarding electricity GOs in EECS there is a 30-digit code, including a country prefix and a company prefix and a product prefix and a chronological number. This code is based on the GS1 coding standard. See A 2.3 of EECS Subsidiary Document 03 alias "HubCom". www.aib-net.org/eecs.

4.1.3 Alternative 2: example ID from established renewable gas registries

The GO ID scheme could look as follows:

BMGO#Country#Registry#Plant#meteringpoint#prodfromdate#prodtodate#timestamp#checkcharacter

where:

- Biomethane GO definition like BMGO
- Country Code (two-digit code: AT, CH, DE, DK, FR, UK etc.).
- Biomethane registry, alias
- Metering point, number
- From date, date when injection of biomethane started
- To date, date when injection of biomethane ended
- Timestamp, the issuing date when the GO was created
- Check character

The check character can be based on various number of previous characters used to ensure the validity of the ID. The principle of the check character is a standard for ID validation. The implementation of an algorithm for the calculation of the check character must be defined (for standardised international trade it is advised to have a standardised number of digits, so that acceptability of the certificate can be automatically checked by checking algorithms.)

4.1.4 Austrian Example (AGCS)

Digits in total 78

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BMGO+"AT"+"AGCS"+33 + 8 + 8 + 17 + 1

Whereas the metering point in Austria or Germany is 33 digits

Metering Point structure in Austria:

- Country code DIN ISO 3166 (2 digits)
- Grid operator (6 digits)
- Postal code (5 digits)
- Meter point number (20 digits)

Example of metering point

- DE 000562 66802 AO6G56M11SN51G21M24S
- AT 008100 08010 AO6G56M11SN51G21M24S

4.1.5 Example of a European GO ID:

BMGO#AT#AGCS#AT00810008010AO6G56M11SN51G21M24S#20150101#20150131#YYYYMMDDHHMMSSmmm#C

4.1.6 Example from AIB

For generation of electricity GO according to EECS there is a 30-digit code, including a country prefix and a company prefix and a product prefix and a chronological number. This code is based on the GS1 coding standard. See A2.3 of EECS Subsidiary Document 03 alias "HubCom" (www.aib-net.org/eecs).

4.1.7 German Example (dena)

Dena uses a 23-digit code, including sender ID, date and time stamp and a random generated identification number. If something like the metering point would be used (in Germany 33 digits) the GO IDs were be quite long. Furthermore, all listed attributes here lead to that problem that all GOs from one production period will have the same ID when one GO is only for 1 MWh.

4.2 Standardised attributes[9]

4.2.1 Country Code of the producing country

- **Alternative a)** the two-digit country codes used by the EU administration (AT, CH, DE, DK, FR, UK etc.) are to be applied.
- **Alternative b)** On EECS certificates the two-digit country codes are based on the ISO 3166-1 country code list.

[9] *In addition to many of the named attributes, under EECS there are also the following attributes on an EECS GO (see EECS Rules C3.5.4 and the scheduled update with the gas scheme):*

- *Production device commissioning date*
- *Technology of production device (besides energy source)*
- *Purpose (is it only a GO (= for disclosure) or can it also be eligible for support or for a target?)*
- *Whether an additional label (Independent Criteria Scheme – ICS) is attached to the GO, and the name of such ICS*

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- **Alternative c)** The three-digit ISO codes are to be applied, as two digits is not sufficient for Belgium, Greece, Bosnia, where there are >1 region within the country, and each is regulated separately

The identifier mentioned in chapter '4.1 Standardised GO Identification in Europe' above must include the country code of the country of production.

The transparency and trustworthiness of the system requires clear identification of the consignments and the country of production is one of the important attributes of a biomethane consignment. The country code will be filled by the sending registry (attribute level 1).

The country code relates to the country of production also where the issuing registry is located in a different country (i.e. there is no registry established in the country of production).

4.2.2 Name and address of producing installation[10]

According to Article 19. para 7. of RED II, the Guarantees of Origin must specify – among other attributes – the identity, location, type and capacity of producing installation.

In accordance with the practice in the biogas industry, the name of the location (city, village, etc.) will can be used as the key identifier of the installation. Every biomethane producing unit joining the national registry will have an identification number – allocated in the sequence of being originally registered. In practice, it may be sufficient to include the identification number of the producing unit – the biomethane registry at the other end of the chain (operating on the country of consumption) will always have the possibility to request the detailed information on the producer from the issuing registry (operating in the country of production).

In case of injection into the natural gas pipeline network, the site of injection should also reference the point of injection such as a meter reference number. Every point of entry and exit of the gas grid will have a meter reference number and this should be recorded as part of the site details.

The national registry also records the biomethane producing capacity and the permitted substrates for the producing installation in question – see below.

4.2.3 Mode of delivery[11]

The final consumers may want to know how the biomethane consignment covered by the EBGO has been delivered. Responding to this requirement the EBGOs should differentiate between the following ways of delivery:

- compressed biomethane injected into the interlinked European natural gas network,
- compressed biomethane injected into the national natural gas network of any European Union, the EFTA and the European Economic Community member state, independently whether the national natural gas networks are interlinked or not,

[10] *In EECS the name of the Production Device is an optional data field, and the Production Device ID is the unique identifier. This ID is also set up according to the GS1 standard. In addition, the location is a mandatory field on the EECS GO. The location can either be given by the address (postal code and city and country) or by the geographical coordinates.*

[11] *In the drafted EECS Gas scheme, the ways of delivery ("means of supply") are listed in a separate fact sheet, to which the Scheme Document refers, in order to allow for flexible adaptation in case of need.*

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- compressed biomethane filled in road or rail tanks,
- liquified biomethane filled in road and/or rail and/or ship tanks
- Biomethane consumed on the site of production.[12]

It will be difficult to track the mode of delivery if different modes of transport are used for bringing the product to the customer. If – for example – gaseous biomethane is converted to bio-LNG, the product characteristics are different, and the change must be also be documented and verified. Further investigation of this issue is required.

The documentation on withdrawal is not mandatory under the "book and claim" approach.

4.2.4 Documentation (audit) on biogas and biomethane producing units

All biogas and biomethane producing units must undergo initial audits in their home country confirming that the units are qualified as a biomethane production facility. This qualification may be different in each Member State and national registry due to different requirements on technical capability, equipment, processing potential of substrates and others. The task of an audit in this respect is to document the possibility to produce biogas/biomethane in the manner of the technical limitations of the production unit. Information of this initial audit are not attached to the EBGO. They serve as a basis for the registration as production facility in a biomethane registry/issuing body and such plant information are usually not changed during the production period unless adaptations are conducted of the production unit.

The national registries may perform the audits with their own staff or may appoint independent auditors. In case the audit is outsourced to a non-accredited auditor, the registry must exercise control over whether the audit was duly performed and - correspondingly - gain confidence that the correct volume of biomethane has been produced and injected. It is preferred appointing or use an accredited auditor under national law or alike. See also the Best Practice Recommendation for Production device Inspections on https://www.aib-net.org/eecs/best-practice-recommendations.

This qualification documentation of the biogas/biomethane producing units will be collected by and stored at the national registry acting in the country of production. The national registry will confirm in the European Guarantee of Origin that the producing unit in question has been audited and qualified as a biomethane producer with the indicated nominal capacity

It is not necessary to provide specific audit details (like the name of the auditor, the time of audit, etc.) on the European GO. The already operating national registries may decide to adapt their existing audit attributes to be compatible with EBGO attributes.

National registries are expected to control that the individual producing unit do not claim higher production/injection volumes than those covered by the audits. This is part of checking that the correct volumes have been injected.

In certain situations, subsidies may be subject to audit performed by an auditor authorised in the country of consumption (even if the plant was built in some other country). Such requirements should

[12] *Some countries may not accept GOs issued for biomethane that is not supplied to a grid or a transport mean. Hence this information must be transparent on the GO, so that countries willing to reject such GOs, can easily recognise them.*

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be handled on a case by case basis (similarly to situations when the EBGO does not contain all information required in the country of consumption).

4.2.5 Injecting period

According to Article 19. para 7. of RED II the Guarantees of Origin must specify – among other attributes – the "*start and end of production*".

In case biomethane is transported through pipelines, it is logical to include the start and end date of injection, which – in practice – correspond to the start and end of production of the biomethane consignments (while the produced biomethane cannot be stored for several days at the producing unit).

The injection period should be identified by indicating **both** the first day when the injection started **and** the last day when the injection (of the volume represented by the given GO) was completed. This means that the time unit will be calendar days and not calendar months, quarters etc. Indicating both the first and last day of the injection period is in full harmony with the requirements of RED I and RED Ii and is best suitable for clearly identifying the biomethane consignment.

In case of delivery in tanks the date of the Bill of Lading or similar document issued by the forwarding company will be considered as the date of ending the production.

The validity of any European GO depends on the final use of it. Hence, RED II defines the validity period for GO used for end consumer disclosure. Other purposes all accounting of volumes only in the calendar year the volume was produced. Therefore, the validity is interpreted differently in this case. Further information on the validity are provided in chapter 4.2.10.

4.2.6 Quantity injected

The European Biomethane GOs should also use 1,0 MWh HHV[13] as a unit, independently from potentially other units used in the domestic registries. This means that a European GO will be issued for the multiples of 1,0 MWh. 1,0 MWh corresponds to about 100 Nm^3 of biomethane. For example: if a biogas upgrading unit operates at 300 Nm^3/h capacity 600 hours a month and requires a single GO to cover the total monthly production than the quantity indicated in the single (monthly), GO will be 1.800 MWh (and not 180.000 Nm^3).

In EECS, handling efficiency is gained by using certificate sets. Certificates are issued and traded and cancelled in certificate sets, which traders can break into smaller sets on request.

Presently, dena and AGCS certificates are issued for the total amount of energy, i.e. they do not issue one GO per MWh. But by using a split function the certificates can be split up to provide different subsets with current unit kWh (for details see chapter '3.6.3 Splitting').

To avoid any misunderstanding, the **EBGO** clearly specifies that the unit of energy relates to the 1 MWh of Higher Heating Value.

Alternative 1. Following the spirit of RED II, the EBGOs must be issued for the net volume of renewable energy (produced in form of biomethane). This means that from the total metered injected volume the following components must be deducted:

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a) fossil propane blended with biomethane to reach the standard quality required for injection, if any
b) natural gas blended into biomethane, if any
c) natural gas consumed during the production process (for example for heating the digesters), if any
d) non-renewable electricity consumed during the production process (for example operating the steerers, pumps and compressors), if any
e) the proportion of energy produced from non-renewable inputs in the production device (pro rate their heating value in the total heating value of all the Inputs).[14]

Collecting and verifying the data on components listed in c)-d)-e) above may be difficult and for this reason Alternative 2. is to be considered.

Alternative 2. ERGaR Scheme Definition of Net and Gross measurement of gas production:

- In order to reach the minimum requirements for the calorific value of the gas they inject biomethane producers may be required to **blend fossil gas** into the biomethane they inject, usually in the form of propane but potentially using other gaseous fossil fuels.
- Biomethane producers must have appropriate process in place to identify if fossil gas has been blended and what the energy content of that fossil gas is, ensuring that it **only issues GO for the biomethane portion of the total gas injected**.
- Therefore, GO only ever record information about MWh of biomethane injected and contain no information regarding any fossil gas blending. This is not considered part of the Net or Gross measurement methodologies.
- Net and Gross measurement refers **exclusively** to the measurement of fossil gas **combusted** on site by a biomethane installation during the production of biomethane.

    a. It does not refer to the combustion any biogas produced by the biomethane installation,
    b. It does not refer to the combustion of any biomethane produced by the biomethane installation,
    c. It does not refer to use of electricity either generated on site from the combustion of biogas or biomethane or imported from the grid.
- When measuring MWh of biomethane according to the ***Net*** method the following calculation is used:

    a. Measure the total MWh of biomethane produced
    b. Subtract MWh of fossil gas **combusted** on site which may include;
        i. Fossil gas used to heat the anaerobic digestion process
        ii. Fossil gas used in the gas upgrading process
        iii. Fossil gas used to power compressors
        iv. Any other use of fossil gas in the process

[14] RED II takes fossil fuel consumption during the production process into account when computing the GHG emission intensity. No methodology is available to deduct the fossil-based energy consumed for heating the digesters or the electricity used for operation of pumps and compressors from the biomethane volumes. Such calculations could be very complex if the efficiency of every installation using fossil energy must be taken into account.

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- When measuring MWh of biomethane according to the ***Gross*** method the MWh of biomethane produced is measured without any reference to use of fossil gas combusted on site.
- Under both the ***Net and Gross method*** the GHG emissions of the fossil gas combusted are included in any GHG factor allocated to the biomethane and recorded on the GO.

4.2.7 Type of substrate(s) processed in the biogas plant

According to Article 19. para 7. of RED II the Guarantees of Origin must specify – among other attributes "the energy source".

In case of biomethane the substrates processed for biogas production are "the energy source". It is definitely not sufficient to use "biomass" as a simple common term, while the GHG emission characteristics and the market value of the biomethane consignment are significantly dependent on the composition of processed materials. As explained in chapter '3.4.2 Technical requirements' the IT-processes behind the domestic registries will require a clear specification of this attribute in order to allow for a (semi-)automatic mapping process during the cross-border transfer.

Overall the approach should be to have the ability to include information in an EBGO on the **substrate**, the **substrate classification** as a waste, residue or product/co-product, and the **classification methodology**. Substrate and substrate classification information may not always be available, and there are different methodologies but by having these three data fields all possible outcomes will be covered.

The substrate classification (definition of substrate categories) should follow the methodology of a commonly accepted standard. Considering the waste hierarchy and ILUC related issues, it is very important to distinguish between wastes, residues, crops and others (e.g. algae).

For REGATRACE Deliverable 2.2, a common approach for the classification of biogas substrates is to be elaborated in view of the EECS Fact Sheet 5, the ISCC classification, the OFGEM classification, other national classifications and classifications of other international organisations.

4.2.8 Sustainability documentation

Including sustainability related information and data in the GOs is optional, so this chapter is relevant only when the economic operator requesting the issuance of the GO explicitly wishes the inclusion of sustainability related information.

In any case including the sustainability characteristics into the **EBGOs** will definitely enhance their market value and acceptance.

For ease of reference, it is recalled that the sustainability criteria for biofuels and bioliquids **in RED I** are as follows:

- Article 17(2) establishes minimum greenhouse gas saving values of 35%, rising to 50% on 1 January 2017 and to 60% from 1 January 2018 for biofuels and bioliquids produced in installations in which production started on or after 1 January 2017.
- According to Article 17(1) wastes and residues only need to fulfil the minimum greenhouse gas requirements, not the other criteria.

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- Articles 17(3), 17(4) and 17(5) require that raw material should not come from high biodiversity value areas, from the conversion of high-carbon stock areas, or from undrained peatland, respectively.
- Article 17(6) requires that agricultural raw materials cultivated in the Community are obtained in accordance with specific agricultural regulations of the EU.
- Annex V contains the rules for calculating the GHG impact of biofuels, bioliquids and their fossil fuel comparators.

In Article 29 RED II defines the sustainability criteria in the same way as in Article 17 of RED I but introduces new minimum GHG emission saving criteria.

Article 29. Para 2. of RED II contains the sustainability requirement for electricity, heating and cooling as follows: „Biomass fuels shall fulfil the sustainability and greenhouse gas emissions saving criteria laid down in *paragraphs 2 to 7 and 10 if used in installations producing electricity, heating and cooling or fuels with a total rated thermal input equal to or exceeding 20 MW in the case of solid biomass fuels, and with a total rated thermal input equal to or exceeding 2 MW in the case of gaseous biomass fuels. Member States may apply the sustainability and greenhouse gas emissions saving criteria to installations with lower total rated thermal input."*

Article 29. Para 10. "The greenhouse gas emission savings from the use of biofuels, bioliquids and biomass fuels shall be:

(a) ***at least 50 %*** *for biofuels, biogas consumed in the transport sector, and bioliquids produced in installations in operation on or* ***before 5 October 2015****;*

(b) ***at least 60 %*** *for biofuels, biogas consumed in the transport sector, and bioliquids produced in installations starting operation from* ***6 October 2015 until 31 December 2020****;*

(c) ***at least 65 %*** *for biofuels, biogas consumed in the transport sector, and bioliquids produced in installations starting operation* ***from 1 January 2021****."*

The GHG emission reduction is to be documented in relation to the fossil fuel comparator:

- *„For biomass fuels used for the production of* ***electricity,*** *the fossil fuel comparator ECF(el) shall be* ***183 g CO_2eq/MJ*** *electricity or 212 g CO_2eq/MJ electricity for the outermost regions.*
- *For biomass fuels used for the production of useful heat, as well as for the production of* ***heating and/or cooling****, for the purposes of the calculation referred to in point 3, the fossil fuel comparator ECF(h) shall be* ***80 g CO_2eq/MJ*** *heat.*
- *For biomass fuels used for the production of useful heat, in which a direct* ***physical substitution of coal*** *can be demonstrated, the fossil fuel comparator ECF(h) shall be* ***124 g CO_2eq/MJ*** *heat.*
- *For biomass fuels* ***used as transport fuels****, for the purposes of the calculation referred to in point 3, the* ***fossil fuel comparator*** *EF(t) shall be* ***94 g CO_2eq/MJ."***

Biomethane producers who have received validation of sustainability (information on attribute level 3) – for example under a recognised scheme, like REDcert, ISCC – are allowed to attach this information

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into their EBGO. The dedicated external expert/auditor will have access to the issued EBGO and is allowed to attach/insert the information of attribute level 3.[15]

The bodies, issuing the **EBGOs** will be the primary source of information to be registered and processed in the cross-border biomethane GO scheme. Correspondingly, the issuing bodies will be responsible for correct registration of the sustainability characteristics of the consignment in the **EBGOs**.

There will be no change in the verification of sustainability claims in conjunction of the operation of a GO scheme. The documentation/verification of sustainability characteristics in relation to biomethane used as vehicle fuel is regulated in the relevant EU documents (RED, RED II, FQD and Communication 2010/C 160/01) and these procedures will be followed.

In view of the above, a flexible approach is needed with regard to the sustainability claim. This means that in practice biomethane volumes with no Certificate of Sustainability will also be included in the GO scheme but in such cases the EBGO covering such biomethane consignment will clearly indicate that "No sustainability verification has been provided".

Among the sustainability criteria, the greenhouse gas emission figure (indicating the greenhouse gas emission caused through the production of the biomethane consignment in question) is considered as most important for biomethane produced in Europe.

For avoidance of doubt: the sustainability characteristics shown on the GO will not include statements regarding greenhouse gas saving in comparison with fossil fuels.

In the country of consumption, the transmitted GHG emission value will be judged in respect to biomethane usage, applicable fossil fuel comparator and minimum GHG saving level and will be decided whether the consignment in question can be used for the intended purpose. In this way the GO can provide enough information regarding sustainability characteristics and can give sufficient flexibility for using the biomethane consignment.

Thus, the EBGOs would include information on GHG emission occurred in conjunction with the production of the biomethane consignment without comparing this number (expressed in g CO2eq/MJ). The comparison with the GHG emission figure of the fossil comparator selected has to be done in the country of consumption for the specific use of the renewable energy source.

As a matter of fact, the fossil comparator varies responding to the changes in the fossil resource supply patterns, also different comparators are applicable in different ways of biomethane usage in different countries. For these reasons, it is neither possible nor feasible to give a GHG emission reduction figure in comparison with any specific fossil energy use or country of destination. Providing a figure on GHG emission related to the production of the given biomethane consignment fully enables customers to calculate how much saving they can actually achieve.

[15] *It is important to mention that any verification (independent if on a voluntary or mandatory basis)* would *lead to additional costs for producers due to additional audits and requirements to conduct them (at least for sustainability verification according to RED II). Experiences from plant operators show that such a verification (which has to be performed on a yearly basis) might cost between 10,000 – 15,000 € per year which puts a high financial burden on small installations.*

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Including a single, averaged GHG emission intensity number characterising a given biomethane consignment becomes possible in RED II. This restriction of averaging GHG emission characteristics in RED I is lifted in Annex VI of RED II, which under 1.(b) provides the formula and methodology for the calculation of greenhouse gas emissions in the case of co-digestion of different substrates in a biogas plant for the production of biogas or biomethane. For easier reference this methodology is attached to this document as Annex I.

4.2.9 Financial support granted to producer

According to Article 19. para 7. of RED II the Guarantees of Origin must specify – among other attributes:

- investment support provided to the producing installation (without the amount),
- Financial benefit provided to the unit of energy (without the amount).

In addition to the requirements of RED II, purchasers of imported biomethane may want to know whether the producer has received financial support for the product in the country of production. Such financial support may be

- feed-in tariff,
- a feed-in premium,
- investment subsidy,
- tax advantage, etc.

According to the prevailing practice in the European countries, a feed-in tariff or feed-in premium is paid to the producer of biomethane upon injection into the domestic natural gas grid.

Generally, the feed-in tariffs or feed-in premiums are paid out by government agencies or by bodies mandated by the government. As a consequence, the rights of disposal of the intrinsic value of biomethane is transferred from the producer to the designated government body or government agency. This means that – after having received the feed-in tariff or feed-in premium for biomethane injected into the national natural gas system – the producer may not be entitled to dispose of the product in any other way, also will not be entitled to GO.

Based upon the above considerations a YES/NO information in the European Biomethane GO on whether the biomethane consignment has received feed-in tariff or feed-in premium would make sense only in those countries where the government (directly or indirectly) does not claim the right of disposal on the biomethane consignment. The possibility for the transfer of an **EBGO** marked with "YES" abroad, should not be excluded, unless the government of the country of production elects not to issue such a guarantee of origin to a producer that receives financial support from a support scheme[16].

In any case, the ultimate buyer in the consuming country should decide whether he is eligible and interested in acquiring the **EBGO** with such YES information.

[16] Article 19. para 2. of RED II: *„To that end, Member States shall ensure that a guarantee of origin is issued in response to a request from a producer of energy from renewable sources, unless Member States decide, for the purposes of accounting for the market value of the guarantee of origin, not to issue such a guarantee of origin to a producer that receives financial support from a support scheme."*

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The situation is different with non-repayable investment subsidies provided to the producing installation(s). Such financial support cannot be assigned to individual consignments. The biomethane plant may produce both for the domestic and the export markets and the ratio between these markets may change every day, every month, every year. The information on investment subsidy is considered as non-relevant for cross-border biomethane transactions, while there is no risk of multiple investment subsidy. Nevertheless, in the spirit of Article 15. para 6. of RED I and Article 19. para 7 of RED II a YES/No information should still be included in the **EBGOs**.

Any information on support systems should be requested by operators of the corresponding biomethane registry. It is not the task of the auditors to verify this information on a regular basis. Hence, registry providers should formulate harmonised rules for receiving that information in a transparent manner and include the information into their IT-system and add respective information to the biomethane production unit.

According to Article 15. para 6. of RED I and Article 19. para 7 of RED II the information on tax benefits provided to the producers of biomethane (for example in conjunction with performing certain environment protection/waste treatment functions) should be included in the **EBGOs**. On the other hand, any tax benefit related to the consumption of biomethane has no relevance to the cross-border biomethane administration (while the product cannot be marketed as biomethane in the country of production – this would clearly be an unwanted case of multiple counting and double support).

EECS foresees the following data fields on support:

a) Type of support (parameter values: production support, investment support, both, none)

b) production support description (code which refers to a fact sheet with more explanation on the support system)

c) investment support description ((code which refers to a fact sheet with more explanation on the support system)

4.2.10 Validity period of the GO

Article 19. para 3. contains the following regulation regarding the validity of GOs.

„For the purposes of paragraph 1, guarantees of origin shall be valid for 12 months after the production of the relevant energy unit. Member States shall ensure that all guarantees of origin that have not been cancelled expire at the latest 18 months after the production of the energy unit. Member States shall include expired guarantees of origin in the calculation of their residual energy mix."

Presently, most of the registries apply a 12 months' validity period for the domestic GOs (certificates), although there are also other approaches. In view of the above quoted regulation of RED II the 12 months' validity period should be applied for the European Biomethane GOs – meaning that the GOs will be automatically cancelled upon the expiry of 18 months from the last date of injection of the said consignment (which is suggested as the starting date for validity of the GO).

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Annex I - RED II ANNEX VI

Annex VI. of RED II contains the Rules for calculating the greenhouse gas impact of biomass fuels as follows:

Part B. Methodology

. 1. Greenhouse gas emissions from the production and use of biomass fuels, shall be calculated as follows:

(a) Greenhouse gas emissions from the production and use of biomass fuels before conversion into electricity, heating and cooling, shall be calculated as:

$E = e_{ec} + e_l + e_p + e_{td} + e_u - e_{sca} - e_{ccs} - e_{ccr,}$

Where

E =total emissions from the production of the fuel before energy conversion;

e_{ec} =emissions from the extraction or cultivation of raw materials;

e_l =annualised emissions from carbon stock changes caused by land-use change;

e_p =emissions from processing;

e_{td} =emissions from transport and distribution;

e_u =emissions from the fuel in use;

e_{sca}=emission savings from soil carbon accumulation via improved agricultural management;

e_{ccs}=emission savings from CO2 capture and geological storage; and

e_{ccr}=emission savings from CO2 capture and replacement.

Emissions from the manufacture of machinery and equipment shall not be taken into account.

(b) In the case of co-digestion of different substrates in a biogas plant for the production of biogas or biomethane, the typical and default values of greenhouse gas emissions shall be calculated as:

$$\mathbf{E} = \sum_{1}^{n} \cdot \mathbf{E_n}$$

where

E =greenhouse gas emissions per MJ biogas or biomethane produced from co-digestion of the defined mixture of substrates

S_n=Share of feedstock n in energy content

E_n=Emission in g CO2/MJ for pathway n as provided in Part D of this Annex (*)

$$\mathbf{S_n} = \frac{\mathbf{P_n} \cdot \mathbf{W_n}}{\sum_{1}^{n} \cdot \mathbf{W_n}}$$

where

P_n = energy yield [MJ] per kilogram of wet input of feedstock n (**)

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W_n = weighting factor of substrate n defined as:

$$W_n = \frac{I_n}{\sum_1^n I_n} \cdot \left(\frac{1 - AM_n}{1 - SM_n} \right)$$

where:

I_n = Annual input to digester of substrate n [tonne of fresh matter]

AM_n = Average annual moisture of substrate n [kg water/kg fresh matter]

SM_n = Standard moisture for substrate n (***).

(*) For animal manure used as substrate, a bonus of 45 g CO2eq/MJ manure (– 54 kg CO2eq/t fresh matter) is added for improved agricultural and manure management.

(**) The following values of Pn shall be used for calculating typical and default values:

P (Maize): 4,16 [MJbiogas/kg (wet maize @ 65 % moisture]

P (Manure): 0,50 [MJbiogas/kg (wet manure @ 90 % moisture]

P (Biowaste) 3,41 [MJbiogas/kg (wet biowaste @ 76 % moisture]

(***) The following values of the standard moisture for substrate SMn shall be used:

SM (Maize): 0,65 [kg water/kg fresh matter]

SM (Manure): 0,90 [kg water/kg fresh matter]

SM (Biowaste): 0,76 [kg water/kg fresh matter]

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