D3.3 | Guidelines for creating the European Biomethane Guarantees of Origin

Deliverable:	Guidelines for creating the European Biomethane Guarantees of Origin
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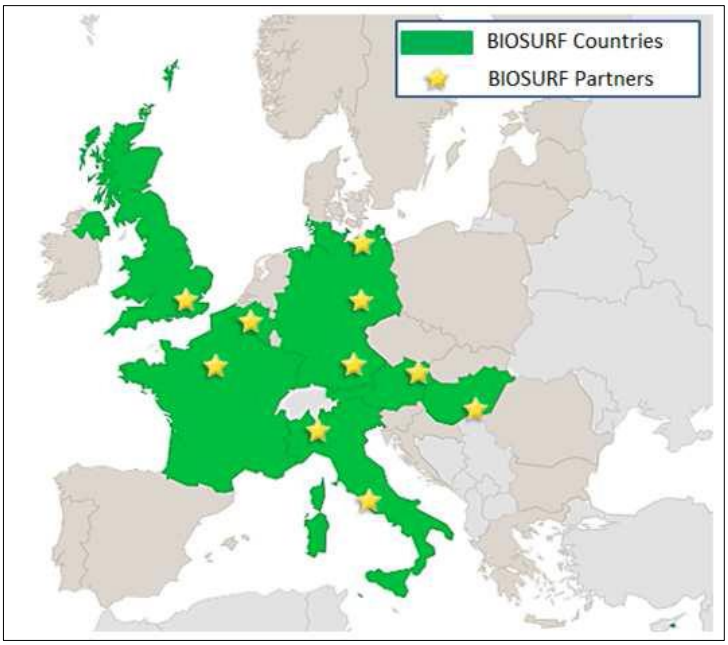
BIOSURF IN A NUTSHELL

BIOSURF is an EU-funded project under the Horizon 2020 programme for research, technological development and demonstration.

The objective of BIOSURF (BIOmethane as SUstainable and Renewable Fuel) is to increase the production and use of biomethane (from animal waste, other waste materials and sustainable biomass), for grid injection and as transport fuel, by removing non-technical barriers and by paving the way towards a European biomethane market.



The BIOSURF consortium consists of 11 partners from 7 countries (Austria, Belgium, France, Germany, Hungary, Italy and United Kingdom), covering a large geographical area, as indicated in the figure on the left.

The intention of the project is:

- To analyse the value chain from production to use, based on territorial, physical and economic features (specified for different areas, i.e., biofuel for transport, electricity generation, heating & cooling);
- To analyse, compare and promote biomethane registering, labelling, certification and trade practices in Europe, in order to favour cooperation among the different countries and cross border markets on the basis of the partner countries involved;
- To address traceability, environmental criteria and quality standards to reduce GHG emissions and indirect land-use change (ILUC), as well as to preserve biodiversity and to assess the energy and CO2 balance;
- To identify the most prominent drivers for CO2-emissions along the value chain as an input for future optimization approaches and to exchange information and best practices all across Europe with regard to biomethane policy, regulations, support schemes and technical standards.

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1. Purpose of the Document

This document belongs to the series of Deliverables produced under the BIOSURF project in relation to cross-border biomethane trade. Deliverable 3.1 provided guidelines for the establishment of national biomethane registries. Deliverable 3.2 contained the proposal for cross-border biomethane administration. According to this proposal the European Biomethane Guarantees of Origin **(EBGoOs)** have a central role in virtual transfer of biomethane consignments along the European natural gas network.

This paper aims at defining the content and attributes of the **EBGoOs** and also serves to assist the preparation of the European biomethane cross-border administration system.

As a matter of fact, each of the existing national biomethane registries have developed its own standards for issuing Guarantees of Origin. This document supports harmonising the content and attributes of the domestically applied Guarantees of Origin for the sole purpose of providing a common base for cross-border transfer of information. The attributes applied in the **EBGoOs** relate to the **EBGoOs** only and do not affect the attributes used in the domestic Guarantees of Origin. **EBGoOs** are not intended to be used for domestic transactions, the domestic GoOs (if issued) must be cancelled at the moment of issuing the corresponding **EBGoO** for the biomethane consignment in question.

Nevertheless, this document may also be useful for organisations engaged in establishing a new national biomethane registry – it provides recommendations for attributes and ID structure for those who plan to start a biomethane registry project.

Nowadays there exist widely different biomethane GoOs in European countries with different attributes and information. These GoOs are created by the national/domestic biomethane registries. The domestic GoOs are used for various purposes depending on the domestic market, subsidy schemes and end consumer needs.

There are pieces of information in the domestic GoOs which are already harmonized or just identical as, for example, injected volume or plant name and address, but most of the details are not harmonized with other biomethane registries, for example: production capacity, network connection, share of injected volume in total production, materials used for biogas production, etc.

For the exchange over national borders with another registry, the harmonization of GoOs is needed – this document aims exactly such harmonisation. The document includes a proposal for the minimum information needed and attributes to be incorporated into the

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European Biomethane Guarantee of Origin (EBGoOs). The admission of EBGoO for subsidies in the receiving country is not the goal of this document, such decisions are solely up to the national governments. The document just focusses on lowering the administrative barriers for the transfer of biomethane cross border.

Disclaimer:

For avoidance of any misunderstanding or misinterpretation: everything written in this proposal addresses only administrative questions and it goes strictly about solving an administrative – and not a political – issue. The removal of the existing administrative barriers for cross-border biomethane transactions does not interfere with the rights of the EU member states to decide on their own biomethane support systems. The establishment of the cross-border biomethane administration system, the introduction of the European Biomethane Guarantees of Origin, the organisation of the European Renewable Gas Registry (ErGaR) do not imply in any way that the biomethane imported should be qualified for financial support, including tax benefits, in the receiving country.

EU Member States and their Governments will be free to decide, among others:

- whether the national biomethane registry operating in the country will join the European biomethane cross-border administration system,
- whether the national biomethane registry operating on the country will accept European Biomethane Guarantees issued in another country,
- whether they prohibit the export of biomethane produced in their country if such biomethane has received any state support,
- whether they prohibit the import of biomethane produced in another country if such biomethane has received any state support in the country of production,
- whether they wish to decline accepting any volumes of imported biomethane for counting towards fulfilling the biofuel or other renewable energy commitments of the country of consumption (the importing country),
- whether they wish to apply any additional criteria (for example regarding the source of biogas/biomethane) in relation to imported biomethane,
- whether they wish to limit the usage of imported biomethane on their territory to specified fields of application.

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2. General

2.1 Definition of EBGoO

The Renewable Energy Directive (RED) 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".

In the spirit of the RED the term "European Biomethane Guarantee of Origin (EBGoO)" is used in this document with the following meaning:

EBGoO is an electronic dataset including information and attributes related to a specified biomethane consignment injected into the European natural gas network. (EBGoOs may have documents attached to them - like auditor reports – to confirm the information contained).

2.2 The functions of EBGoOs in the cross-border biomethane administration system

The following three key elements are essential for a Europe-wide biomethane documentation system:

a) Cross-border transfer of sustainability claims,
b) European natural gas network treated as single logistical facility,
c) Mass balancing in the European natural gas network.

The European Biomethane Guarantees of Origin (**EBGoOs)** will become an integral part of the complex system of cross-border biomethane administration – specifically serving the mass-balancing of biomethane injected into the European natural gas network[1]
In order to clarify the function and importance of the European Biomethane Guarantees of Origin (**EBGoOs)**, the above mentioned three elements are explained below:

a) Cross-border transfer of sustainability claims

[1] „European natural gas network" is not a legal term applied in EU documents. In this paper it is used only as short form for the „European natural gas transmission and distribution systems"

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In relation to sustainability verification, the Communication COM 2010/C 160/01[2] contains: "The method by which a connection is made between information or claims concerning raw materials or intermediate products and claims concerning final products is known as the chain of custody. The chain of custody would normally include all the stages from the feedstock production up until the release of the fuels for consumption."

Note: RED, FQD and COM 2010/C 160/01 COM 2010/C 160/01 are mandatory only for biomethane used as transportation fuel. In some member states sustainability criteria are also applicable to biomethane used for other purposes (electricity generation and heating). We need a flexible documentation system which meets all possible requirements and serves all possible uses of biomethane.

The complete chain of custody must be covered also with regard to biomethane injected into the European natural gas network (the transmission and distribution systems taken together). Due to the fact that in the natural gas pipelines the injected biomethane cannot be tracked, the most practical approach is to cover the chain of custody (from raw material supplies till the end-user) in two stages:

I. The first part of the chain of custody starts with the raw material supplies and covers **production** (both anaerobic digestion and biogas upgrading) up to the injection into the natural gas network. This part is documented by the established sustainability verification procedures defined in the RED and FQD, exactly like in case of liquid biofuels (and the respective information, or reference to it, will be included in the EBGoO electronic dataset),

II. The second part of the chain of custody covers pipeline **transportation** from the moment of grid injection until the withdrawal by the end-user. This part can be administered by a to be established voluntary scheme applying the mass balancing methodology in relation to biomethane blended with natural gas in the grid.

Based upon the work which was presented in BIOSURF Deliverable 3.2, EBA has proposed to establish a new voluntary scheme to be recognized by the Commission (in accordance with the RED and COM 2010/C 160/01) for the special purpose of handling the mass balancing of biomethane distributed along the European natural gas network. Such voluntary scheme is provisionally named as the "European Renewable Gas Registry" (**ERGaR**[3]) in this paper and the follow-up communication.

[2] COM 2010/C 160/01 *Communication from the Commission on voluntary schemes and default values in the EU biofuels and bioliquids sustainability scheme*

[3] ERGaR (European Renewable Gas Registry) – under preparation

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The national biomethane registries will be the primary source of information to be registered and processed by **ERGaR**. This means that the sustainability characteristics of the consignment must also be forwarded through the national biomethane registries. In practice the registries will require the producers to provide the documentation on sustainability (detailed below) in conjunction with registering the given biomethane consignment for export and subsequent mass-balancing in the European natural gas network. These sustainability characteristics will be transferred cross-border within **ERGaR** together with the respective **EBGoO.**

b) European natural gas network

The injected biomethane gets blended with natural gas in the pipeline network and mass balancing is the only accepted methodology to handle the situation when a renewable fuel (biomethane) is mixed with fossil fuel (natural gas).

The natural gas network operated on the territory of the European Union and the European Economic Area in considered as a single, closed logistical facility with specific regard to mass-balancing of biomethane injected into the European natural gas distribution system.

For this purpose, the "European natural gas network" can be defined in line with Directive 2009/73/EC[4] as follows:

"Biomethane is considered as injected into the European natural gas network upon injection into either the transmission system (Article 2.3.) or into the distribution system as defined in Directive 2009/73/EC Articles 2.3. and 2.5. Correspondingly, the fact of injection is to be confirmed by either a transmission system operator (as defined in Article 2.4.) or by a distribution system operator (as defined in Article 2.6.). In the same way biomethane is considered as withdrawn from the European natural gas network upon withdrawal from either the transmission system (Article 2.3.) or from the distribution system as defined in Directive 2009/73/EC Articles 2.3. and 2. 5.. Correspondingly, the fact of withdrawal is to be confirmed by either a transmission system operator (as defined in Article 2.4.) or by a distribution system operator (as defined in Article 2.6.). "

c) Mass balancing biomethane blended with natural gas

[4] *DIRECTIVE 2009/73/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 13 July 2009 concerning common rules for the internal market in natural gas and repealing Directive 2003/55/EC*

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The above mentioned interpretation and definition of the European natural gas network must be accompanied with proper documentation for performing the mass balancing in the network. An independent, transparent documentation scheme is to be organised for mass balancing of biomethane within the European natural gas network.

The European Biomethane Guarantees of Origin (**EBGoOs)** will be the core documents in the administration of the cross-border biomethane movements. **ERGaR** will rely on the information provided by the national biomethane registries in the form of the **EBGoOs**. These **EBGoOs** will be issued for individual biomethane consignments by the national biomethane registries (**ERGaR** is envisaged to be built and operated as a hub with connections to all national biomethane registries, enabling the transfer of European Biomethane Guarantees of Origin in efficient, transparent und trustworthy way).

2.3 Difference between the national and European GoOs

The biomethane Guarantees of Origins are issued by the national biomethane registries but they serve different purposes. The GoOs used on the domestic markets are strictly adapted to the requirements of national support schemes and other relevant national regulations, while the **EBGoOs** are supposed to meet the requirements of the international transactions.

The content and attributes of the European Biomethane GoOs should correspond to the harmonised view of the national biomethane registries participating in the international cooperation and contain the minimum information necessary for acceptance of the biomethane consignment into the European mass balancing administration.

The national GoOs may address different ways of using biomethane (electricity, heat, transport) while the European GoOs must be neutral with respect to usage in the country of consumption (the destination of the product will not necessarily be known at the time of injection/issuance of the EBGoO.)

2.4 Content of the European Biomethane GoOs

According to Article 15. para 6. of the RED the Guarantees of Origin must specify at least:

- The energy source *(interpretation for biomethane: the biogas substrates)*
- Start and end of production *(interpretation for biomethane: start and end of injection)*
- Identity, location, type and capacity of producing installation
- Investment support provided to the producing installation
- Financial benefit provided to the unit of energy (support scheme, etc.)

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- Date, country of issue,
- Unique ID

In the following chapters dedicated to the content of the **EBGoOs** the relevant regulations of the RED are fully considered.

The **EBGoOs** must contain the minimum information necessary for acceptance of the biomethane consignment into the European mass balancing administration – each consignment must be clearly identified with all major attributes belonging to it. In view of their universal function, the **EBGoOs** 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 **EBGoOs** may not be sufficient in certain cases. Special cases will be handled through requiring additional information (in relation to specified consignments) from the national biomethane registry issuing the **EBGoO** by the national biomethane registry acting in the country of consumption.

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

The registries active today have already set up their individual attribute structures and their identification schemes for their GoOs. The databases or file systems set up by the registries create and handle GoO information. These individual solutions may be well adapted, efficient and fulfil the regulations of the domestic biomethane market. The IT and attribute structure was set up without international coordination and represent therefore individual domestic solutions.

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3. GoO IDs and GoO Attributes of a European GoO

3.1 Standardized GoO Identification in Europe

A standard unique identifier for every single issued European Biomethane Guarantee of Origin is needed to identify the GoO all through cross-border along the chain of custody. This uniqueness is guaranteed by the way the ID for a GoO is constructed. This identifier may differ from the identifiers applied by the national biomethane registries on the domestic market.

In case a domestic GoO has been already issued for a given biomethane consignment, then this must be deactivated simultaneously with the issuance of the European GoO (the national biomethane registry marks the original GoO as "replaced by **EBGoO**). The competent national registry should keep clear records linking the deactivated domestic GoO with the related issued European GoO. The original GoO will no longer be available for further actions in the outgoing registry after the transfer is successfully completed.

The GoO ID scheme could look as follows:

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

where:

- Biomethane GoO definition like BMGoO
- Country Code (like 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 (of GoO created)
- Check character

The check character can be based on a 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 agreed mutually.

Digits in total 78

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

Whereas the metering point in Austria or Germany is 33 digits

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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

Example of a European GoO ID:

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

3.2 Standardized attributes

a) Country Code

It is logical to apply the country codes used by the EU administration (like AT, CH, DE, DK, FR, UK etc.).

It is also logical that the identifier mentioned above includes 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 and does not have anything to do with where the biomethane was produced. That is only the case when the initial transfer is executed. In principle the plant identification is the major information of the production country/city.

b) Name and address of producing installation

According to Article 15. para 6. of the RED the Guarantees of Origin must specify – among other attributes – the identity, location, type and capacity of producing installation.

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In accordance with the practice in the biogas industry, the name of the location (city, village, etc.) will be used as the key identifier of the installation but it will be extended with the short name of the owner (to avoid any misunderstanding in case of several plants in the same geographical location) and with the exact address.

We believe 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.

Every biomethane producing unit joining the national registry will have an identification number – given 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).

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

c) Documentation (audit) on biogas and biomethane producing units

All biogas and biomethane producing units must undergo initial audits (by independent auditors/inspectors/authorised experts) in their home country confirming that the units are equipped with all necessary installations and are technically capable of producing biomethane at the declared nominal capacity. Such audit reports should also contain the information about the technical capability of the unit to receive and process different type of substrates (see paragraph “h)” below).

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 (given in Nm^3/hour biomethane).**

Generally, the national registries are not expected to carry out the audits themselves, but must control whether the audit was duly performed and – correspondingly - gain confidence that the correct volume of biomethane has been produced and injected. It should not be necessary to provide specific audit details on the European GoO. The

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already operating national registries may decide to adapt their existing audit attributes to be compatible with EBGoO attributes. In any case, double audit - one for the domestic GoO and one for the EBGoO – must be avoided.

In case a national registry decides to perform also the auditing, then it needs to demonstrate that they are a competent body, in the UK - for example - through accreditation by national regulator, (e.g.Ofgem[5]) or a national accreditation service (e.g. UKAS[6], DAkkS[7]).

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

d) Injecting period

According to Article 15. para 6. of the RED the Guarantees of Origin must specify – among other attributes – the “start and end of production”.

In case of biomethane is will be 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 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 GoO) 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 the RED and is best suitable for clearly identifying the biomethane consignment.

[5] The government regulator for gas and electricity markets in Great Britain
[6] United Kingdom Accreditation Service
[7] German Accreditation Service (*Deutsche Akkreditierungsstelle*)

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*Note: Hourly balancing will not be possible within **the** cross-border biomethane administration system and this is not considered as necessary. (The hourly balancing customary in the gas world is applied to the physical transactions).*

We think that the validity of any European GoO should start with the day of completing the injection (in other words with the last day of the injection period - and not with the date of the issuance of the GoO or any other date. As mentioned above: the day of completion of injection provides the best identification of a biomethane consignment.

e) Pressure

The pressure of injection is an indirect indication on whether biomethane was injected into the transmission or the distribution grid. It also refers to the energy consumed for reaching the injection pressure.

A question could be raised whether the injecting pressure is a needed attribute in relation to cross-border trade, where the mass-balancing is virtual. The answer is that this is not necessary, this kind of attribute does not determine the „green" value of the biomethane which is the purpose of the GoO.

f) Quantity injected

According to earlier discussions, the European Biomethane GoOs are supposed to use 1,0 MWh LHV[8] as a unit, independently from potentially other units used in the domestic registries. This means that a European GoO will be issued for the multiples of 1,0 MWh. 1 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 GoO to cover the total monthly production than the quantity indicated in the single (monthly), GoO will be 1.800 MWh (and not 180.000 Nm^3).

There will be a possibility to split the European Biomethane GoOs in any ratio at minimum 0,1 MWh but subject to keeping the 1,0 MWh unit.

[8] The lower heating value, LHV - also known as 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, which assumes the latent heat of vaporization of water in the combustion products is not recovered.

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To avoid any misunderstanding, in the Rules of ERGaR it will be clearly specified that the unit of energy relates to the 1 MWh of Lower Heating Value.

g) Documentation (audit) on injection

With regard to the documentation, confirmation and audit of the injected volume of biomethane, the same procedure for both domestic and export consignments will be applied. By other words: there will be no separate procedure for volumes of biomethane with export destination, which will be the subject of the European Biomethane Guarantees of Origin.

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

According to Article 15. para 6. of the RED 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".

One way of covering the origin of biomethane in the GoO is to register the composition of substrates consumed by the biogas/biomethane plant. (Such substrate composition should also be indicated in the respective Certificate of Sustainability).

The list of potential substrates could be very long, such as shown in Annex I.

The second alternative is to group the substrates in order to limit the number of processed data. The following groups could be agreed:

A	Human/Municipal waste
B	Animal excrement's
C	Industrial waste steams
D	Agricultural by-products
E	Main energy crops
F	Other biodegradable organic materials

To indicate the source of biogas/biomethane according to the above grouping is considered as the absolute necessary minimum. Customers of gas will want to know what their gas is made of and may not want to purchase biomethane produced from

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'Main energy crops'. As a matter of fact, the intrinsic value of the EGoO changes with the composition of substrates processed.

The substrate composition does directly influence the GHG emission characteristics of a given biomethane consignment. Nevertheless, it is not enough to name the substrates, as exact GHG emission numbers must also be included in the **EGoOs** (see "Sustainability documentation" below)

i) Sustainability documentation

The national biomethane registries, issuing the **EGoOs** will be the primary source of information to be registered and processed in the cross-border biomethane administration system. Correspondingly, the national biomethane registries will be responsible for correct registration of the sustainability characteristics of the consignment in the **EGoOs**.

This means that the sustainability characteristics of the consignment must also be forwarded through the national biomethane registries. In practice the registries will require the producers to provide the documentation on sustainability (detailed below) in conjunction with registering the given biomethane consignment for export and subsequent mass-balancing in the European natural gas network. These sustainability characteristics will be transferred cross-border within ERGAR together with the respective Guarantees of Origin.

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

Note: the Member States' national verification methods, when economic operators provide the relevant national authority with data in accordance with the requirements laid down in the national system, are recognised under the RED and FQD, parallel to the voluntary schemes

The EU documents do not contain the mandatory requirement for sustainability verification in case biomethane is used for electricity generation or heating/cooling. Nevertheless, some member states have introduced such requirements.

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In view of the above, ERGaR needs to be flexible with regard to the sustainability claim. This means that in practice biomethane volumes with no Certificate of Sustainability will also be included in the mass-balancing within the European natural gas network but in such cases the **ERGoO** covering such biomethane consignment will clearly indicate that "No sustainability verification has been provided":

Communication 2010/C 160/01 explains: "**the mass balance system means a system in which sustainability characteristics remain assigned to consignments.** Sustainability characteristics could include for example:

- evidence showing compliance with the Directive's sustainability criteria, and/or
- a statement that the raw materials used were obtained in a way that complies with the Directive's land related sustainability criteria, and/or
- a greenhouse gas emission figure, and/or
- description of the raw material used, and/or
- the statement" production has been awarded a certificate of type X from recognised voluntary scheme Y", etc."

Note: from the above list of 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.

In line with Communication 2010/C 160/01, and considering the specifics of biomethane injected into the natural gas network the sustainability characteristics can be limited to the following elements:

- confirmation that the raw materials used for biogas production do not come from high biodiversity value areas, from the conversion of high-carbon stock areas, or from undrained peatland, respectively.
- confirmation that agricultural raw materials cultivated in the Community (and used for biogas production) are obtained in accordance with specific agricultural regulations of the EU.
- confirmation that GHG emissions (from raw material supplies through anaerobic digestion and upgrading until injection) are calculated in accordance with the rules contained in Annex V of the RED.

Important note: the sustainability characteristics will not include numbers 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

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saving level and will be decided whether the consignment in question can be used for the intended purpose. In this way ERGaR will provide enough information regarding sustainability characteristics and will give sufficient flexibility for using the biomethane consignment.

Thus the **EBGoOs** will include information on GHG emission occurred in conjunction with the production of the biomethane consignment **without comparing this number** (expressed – for example – in kg CO_2eq/MJ) with the GHG emission figure of the fossil comparator selected for the specific use of the renewable energy source. In relation to the biofuels the RED stipulates GHG emission savings as a percentage to the fossil comparator (initially 35%).

As a matter of fact, the fossil comparator changes 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 biomethane 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.

It is obvious that including a single sustainability (GHG emission) number characterising a given biomethane consignment would be the simplest and best solution. Nevertheless, this approach is in contradiction with the prevailing EU regulations, most importantly with COM 2010/C 160/01, which contains: *"In case the raw materials processed for biogas production are characterised with different figures on greenhouse gas emissions, then these figures should remain separate, i.e. cannot be averaged for the purpose of showing compliance with the sustainability requirements."*

In lack of the possibility for averaging GHG emission values of different substrates, the operators may decide to simplify the issue through applying the lowest sustainability claim to a consignment of biomethane (produced from different substrates with different sustainability characteristics). For example: the ISCC scheme and methodology for verification of sustainability (one of the schemes approved by the Commission) contains the following regulation regarding batches with different GHG values:

"Within the bookkeeping sustainable batches with different GHG values cannot be aggregated. If two or more incoming batches have different GHG input values, the highest GHG emission value (of the least performing batch) could also be used consistently for the entire input if other sustainability characteristics are identical, i.e. aggregation is allowed if all batches use the GHG value of the least performing batch."

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For ease of reference, it is recalled that the sustainability criteria for biofuels and bioliquids of the RED 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.
- 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.

The method by which a connection is made between information or claims concerning raw materials or intermediate products and claims concerning final products is known as the chain of custody (already introduced in paragraph 2.2). For the purpose of demonstrating compliance with the sustainability requirements, economic operators are required to use a mass balance methodology with respect to chain of custody (RED Article 18(1)).

In line with the RED the Communication on voluntary schemes (2010/C 160/01) recommends that "*The mass balance is the method by which a connection is made between information or claims concerning raw material or intermediate products and claims concerning final products is known as the chain of custody. The chain of custody would normally include all the stages from the feedstock production up until the release of the fuels for consumption.*"

Biomethane producers who have received validation of sustainability – for example under a recognised scheme, like REDcert, ISCC – forward this document to the national registry for inclusion into the **ERGoO** documentation.

j) Financial support granted to producer

According to Article 15. para 6. of the RED the Guarantees of Origin must specify – among other attributes:

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- investment support provided to the producing installation
- Financial benefit provided to the unit of energy.

In addition to the requirements of the RED, 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, feed-in-tariff or feed-in-premium is paid to the producer of biomethane upon injection into the domestic natural gas grid under the assumption that the product will be consumed in the same country.

Generally, the feed-in-tariffs or feed-in-premiums are paid by government agencies or by bodies mandated by the government. As a consequence, the rights of disposal of the product goes over from the producer to the designated government body or government agent. 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 will have no right to dispose of the product in any way, also will not be entitled to a GoO or Certificate representing the volume covered by the feed-in tariff or feed-in-premium.

Presently no European government is offering feed-in-tariffs or feed-in-premiums for exported biomethane consignments. This means that the producer of biomethane must decide:

- whether he wishes to avail himself with the domestic financial support (provided to the unit of energy – biomethane) and, correspondingly does not export the product
- or his biomethane consignment is designated for export and (as such) does not get feed-in-tariff or feed-in-premium type financial support at home.

Based upon the above considerations a YES/NO information in the European Biomethane GoO 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. We should not exclude the possibility for the transfer of an EBGoO marked with “YES” abroad, unless the government of the country of production does not prohibit the national registry to do so. In any case, the ultimate buyer in the consuming country

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should decide whether he is eligible and interested in acquiring the EBGoO with such YES information.

The situation is completely 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 market 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 double investment subsidy. Nevertheless, in the spirit of Article 15. para 6. of the RED a YES/No information should still be included in the EBGoOs.

According to Article 15. para 6. of the RED 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 EBGoOs. 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 double counting and double support.

k) Validity period of the GoO

Most of the registries apply a 12 months' validity period for the domestic GoOs (certificates), although there are also other approaches. It seems reasonable to use 12 months' validity for the European Biomethane GoOs – meaning that the GoOs will be automatically cancelled upon the expiry of 12 months from the last date of injection of the said consignment (which is suggested as the starting date for validity of the GoO). It is to be noted, that this is not in line with the prevailing EU regulations regarding biofuels, where the validity of the GoOs is limited in 3 months. Nevertheless, the specifics of the biomethane (and natural gas) trade call for a 12 months' validity period.

l) Documentation (audit) on withdrawal from grid

This is not part of the EBGoO attributes but must be handled within ERGaR to complete the mass balancing in the European natural gas network.

With regard to the documentation, confirmation and audit of the volume of natural gas taken out from the grid, each registry should follow the same procedure for both domestic and export consignments. This means that there will be no separate procedure for those volumes of natural gas which will correspond to the relevant European Biomethane Guarantees of Origin.

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As a matter of fact, the withdrawal documentation will cover a natural gas transaction (and not a biomethane transaction) in the country of consumption. Nevertheless, for the purpose of mass-balancing the confirmation is necessary that the respective physical natural gas withdrawal transaction (corresponding to the biomethane volume represented by the GoO) has taken place.

It is justifiable and also feasible to expect that the owner of the European Biomethane GoO requesting the cancellation of the given GoO provides the documented evidence about the corresponding physical natural gas transaction. The licenced supplier that would be selling gas to the end customer must be able to present the proof. Their information will be based on grid operator (distribution) data.

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4. Prerequisites

A common understanding for European exchange

Before a GoO exchange may happen, registries have to fulfil certain prerequisites. The local biomethane registry is responsible for issuance of GoOs and of fulfilling the prerequisites, otherwise the registry cannot be accepted as a partner to exchange GoOs. We have to understand that a GoO is not a physical document to be exchanged but a certified digital data package of information.

- Whatever the GoO transaction may be, no information must get lost.
- Registries don't change and don't delete attributes of a GoO.
- When a GoO is transferred, all attributes and documentation of a GoO is transferred and no information gets lost during transfer.
- The sending registry flags the GoO as cancelled "because of transfer" but does not delete anything. In fact, we are just adding information to our biomethane database, if we overwrite information it is maybe only a status field.
- At any point in time registries should be able to trace the lifespan of a GoO, including all transactions and all authorized persons involved.

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5. Splitting of GoO

A Biomethane GoO is generated for a certain period of injection. In such, there can be different recipients with different volumes of biomethane. We are confronted with the speciality of a GoO, which is, that it may be split in several parts. The question remains to be answered what information should be added to the registry system to document the split. A GoO represents attributes of a volume of biomethane injected into the grid. Parts of that volume may be separated from the GoO and transferred further on. Splitting the GoO into two parts raises the question how the identification scheme of the old and new GoO should look like.

Only the volume of biomethane of a GoO should be split. All the other attributes of a GoO remain unchanged.

We must define how a splitting of a GoO into two parts will affect the ID of the original GoO, and how the ID of the split GoO should be constructed. Further on we have to answer the question if we would have the GoO attribute information twice or once in the registry system. As we don't want to create information redundancies, we must take care not to duplicate information. Should the attribute "injected volume" of GoO be changed if we split the GoO. If the answer is no, we have to ask ourselves where to store the information about the split volume.

After a split of a GoO, the original injected volume may still be of importance later on and therefore this information should not get lost because of a split or of a transfer. The GoO may carry other volume information generated during injection with it. The ratio of the actual volume of a GoO and the original volume could be of relevance for determining the actual value of other volume attributes. So a GoO carries two volumes with it – the actual volume and as an info also the original volume of biomethane injected.

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6. The registry structure

To fulfil our prerequisites, we have to develop an idea on how the GoO ID structure, as part of the IT system, and its database structure of a biomethane registry should look like and how GoO IDs are generated when we split a GoO into two parts.

Generally, it should be differed between:

- Registries already using an IT system for the domestic biomethane structure and
- Countries not having established a registry or an IT system for its registry yet.

Existing registries with an IT system would need to adapt to the European GoO structure whereas the newcomers have the chance to start right away with an ideal structure.

This document is based upon a concept, that the exchange of European GoOs is executed via a centralized European biomethane hub (ERGaR) but the content is also applicable to a bilateral, registry to registry exchange of GoOs.

6.1 An example of an existing registry structure:

A structure of an existing biomethane registry database can look as shown in Figure 1. The GoO is connected to the Company via a table “Titeltracking” which defines the ownership of the GoO.

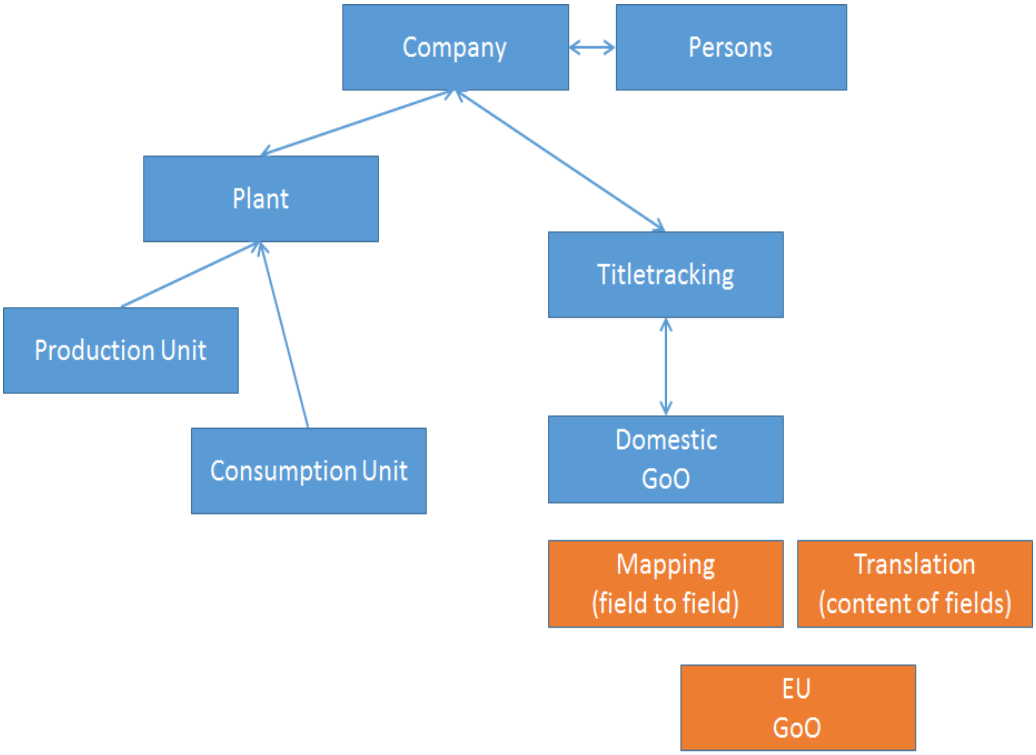

Figure 1 Existing domestic system and adaption for EU mapping

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The minimal impact at this system is a mapping and a translation of content fields of the GoO to the European standard as can been seen in *Figure 1* in the bottom area. In that case the orange part has to be added to the existing registry.

The mapping table is used to transfer attributes from domestic fields to EU fields and further on the translation table translates domestic texts to english texts where necessary.

The mapping and translation process must be without error. The domestic registry is responsible for the accurate mapping and translation.

An European ID is only necessary if a transfer to another system is triggered.

If the transfer is started, the domestic existing database remains unchanged except that the state of the GoO has to be changed from “valid” to “cancelled by transfer”.

The entries within the table’s GoO and “Mapping”, “Translation”, “Domestic GoO” and “EU GoO” will look like the examples in *Figure 2*:

Mapping

Domestic Field	European Field
Attribute 1	EU Attribute 1
…	…

Translation

Domestic Text	European Text
Wasserkraft	Hydropower
…	…

Domestic GoO

ID	Volume	Attribute 1	Attribute . n
DOM_1	100	Wasserkraft	…
DOM_2	50	…	…

EU GoO

Domestic ID	European ID	Volume	Attribute EU 1	Attribute EU 2
DOM_1	EUID_A	100	Hydropower	…

Figure 2 Example of mapping and translation for EU GoO on database entry level

Even if the GoO is transferred to another system, nothing is deleted in the current system. Changes in the current database are reduced to a minimum. The only content that is changed, is the state of the domestic GoO form “valid” to “cancelled by transfer”.

Mapping table

Every registry which does have individual elements as part of their registry has do dispose a mapping scheme, which maps the domestic attributes to the European attributes. This is kind of a translation table. Local attributes and local language have to match European language which will be English. European attributes have to be a subset of domestic attributes. Precondition of an exchange is that all the European attributes are available in the domestic registry individually or generated out of a set of domestic attributes. The same principles will be applied if an EBGoO is “imported” into the national registry. European attributes are mapped into domestic formats where needed.

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6.2 Splitting in an existing system

A split of biomethane GoO should be possible in all domestic registries. If a split is not implemented yet, the afford for the adaption of the existing system should be kept as small as possible. *Figure 3**Errore. L'origine riferimento non è stata trovata.*** shows an example of how a split can be implemented in an existing system. By the "parent" GoO two or more child GoOs are generated. All of the child GoOs store the whole information. The parent GoO state is set to "cancelled by split" while the new child GoOs are set to "valid". Disadvantage of this solution is that all child GoOs store the same attributes information and hence this information is redundant. Advantage is that the database structure doesn't need to be changed and hence all changes can be made within the software.

Figure 3 shows an example of a splitting within the existing database structure. For the spilt of the GoO DOM_1 two new GoOs are generated (DOM_11 and DOM_12). The parent GoO is set to "cancelled by split" and the two new are set to "valid". The whole attribute information of the genesis GoO is stored twice again. The impact on the structure of the domestic system is reduced to a minimum but information is stored redundant.

Domestic GoO

ID	Volume	Attribute 1	Attribute . n	State
DOM_1	100	Wasserkraft	...	active
DOM_2	50	...	...	active

Domestic GoO

ID	Volume	Attribute 1	Attribute . n	State
DOM_1	100	Wasserkraft	...	cancelled by split
DOM_2	50	...	...	active
DOM_11	70	Wasserkraft	...	active
DOM_12	30	Wasserkraft	...	active

Figure 3 Database entries for splitting in an existing system

Hence the genesis GoO is split into two new genesis GoO, both can be handeld separately and hence also be exchanged or traded separately. A transfer of one of the two new GoOs does not have any impact on the other GoOs.

Only the new GoO will be mapped to the European standartized attributes and then can be summarized as a digital package that can be exchanged between different registries.

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6.3 A recommended structure for a new system

One of the keys of flexible transferring of GoOs is that the GoOs – or the volume of a GoO - can be split into smaller units (tradeable parts). The described scheme in *Figure 1* is not complete because we have to foresee a splitting of the GoOs.

We would expect a split to generate at least one new GoO with the same information as the original GoO. It may be the case that in existing registries such GoO copies and redundanciese are accepted.

Nevertheless technical redundancies should be avoided whereever possible.

A database structure as shown in *Figure 4* is recommended. It includes a table "tradeable part of GoO" which registers the GoOs and its split parts. The information about the GoO is stored in the "Domestic GoO" table while the tradeable units information is stored in a different table "tradeable part of GoO". Hence, no matter in how many parts the original GoO is split, the genesis information are stored only once. As a consequence the connection between the GoO domestic and tradeable part table is only documented with each transfer.

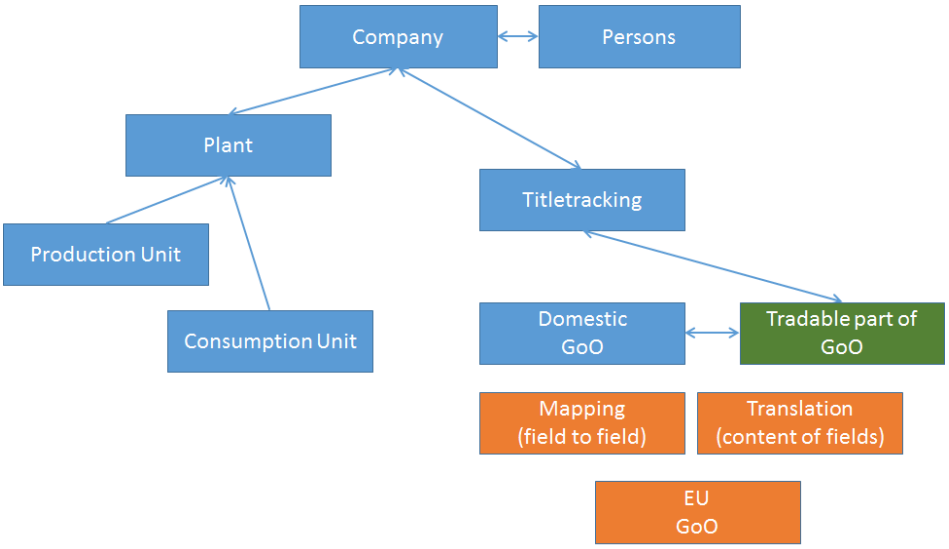

Figure 4 Recommended Database scheme for a new system

Here we incorporated a tradeable part table, where information about the splitting of a GoO is registered.

In this case the mapping process uses the "Tradeable part of GoO" and the "domestic GoO" table and maps it via "Mapping" and "Translation" tables to a "EU GoO". The information of these tables are combined to create an exchangeable EU-GoO. For the implementation of a new domestic registry it is also recommended to implement the GoO ID in line with the European Biomehtane GoO ID generation algorithm. This eases the process of mapping.

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The entries within the tables “Tradeable Part of GoO”, “Domestic GoO” and “EU GoO” can look like in *Figure 5*. Two initial GoOs are generated and saved in the “Domestic GoO” table. For titletracking and trades entries in the “Tradable parts” table are generated. After a first split two new entries are generated only in the “Tradeable parts” table. The original tradable unit with the ID EUID_A is set to “cancelled by split” while the two new entries with the ID’s EUID_A1 and EUI_A2 are set to active. A further split of the unit EUID_A1 to EUID_A11 and EUID_A12 generates two new entries that are active while the entry with EUID_A1 is set to “cancelled by split”.

If the new system architecture is developed in line with the European standard, the mapping and translation of a Domestic GoO to an EU-GO hence is easier because it is a 1 to 1 mapping of existing attributes.

This structure enables also, that only smaller parts of a genesis GoO are transferred. For a transfer the tradeable unit entry of the part is mapped to the European standartized attributes and then collected to a digital data package that can be exchanged. The tradable unit in the sending registry is set to “cancelled by transfer” while all other parts of the genesis certificate will stay as “valid” in the sending system.

Domenstic GoO

ID	Inj Vol	Attribute 1	Attribute . n
EUID_A	100	Wasserkraft	...
EUID_B	50	...	...

Tradeable Part of GoO

ID	Parent ID	Genesis ID	Vol	State
EUID_A		EUID_A	100	active
EUID_B		EUID_B	50	active

Tradeable Part of GoO

ID	Parent ID	Genesis ID	Vol	State
EUID_A		EUID_A	100	cancelled by split
EUID_B		EUID_B	50	active
EUID_A1	EUID_A	EUID_A	70	active
EUID_A2	EUID_A	EUID_A	30	active

Tradeable Part of GoO

ID	Parent ID	Genesis ID	Vol	State
EUID_A		EUID_A	100	cancelled by split
EUID_B		EUID_B	50	active
EUID_A1	EUID_A	EUID_A	30	cancelled by split
EUID_A2	EUID_A	EUID_A	70	active
EUID_A11	EUID_A1	EUID_A	20	active
EUID_A12	EUID_A1	EUID_A	10	active

EU GoO

Domestic ID	European ID	Volume	Attribute EU 1	Attribute EU 2
EUID_A	EUID_A	100	Hydropower	...
EUID_A1	EUID_A1	30	Hydropower	...
EUID_A11	EUID_A11	20	Hydropower	...

Figure 5 Database entries and splitting scheme

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6.4 Existing database structure and transfer

Before the transfer of a EU GoO, a kind of translation process has to be performed to bring the domestic GoOs into a European exchange format. This is necessary as existing registries are not yet set up on coordinated European GoO attributes. There are different local attributes in each registry and the database/file structures are individual per country.

The EU GoO information has to be stored in the recommended structure of the EU GoO table (described later on) manually or automatically to generate a transferable data package.

During the transfer of a GoO there is an intermediate step where we bring domestic structure and GoO content into EU GoO structure and content via a mapping and translation process.

The exchangeable standardized information including the GoO IDs (defined below) have to be transformed into a digital data package in the specified format which needs to be agreed on in detail. This can be a common format like csv or xml or any other widely established method.

Sending GoO Information

After the data package is ready and corresponds to the mutually agreed European GoO structure, the package can be transferred via a secured communication for example signed email, web service or SFTP (Secure File Transfer Protocol) channel to a foreign registry directly or using a central hub available in the future. The way of communication has to be agreed.

During the transfer between two different systems no information is changed nor should be lost.

Receiving GoO Information

The receiving registry takes the European GoO information into its biomethane database which may look quite different. All information of the GoO is taken into the receiving registry and stored in the domestic scheme. Only at that point GoO information is presented in two registries whereas in the receiving registry the status is “valid” or “generated by transfer” and in the sending registry the status is set to “cancelled by transferred”.

European GoO Communication Hub

The communication is either between the registries directly or via a centralized communication hub (ERGaR), which acts as single point of contact for the exchange. The

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central hub does not change any information of the digital data package. The hub serves as a responsible party for the communication between the different domestic registries.

The major technical advantage of the central hub is that each registry just need one interface to be operated. This reduces efforts, costs and time compared to the establishment of an interface to each domestic registry individually. Beside technical aspects the hub can define a common format, rules and processes which have to be applied by all particpating registries within the communication cycle.

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Annex I: Biogas substrates

	Substrate
A	**Human/Municipal waste**
1	Sewage sludge (typical municipal)
2	Source separated municipal organic waste
3	Biodegradable fraction of MSW (without source separation)
4	Restaurant, kitchen and supermarket waste
B	**Animal extrements**
1	Liquid pig manure (slurry)
2	Liquid cattle manure (slurry)
3	Cattle manure with straw
4	Corn stover (corn straw)
5	Chicken and turkey manure dry, without straw
C	**Industrial waste streams**
1	Waste from food/vegetable processing plants (FAB industry)
2	Slaughterhouse waste
3	Spent grains (Breweries, wineries, whisky distilleries)
4	Sludge from pulp and paper mills
5	Other organic industrial waste
D	**Agricultural by-products**
1	Second (catch) and cover crops
2	Corn and sunflower stover
3	Cereals straw
4	Grass from land maintenance
5	Other agricultural by-products and wastes
E	**Main energy crops**
1	Maize silage
2	Sorghum bicolor silage
3	Sugar and fodder beat – fresh
4	Grass silage
5	Other energy crops
F	**Other biodegradable organic materials**

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