Guarantees of Origin: systemic developments and new energy carriers

7/05/24

1. **Guarantees of Origin – a market oriented regulated certificate**
2. Electricity GOs
3. Gas and Hydrogen GOs – challenges
4. Hydrogen specifics
5. PPAs, GGPAs, HPAs

Guarantees of Origin

Regulatory framework

Guarantees of Origin

2001	Directive on renewable electricity	
2009	Renewable Energy Directive	
2018	RED II	
2018	RED III	+ Refinement

Guarantees of Origin

Regulatory framework: RED III. Article 19

- ✓ **Responsibility: Member States**
  - Right of the producer of renewable energy – not an obligation.
  - The MS may choose not to issue GOs if there's financial support.
- ✓ **Not necessarily limited to renewable sources**
  - Full disclosure is a possibility.
- ✓ **Standard size: 1 MWh**
  - Where appropriate the standard size may be divided to a fraction multiple of 1 Wh
- ✓ **Expiration: 12-18 months**
- ✓ **Compliance with CEN – EN 16325**
- ✓ **Production period:**

'(a) the energy source from which the energy was produced and the start and end dates of production, which may be specified:

(i) in the case of renewable gas, including gaseous renewable fuels of non-biological origin, and renewable heating and cooling, at an hourly or sub-hourly interval;

(ii) for renewable electricity, in accordance with the imbalance settlement period as defined in Article 2, point (15), of Regulation (EU) 2019/943.';

Guarantees of Origin

Regulatory framework

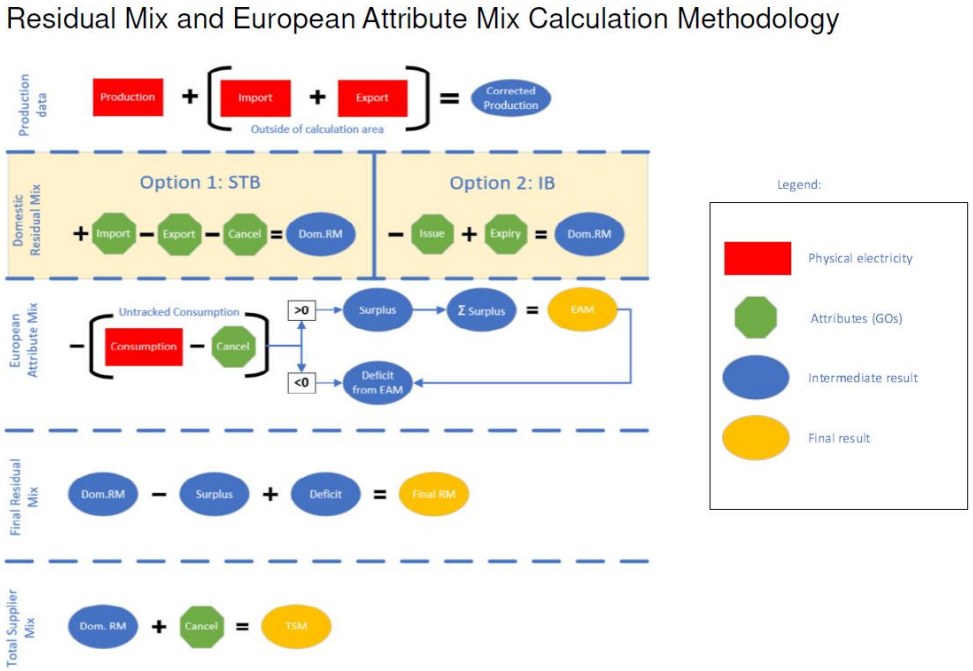
- ✓ **Consumption from gas or hydrogen networks – MS responsibility on 'network characteristics'**
- ✓ **Recognition of GOs issued by other MSs unless doubts about veracity, accuracy or reliability.**
- ✓ **Shall not recognize GOs from third countries except:**
  - They are compatible and
  - The Union has concluded an agreement of mutual recognition and
  - There is direct import or export of energy
- ✓ **Residual Mix – MS responsibility**
- ✓ **MS shall ensure that the same unit of energy is taken into account only once.**

- ✓ **Purpose: DISCLOSURE**
  - Demonstrating to final customers the % or quantity of energy from renewable sources in an energy supplier's energy mix.
  - Demonstrating the energy supplied to consumers under contracts marketed with reference to the consumption of energy from renewable sources.
- ✓ **GOs have no function in MS's target compliance**

Guarantees of Origin

Residual Mix

European Methodology – REDISS project (2015)

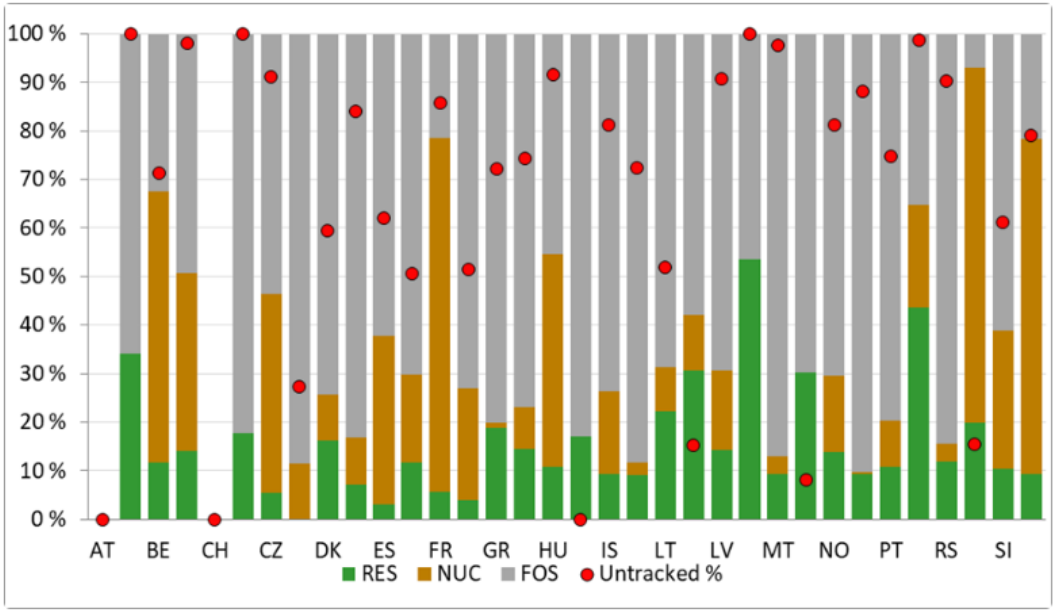


https://www.aib-net.org/facts/european-residual-mix

Guarantees of Origin

Residual Mix

Member States' Responsibility



» *Residual mixes 2022*

https://www.aib-net.org/facts/european-residual-mix

Guarantees of Origin

Revision of CEN – 16325: the never-ending discussion

Revision of CEN – 16325 for the inclusion of new energy carriers

A new draft will be put for a vote during summer 2024 - the outcome remains uncertain

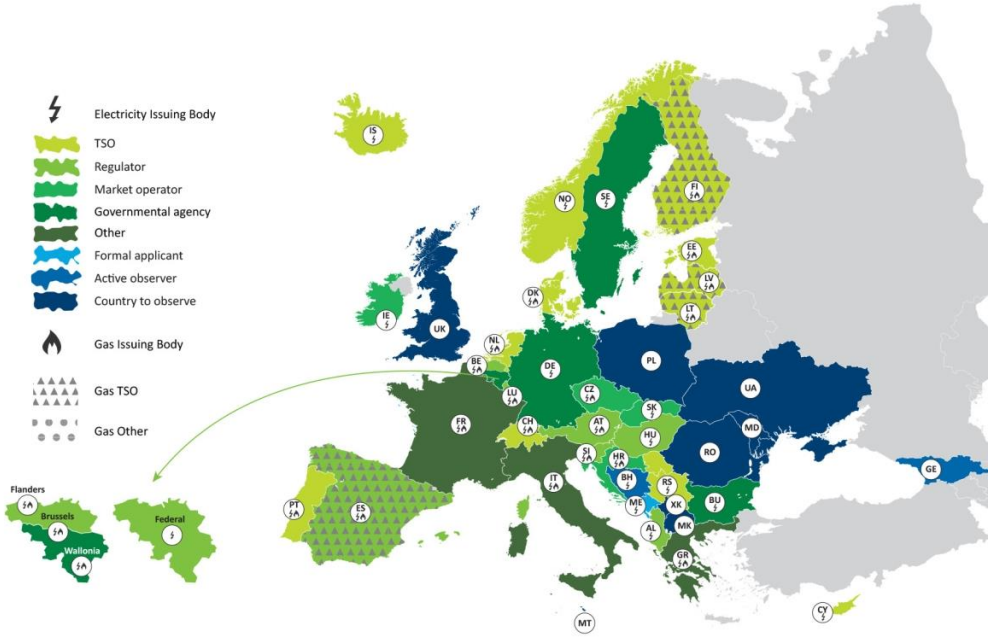
Guarantees of Origin

AIB - EECS Rules

The European Energy Certificate System

The European Energy Certificate System (EECS) offers a framework for creating and transferring electronic documents (EECS Certificates). For each megawatt-hour of energy, EECS certifies the quality of its source and/or the method of its production.

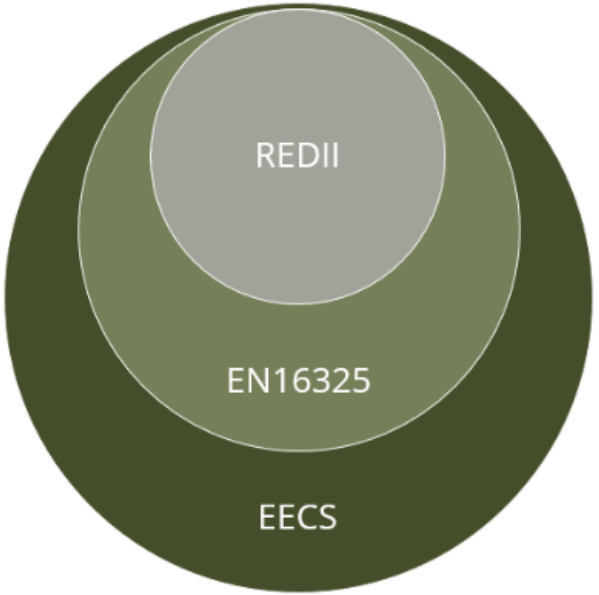
See the EECS Rules



Guarantees of Origin

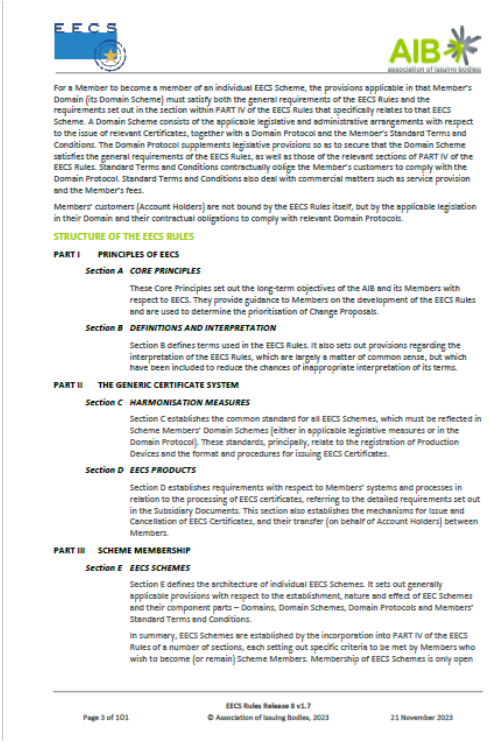
AIB - EECS Rules

1. GOs are for disclosure – legislation
2. Reliable GO system – mandatory standard
3. Efficient and reliable GO system – voluntary standard



Guarantees of Origin

AIB - EECS Rules



For a Member to become a member of an individual EECS Scheme, the provisions applicable in that Member's Domain (its Domain Scheme) must satisfy both the general requirements of the EECS Rules and the requirements set out in the section within PART IV of the EECS Rules that specifically relates to that EECS Scheme. A Domain Scheme consists of the applicable legislative and administrative arrangements with respect to the issue of relevant Certificates, together with a Domain Protocol and the Member's Standard Terms and Conditions. The Domain Protocol supplements legislative provisions so as to secure that the Domain Scheme satisfies the general requirements of the EECS Rules, as well as those of the relevant sections of PART IV of the EECS Rules. Standard Terms and Conditions contractually oblige the Member's customers to comply with the Domain Protocol. Standard Terms and Conditions also deal with commercial matters such as service provision and the Member's fees.

Members' customers (Account Holders) are not bound by the EECS Rules itself, but by the applicable legislation in their Domain and their contractual obligations to comply with relevant Domain Protocols.

STRUCTURE OF THE EECS RULES

PART I PRINCIPLES OF EECS

Section A CORE PRINCIPLES

These Core Principles set out the long-term objectives of the AIB and its Members with respect to EECS. They provide guidance to Members on the development of the EECS Rules and are used to determine the prioritisation of Change Proposals.

Section B DEFINITIONS AND INTERPRETATION

Section B defines terms used in the EECS Rules. It also sets out provisions regarding the interpretation of the EECS Rules, which are largely a matter of common sense, but which have been included to reduce the chances of inappropriate interpretation of its terms.

PART II THE GENERIC CERTIFICATE SYSTEM

Section C HARMONISATION MEASURES

Section C establishes the common standard for all EECS Schemes, which must be reflected in Scheme Members' Domain Schemes (either in applicable legislative measures or in the Domain Protocol). These standards, principally, relate to the registration of Production Devices and the format and procedures for issuing EECS Certificates.

Section D EECS PRODUCTS

Section D establishes requirements with respect to Members' systems and processes in relation to the processing of EECS certificates, referring to the detailed requirements set out in the Subsidiary Documents. This section also establishes the mechanisms for issue and Cancellation of EECS Certificates, and their transfer (on behalf of Account Holders) between Members.

PART III SCHEME MEMBERSHIP

Section E EECS SCHEMES

Section E defines the architecture of individual EECS Schemes. It sets out generally applicable provisions with respect to the establishment, nature and effect of EEC Schemes and their component parts – Domains, Domain Schemes, Domain Protocols and Members' Standard Terms and Conditions.

In summary, EECS Schemes are established by the incorporation into PART IV of the EECS Rules of a number of sections, each setting out specific criteria to be met by Members who wish to become (or remain) Scheme Members. Membership of EECS Schemes is only open

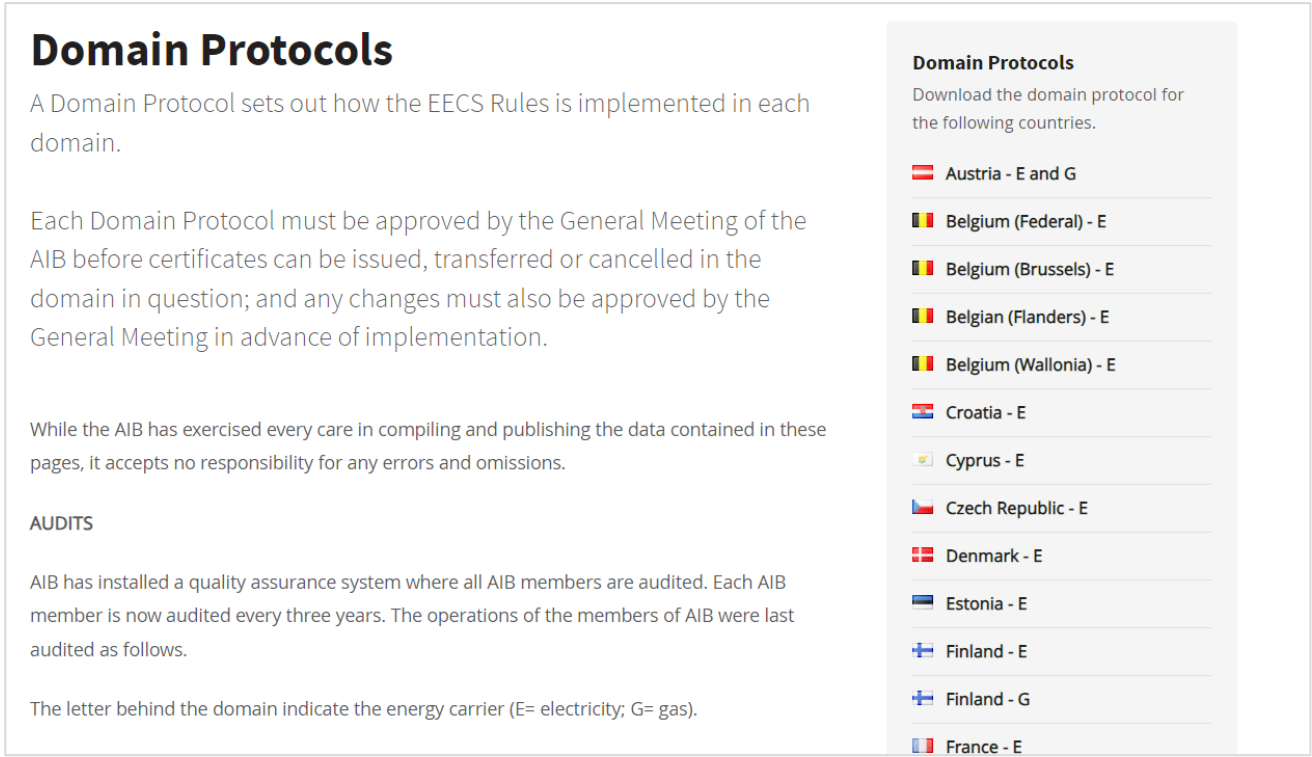
EECS Rules: Harmonization beyond CEN Standard

- **EECS Rules - 100 pages**
- **Ensuring**
  - Uniqueness
  - Immutability
  - Operational reliability
  - Protection of account holders
  - Governance
  - Access and Transparency
  - Cost effectiveness
  - There is direct import or export of energy

https://www.aib-net.org/eecs/eecsr-rules

Guarantees of Origin

AIB - EECS Rules – Domain Protocols



Domain Protocols

A Domain Protocol sets out how the EECS Rules is implemented in each domain.

Each Domain Protocol must be approved by the General Meeting of the AIB before certificates can be issued, transferred or cancelled in the domain in question; and any changes must also be approved by the General Meeting in advance of implementation.

While the AIB has exercised every care in compiling and publishing the data contained in these pages, it accepts no responsibility for any errors and omissions.

AUDITS

AIB has installed a quality assurance system where all AIB members are audited. Each AIB member is now audited every three years. The operations of the members of AIB were last audited as follows.

The letter behind the domain indicate the energy carrier (E= electricity; G= gas).

Domain Protocols

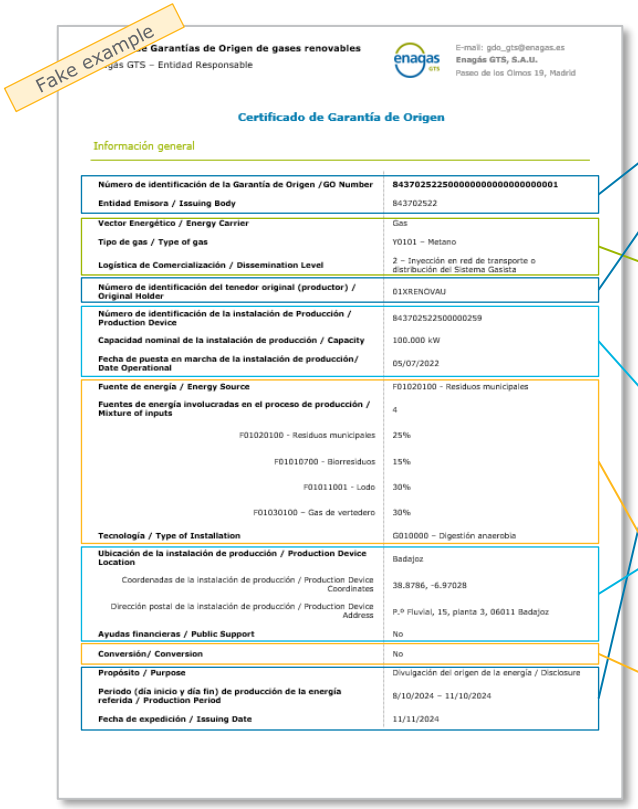
Download the domain protocol for the following countries.

- Austria - E and G
- Belgium (Federal) - E
- Belgium (Brussels) - E
- Belgian (Flanders) - E
- Belgium (Wallonia) - E
- Croatia - E
- Cyprus - E
- Czech Republic - E
- Denmark - E
- Estonia - E
- Finland - E
- Finland - G
- France - E

https://www.aib-net.org/facts/aib-member-countries-regions/domain-protocols

Guarantees of Origin

General Functioning


Fake example

...e Garantías de Origen de gases renovables
...gas GTS – Entidad Responsable

E-mail: gdo_gts@enagas.es
Enagás GTS, S.A.U.
Paseo de los Olmos 19, Madrid

Certificado de Garantía de Origen

Información general

Número de identificación de la Garantía de Origen /GO Number	843702522500000000000000001
Entidad Emisora / Issuing Body	843702522
Vector Energético / Energy Carrier	Gas
Tipo de gas / Type of gas	Y0101 – Metano
Logística de Comercialización / Dissemination Level	2 – Inyección en red de transporte o distribución del Sistema Gasista
Número de identificación del tenedor original (productor) / Original Holder	01XRENOVAU
Número de identificación de la instalación de Producción / Production Device	843702522500000259
Capacidad nominal de la instalación de producción / Capacity	100.000 kW
Fecha de puesta en marcha de la instalación de producción/ Date Operational	05/07/2022
Fuente de energía / Energy Source	F01020100 - Residuos municipales
Fuentes de energía involucradas en el proceso de producción / Mixture of inputs	4
F01020100 - Residuos municipales	25%
F01010700 - Biorresiduos	15%
F01011001 - Lodo	30%
F01030100 – Gas de vertedero	30%
Tecnología / Type of Installation	G010000 – Digestión anaerobia
Ubicación de la instalación de producción / Production Device Location	Badajoz
Coordenadas de la instalación de producción / Production Device Coordinates	38.8786, -6.97028
Dirección postal de la instalación de producción / Production Device Address	P.º Fluvial, 15, planta 3, 06011 Badajoz
Ayudas financieras / Public Support	No
Conversión/ Conversion	No
Propósito / Purpose	Divulgación del origen de la energía / Disclosure
Periodo (día inicio y día fin) de producción de la energía referida / Production Period	8/10/2024 – 11/10/2024
Fecha de expedición / Issuing Date	11/11/2024

Characteristics of the certificate

- Identification number of GO, issuing body and account holder
- Purpose: always the disclosure of the energy origin
- Production period and issuing date

Characteristics of the energy produced

- Energy vector: in this case it will always be gas
- Type of gas: based on EECS rules
- Dissemination level: injection in gas grid, in networks outside of gas grid, off-grid or self-consumption

Characteristics of the production device

- Identification of production device, nominal capacity, date operational, location.
- If the production device has received public support

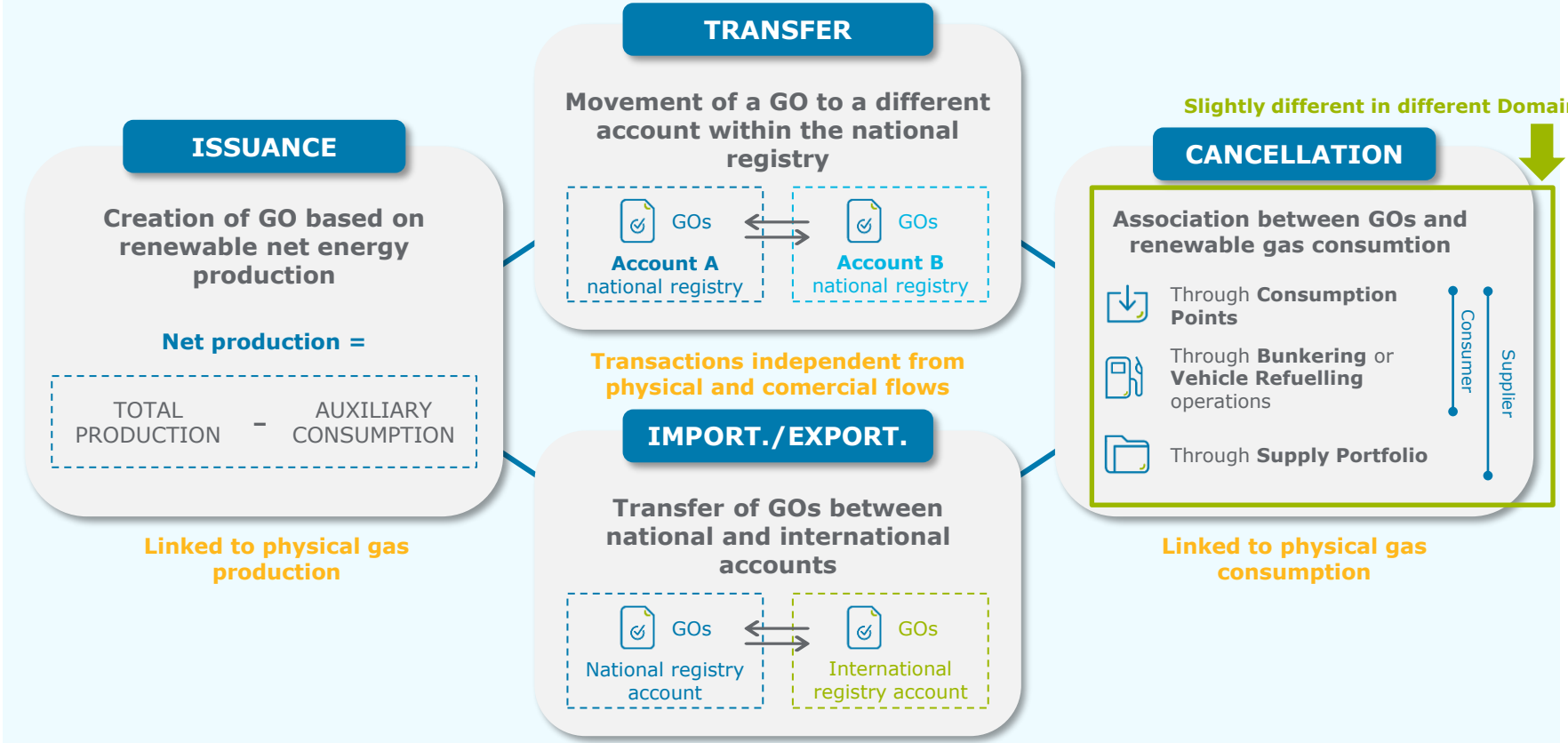
Characteristics of the production process

- Energy source for which the GO is issued, as well as energy sources that participate in the production process.
- Technology
- If the production device has a conversion process

Mandatory vs. Optional fields

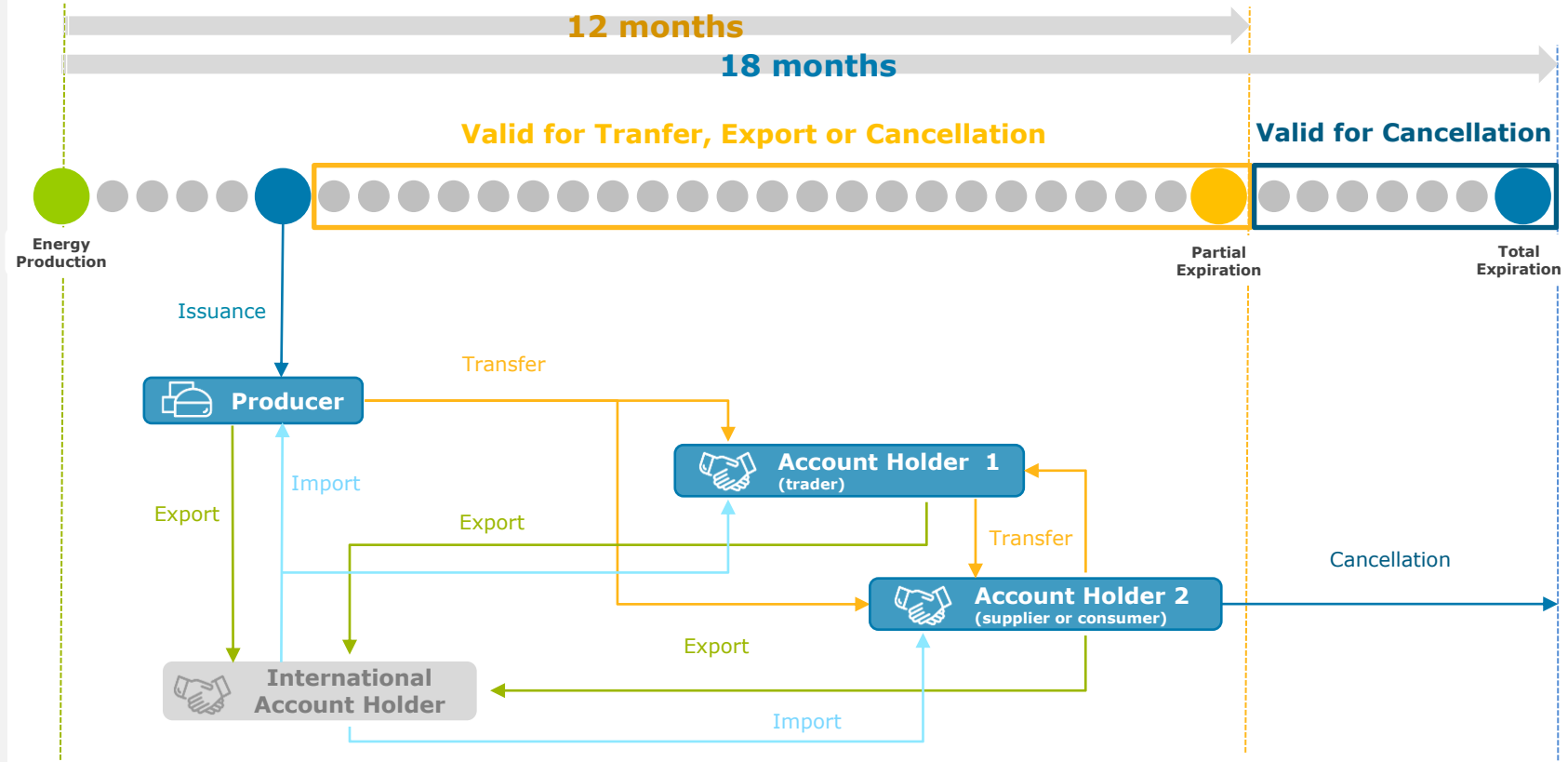
Guarantees of Origin

General Functioning



Guarantees of Origin

GO life cycle



1. Guarantees of Origin – a market oriented regulated certificate
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3. Gas and Hydrogen GOs – challenges
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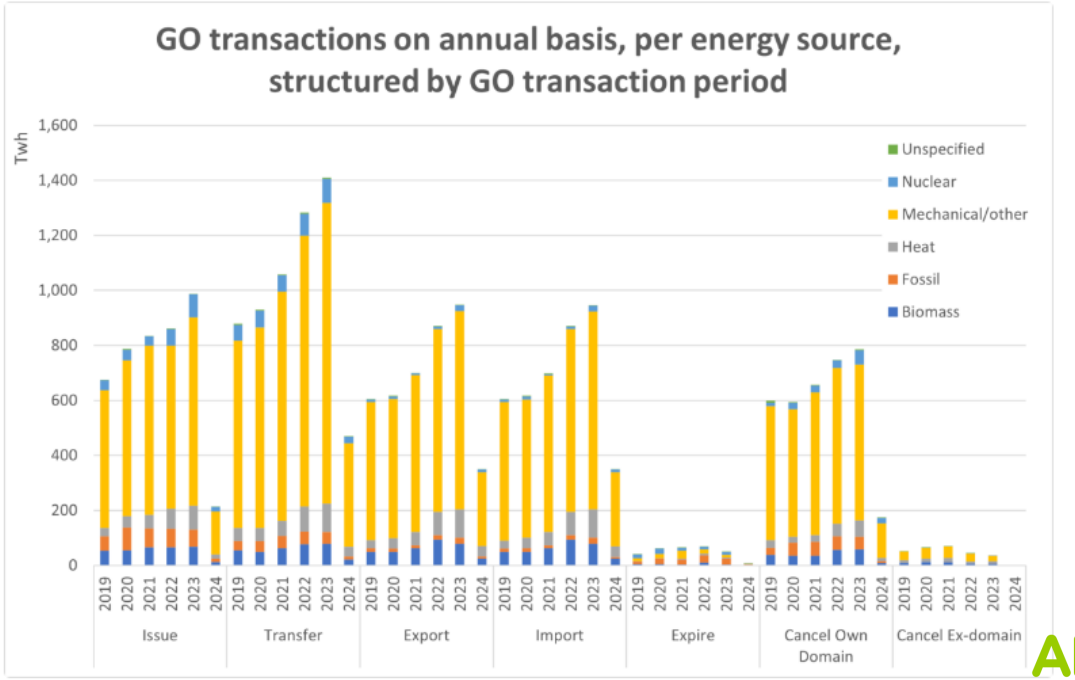
Guarantees of origin of renewable electricity



New challenge!

Granular certificates

According to Article 19 (RED III)

The production period for renewable electricity may be specified in accordance with the imbalance settlement period.

AIB association of issuing bodies

Successfully established 20 years ago

1. Guarantees of Origin – a market oriented regulated certificate
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Main Challenges – Gas and Hydrogen GOs

1. **Late Transposition and market fragmentation**
2. **Delayed approval of CEN-16325**
3. **Issues left open in the CEN-16325 draft**
4. **Sustainability Certification and Union Data Base**

RED II lately and not completely transposed

- ✓ **Not every MS has designated an Issuing Body for renewable gases and hydrogen**
  - Late transposition
  - Waiting for the approval of CEN – 16325 revision
  - Renewable gases not a priority
- ✓ **In absence of an Issuing Body for renewable gases:**
  - Some MS have fostered a Biomethane market based on subsidies and 'non-official' certificates
  - Biomethane has stalled in absence of subsidies.

Transposition of RED II – Implementation of GO systems for renewable gases

RED III – Refinement of GO systems for renewable gases.

Current Status

Guarantees of Origin

- Verticer*
- Energinet*
- Ambergrid*
- Gas Networks Ireland

Certificates of Origin

- DENA
- AGCS
- GGCS

- E-Control
- Connexus
- Enagás GTS
- Gasgrid Finland

+4 expected in 2024

The Gas Scheme Group was only officially established in December 2023 – with the official membership of 3 Issuing bodies (Approval of their Domain Protocols)

(*) Observer at AIB Gas Scheme Group

Issues left open in the CEN-16325 draft

1. **Network Characteristics and Fuel Index**
2. **Changes in the dissemination level**
3. **Hydrogen blending**

Issues left open in the CEN-16325 draft

Network Characteristics and Fuel Index

What is the meaning of network characteristics?

> When a customer consumes gas from a hydrogen or natural gas network, including gaseous renewable fuels of non-biological origin and biomethane, as demonstrated in the commercial offer by the supplier, Member States shall ensure that the guarantees of origin that are cancelled correspond to the relevant network characteristics.';

Gas networks vs. Hydrogen networks?

> **5.3.5 Obligatory additional information on a GO for Gas**
>
> In addition to the information in 4.5.2, when a GO has been issued for an Energy Carrier for which the gas composition has been used to establish the proportion of that Energy Carrier of a Gas mix which contains more than one Energy carrier, then the GO shall contain the gas composition of that Gas mix expressed by the Fuel Index of the final Output.
>
> Where the Energy Carrier is unspecified Gas, the Fuel Index need not be specified.

Is 'network characteristics' compatible with Fuel Index?

Issues left open in the CEN-16325 draft

Changes in the dissemination level

Annex E
(normative)

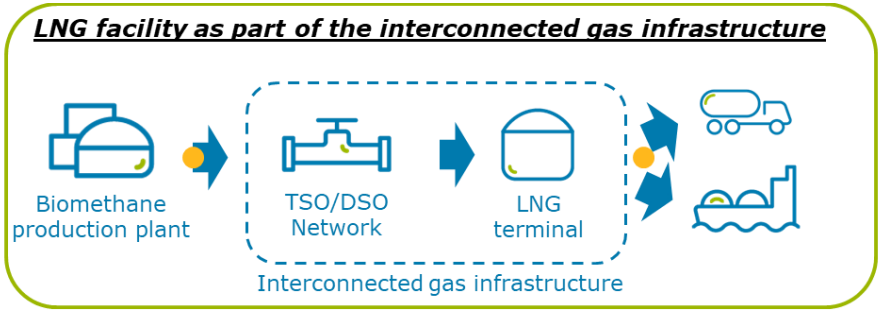
Dissemination level of the physical energy for which the GO is issued

The parameter value for the Attribute on the GO that indicates the dissemination level of the produced physical energy for which the GO is issued, as in 4.5.2.2.q, is one of the following:

1) Consumed by the operator of the production device [this applies for Electricity, Gas and Heating and Cooling];

The parameter value for the Attribute on the GO that indicates the dissemination level of the produced physical energy for which the GO is issued, as in 4.5.2.2.q, is one of the following:

1) Consumed by the operator of the production device [this applies for Electricity, Gas and Heating and Cooling];
2) Disseminated over a Distribution or Transmission System:
   a) for Electricity;
   b) for Natural Gas;
   c) for Hydrogen;
3) Disseminated over a Closed Distribution System:
   a) for Electricity;
   b) for Natural Gas;
   c) for Hydrogen;
4) Disseminated over any other network than a Distribution or Transmission System or Closed Distribution System:
   a) for Electricity;
   b) for Natural Gas;
   c) for Hydrogen;
   d) another Gas system;
5) Disseminated over a heating or cooling Grid [this applies for Heating and Cooling];
6) Disseminated by vehicle [this applies for Gas and Heating and Cooling];
7) Dissemination unspecified – not consumed by the operator of the Production Device [this applies for Gas].



Issues left open in the CEN-16325 draft

Hydrogen blending

✓ **Request from hydrogen project promoters**

How is this handled in Spain - this situation has not considered in any other country for the time being

1) Issuance of different types of GOs based on their compatibility with network injection

Gas type	Dissemination Level	GO type
Unspecified gas	Any	Biogas
Methane	Any	Network Compatible Gas
Hydrogen	Injection into the gas networks	
	Any other different from injection into the gas networks	Hydrogen

2) Restriction based on the type of GO and the type of gas consumed at the cancellation process

Gas consumed	Type of consumption point	GO type
Hydrocarbon gas not fulfilling gas network quality specifications	- Self-consumption points - Off-grid consumption points - Consumption point from an un-upgraded Biogas network that is not connected to the gas system	Biogas
Gas compliant with the gas network quality specifications	- Consumption points from the natural gas networks - Off-grid consumption points - Consumption point from a natural gas-compatible network that is not connected to the gas networks - Self-consumption points	Network Compatible Gas
Hydrogen[1]	- Consumption points from an eventual interconnected Hydrogen network - Off-grid consumption points - Consumption points from a hydrogen network that is not connected to the eventual hydrogen interconnected networks - Self-consumption points	Hydrogen

Ex Domain Cancellation

✓ **Provided importing/exporting GOs is not technically possible between two registries**

Example

- An Spanish consumer is offered French biomethane GOs.
- For the time being there is no possibility for exporting GOs from France into Spain.
- EEX and Enagás GTS agree to allow ExDomain Cancellation between them.
- An Account Holder in France cancels GOs in an ex-domain operation, identifying the beneficiary as an Account Holder in Spain.
- The Gos in France are cancelled and labeled as exported.
- EEX sends Enagás GTS the information regarding the operation.
- Enagás GTS uses this information as 'imported and canceled' GOs for the disclosure of the beneficiary.

Ex-Domain Cancellation is an interim solution until the proper import/export functionality is enabled.

Sustainability certification and UDB

Evolution of certification in European Directives

European Commission

2001 — **Directive on renewable electricity**

Firs mention to the need of proving the origin of renewable electricity–
GOs for (renewable) electricity

2003 — **Directive on biofuels**

2009 — **Directive on Renewable Energy (RED I)**

- GOs for electricity and **heating and cooling**
- Definition or **sustainability criteria** for **biofuels** used in **transport sector**.
- **Sustainability verification** procedures to be defined by **Member States**

2018 — **Directive on Renewable Energy (RED II)**

- GOs also for **renewable gases, including hydrogen**
- Definition **verification schemes** for sustainability and emissions reduction criteria: voluntary vs. national
- Requirements on sustainability and emission reduction criteria applying to **biofuels, bioliquids y biomass-fuels**

2023 — **Delegated Regulation RFNBOs**

RED III - UDB

According to REDII, biogas is a biomass-fuel and sustainability certification is needed in order to use it for target compliance.

Background – Renewable Certification in RED

REDIII sets **two parallel certification systems for renewable gases** (biogas and renewable hydrogen) : **Guarantees of origin and sustainability certification.**

Article 19. Guarantees of origin

Guarantee of origin (GO)

Same functioning and purpose as electricity GOs:

- ✓ **Informing the final customer about the origin of its gas supply.**
- ✓ **Supply disclosure.**

Article 29. Sustainability and emissions saving criteria
Article 30. Verification of compliance.

Sustainability certificates.

Linked to **Voluntary schemes, mass balancing, custody chain**, and when referring to hydrogen, linked to PPAs:

- ✓ **Target compliance**
- ✓ **Quantification of CO2 emissions**

GOs vs. Sustainability certificates

Functional divergence

The certificates have different requirements, elements and purpose.

Independent issuing systems

EU regulation establishes no link between GO and Sustainability certificate.

Risk of double claims

As both GOs and Sustainability certificates are issued independendtly for the same production.

Confusion and Complexity for producers and consumers.

Different approaches in different countries: in some cases they get combined in a multi-purpose certificate, in some others they are kept separately and target compliance requires that both certificates are produced together.

The Union Database

Regulatory background – The Renewable Energy Directive (RED II & RED III)

- ✓ Originally set as a point in Article 28 (other provisions) in RED II

> 2. The Commission shall ensure that a Union database is put in place to enable the tracing of liquid and gaseous transport fuels that are eligible for being counted towards the numerator referred to in point (b) of Article 27(1) or that are taken into account for the purposes referred to in points (a), (b), and (c) of the first subparagraph of Article 29(1). Member States shall require the relevant economic operators to enter into that database information on the transactions made and the sustainability characteristics of those fuels, including their life-cycle greenhouse gas emissions, starting from their point of production to the fuel supplier that places the fuel on the market. A Member State may set up a national database that is linked to the Union database ensuring that information entered is instantly transferred between the databases.

- ✓ Implementation for liquids between 2018-2023
- ✓ Deadlock for gases – 'impossible' interaction between UDB and GO Registries.
- ✓ RED III: Article 31a:

> 4. Where guarantees of origin have been issued for the production of a consignment of renewable gas, Member States shall ensure that those guarantees of origin are transferred to the Union database at the moment when a consignment of renewable gas is registered in the Union database and are cancelled after the consignment of renewable gas is withdrawn from the Union's interconnected gas infrastructure. Such guarantees of origin, once transferred, shall not be tradable outside the Union database.

Current Status

Article 19. Guarantees of origin

- ✓ Developed by **Member States**
- ✓ Electronic certificates in an account in a registry. Apply to the production or registered production devices.
- ✓ **Book & Claim**
- ✓ Supply mix of the supplier & qualification of gas consumptions
- ✓ Harmonized by CEN16325
  - ✓ **1 GO for 1 MWh**
  - ✓ Sustainability certification and GHG emissions as optional fields**
  - ✓ High Calorific Value (as gas market rules)
  - ✓ Renewable NET production
- ✓ Expiration set by the Directive (12-18 months)
- ✓ Covers renewable but can be extended beyond renewable.
- ✓ Cancellation requires compliance with 'network characteristics'
- ✓ AIB vs. ERGAR exchange Hubs. ExDomain Cancellation.

Article 29. Sustainability and emissions saving criteria
Article 30. Verification of compliance.

- ✓ Developed by **Voluntary schemes**
- ✓ The voluntary scheme through a certification body certifies the production device. **Certified producers issue PoS-pdf document**.
- ✓ A PoS-pdf document is issued for **undetermined amounts of energy** included in a 'consignment'
- ✓ **This PoS-pdf passes-through along with the commodity contracts**.
- ✓ **Mass balancing** – the PoS is an attribute moving along the commodity: 3–month balance.
- ✓ No expiration date
- ✓ Low Calorific Value
- ✓ Covers sustainable-renewable production.
- ✓ There is no such a process defined for cancellation – last user holding the pdf-document claims the renewable amounts.
- ✓ **Some MS have developed systems (GO-like) to deal with these certificates**.

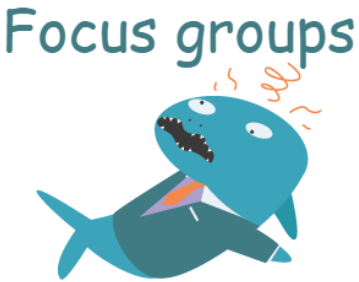
The Union Database

Development for gases

New PoS concept

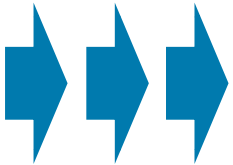
- ✓ **PoS – electronic certificate in the UDB for each MWh injected into the gas network**
- ✓ Voluntary schemes register production facilities in the UDB
- ✓ EOs send production data to UDB
- ✓ Infrastructure operators send production data to UDB
- ✓ **UDB issues PoS – electronic ID in a UDB account**

How is this integrated with the GO Registries?



December 23 – January 24

- ✓ GO avoidance vs.
- ✓ GO cancellation upon issuance



February 24 onwards

- ✓ Mutual referencing
- ✓ Real time communications

The UDB – next steps?

1. **Common understanding of UDB concept**
   - At national level there's a huge lack of knowledge about UDB concept among the stakeholders in the renewable gas market.
   - Even at EU level it seems the understanding what DGENER intends for the UDB is sometimes unclear.

2. **Promoting the processes set by the gas market regulation into the certification processes.**
   - Gas market data used and/or resulting from the regulated processes shall be the basis for certification: daily balancing figures, GCV…

3. **Need for a target model and a roadmap for the certification of renewable gases**
   - A functional National-EU integrated model requires a higher level of harmonization than what is provided by the Renewable Energy Directive.
   - An integration model defined at a too-high level will not show the issues to be addressed. Issues are in the detail. Processes need to be assessed from all different perspectives.

4. **May gas certification be addressed as such in RED IV?**
   - The patchwork of extensions of certificates conceived for other energy carriers of different nature may be the core problem. Gas has more complex logistics than electricity, and has a stronger and more detailed regulation than liquids.

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5. PPAs, GGPAs, HPAs

The Delegated Act (Commission Delegated Regulation (EU) 2023/1184)

	Additional requirements	PPAs *Purchase agreement of renewable electricity with a renewable electricity producer from one or more tan one production devices.*	Additionality *The commissioning of the electrolizer took place no later tan 36 months after the commisiong of the renewable electricity production device.*	Temporal correlation *Hydrogen production takes place witin the same time period as the renewable electricity production.* ***Until 2030 – monthly >2030 – hourly***	Geographical correlation *Hydrogen production takes place in the same electricity bidding zone as the renewable electricity.**
Direct Production	N/A	N/A	👍	N/A	N/A
Electricity consumption from the grid	RES > 90% Limitation in %production hours= %RES	N/A	N/A	N/A	N/A
	When reducing the needs for redispatching	N/A	N/A	N/A	N/A
	<18gCO2eq/MJ	👍	N/A	👍	👍
	Default situation	👍	👍 Not aplicable until 2038 in case of electrolysers commissioned before 2028	👍	👍

(*) there are some exceptions applying to neighboring bidding zones

1. Guarantees of Origin – a market oriented regulated certificate
2. Electricity GOs
3. Gas and Hydrogen GOs – challenges
4. Hydrogen specifics
5. **PPAs, GGPAs, HPAs**

PPAs, GGPAs and HPAs

Green Gas Purchase Agreements and Hydrogen Purchase Agreement

- Commodity + GOs + Proof of Sustainability
- Commodity + PoS (if there is no GO involved)

If there's no Sustainability certification involved:

- Commodity + GOs
- GOs

Slowly developing market - > most GGPAs and HPAs will be physical

Thank you