Technical support for RES policy development and implementation.
Establishing technical requirements & facilitating the standardisation process for guarantees of origin on the basis of Dir (EU) 2018/2001

Task 1
Mapping of the currently existing standardisation frameworks

Task 1.3
Identification of the main challenges which currently exist in the management of guarantee of origin system

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FaStGO
Facilitating Standards for Guarantees of Origin

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1. Introduction

1. Framework

The FaStGO project provides expert advice to the European Commission DG ENER, based on the terms of Reference N° ENER/C1/2019-517: "Technical support for RES policy development & implementation. Establishing technical requirements and facilitating the standardisation process for guarantees of origin on the basis of Dir (EU) 2018/2001."

Under task 1.3 the project identifies the main challenges that currently exist in the management of guarantee of origin systems.
Under task 2, the project team will propose options for updating European Standard EN16325 on guarantees of origin – which is in the process of being revised through a separate CEN CENELEC process. It may be possible to address some of the challenges identified under this task through the revision of this standard EN16325. However, the identification of system management challenges is not limited to challenges that can be resolved in EN16325. This project output aims to provide an overview of the wider framework, thereby also providing a view on interactions between various challenges. This should help to prevent the proposal, or uptake, of options that, while addressing one particular challenge would cause problems to another part of the system.

The text proposals for the revision of EN16325 that will be drafted later in this project will be used as an input for the CEN/CENELEC process on the revision of this standard on guarantees of origin.

2. What and why

Article 19 of the Renewable Energy Directive 2018/2001, (generally referred to as REDII) sets up a framework for guarantees of origin that builds on the provisions of the previous Renewable Energy Directives (2009/28 and 2001/77). The term Guarantee of Origin (GO) defined in these EU laws and is in common use by electricity system operators and market participants.

The market for electricity GOs continues to grow, with generation that received a GO reaching 791 TWh[1] in 2018, of which 653 TWh[2] were issued under the European Energy Certificate System (EECS). In 2019 EECS GO issuing increased to 703 TWh[3]. Power generation eligible for guarantees of origin but not currently receiving it is consistently decreasing and had reduced to 176 TWh in 2018. (Applying for GOs is not

[1] https://www.recs.org/cover-stories/go-monitoring-2018-report
The report studies 31 European countries:
Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, the Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.
[2] https://www.aib-net.org/facts/market-information/statistics/activity-statistics-all-aib-members
[3] Figures for non-EECS GOs are not available for 2019.

mandatory for producers.) Also, in 2018, cancellations of GOs (the step required to prove ownership and use of a megawatt-hour of electricity) passed 700 TWh for the first time[4].

Figures on cross border trade of gas certificates are not yet available on a centralised level. As REDII is, for the first time, introducing a legal framework for the concept of guarantees of origin for gas, there is a variety of types of gas certificates circulating in Europe, for which terminology is still in the process of being harmonised.

This document addresses the current challenges facing the GO system and only briefly touches upon the many challenges that have already been overcome since GO systems were implemented over the past two decades. It takes as fixed the basic approaches which have been developed into the fundamentals of GO systems today and focuses instead upon the challenges the system faces going forwards.

Many of the initial challenges for setting up GO systems were described in the E-track[5], RE-DISS[6], CertifHy[7] and Biosurf[8] projects. Other challenges that have arisen as GO markets have grown, were addressed by solutions developed by the members of the Association of Issuing Bodies[9], ERGaR[10] and CertifHy, to which this document will refer. This document considers the known challenges that remain as of March 2020.

This document reports on the known challenges. It provides a mapping of the landscape which aims to facilitate a sanity check when later on recommendations are proposed for the further development of GO systems. Specifically, it aims to ensure that any measure to address a challenge, doesn't cause unintended harm for another aspect related to the whole GO system.
This document aims to provide a balanced overview based on the different views of the stakeholders.

Where the document phrases a recommendation, this comes from clear signals captured by the project team, with the aim to support and speed up the work in CEN on the revision of EN16325.

4 https://www.recs.org/cover-stories/go-monitoring-2018-report
5 https://ec.europa.eu/energy/intelligent/projects/en/projects/e-track
6 http://www.reliable-disclosure.org/
7 https://www.certifhy.eu/
8 http://www.biosurf.eu/en_GB/
9 http://www.aib-net.org
10 http://www.ergar.org

3. Executive summary

The document groups the identified challenges into three categories: (1) the design of guarantees of origin; (2) the GO Market; and (3) cross-border cooperation amongst competent bodies for issuing GOs and for supervising energy source disclosure.

Recommendations for EN16325

The basic points of attention regarding revision of CEN/CENELEC standard EN16325 on guarantees of origin may be summarised as follows.

Design of GO systems

1. With regards to the **prevention of fraud in production data registration and audit of production devices**, it is recommended that EN16325 ensures robust data registration systems. With regards to audit of production devices, it is debatable whether a GO standard should determine HOW audits should be conducted. Rather, it makes sense that the GO standard arranges WHAT the competent body needs to be reassured of by a third-party guarantor which does not benefit from the issuing of GOs.
2. It is recommended exploring whether the end of the **GO validity period and expiry date** should coincide, and to keep them both at the current 12 months after the end of the production period. If it is decided that they should not coincide, then it is proposed that at least the transfer of ownership of GOs should only take place in the validity period - which ends 12 months after the end of the period of production of the corresponding energy. It is also recommended that GO cancellation may only take place before 31st March following the year in which the corresponding energy is consumed.
3. Rather than **simplifying data on GOs for plants with a capacity of less than 50 kW**, it is recommended that the processes for handling GOs issued for generation from small production devices should be simplified. However, when a member state opts to simplify data on GOs for small capacity plants, then the type of data on the GO that can be simplified should be standardised and limited, in order to ensure trust in cross-border transfer of these GOs.
4. In order to facilitate an **EU-wide green label, and to offer consumers information which will facilitate informed consumer choice**, there should be a data item on the GO that enables consumers to differentiate GOs from each other based on quality criteria. It is recommended that an optional data field be introduced onto a GO that makes reference to an **independent criteria scheme,** if and when one is applicable. Note that in the gas and hydrogen sector, there is a strong demand for recording on the same certificate that carries the GO, related greenhouse gas information and/or compliance with GHG emission saving criteria and sustainability criteria from REDII. Furthermore, sections 4, 9, 10, 11, 13 and 17 of this document contain considerations on what might be acceptable voluntary **data fields for the GOs** for the various energy carriers.
5. Treatment of the **Storage** of energy using the same energy carrier can in principle be considered under the same rules as those that apply for energy carrier conversion, which relates to storage of energy in another energy carrier. For simple storage of energy in the same energy carrier, the administration and verification procedures for cancelling and re-issuing GOs can, however, be omitted. This can be achieved by ruling that for this type of storage it is not necessary to cancel and issue GOs. If the operators of the storage device want

to "green its storage energy losses", then they can cancel GOs in accordance with the quantity of energy lost by storing the energy.

6. While **categorising the different gaseous energy carriers**, it is acknowledged that hydrogen with a 99,9% (by volume) purity level is intrinsically a different energy carrier than hydrocarbon gases – which have a different value to end-consumers.
7. Rules are needed for harmonising **energy carrier conversion**. GOs can only be issued for energy produced from a primary energy source, or from another energy carrier. In the latter case, a quantity of GOs must be cancelled which corresponds to the amount of energy input to this conversion device and conveyed by the other energy carrier. While doing so, the source of the energy recorded on the cancelled GOs associated with the input must be retained on the newly issued GOs. The other essential information which is to be recorded on the newly issued GOs can be retrieved from the conversion device. Information on received financial support can be accumulated from the conversion device and the cancelled GOs for the input to it. It can be considered whether and how to optionally retain more information from the cancelled GO for input to the newly issued GOs for the output of the conversion.
8. **Determining the attributes of energy from production devices with multiple inputs and/or multiple outputs** can be brought to a generic level or be treated at an energy carrier specific level.
   Several issues need to be addressed:
   I. The principle used to allocate the attributes of multiple energy inputs to the related outputs;
      Where energy is generated from a mixture of input fuels/materials, two options need to be considered:
      1. Where possible, to allocate how the energy could physically have been generated from each of the inputs separately – then a quantity of GOs can be issued which reflect in their attributes the amount of energy from each individual input fuel/material. This shall be in accordance with the proportion by energy content of that input fuel/material in the total mixture used.
      2. The process physically requires the combination of these inputs for the output energy to be generated (e.g. power and waste) – so a GOs can be issued with reference to more than one energy source.

      The above approach continues to apply when there are multiple outputs.
   II. Consider the different applicable ways for determining the energy content of the input, in order to allocate it proportionally to the output;
   III. Ensure that a Production Device is defined in such a way that it comprises only one Technology;
   IV. Clarify which energy flow(s) should be considered as auxiliary and what is an Input energy carrier to the production device;
   V. Use of another energy carrier as input.

GO Market

12. **Prevention of double disclosure of the origin of sold energy**: Robust processes for issuing, transferring and cancelling of GOs must be installed to prevent the disclosure of the same instance of sold energy and with the same origin more than once.

13. **Onsite consumption and non-interconnected grids**: In order to avoid double disclosure, the definition of the area in which tradable GOs are issued must be the same as the defined area of consumption that is used for the residual mix calculation.
    a. If tradable GOs are issued and not immediately cancelled for energy that is consumed on the site of the production device, such onsite consumption must be incorporated in the consumption figures of the residual mix.
    b. Several stakeholders differentiate the quality of GOs according to whether or not the energy represented by the GO can be physically delivered to them. The data on the GO can facilitate them in their quest for information. A data field 'means of supply' can be added to the basic information on the location of the production device, to inform consumers of whether a gas was brought to the market through a grid or by vehicle.
14. **GO Cancellation by consumers and intermediaries**
    Art. 19.1 of REDII allows for GOs to be used by parties other than suppliers, in demonstrating to final customers the origin of the energy supplied to them. In the texts setting out the purpose of the GO, it must therefore be acknowledged that GOs may be cancelled by consumers and intermediaries, and not solely by suppliers.
    Double disclosure can take place when multinational market parties try to centrally cancel GOs for all the countries in Europe where they are active, by doing so in the GO registry of a single country, while the residual mix calculation method does not allow for this. Solutions need to be developed.

Cross-border cooperation amongst Competent Bodies for Issuing GOs

21. **Compliance and alignment of designated competent bodies** for the issuance of GOs
    The credibility of a GO system in a country also depend upon the credibility of the GOs imported into that country. A country can scrutinise a foreign GO system from which it allows imports. However, when there are many countries from which imports are allowed, such scrutiny becomes a significant burden. This burden is even greater if scrutiny has to be repeated whenever a country updates its systems. EN16325 might be expanded to set out the requirements for an auditor to assure the quality of member state GO schemes. Note that an organisation that facilitates such audits would need to be adopted as the result of joint action by Member States.

23. **Complementing a solid GO standard with a flexible agreement between Issuing Bodies:**
    A reliable GO system requires detailed rules to be agreed amongst Issuing Bodies. However, going down to a deep level of detail in a formal standard like EN16325 risks being too inflexible in changing circumstances, where speed of reaction may be essential – for instance, where system or data security is paramount.

    Ideally, EN16325 will contain a basic package of solid rules, to be complemented with a separate agreement between issuing bodies for organising the detailed implementation of reliable cross-border GO transfer.

25. Practical aspects must be considered with regards to the data management between different organisations involved in GO issuing following **energy carrier conversion**. Sector coupling requires well-designed processes for

cooperation between the involved issuing bodies of the different energy carriers, where these are not the same issuing body.

Challenges not directly linked to EN16325 on GOs

This document also contains a description of challenges that exist in the management of GO systems which, while they may not have a direct place in the EN16325 standard for GOs, may need to be taken into account.

- Avoiding double counting following from **the interplay of GOs** (REDII art.19) **and sustainability certificates** (REDII art.25-31)
    - A link between the management of the two types of certificates (GOs and sustainability certificates) must be established to ensure that there is no double disclosure of the same attributes for which a GO is issued. If not, a risk exists that the party who consumes (cancels) the sustainability certificate will claim to have consumed the renewable origin of the corresponding energy. This risk arises when GOs are issued and traded separately from the sustainability certificates, as this may allow a unit of renewable energy to be claimed twice - at the cancellation of the GO, AND at the redemption of the sustainability certificate.
    - It is possible to embed the GO in an electronic document that serves multiple purposes. It is recommended that **a data field that indicates the purpose** of the electronic document be **provided on the electronic document that carries the GO**. This facilitates Member States in their own choices for system set-up and seeks to avoid confusion. The electronic document that carries the GO should only be used for the purpose for which it was issued. The purpose of a GO is described in art.19.1 of the REDII.

- FaStGO is not in place to indicate whether or not GOs can be used for EU-ETS; that is up to policy-makers. However, in case policy-makers decide to allow **GOs to be used for EU-ETS compliance**, there are some aspects that should be taken into account, like the data recording, processes and relationships.
- Measures **for prevention of financial fraud in GO markets** are needed when large volumes are traded.
- Market parties benefit from **well-designed GO activity statistics** in order to strengthen themselves with an estimate of the development of GO market behaviour.
- There is not yet a signal of interest for **cross-border trade of heating and cooling GOs**. That makes it hard to estimate the extent to which issuing bodies need to prepare for this.
- **Sector coupling** and Energy Carrier Conversion is likely to have an **influence on GO market price for different energy carriers**, but so far there is no experience on which any analysis can be based.
- There is a centrally calculated **Residual Mix** for electricity that is a building block for the avoidance of double disclosure. The provider of this calculation, the AIB, has no control over whether Member States actually use this residual mix or the calculation method behind it.
- This document considers some elements related to the **IT Infrastructure** for cross-border transfer of GOs.
- **Synchronising discussion fora for gas GO issuing bodies** will benefit the practical handling of gas GOs.

- There are great **merits** to be derived from the Association of Issuing Bodies and the **agile responsiveness** to the evolving GO market over the past two decades. However, constant attention is required to mitigate the **challenges facing issuing bodies in making collective decisions**.

4. Expert stakeholder consultation

This document was distributed to experts who work in areas that are related to GOs, for consultation. Experts did not necessarily comment on all sections of this document and may have selected specific topics related to his area of expertise. Feedback was collected in the structure of an online questionnaire.

There were 28 respondents, of which the following sixteen agreed to be named: 3Degrees Group Inc., BDEW Bundesverband der Energie- und Wasserwirtschaft (German Association of Energy and Water Industries), CargoX, Commerg Ltd, EKOenergy, Energinet Gas TSO, ENGIE, Finnish Forest Industries Federation, Fortum, Gas Networks Ireland, GRT gaz, Naturgy, NValue AG, Oeko Institut, UBA, Yélé Consulting.

At the start of the questionnaire, respondents were asked to fill in basic information on the role of their organisation, relevant energy carriers they work with, and length of their experience with GOs. Most of the respondents operated in the field of electricity and/or gas, whereas hydrogen and heating and cooling were relevant for less than half of the respondents.

The questionnaire attracted answers from a few representatives of issuing bodies for electricity and gas certificates as well as GO market actors (energy producers, suppliers and traders). Several respondents wanted to further specify their role e.g. consultant, research, lobbyist, NGO, service provider, manufacturer. Fourteen respondents indicated they have been active in the GO field for more than five years.

The background information of the respondents is presented in the figures below. It is worth noting that the respondents were able to select multiple answers and hence the percentages representing the share of respondents selecting a specific answer do not add up to 100%.

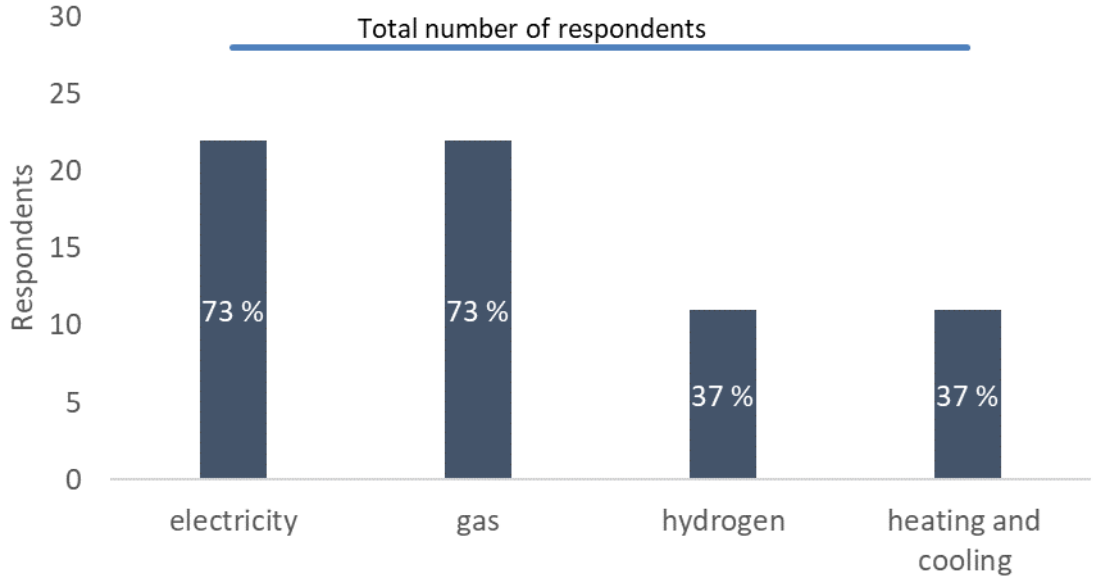


Figure 1. Sector of operation of the respondents of the expert stakeholder consultation

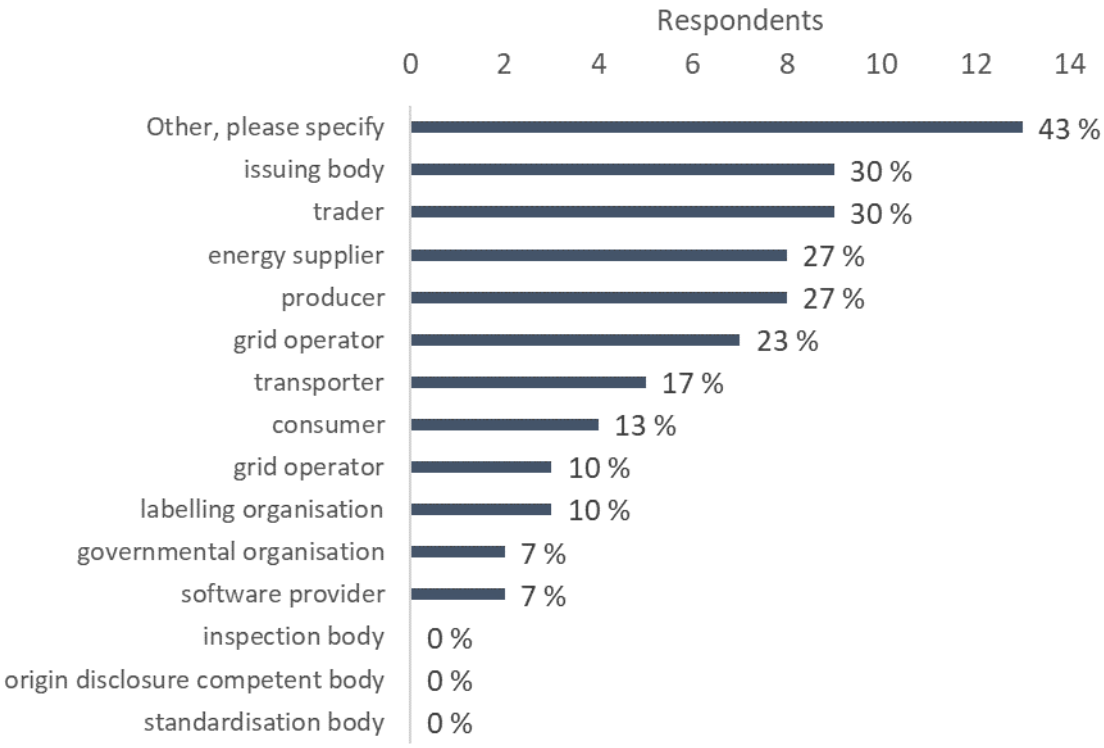


Figure 2. Area of operation of respondents of the expert stakeholder consultation

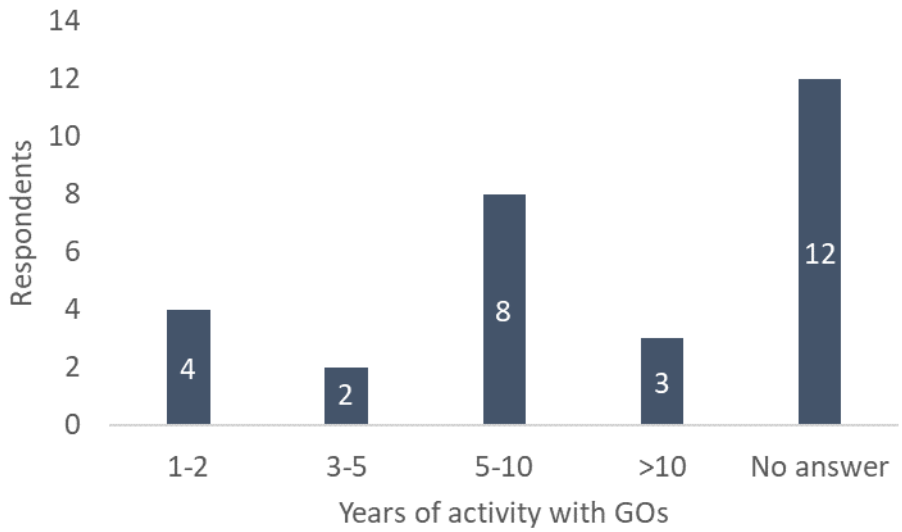


Figure 3. Years of experience with GOs of the respondents of the expert stakeholder consultation

As a general remark, the number of respondents in each category was too low to have any confidence that they represented the views of that group of stakeholders in general (Issuing Body, Grid Operator, Trader, Producer, Consumer, …). However, the responses received do indicate the views held by a not insignificant number of stakeholders. Furthermore, responses were received from organisations representing all groups of stakeholders with whom the consultation was shared. Several other stakeholders indicated an interest to participate in the consultation but didn't manage to do so in the 3 weeks during which it was open.

The experiences and views of project team members are not included in the overview of the stakeholder consultation in Annex 1. However, their experience is integrated into this document, which in some places contains balancing counterarguments for single-sided views that might exist in some of the consultation responses.

5. Glossary

GO	A guarantee of origin in the meaning of article 19 of REDII
IEM	Internal Electricity Market Directive nr 2009/72/EU and 2019/944/EU
REDII	The Renewable Energy Directive 2018/2001/EU
RES	Renewable energy sources
RFNBO	Renewable Fuel of Non-Biological Origin

2. Design of Guarantees of Origin

1. Prevention of fraud in production data registration and audit of production devices

Key to the credibility of a GO system is the **reliability of the data recorded on the GO itself.** Ensuring the reliability of this data requires a system that is well set up in the first instance. Such systems must have accurate measurement infrastructure, secure data reporting systems, and transparent, accessible system information tools. Together, these requirements should assure delivery of the fundamental principle of a GO system – that one MWh of electricity production may receive one, and only one, reliable and accurate GO that can be easily tracked by system operators as it is quickly and safely transferred between the accounts that market participants or their representatives hold in national GO registries.

If cases of misuse of the GO system occur, such as a producer claiming to provide renewable power while feeding their production device with fossil fuel, they can and must be identified. If such fraud is identified in a GO system, the legal procedures of the Member State should take corrective and punitive action as appropriate. Identifying fraud requires clear and robust procedures.

a. The first layer of control is provided through clear procedures for production device registration, and/or the integration with other licencing and registration systems in the country (e.g. environmental licencing procedure, DSO/TSO registration in the grid access registry, …).
b. The second layer of control comes from the accurate work of the measurement body (See: Approved Measurement Body definition in EN16325 section 3).
c. The final layer of control comes from performing onsite inspections to check that the data provided in the earlier layers of control is accurate. This includes both initial inspections of production devices at their time of registration and ongoing "production inspections" that require checks on the correctness of submitted data against which GOs have been issued.

In order to keep costs manageable, any supervisory & inspection procedures should be set up efficiently and, where possible, integrated with existing inspection and verification procedures. A robust system for auditing production devices and production data can prevent fraud before it happens, while also identifying any fraud that does take place. All operators of GO schemes are aware of the importance of inspections of production devices (PD), both through onsite verification and offsite documentation checks and integration with data from licencing authorities. The following experiences from different sectors can be taken into account.

Electricity:

Within the AIB, debates have taken place on how to balance the need for production audits and production device audits against the cost of conducting such audits and the impact of this cost on overall GO system management costs. These debates revealed that the risks of fraud are different for different technologies and fuels, and in different countries. Therefore, the EECS Rules include guidance on how to secure the sought-for balance mentioned above.

For electricity, the rules allow issuing bodies to decide for themselves on the need for onsite inspections, while stating that such inspections are likely to be necessary in the case of electricity production from biomass. However, in other cases, inspections may

not be necessary. For instance, take hydropower stations in the mountains: here, fraudulent production of non-renewable electricity is unlikely, while e.g. environmental agencies have usually performed audits in licencing procedures and the meters are checked by the TSO/DSO, so there is not always a case for incurring audit costs, including significant travel costs for reaching such plants. General requirements under the EECS Rules on production device inspections contain a list of elements that issuing bodies should check for accuracy against the registered data (EECS Rules art. E3.3.7, E3.3.11, E3.3.12 mention generic rules for all energy carriers. N5 is specifically for electricity).

The AIB has published Best Practice Recommendations for Production Device Inspections (https://www.aib-net.org/eecs/best-practice-recommendations). These recommendations include specifications on the appointment and role of the inspector, and on the subjects to be covered in the inspection report (like energy flow diagram, including the location of meters involved in calculating the amount of GOs to be issued; brand, type, calibration certificate and seal date of all involved meters; confirmation of data in the GO application; …). One challenge is that, in the past, such best practice recommendations were not enforceable across Europe as there was no higher authority requiring them to be followed. This has resulted in different practices in different countries on production device inspections. Unless EN16325 incorporates such best practice recommendations or at least requires compliance with their underlying principles, then this current challenge will persist into the future.

Gas:

Gas generic:

Under the EECS gas scheme, production device inspections are mandatory (www.aib-net.org/eecs/eecr-rules). Other than this, the same principles on inspections apply for EECS gas scheme members as for EECS electricity mentioned above.

Biomethane:

ERGaR relies on natural gas TSOs and DSOs as its primary source of data on the injection of gas into the grid. Also, ERGaR has a system of audits to ensure the credibility of the data used. These include:

Initial audits:

All biogas and biomethane producing units must undergo initial audits in their home country to confirm that the units qualify as biomethane production facilities. Specified requirements on technical capability, equipment, processing potential of substrates and others are checked and verified by the auditor. The task of the initial audit is to document the technical capability and throughput capacity of the unit to produce biogas/biomethane. The information on the initial audit serves as a basis for registration as a production facility in the biomethane registry, and such plant information is considered valid until technical adaptations are conducted in the production unit. In case of changes in technology, the audit must be repeated.

Production audits:

The composition and volume of the input material (for renewable gas – biomethane) production is reported by the producer, and no other information source is available for these data. The audit of the producers should be integrated into the GO scheme. The declarations by the producers are to be audited yearly. Where incorrect data has been reported, the already-issued relevant GOs must be withdrawn and the issuance of GOs to the producer must be suspended.

Hydrogen:
CertifHy II elaborated a procedure for the audit of production devices, endorsed by the participants of the CertifHy II project. This is publicly available: https://www.certifhy.eu/images/media/files/CertifHy_2_deliverables/CertifHy_P0.2_Registration-of-Production-Device_V1-0_2019-03-11_endorsed.pdf

Heating and Cooling

For heating and cooling, the risk for fraud by falsifying the energy source may be greater than for any other energy carrier. Renewable energy sources with which heat is produced can often easily be replaced with non-renewable fuels. Inspection systems must take this into account, including as regards the frequency with which they are carried out. Issuing GOs for heating and cooling is not yet widespread.

As an example, the GO system for heating and cooling in Flanders requires bi-annual inspections of production devices for heating and cooling (note that in Flanders GOs are only issued to heating and cooling devices with a thermal capacity above or equal to 300kW), whereas in the Netherlands an annual report on the feedstocks is required, set up by an external accountant.

Another concern relates to the use of heat. It can be considered whether there needs to be a demonstrable economically justified demand for the heat/cold (synergy with the HEC criterion: to be eligible for Highly-Efficient Cogeneration Guarantees of Origin for electricity, it must be proven that the cogenerated heat satisfied an economically justified demand). For example: heating a building that would normally be heated is reasonable. But if heat for which a GO is issued were to be systematically discarded as waste heat, it would damage the credibility of the heating and cooling GO system.

Lessons from the consultation

From the consultation, it is clear that there is no general sector-wide advice when examining the specifics of **how** to assure the quality of registered production data. Even between representatives of the same role, there is no general agreement on the required audit frequency for production devices. Nor is there general agreement on whether or not to have a detailed and harmonised production (device) audit approach whereby the details of production and production device audit requirements are left to national discrepancy, and whether they should be harmonised at a European level with mandatory implementation, or whether the responsibility for ensuring data quality should be left to the discretion of the Competent Body.

The two, main opposing reasonings behind the diverging viewpoints are as follows:

- "All Member States are working to the same over-arching EU Directives. Therefore, the quality of renewables must be standardised if a MWh of renewables in one country is of the same environmental value across all Member States."

Versus:

- "National implementation of the principles should be left to national authorities, to ensure that inspections are tailored to local conditions. Inefficient inspections could result in higher administrative costs for both producers and national governments and should, therefore, be avoided."

Conclusion and takeaways for revision of EN16325

While at first sight such positions seem to be divergent, they could be seen as having common grounds, as all respondents seem to agree on the relevance of some type of

quality control. Most parties involved in gas agreed that it is important to undertake inspections for biomass devices.

Cost efficiency can be gained (or maintained) by synchronising the controls for quality of production registration for GO issuing, with other control processes taking place at a national level.

It is hence debatable whether a GO standard should determine HOW audits should be conducted. Rather it makes sense that the GO standard arranges WHAT the competent body needs to be reassured of by a third-party guarantee who does not benefit from the issuing of GOs.

Note: The elements mentioned in the EECS Rules E3.3.7, E3.3.11, E3.3.12, N5 provide a basis that has survived many years, and thorough discussion between Competent Bodies for electricity across Europe, in order to ensure the quality of the registered data on production devices and production that is eligible for GO issuing. With the EECS rules section O5, this framework has also recently been enabled for gas.

2. GO Validity

Challenges with current 12 months GO lifetime: reduced market value for GOs issued close to expiry

The Directive 2009/28/EC limits the GO lifetime to 12 months from production, thus: "*Any use of a guarantee of origin shall take place within 12 months of production of the corresponding energy unit. A guarantee of origin shall be cancelled once it has been used.*"

In practice, this has been implemented differently in different Member States. As the main use of GOs is for electricity disclosure within a calendar year, electricity suppliers have had to make at least two GO cancellations for a certain year, in order to avoid expiry of their GOs. Typically, the first cancellation is done before the year-end, to avoid the expiry of GOs issued for the beginning of the year production, and second before the deadline for annual disclosures, which is typically the end of March the following year.

The strict 12 months expiry rule has forced marketplaces to define their GO products so that one year's production is divided into at least two separate categories of GOs with different market values, thus hampering the liquidity of the market.
Moreover, in Member States that have implemented the Directive in such a way that for a given year, only GOs issued for production during the same calendar year are accepted for supplier's disclosure reporting, so the actual lifetime of GOs issued for the beginning of the year is longer than those issued for the last months of the year. This has also been reflected in the market prices of the corresponding GOs.

Another challenge is that sometimes administrative processes for issuing GOs take a significant amount of time. This can be the case for the first issuance of GOs to a given production device, which can only happen after a (sometimes heavy) administrative application process including files and inspection reports which might take months to complete. It can also happen if an erroneous meter reading is spotted, resulting in the suspension of any GO issuance until the meter is replaced, re-inspected and the administrative tasks of both the producer and the issuing body are finalised to a satisfactory level to record the correct amount of GOs to be issued for the energy produced during the suspension. When a GO is issued many months after the production period, the tradeable period is significantly reduced, and with it, the price at which a producer can sell its GOs.

Challenges with the Directive EU 2018/2001 12+6 months lifetime: ambiguity

In art.19.3 of REDII, the maximum lifetime of GOs was arguably extended to 18 months: "*For the purposes of art 19.1 Guarantees of origin shall be valid for 12 months after the production of the relevant energy unit. Member States shall ensure that all guarantees of origin that have not been cancelled expire at the latest 18 months after the production of the energy unit. Member States shall include expired guarantees of origin in the calculation of their residual energy mix*."

- There is a tendency to interpret the 12-month validity in a way that a GO can be used for consumption periods ending 12 months after the end of the production period of the energy for which it was issued.
- It is not clear what would happen between the end of the validity period and before expiry when those are not on the same date.
    - Could the GOs still be transferred or would they be locked to account holders' accounts?

- Could the GOs still be cancelled?

  Note: In some countries, the existence of a GO on an account on the annual disclosure reporting deadline for electricity suppliers is considered to be a cancellation (e.g. Spain). In most other countries, an explicit cancellation action must take place.

Having different implementations of the expiry date in different member states implies creating a difference in the market. Market parties can get confused in the difference between national expiry rules. In their ignorance they may hold on to GOs needlessly long and may initiate transactions to Domains where the GOs expire. Handling a large quantity of refusals of transactions of expired certificates withholds a practical risk of losing the market value of certificates that could have been used elsewhere had the expiry rules been known and standardized, as well as loss of certificates during transfer, overhead administration for the market and issuing body, and/or extensive helpdesk efforts for importing and exporting registry operators.

- Timing of Residual Mix calculation could be jeopardised depending on the definition of the period during which cancellation is allowed and during which expiry can be determined. While double-counting must be avoided in the residual mix, in either interpretation, it is not recommended to postpone the residual mix calculation timing by 6 months, as that would cause suppliers' origin disclosures to relate to a period too far in the past. When a supplier's origin disclosure on their invoice relates to a period almost 2 years ago, its relevance and even its credibility diminishes.

Interpretative option for solving the matter

The following principles were proposed to the stakeholder consultation, for a harmonised interpretation of the concepts of validity and expiry of GOs concerning REDII art. 19.3.

Validity relates to consumption period to which the GO cancellation relates.

1. GO is valid for 12 months means: a GO can be used for consumption periods ending 12 months after the end of the production period of the energy for which it was issued

Expiry relates to the period during which GO transfer and cancellation can take place.

2. A GO can be traded and cancelled during a period of maximum 18 months after the production period of the GO. (this option was not broadly supported in the consultation)

Consistent measures are needed to ensure that a GO taken into account for a specific consumption year is not already taken into account as "expired" in the residual mix. Whether it is beneficial to enable transfer and cancellation for a longer time than the period of validity is debatable.

Final cancellation date in relation to the preceding consumption year

The Risk here is that at the time of residual mix cancellation, it is not yet determined whether a GO issued for production in year X will either:

a) Be cancelled for a targeted consumer's consumption in year X, or
b) Be cancelled for consumption in year X+1, or
c) will expire and be absorbed into the residual mix.

This causes double counting risk, unless

a) the residual mix calculation is postponed, which is not recommended because of the impact on relevance and credibility, and postponement of the date of publication of disclosure statements.
b) An end date is set for the period during which cancellations are allowed for a disclosure year (= consumption year).

3. In addition to a rolling 12-month validity period for the consumption to which GO cancellation can be allocated, hence also an annual fixed end date is needed until when cancellations are allowed for a preceding consumption year. In line with the RE-DISS[11] recommendations, it is advisable to set such an end date for cancellations as the 31st March of the year following the year of consumption.

Lessons from the consultation:

There seems to be general support for the main parts of the description of the challenges as well as for the proposed solutions to overcome them. The clearest objection from the consultation is towards the extension of the lifetime of GOs from the current 12 months to 18 months. The respondents see that the 6-month extension should apply in cases of **exception handling** (e.g. delayed issuance), but not become a standard process.

Some of the respondents acknowledged the shortcomings of the current 12 months practice (biannual cancellation by suppliers to avoid expiry, shortened lifetime if issuance is delayed etc…), but nearly all considered these shortcomings as the lesser of the two evils when compared to moving to a GO lifetime of 18 months and to separating the concepts of validity and expiry. In brief, the 12 months lifetime is already such "a standard" that it is difficult and undesirable to change. The 6-month extension was seen to have a serious negative effect on current market conditions and rules as well as customer perception.

The applicability of different production year GOs to different disclosure years varies between Member States and this was reflected by the diversity of opinions on this point in the questionnaire. A deadline on 31st March for previous year disclosure was generally supported (this means that all GO cancellations that count for year X disclosure should be made before March 31st X+1). Going further than that divided opinions, e.g. standardising that the production or cancellation time of the GO would automatically determine the disclosure year for which it is counted. For the respondents it seemed most important that the disclosure periods and associated deadlines are standardised across the European single market and the question of how was only secondary.

1. GO is valid for 12 months means: a GO can be used for consumption periods ending 12 months after the end of the production period of the energy for which it was issued

➔ General support

[11] www.reliabledisclosure.org "Best Practice Recommendations"

2. Consulted initial principle, not retained: A GO can be traded and cancelled during a period of maximum 18 months after the production period of the GO.

➔ Not broadly supported. The extra 6 months should be considered as a theoretical maximum for exception handling.

3. In addition to a rolling 12-month validity period for the consumption to which GO cancellation can be allocated, an annual fixed end date is also needed until when cancellations are allowed for a preceding consumption year. In line with the RE-DIS[12] recommendations, it is advisable to set such end date for cancellations at 31st of March of the year following the year of consumption.

➔ General support. A common disclosure deadline on the 31st of March of the next year for previous year disclosure is supported.

Recommendation towards the revision of EN16325

The extension of a GO's lifetime from the strict 12 months in REDI to 18 months in REDII has caused confusion among stakeholders. If no standard is set on expiry, there is a clear risk that expiry and disclosure deadline practices will become more diversified than today, which was considered a threat to the reliability and public perception of the GO system throughout the consultation responses. Therefore, it is recommended that EN16325 sets basic rules for expiry.

One of the main causes of concern was that REDII separates expiry (maximum 18 months) from the end of validity (12 months). The implementation of this separation is not at all clear to the respondents. Thereby, if possible, a GO's validity for disclosure use should cease at the same time as the GO expires.

Recommendation 1: In order to avoid confusion by traders, while at the same time reducing the handling of errors in international transfers, the period during which the GO can be transferred should be standardised as a period of 12 months after the end of the period of production of the corresponding energy. This means the period of "validity" of a GO should be defined as the period during which the ownership of that GO may be transferred.

It is suggested that the timeframe during which cancellation can take place should coincide with this timeframe.

Recommendation 2: Consider standardising a harmonised disclosure deadline in Europe (March 31st) for the previous year's consumption.

Subject to further national requirements, the period during which cancellation of GOs can take place, lies in the shortest of the following two periods:

1) Cancellation of GOs can take place until 31st March after the year in which the corresponding energy is consumed.
2) A maximum of 18 months after the end of the period of production of the corresponding energy.

[12] www.reliabledisclosure.org "Best Practice Recommendations"

Member States can impose shorter periods of time during which cancellation is allowed.

3. Simplified information on GOs for small capacities

Challenge

REDII art. 19.7 specifies that *"Simplified information may be specified on GOs from installations of less than 50 kW".* If the definition of 'simplified information' is not standardised between Member States, the import and export of such GOs could be hindered for technical reasons, creating a barrier for the international transfer of GOs from small installations. If GOs from installations of less than 50kW were harder to transfer internationally, they could be confined to their domestic markets, potentially reducing their price.

The type of production technology that is most frequently used in installations of less than 50 kW is currently solar photovoltaic devices. Depending on policy and market developments, the rollout of small devices could expand to other technologies.

Potential reasons for simplifying data on the GOs:

- To aggregate the issuing efforts for many small production devices, so that small producers are not put off by the effort of requesting GOs, and a registrant can aggregate its application for the issuance of GOs from a large number of devices;
- To avoid the administrative burden of too many sets of single certificate issuances per month;
- To empower small producers to fully participate in renewable energy markets without facing the regulatory requirements placed on larger producers; and
- To simplify audit requirements.

In contrast with the facilitation of simplified information on GOs for small capacities, it must be noted that REDII art.19.2 also enables making the issuance of a GO subject to a minimum capacity limit.

This especially deserves consideration for heating and cooling. Whether GOs should be issued for every domestic wood pellet stove for which the heat is consumed onsite is questionable, both for reasons of GO credibility and for administrative complexity. Also, higher capacities tend to be subject to emission requirements, whereas stimulating GO issuing for any heat from incinerated biomass could introduce undesirable emissions.

The general aspect of where the energy is disposed could provide a leading principle (e.g. injection into a grid for distribution or transmission of electricity, gas, heating and cooling, or distribution by means of a vehicle to serve several consumers etc.) as, in many cases, economic viability is associated with a minimum capacity. This relates to the subject of Onsite consumption in section 13 - *Double disclosure related to onsite consumption and non-interconnected grids.*

Takeaways from consultation

From the stakeholder consultation, we have learnt that not all stakeholders are in favour of having simplified information on GOs. In particular, traders generally prefer a fully informative GO.

The respondents indicated that simplification would most likely to allow small PV producers to participate as well. On the other hand, there is an acknowledgement that this kind of small PV production is probably most valuable in a limited regional market and, therefore, has little to gain from full integration into the pan-European market. While such simplifications seem to focus on small PV, audits of small installations should be simpler than for more substantial installations and could rely on other administrative processes as set out in national legislation to avoid unjustifiable costs.

In the current landscape, there seems to be no case for simplifying information for gas, as the minimum capacities for economic viability are significantly above the 50kW threshold.

Enabling aggregators to take over the administration for small production devices could help to overcome the initial concern.

Recommendation and takeaways for revision of EN16325

This project does not recommend simplifying information on the GO, but rather providing simplified processes for handling GOs issued for generation from small production devices, such as:

- Enabling aggregators to administer GO applications and issue requests on behalf of producers and facilitate their mandates to efficiently manage GO portfolios on behalf of the owners of small production devices.
- Audits of small installations, while assuring fraud-resistance, should be simple. Where possible, unjustifiable costs should be avoided by relying on existing administrative processes under national legislation.
- Building GO registry interfaces for account holders in such a way that a trader who sells or buys many GOs from (many) small production devices is assisted by a simplified administrative process for organising these transfers.

Guidance for simplifying information on GOs for small production devices

If a Member State does opt for enabling simplified information on GOs, the following guidance rules are recommended:

1. Include the reasons for simplifying data on GOs from small installations in CEN EN 16325, along with a specification of the minimal data that GOs from small installations must include.

2. Clarify the meaning of the 50kW capacity limit as the nominal production capacity of the corresponding energy carrier. (Alternatively, this could be the maximum production capacity; or the average production capacity over the past operational year, or the input capacity etc.).

3. Provided the Competent Body is certain of the eligibility of GO issuance for the corresponding energy production, the following parameters can be allowed to contain simplified data on GOs issued for small devices:
    - Identification of production device (name, ID, address) => postal code or province of the production device;
    - The capacity of production device => category of capacities;
    - Date operational => the year in which the production device became operational.

This enables the aggregation of several plants with given characteristics. A number of parameters could be left off single certificates from small installations but included in a set of certificates issued for a group of production devices with the same characteristics.

4. Some parameters should not be simplified, either because of their value to consumers seeking to make conscious and informed choices about their energy consumption, or because they are needed to maintain the quality of the system and to avoid double counting.
   Parameters that should not be simplified:
   - Energy source;
   - The energy carrier: whether it relates to electricity, gas, (hydrogen,) heating or cooling;
   - (Technology) Type of installation;
   - Date of issue;
   - Country of issuance; and
   - Unique identification number per certificate (in order to avoid double-counting during transfer and cancellation).

4. Facilitate an EU wide Green Label and/or a premium market for renewable energy

REDII Art. 19.13 requires the European Commission to *"present a report assessing options to establish an EU-wide green label with a view to promoting the use of renewable energy coming from new installations".*

In some countries, GOs are already used in combination with a label indicating that extra criteria have been met. One of these criteria is whether the buying of this GO contributes to additional renewable energy production that would not have been produced without the issuing and buying of the GO. Such a criterion is often referred to as "additionality". However, unambiguously defining what is meant by additionality is not simple. EECS GOs, therefore, provide a data field that allows the providers of a label to demonstrate compliance with their criteria for the corresponding MWh. The parameter conveyed in this data field is the name of the label, or 'Independent Criteria Scheme', shortly 'ICS'. It is the ICS operator, not the GO Issuing Body, who reassures compliance of the corresponding amount of energy, with its Independent Criteria.

Whether the above process could also work for any eventual EU-wide green label, or whether the proposals from the abovementioned assessment will require a change in the data architecture of GOs, has yet to be clarified.

Challenges on the GO operator side

1. Bring the role of any eventual EU-wide green label into the scope of CEN EN 16325, to:
2. Define any extra data to be collected during production device registration and issuing of GO. This could include aspects like:
    a. The mode of operation of plants; or
    b. The grid situation of plants as it relates to the point of consumption, cf. REDII recital (90) on the additionality of RFNBOs; and
    c. The relationship between plant and consumer (this might be of higher relevance for GOs for heating and cooling as there is currently no pan-European heat grid);
3. Find a way to provide additional information to markets (and regulator/public institutions/…) either by having extra information on GOs or by providing transparent plant-specific data (in a production device database) as an official reference for additional criteria;
4. Determine whether extra data should be mentioned on the GO, and what data this should include;
5. Work with the eventual operators of any EU-wide green label(s) through the GO issuing process; and
6. Ensure that the conversion between different energy types can be reflected by GO systems in such a way that relevant (e.g. additionality) aspects are sufficiently documented.

Challenges for producers and traders

1. Establish and deal with the difference between the market value of GOs with and without any eventual EU-green label;
2. Gain insight in and properly ascertain the magnitude of this difference (unless there is a requirement for issuing bodies to collect and publish GO transfer prices); or
3. Face the interaction between GO markets for "standard" renewable energy trading and regulation-driven markets (cf. REDII recital 90 on RFNBOs).

Takeaways from consultation

The participating electricity GO issuing bodies state that GOs currently already contain the relevant information required for labelling. Also, several issuing bodies have experienced that it is difficult for governmental organisations such as themselves to qualify certain types of RES as being 'better' than others. Rather, it is labelling organisations who should do so, based on neutral information provided by authorities, to communicate to consumers and suppliers the arguments behind labelling criteria, such that they can make an informed choice.

A label facilitator questioned whether it should be the job of the European Commission to facilitate a label. There are labels available in the EU, some are created by market players, some created by NGOs.

The following parameters on a GO are particularly relevant differentiators for consumers, and were mentioned by several contributors to the consultation:

- The commissioning date of the production device (already included in line with art. 19.7);
- A reference to an independent criteria scheme;
- The type of gas;

It is acknowledged that financial support mechanisms are still the major influencers over the amount of new build RES production, especially for gases. The addition of optional data to the GO could further enhance the effectiveness of GOs, and several stakeholders mention the usefulness of adding the following data on the GO:

- Greenhouse Gas Emission information, or at least whether or not the GHG emission saving criteria from REDII are met, especially for gas GOs;
- Whether or not the sustainability criteria from REDII are met; and
- Additional details on the verification/audit procedures complied with and the GHG value of the energy, which would add credibility to the 'product'.

One respondent would, in addition, enable the following data to be disclosed:

- For CHP, power and heat efficiencies (to support emissions calculations).
  - These efficiencies are, however, already mandatory for highly-efficient cogeneration (HEC) GOs in line with Annex X of the Energy Efficiency Directive 2012/27 and are foreseen in the provisions for HEC GOs under EECS.
- For biomass, the proportion of non-RES feedstock used by this installation.
- The ownership of, or the company operating, this GO; as this could encourage actors to build and operate new RES production
  - It seems more efficient, both for the registration process and for the user of substantial quantities of GOs, to provide such information through a label rather than to do so by adding this information to the GO.

Apart from the data on the GO, there are proposals from stakeholders regarding the level of detail of the data disclosed to the public:

- If the location of the installation specified at a greater level of granularity (region or city, not simply country), local valorisation would be possible.
- There would be less ambiguity in the identification of power generation equipment by the use of EIC codes (as assigned by a TSO or ENTSO-E) than by the current use of name, age and capacity.

- For GO conversion (e.g. through batteries or from renewable gas to renewable power) a link to the source GO should be given, along with the proportion of conversion losses.
- Several stakeholders have expressed a wish for a further level of detail to be held on GOs:
    - Further standardised granularity for disclosing production period, i.e. down to the day (or hour), would be a valuable addition. (…) There is a general trend toward renewable energy consumers demanding more specific, less generic GO products. Some renewable energy buyers are interested in matching their production and consumption more closely and having a more specific "timestamp" would facilitate this process.

One consultee expresses a much-heard concern as follows:

- Raise consumer awareness of the need to stimulate new build, by requiring GOs from recent/new installations, and favouring installations which either do not receive subsidies or which participate in competitive support mechanisms.
- With the surge of competing renewable sources and technologies, renewable electricity sourcing strategies based on GOs from low-cost sources such as legacy hydro are likely to undermine the value of procuring other, more expensive, renewable energy sources.
- National issuing bodies should check the general perception and interpretation of consumers when being offered a green tariff underpinned with renewable GOs or when they are being told that a company is certifying its energy consumption based on 100% renewable/low carbon energy.
- As consumers seek to increase the impact of their renewable energy purchasing, providing additional relevant data for each GO can support growth of purchasing which has a beneficial impact on the environment.

While it is not possible for issuing bodies to know precisely what consumers perceive, the concern related to this issue is acknowledged. It is probably the most difficult aspect to manage from within the GO system. It is most closely related to the framework for origin disclosure and the information channels that reach the relevant consumers.

This overview should be considered in combination with the responses concerning additional data on the GO addressed, which are in section 9: "*Data to be recorded on the GOs: what information is relevant for consumers*".

Recommendation for revision of EN16325:

1) Ensure that the GO identifies the type of gas being certified (which may be integrated with the data field that identifies the energy carrier);

2) Optional data fields should be standardised:
   For all energy carriers:
   - Enabling a data field on the GO that identifies a label (Independent Criteria Scheme) connected to it.

   For gas GOs and hydrogen GOs:
   - Greenhouse Gas Emission information, or at least whether or not the GHG emission saving criteria from REDII are met, especially for gas GOs;
   - Whether or not the sustainability criteria from REDII are met;
   - Additional details concerning which verification/audit procedures have been observed and the GHG value of the energy would add credibility to the 'product'.

5. Energy Storage – and its relationship with the concepts of energy carrier conversion and onsite consumption

Challenge: simplifying complexity and clarifying ambiguity

How energy is certified when it enters and/or leaves a storage device is a matter that is frequently debated by GO system operators and market participants. For example, should an energy storage device be considered as a conversion device? Should energy that enters a storage device have its GO cancelled? Should energy that comes from a storage device have a GO issued, and if so, for what generation technology?

In general, the question is how to manage GO issuance and cancellation when the energy passes through a storage device? Can the same principles that apply to energy that does not go through storage, be applied to energy that does?

Proposed solution

A storage operator should function as any other energy supplier which does not operate a source of generation. If they wish to supply a particular energy product, then storage operators need to procure the related GOs and either transfer them to the consumer for cancellation or cancel them on the consumer's behalf.

Two principles both following from the phrasing in REDII art.1, and together they simplify the issue:

1) For the purpose of disclosure of the origin of energy to consumers, determining whether consumed (or lost) energy is renewable can only be proven by cancelling a GO, or by reference to the renewable part of the residual mix.
2) Tradable GOs can only be issued for energy that is placed on the market (see also the challenge on "Onsite consumption" in section 13), as long as there is no possibility for double disclosure of this energy.

This results in the following guidelines:

Storage losses:

1. If produced renewable energy is stored directly after production 'behind the meter', *before* being placed on the grid => only issue GOs for the energy placed on the grid and made available to the market.

2. If energy is stored *after* being placed on the grid and made available to the market:

   It could be considered that similar rules apply as for energy carrier conversion[13], as this is usually a form of storage in another energy carrier. This would require GOs to be cancelled for the energy fed into the storage device, and GOs to be issued for the energy coming out of the storage device and disposed to the market.

[13] Definition of energy storage in Art. 2.59 of the Internal Energy Market Directive (EU) 2019/944: (59) 'energy storage' means, in the electricity system, deferring the final use of electricity to a moment later than when it was generated, or the conversion of electrical energy into a form of energy which can be stored, the storing of such energy, and the subsequent reconversion of such energy into electrical energy or use as another energy carrier.

For simple Storage, or 'storage of energy in the same energy carrier', it is however administratively less complex to cancel GOs for claims on the origin of the storage losses, than to install all the controls necessary for cancelling GOs for stored energy and issuing GOs for energy coming out of storage (these would, in any case, have identical data to the GOs cancelled for input as the storage is not a production device). In both cases, the result after the storage is a reduced amount of GOs for the same energy carrier with the same attributes as the GOs available before storage. This would imply that:
The stored energy is no longer connected to the GO (book and claim principle) and =>

a. The storage provider can freely decide to "green" storage losses by cancelling the amount of GOs equal to the amount of energy lost in storage.
b. The storage provider doesn't HAVE TO cancel GOs and doesn't have to "green" their losses. If the provider doesn't cancel GOs, the origin of the storage losses is considered to be the residual mix.

A storage operator is not consuming energy, just holding energy and causing some losses. The same goes for a distribution or transmission system operator: energy losses during distribution are considered as a type of consumption. The origin of this energy loss-consumption can be claimed as coming from RES, on condition that GOs are cancelled.

Energy Carrier Conversion:
Cancel GOs for the amount of input in an energy carrier conversion device, corresponding the measured energy input; and
Issue GOs for measured output of the conversion device.
See also section 7 on Energy Carrier Conversion rules.

Onsite consumption
Proposed solution:
Stick to basic principles: Tradeable energy production from RES should receive tradeable GOs. In line with the general principles, the condition is that this doesn't cause double consumption of the same renewable attributes. Here the consultation teaches us that the concept of 'tradeable energy' is ambiguous. Section 13 on Onsite consumption elaborates this in-depth.

Takeaways from the consultation

1) The principle that "Only the cancellation of a GO determines whether consumed (or lost) energy is renewable" is broadly supported.
   The only opponent, from a gas certificate registry, seems to demand clarification that this is only applicable when a GO is being used for voluntary disclosure of the origin of a MWh to an end consumer, and not when GOs are being used to meet policy targets. This is indeed the intention and was added to clarify the principle.
2) There is broad support for the principle that GOs can only be issued for energy that is placed on the market, and that has not otherwise been disclosed. However, "placed on the market" is considered to be ambiguous terminology that needs further specification.

As the debate has been most lively for electricity GOs, the interpretations by two electricity GO issuing bodies are mentioned here:

- Issuing body 1: Tradable GOs can be issued as long as the energy is delivered to a third Party and its attributes are not consumed onsite.
- Issuing body 2: GOs for trading are those which are measured and settled and have no possibility of double disclosure.

6. Categorising different types of gases in the design of GO systems

GO schemes are in operation for electricity and gas; and more recently for hydrogen, albeit on a pilot basis.

Up to now, only GOs for electricity (and heating and cooling, albeit on a voluntary basis) were covered by the regulatory framework through REDI (article 15), while REDII (article 19) requires GOs to be used to guarantee the origin of all energy from renewable sources.

Furthermore, the REDII mentions in article 19.7, that the guarantee of origin shall specify *whether it relates to*

1) *Electricity;*
2) *Gas, including hydrogen; or*
3) *Heating or cooling.*

Note: Renewable energy can also be delivered through a liquid energy carrier, and gases could also be traded in liquified form.

A generic GO system as a basis for all energy carriers

GO systems for different energy carriers have a lot in common: Indeed, to achieve their purpose, they all need to incorporate measures for:

- the avoidance of double counting;
- reliable data registration;
- designing procedures and allocating roles for measuring, auditing, registering, issuing, supervising transfer and cancellation; and
- supervising disclosure and expiry.

Why categorise GOs for different energy carriers, and why differentiate hydrogen from other hydrocarbon gases

However, GOs for different energy carriers need to be clearly distinguished for three reasons:

1) Each energy carrier has a distinct use in the energy system, with distinct applications for end consumers. Therefore, it must be ensured that GOs are only used to make a claim on the type of energy carrier for which they were issued. Not doing this would result in the leakage of attributes into the overall system of the energy carrier, which undermines the concept of the residual mix.

2) The energy systems associated with each energy carrier have inherent technical differences, such as:
   - the definition of the energy distribution system across which GOs can be applied:
     - Electricity: EU electricity transmission and distribution systems, closed distribution systems, private grids and direct lines.
     - Gas: National gas transmission and distribution networks, as well as bulk distribution;
     - Hydrogen: Pipelines and bulk delivery systems;
     - Heating and cooling: (district) heating grids, direct consumption.
   - the definition of the energy products across which GOs can be applied:
     - Electricity: GOs are applicable to the consumption of electricity in any form,

    - Gas: there are specific rules regarding the application of GOs across various gas products (natural gas, propane, butane) and forms of delivery (grid and bulk),
    - Hydrogen: while there are different product qualities, GOs can be applied across all volumes of hydrogen meeting the purity specification specified by the GO scheme (99,9%),
    - Heating and cooling: to be considered together with the considerations of the boundaries of the GO system for heating and cooling;
  - Energy carrier production configurations and the amount of renewable energy produced by a production device
    - The production processes for Hydrogen are more diverse than those for electricity or renewable gas production, requiring robust approaches capable of handling all configurations (see CertifHy project documents)
  - Means of measurements and the applicable requirements are specific to each energy carrier
    - For Hydrogen, there are specific practices for determining the quantities produced and delivered
  - The way cross-border exchanges are handled
    - Hydrogen GOs are already transferred/traded across borders over cross-border logistical systems (Benelux)

3) the applicable regulatory framework and market characteristics of each energy carrier also differ:
   - Electricity transport and distribution is subject to national regulation – harmonised through the European Directive on the Internal Electricity Market (2019/944). There are strict requirements on Member States to ensure the unbundling of roles and responsibilities on the supply of electricity and the operation of power grids. Heating and cooling are either consumed immediately at the place of production or are transported through a liquid material flowing through pipes. European legislation from Directive 2018/2012 provides a level of harmonisation in this matter.
   - Gas from renewable energy sources that is distributed over the natural gas network falls under strict regulations, through the European Gas Directive 2009/73. As with electricity, there are strict rules on unbundling between the roles of supply and grid operation. Gas from the natural gas grid is widely used in combustion applications (e.g. heating, engines, turbines, …), but also has applications in chemical industry processes.
   - Methane, propane, butane, mixtures of gases, … can be transported in bulk. Regulations are not coming close to those from the European Directives for the internal markets for electricity and (natural) gas; and demand for GOs for gases transported in bulk has not yet become apparent. However, liquified biomethane is established in a physical supply chain in some countries (e.g. Italy).
   - Hydrogen is not regulated to the same extent as electricity and gas. There are currently no EU rules on the unbundling of roles on supply and distribution.
   - Heating and cooling regulations are increasingly integrated into the regulatory framework.

Clarification on hydrogen injection into the gas grid

It is to be noted that **once hydrogen has been injected into the natural gas grid, the corresponding energy is used as gas from the gas system**. The FaStGO

project team, therefore, recommends that **Hydrogen injection into the gas grid is handled as a form of energy carrier conversion**.
This implies:

1. If hydrogen GOs have been issued for hydrogen before its injection in the gas grid, then these need to be cancelled and the corresponding amount of Gas GOs need to be issued so that the corresponding energy may be supplied to gas consumers using these gas GOs.
2. If no hydrogen GOs have been issued for the hydrogen injected into the gas grid, (hydrocarbon) then gas GOs can be issued for the amount of energy injected into the gas grid in the form of hydrogen.

It is therefore clear that in addition to the general rules that can be applied to all GOs, there will also need to be separate sets of specific arrangements for electricity, gas, hydrogen, and heating and cooling.

In particular, while (hydrocarbon) Gas and hydrogen have in common that they are both gaseous energy carriers, the above analysis shows that GOs for Gas and Hydrogen have the same reasons to be distinguished as GOs for Gas and Electricity, such that the two forms of energy:

1) Have distinct uses in the overall energy system, and they consist of a different product with a different value for end-users. For Gas, the exact chemical composition is not as relevant as for hydrogen, between a certain range of boundaries, as it is mostly used for combustion applications that convert into heating or mechanical energy. Hydrogen applications relate to its unique chemical composition;
2) Are associated with distinct energy sub-systems subject to different technical requirements and practices; and
3) They are covered by distinct regulatory frameworks.

Options for a basic structure of EN16325:

Based on the above reasoning, a section on generic requirements for GO systems will define and include all the aspects that need to be addressed. Where there are differences between the four energy carriers, these will each be covered individually in a separate section dedicated to these energy-carrier-specific differences.

For the gaseous energy carriers, however, there are differences of opinion concerning whether or not to further categorise the different types of gas into separate rule-sets.

The markets for methane and hydrogen, being the main gases under discussion here, are different. Their different characteristics (market dynamics and means of supply and regulation) need to be considered in the design of a GO system for gas.
This raises questions for GO system design with regards to the description of roles, rules for measurement and inspection, and GO market development concerning the physical gas market for each type of gas. Taking into account the above-mentioned different characteristics, this offers a few options for gas GO system(s), including:

1) Consider all gases together and apply to them the same terminology and set of rules. Describe these in such a way that they are both applicable to all types of gas and also foresee room for differentiating different types of gas where required by the market. While this enables the aggregation of roles related to different types of gas and correlated efficiency gains, it also acknowledges that there might continue to be distinct discussion fora for gas GO issuing bodies and gas GO traders using the same set of rules.

2) Design a separate set of rules for GOs issued to different types of gas. This would enable essential differences between gas types to result in differently formulated rules for the different GO systems. Acknowledging this might stimulate the development of separate GO systems and could lead to higher overall system management costs.

While the physical markets for methane and hydrogen may differ greatly for each energy carrier, their respective GO markets may be more similar. While measurement requirements and expert discussion fora will probably be set up for each physical energy carrier, it has yet to be decided whether the text of GO standards needs to be different for each type of gas. It is questionable whether systems to support hydrogen GOs, methane GOs and GOs for other gases require the additional overhead cost of setting up separately managed systems for each. System management cost needs to be balanced against the need for differentiation.

Proposed structure, in relation to the treatment of the different energy carriers

The proposal is to structure EN16325 according to the following basic framework:

Introduction
Framework and scope
Generic rules for guarantees of origin (Generic for all GOs), including rules for energy carrier conversion
Energy carrier-specific rules
1. Electricity
2. Gaseous hydrocarbons (including mixtures of hydrocarbon gases and gases injected into the natural gas grid)
3. Hydrogen (delivered to consumers with a purity of at least 99,9%vol hydrogen)
4. Heating and Cooling

Takeaways from consultation

The majority of consultation respondents endorsed the structure proposed above. However, four parties disagreed with a distinction in the original categorisation between gaseous hydrocarbons and hydrogen.

1) Two respondents felt that:
   a. Renewable & decarbonised gases (hydrogen included) should be addressed by the same text, as they have similar and compatible uses in energy systems, in particular where these gases are blended.

      Energy subsystems are largely expected to be the same, in particular during the early increase of renewable hydrogen production. Most of the recently announced power-to-gas projects will be connected to natural gas grids. Hydrogen is fully compatible with existing natural gas grids made of polyethylene (e.g. in Spain 86% of the distribution grid is today made of polyethylene) and conventional domestic heating equipment is now able to cope with blends of up to 20% hydrogen (according to EHI in June 2019). The purity of hydrogen would have little or no impact in blends.
      Also, it is expected that the forthcoming revision of the Gas Directive 2009/73 will address decarbonised gases (mainly hydrogen) and that an unbundling regime will be proposed.

b. One of these respondents is not in favour of a separate set of rules or GOs for hydrogen, which it feels would only work with a pure hydrogen infrastructure. The gas industry is planning to inject increasing percentages of hydrogen into the gas network and the gas-mix over the next few years. Therefore, it is not operationally realistic to distinguish between gaseous hydrocarbons and hydrogen.

   This respondent supports option 1 of the gas GO system because it believes that with terminology and a set of rules which refers to all gases, the market has the best basis for a decarbonised gas system. However, they agree that this system must leave room for differentiation.
   The Madrid Forum (of ENTSOg) is currently working on terminology that considers all gases, and the respondent supports the work and the approach presented by the European gas associations.

Reaction: After this consultation, the above text makes it clear that once hydrogen has been injected into the natural gas grid, the corresponding energy is used as gas from the gas system. Gas GOs need to be issued (based on the cancellation of the hydrogen GOs), to be able to deliver energy with the corresponding attributes to a user of gas from that gas system.

2) Another party considered that it is too early to categorise, as the needs for the new energy carriers first need to be identified.

Reaction: The proposed structure acknowledges that we are dealing with four distinct energy carriers and allows us to address jointly what is common to them and cover separately the specifics for each energy carrier.

3) "For gas fuels, there may be a need to differentiate between gas which is injected and gas which is not injected, into the network. However, this issue requires further assessment."

Reaction: GOs are for proving the origin of what is supplied to end consumers, for whom it is not necessarily different if the energy is delivered through a grid or in bulk.

4) One stakeholder's proposal is to bring all gaseous fuels into a single category.

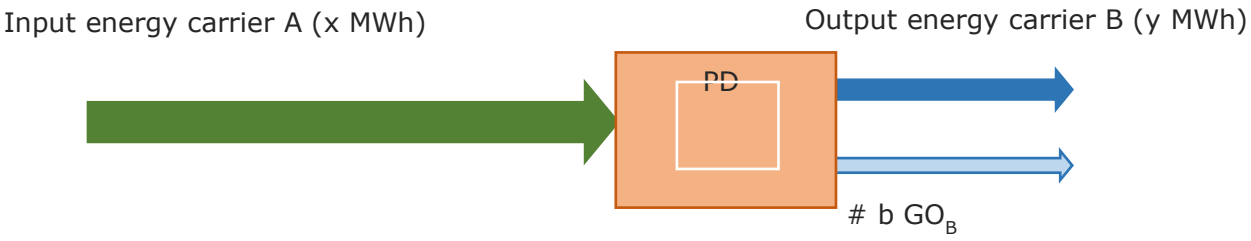
Reaction: This would exclude GO issuing for any gases that are not used to carry energy, which is a very relevant consideration for hydrogen. At the time of production of hydrogen, the end-use (chemical processes or energy) is not yet known in a basic book-and-claim structure.

7. Energy Carrier conversion: Rules for GO issuing related to energy carrier conversion

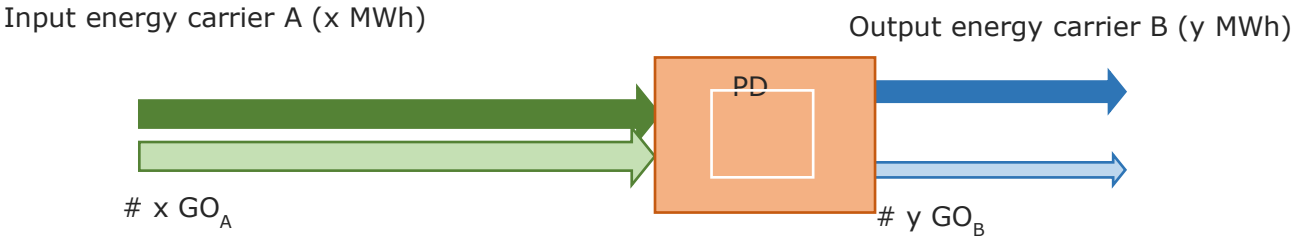
Challenge

Energy carrier conversion is the production of an energy carrier (e.g. hydrogen) from another energy carrier (e.g. electricity). Of all system management challenges, energy carrier conversion is the one pushed most by the REDII implementation deadline. It requires GO systems of different energy carriers to synchronise.

To allow claims of producers related to the origin of the resulting energy carrier, it requires the issuance of GOs, which can only be facilitated if an appropriate amount of GOs for the original energy carrier is cancelled. Also, this must be related to the physical conversion of the energy carrier. Rules are needed for handling GOs for multiple energy carriers, in relation to physical energy carrier conversion.



In an energy market where GOs exist for only one energy carrier B, the issuing of GO_B of energy carrier B (e.g. Electricity) is a logical process, relating to the energy source of the input energy carrier A (e.g. biogas)
When GOs exist for multiple energy carriers (A, B, …), a producer may also want to use GOs to prove the renewable origin of input energy carrier A (e.g. biomethane) which produces energy carriers B (e.g. electricity). This implies that GOs are being cancelled to prove the origin of the input energy carrier:



Here, it is essential to adopt a clear framework for governing this process (to prevent double-counting, misunderstanding, double perception, lack of trust etc.).

Affected areas of GO system operation

Issuing of GOs, cancellation of GOs, conversion of energy carriers.

Potential direction for solving the matter

A set of basic consistent principles could be the following:

1) GOs are only issued for a physical energy carrier that is physically being generated.
2) GOs are only issued for the production of the energy carrier that is mentioned on the GO (no gas GOs can be issued for electricity production).
3) An amount of GO_A is cancelled in correspondence with the measured amount of input of energy carrier A in the production device.
4) The amount of energy input to the production device is measured.)

The amount of GO_B to be issued as a result of the energy carrier conversion is hence not equal to the amount of cancelled GO_A that proved the origin of the energy input to the energy carrier conversion.

5) An amount of GO_B is issued for the amount of measured net output of energy carrier B.
6) Rules for recording data on the newly issued GO_B need to be harmonised.
    a. As a basic implementation of GOs in the meaning of REDII art.19, there is no need to maintain data from the full supply chain before the creation of energy carrier B. This would lead to the following guideline as a minimum requirement for sourcing the data to be recorded on GO_B:
        i. From GO_A:
            1. the energy source; and
            2. (in case the GO would be embedded in an electronic document that can serve multiple purposes: the purpose (being "disclosure")
        ii. Cumulated from PD + GO_A: information related to the support received for the production or investment
        iii. From the converting production device "PD": the rest of the data fields on GO_B. Note that the GO issued for the output of the conversion shall get a new number and a new issuing date. Of these data, the production period is the one that leaves the most room for discussion, as some might advocate that this lengthens the validity period of the claims that can be made with the original RES production.

    (the EECS Rules nos. C3.2.2, C3.2.3, C3.6.1 facilitate the above-proposed rules)

    b. Depending on the degree of interlinking the requirements of REDII art. 19 GOs with the REDII art. 25-31 sustainability certificates, there may be a case for linking also the full data set of GO_A to GO_B. There are several ways to establish this.
        i. Copying all the data fields of GO_A on GO_B; or
        ii. Provide a single data field on GO_B that links to GO_A. This way all the information related to GO_A is accessible. While this is in terms of GO data structure the easiest solution, it calls for a thorough consideration on the pan-European IT systems architecture as described under challenge 20. Indeed, in the architecture of a GO registry per country, after export, the data behind the link to GO_A may no longer be available to the importing system operator.

    (the EECS Rules nos. C3.6.2 and C3.6.3 initiate facilitating this addition, but need further elaboration for standardised solutions)

7) In case of GOs of energy carrier A from different installations/production periods => how many GOs of energy carrier B with each attribute data set? This is a specific case of 'multiple inputs and multiple outputs'. The attributes of the input GOs are allocated to the output GOs pro-rata the total input for which GOs are cancelled.

    => Pro-rata allocation and completion
    x1 / x = y1 / y GOs with the characteristics of the submitted x1 GOs
    x2 / x = y2 / y GOs with the characteristics of the submitted x2 GOs
    xn / x = yn / y GOs with the characteristics of the submitted xN GOs

    With
    x = measured input (energy source/material input), y = measured net

output that is entitled to GOs, and
x = (x1 + x2 + ... + xn)
y = (y1 + y2 + ... + yn)

Further challenges in the rules for energy carrier conversion

Matching data formats of GOs from different scheme providers (as elaborated in challenge nr 22).

Takeaways from consultation

No respondent opposed the proposal. In general, respondents either endorsed the proposed methodology or indicated that the problem or the solution was not well understood. This indicates the need for clearer formulation when proposals on this matter are drafted for EN16325.

8. Determining the attributes of energy from production devices with multiple inputs and/or multiple outputs

Challenge

While hydrogen is the energy carrier for which production from multiple energy inputs and/or co-production with other outputs is most common, this also happens with the energy carriers.

For instance

- Production of hydrogen by the plasma gasification of biomass involves two energy inputs: biomass and electricity
- In a chlor-alkali process, hydrogen is co-produced with Chlorine and caustic soda
- The situation also occurs in the case of co-generation of power and heat by co-firing biomass with fossil energy
- Biomethane produced from biomass and heat also falls in this category

Rules need to be defined that determine the amount of energy from a particular energy source resulting from a conversion process in which energy of that source is used as an input. If such information is carried on the certificate, it must also be defined how the greenhouse gas intensity of the energy products is determined.

Hydrogen

In CertifHy, the adopted approach for determining the amount of renewable product from a process using multiple energy sources is to consider that the share of renewables in the output(s) is simply the share of renewable energy in all the energy inputs taken together, on an energy basis. No difference is made between energy inputs in the form of an energy carrier, and energy inputs in the form of a feedstock - only energy content is considered.

Heating and Cooling

This question also arises when certifying energy sources for heating and cooling.
A general principle in heating and cooling with heat pump technology is that the energy source is the heating or cooling from the environment. Two approaches are possible:

1. Any energy (usually electricity) consumed by the heat pump could be considered as energy that is auxiliary to the production of heating or cooling.
2. However, the same energy could be considered as an input instead of an auxiliary. That implies that all energy inputs to the conversion process could be considered (in this case, both ambient heat and electricity) following the approach adopted by CertiQ for heat GOs.

Gas – Synthetic methane:

Synthetic methane is produced by Methanation: 2 H2 + CO2 => CH4 +O2.
REDII defines biogas as *gaseous fuels produced from biomass.*
It can be derived that, for synthetic methane to be considered biogas under REDII, both the hydrogen and the CO2 need to be of biological origin.

REDII defines Renewable Transport Fuel of Non-Biological Origin (RFNBO) as *liquid or gaseous fuels which are used in the transport sector other than biofuels or biogas, the energy content of which is derived from renewable sources other than biomass*

Therefore, for synthetic methane to be considered an RFNBO, REDII requires only the energy content to be of renewable origin, i.e. the CO2 can be from any source.

Gas – biomethane

Renewable gas from biodigestion is produced through a chemical process, of which the input material (being the energy source) is considered to be of biological origin. There is no harmonised practice amongst the issuing bodies of biomethane certificates in ERGaR yet on the way the attributes of the inputs are allocated to the outputs. REDII Article 30 on mass balancing, provides a framework for considering multiple inputs and outputs.

Gas -generic

Under EECS, Multi-energy input is covered by EECS Rules section O6.3.2 and O6.4 for gas certificates.

Electricity

Co-generation of electricity and heat from e.g. coal and biomass is a relevant case of multi-energy input and output. Under EECS:

1. Multi-energy input is covered by EECS Rules section N6.3.2 for electricity certificates.
2. Highly-efficient cogeneration of electricity and heat is considered a specific type of electricity guarantee of origin, related to the technology of production, instead of to the energy source, where the "useful heat" in the output is subject to strict criteria under the Energy Efficiency Directive 2012/72/EU.

Lessons from the consultation:

Most of the respondents agreed that the attributes on issued GOs should report the input energy mix (e.g. if hydrogen is generated with 70% RES electricity, this origin should be reflected in the amount of hydrogen GOs issued for RES, pro-rata to the measured net output of hydrogen). The same approach could be taken e.g. for heat pumps. According to the consultation respondents, there did not seem to be a wish to nett the auxiliary losses concerning another energy carrier from the amount of issued GOs. This would affect national policies, as REDII does not harmonise this level of detail.

One of the concerns raised was that there is no one-for-one link from the input materials to the specific energy output in case of chemical processes such as biodigestion.
Also, if the electricity consumed for e.g. hydrogen production or by heat pumps comes from unknown energy sources (= residual mix), no guarantees of origin can be issued in proportion to this quantity of output.

Conclusions and takeaways for revision of EN16325:

Several issues need to be addressed:

VI. The principle used to allocate the attributes of multiple energy inputs to the related outputs;
VII. Consider the different applicable ways for determining the energy content of the input, in order to allocate it proportionally to the output;
VIII. Ensure that a Production Device is defined in such a way that it comprises only one Technology;
IX. Clarify which energy flow(s) should be considered as auxiliary and what is the Input;
X. Use of another energy carrier as input.

I. The principle used to allocate the attributes of multiple energy inputs to the outputs

In the electricity GO system, each GO is issued for a single energy source, which for multifuel plants means that GOs are issued for each energy source in proportion to their share of the total fuel input. Where the input is a blend for which there is no additional value in decomposing it into its components, the energy source mentioned on the GO can be a mixture of energy sources. This can be the case with biodigestion of renewable solid or liquid biomass streams like e.g. manure and organic waste.
The same principle could be adopted for other energy carriers: e.g. gas GOs should be issued with energy sources in proportion to their input. However, some processes fundamentally require the combination of more than one energy input and the product cannot be attributed to just one of the inputs. For instance, hydrogen produced by the plasma gasification of waste is made both from waste and electricity. The possibility of multiple energy inputs allocated together to a single output needs to be foreseen for such cases.

Recommendation: Where energy is generated from a mixture of input fuels/materials, two options need to be considered:

3. Where possible, to allocate how the energy could physically have been generated from each of the inputs separately – then an amount of GOs can be issued that mentions an amount of energy from individual input fuel/material in its attributes. This shall be in accordance with the energetic proportion of that input fuel/material in the total mixture used.
4. The process physically requires the combination of these inputs for the output energy to be generated (e.g. power and waste) – then a GOs can be issued with reference to more than one energy source.

The above approach continues to apply when there are multiple outputs.

Numeric example: with abstraction made of the energy carriers:

There are 3 input streams in the production device, which may come from various energy carriers:

120 MWh of input 1 comes from wind, and
230 MWh of Input 2 from solar energy, and
50 MWh of Input 3 from diesel.

The production device produces:

100 MWh of Output energy carrier A, and
200 MWh of Output energy carrier B.

The quantity of GOs to be issued, and the attributes on these GOs issued for the output energy carrier, with regards to the energy source, are determined as follows:

Issuing of GOs for only one of the outputs:
In EECS and EN16325, there are procedures for the multiple inputs for a single output energy carrier A. This would mean in the above example that 120 / (120+230+50) * 100 MWh of GOs for A would mention the energy source is wind, and 230 / (120+230+50) *100 MWh of GOs for A would mention the energy source is solar energy. For the remaining 50 / (120+230+50) *100 MWh of energy production in energy carrier A either:

- no GOs are issued because the input is from fossil source; or
- this quantity of GOs is issued mentioning the energy source is diesel;

in accordance with the provisions of the national GO scheme.

Issuing of GOs for more than one of the outputs:

- ⇨ In the above example: Same amount of GOs issued for energy carrier A:
  1. 120 / (120+230+50) * 100 MWh of GOs for A would record the energy source as wind, and
  2. 230 / (120+230+50) * 100 MWh of GOs for A would record the energy source ss solar energy.
  3. For the remaining 50 / (120+230+50) * 100 MWh of energy production in energy carrier A, either:
     - no GOs would be issued because the input is from a fossil fuel source; or
     - this quantity of GOs is issued recording the energy source as diesel;

  in accordance with the provisions of the national GO scheme.

- ⇨ Additional GOs issued for energy carrier B:
  1. 120 / (120+230+50) * 200 MWh of GOs for B would record the energy source as wind, and
  2. 230 / (120+230+50) * 200 MWh of GOs for B would record the energy source as solar energy.
  3. For the remaining 50 / (120+230+50) * 200 MWh of energy production in energy carrier B, either:
     - no GOs would be issued because the input is from a fossil fuel source; or
     - this quantity of GOs is issued mentioning the energy source as diesel;

     in accordance with the provisions of the national GO scheme.

II. Consider the different applicable ways for determining the energy content of the input

Determining the energy input depends on how the conversion technology extracts the energy input. In the case of a combustion process, calorific values can be used. In the case of a chemical process, from a thermodynamic point of view, the chemical reaction enthalpy is better to be used. Where the latter is too complex to determine, which is the case for non-homogenous volatile compositions, fallback on the calorific enthalpy is recommended. The latter should be the case for biodigestion of solid and liquid biomass. Whether the reaction enthalpy is of use in practice, needs further consideration.

III. Measurement of the output of a PD when more than one PD of different technologies are on 1 site

For clear allocation of inputs to outputs, the boundaries of the production device (PD) must be clarified.

The reason for this is that if, for example, hydrogen is certified from a production site with two hydrogen production devices being methane and electrolysis, then there are two chemical routes to hydrogen and these both have significantly different thermodynamic characteristics. When calculating the energy balance for the combined site, if the aggregate MWh of methane and MWh of electricity are used as input and the total produced hydrogen is divided pro-rata into the number of GOs for methane hydrogen and those for electrical hydrogen, the result is to allocate significantly more GOs for electrical

hydrogen than the amount of MWh of hydrogen which the electrolyzer could ever have physically produced. Therefore, in such a case, the production devices should be: (1) the methane-based hydrogen production unit; and (2) the electrolysis hydrogen production unit.

One production device (PD) has a single technology => this must be reflected in the definition of the PD, which could look as follows.

=> Production device (PD)= a separately measured device (or group of devices) that produces one or more Outputs from one or more Inputs, using one specific technology.

IV. When is an energy flow in the production device considered as an auxiliary and when is it considered to be an Input?

V. Use of another energy carrier as input

This case is addressed in section 7 (*Energy Carrier conversion: Rules for GO issuing related to energy carrier conversion*) where GOs have been issued for this energy carrier.

9. Data to be recorded on the GOs: what information is relevant for consumers

Apart from the data fields mentioned in REDII Art. 19.7, there can be reasons for consumers to make selective choices in the details on their energy origin. They, however, can only do so if the GO provides information on the variable that stimulates their choice.
A minimum level of transparency on details can make a difference in the public acceptance of the GO system.

This demands of the GO system design that it understands what type of information has value for consumers. More specifically: what data fields are relevant to be mentioned on GOs for their users?
Such information could be optional or mandatory, depending on the desirability in the market, but in either case, the format should be standardised to facilitate efficient and reliable cross border transfers.

See also sections 4 and 13 on: 'EU-wide label' and 'onsite consumption'.

Suggestions

Generic on all GOs

- Whether or not the corresponding energy was sold on the market;
- Optional information:
    - Greenhouse gas emissions produced;
    - Whether or not sustainability criteria of REDII are fulfilled, and a reference to the report and identity of the auditing body; and
    - Intended category of use of the corresponding energy.

Electricity

- Whether fed into a distribution system or transmission system (or closed distribution system)

Gas

- The system into which the gas is fed at the time of production: whether or not the corresponding energy was injected into an isolated system, a national grid or a system that is interconnected with other countries in Europe, or fed into a bulk distribution system, being either road, rail or ship transport;
- The type of gas (chemical composition: methane, hydrogen injected into the gas network, or other gas):
    - If there is a separate energy carrier defined for hydrogen supplied to the consumer as pure hydrogen, then it is not certain whether it will have value to the consumer to include this data field;
- Technology of the production process;
- The calorific value:
    - As the GO always represents 1 MWh, this might not strictly be needed; however, for a gas with a very low calorific value, this might have some relevance for credibility by the consumer.
- The sustainability criteria and GHG emissions (savings) in order to be recognised in the EU ETS scheme.

Hydrogen

- The system into which the hydrogen is fed at the time of production: whether fed into pipeline distribution or bulk distribution;
- Technology of the production process: whether water electrolysis, chlor-alkali, biomass gasification etc.;
- GHG intensity;
- Average GHG intensity of non-certified hydrogen in the last 12 months (in CertifHY, this is required not to be higher than GHG intensity of hydrogen from the benchmark process, i.e. methane steam reforming).

Heating and cooling

- Whether or not injected into a network for heating and cooling;
- Chemical composition of the heat carrier;
- Aggregation state of the heat carrier;
- Temperature range of the heating or cooling from x-y °C (high-temperature heat has higher enthalpy, meaning a higher quality of heat);
- Pressure range from x-y [kPa].

Lessons learnt from the consultation
There are diverging views on this topic.

A view from opponents of mandatory data in addition to the basic requirements of REDII: adding new data fields in addition to mentioned could only bring marginal benefit to some actors while placing an increased burden on data collection and management. These stakeholders feel the consumer needs very few data fields on a GO (namely the energy source and technology), though there are others with contradictory experience on matters of interest to consumers.

Another stakeholder states that adding extra data fields should be optional.

Information on GHG emissions is a highly relevant piece of information on a GO for stakeholders active in the gas sector. Apart from that, facilitation of gas GOs requires some additional fields (especially fulfilment of REDII sustainability criteria, category of intended energy use and type of gas).

Also relevant is whether energy generated is fed into a common system (grid) (see section 13: *"Double disclosure related to onsite consumption and non-interconnected grids")*. It is worth noting that the understanding and definition of the term "grid" is not unanimous, which hampers standardisation of the matter.

For gas, it must be defined whether GOs are issued based on the higher or the lower heating value of the energy carrier.

For gas, in some countries (such as France), consumers have the right / are willing to know from which biomass (and region) the biomethane GO originates.

Besides these, the possibility of GOs to promote additionality (e.g. exclusion from counting towards targets) could be supported with new data fields.

Conclusion and takeaways for revision of EN16325
The project team recommends considering the above-mentioned additional data fields on GOs.

Relevant sections of this document that consider arguments and proposals for data fields on GOs are:

4 *"Facilitate an EU wide Green Label and/or a premium market for renewable energy"*;
10 *"Avoiding double counting following from the interplay of GOs (REDII art.19) and sustainability certificates (REDII art.25-31)"*;
11 *"Using the data on the GO for purposes wider than origin disclosure - EU-ETS"*;
13 *"Double disclosure related to onsite consumption and non-interconnected grids"*;
17 *"Cross-border trade of heating and cooling GOs"*.

10. Avoiding double counting following from the interplay of GOs (REDII art.19) and sustainability certificates (REDII art.25-31)

Legislative reference

The Renewable Energy Directive 2018-2001-EU (REDII) addresses two separate aspects of tracking the origin of energy: guarantees of origin (art.19), and sustainability certificates (art. 3.1 and 7.1, 25-31), which will be recorded in an EU Database (art.28.2).
The scope of the GO system under article 19 states: GOs are for demonstrating to end-users the origin of the energy they are consuming. On the other hand, sustainability certificates used for fuel target compliance are created in line with art. 25-31.

In essence, GOs (under Article 19) shall have no function in terms of a Member State's compliance with renewable energy targets. On the other hand, certificates created in line with Articles 27-30 – particularly those regarding transport fuels - enable counting of the respective volumes towards meeting the respective targets.

From common logic, this should also work the other way around: sustainability certificates should not be used for renewable energy consumption claims. It is, however, difficult to prevent this from happening in reality.

Double disclosure risk

A link between the management of the two types of certificates (GOs and sustainability certificates) must be established to ensure that there is no double disclosure of the same attributes for which a GO is issued. If not, a risk exists that the party who consumes (cancels) the sustainability certificate will claim to have consumed the renewable origin of the corresponding energy. This risk arises when GO had been issued and traded separately from the sustainability certificate, allowing a unit of renewable energy to be claimed twice, being at the cancellation of the GO AND at the redemption of the sustainability certificate.

Options for interlinking GOs (origin disclosure purpose) and Sustainability certificates (target counting purpose)

This can be done in several ways:

1. By forbidding the issuance of a GO when a sustainability certificate is granted. This implies that, to exclude double disclosure for renewable gas volumes which are placed on the market as biofuel for transport, the rules and regulations of the national issuing bodies contain the provision that no GOs are issued to the producer for those volumes which are supplied to transport. However, this precludes in principle the end-user from being informed about the origin of that product, as GOs must be used for this; or
2. By clearly communicating that the sustainability certificate does not encompass any claim of the origin of the consumed batch. However, it is difficult to control what claims suppliers and consumers are making, especially when there are no harmonised prescriptions for disclosure of the origin of supplied gases; or
3. By bringing the two purposes together on a single certificate so that both stay together for the whole of their lifetime.

Member states can opt to implement any of these three different approaches, and they need to choose what works for their system, as long as it ensures the avoidance

of double counting and double disclosure of the same unit of energy from RES, and does not create barriers for cross-border trade between EU Member States.

The last option (3) seems to provide the greatest value (both in the market value of the certificates, and in reassuring the avoidance of double claims of the same units of renewable energy). Such an option requires both functions to be delivered by a single "electronic document" that meets the requirements of both art. 19 and of art. 29-30 of the REDII and will hence have 2 separate functions which stay together until their final use.

Both certificates, however, are issued under different approaches: GOs under Article 19 are issued on a "book and claim" basis, while sustainability certificates under Articles 27-30 are issued in accordance with a mass-balancing methodology. For those energy carriers and those production devices where an umbrella "energy certificate" would be issued, both methodologies' characteristics need to be incorporated.

Considerations with regards to a "multifunctional - single certificate" approach

Several questions are to be considered when considering the **joint management in a single "energy certificate" of a GO (origin disclosure purpose) and a sustainability certificate (target compliance purpose)**:

a) Many interpretations of the concept of mass balancing exist. Here it is essential to establish an understanding of, and ideally resolve, any differences between the concepts of mass balancing as understood by different organisations, to achieve a common definition and understanding.
b) The data content of a certificate in a possible single-certificate system. Efficiency can be gained from collecting data in a single process together for multiple purposes (e.g. origin disclosure to consumers and transport fuel target compliance).
c) How the cross-border transfer of such certificates interacts with a required share of renewables, in particular in transport fuels and its correct handling target-wise.
d) The end-use of the energy to which the certificate corresponds needs to be handled.
e) The requirement for sustainability is to demonstrate specified GHG emission savings as compared to the relevant fossil fuel equivalent. The thresholds for different end-use applications are different and are fixed in REDII.

Technical option for a single certificate solution

Because different sustainability criteria are relevant to different categories of consumption these criteria cannot be fulfilled independently from usage.
Hence the issuing procedure of the GOs must be adapted in one of the following ways:

- Issuance in line with the same procedures as for mass balancing certificates, meaning the withdrawal of gas from the gas system for its use should be documented and its volume should be compared with its value as specified on the GO;
- No issuance until the end-use is known;
- At the time of GO issuance: Predetermine on the GO the allowed category of end-use and install a supervision mechanism to this; or
- At the time of GO issuance: specify on the GO the GHG emissions-saving value for different categories of end-use.

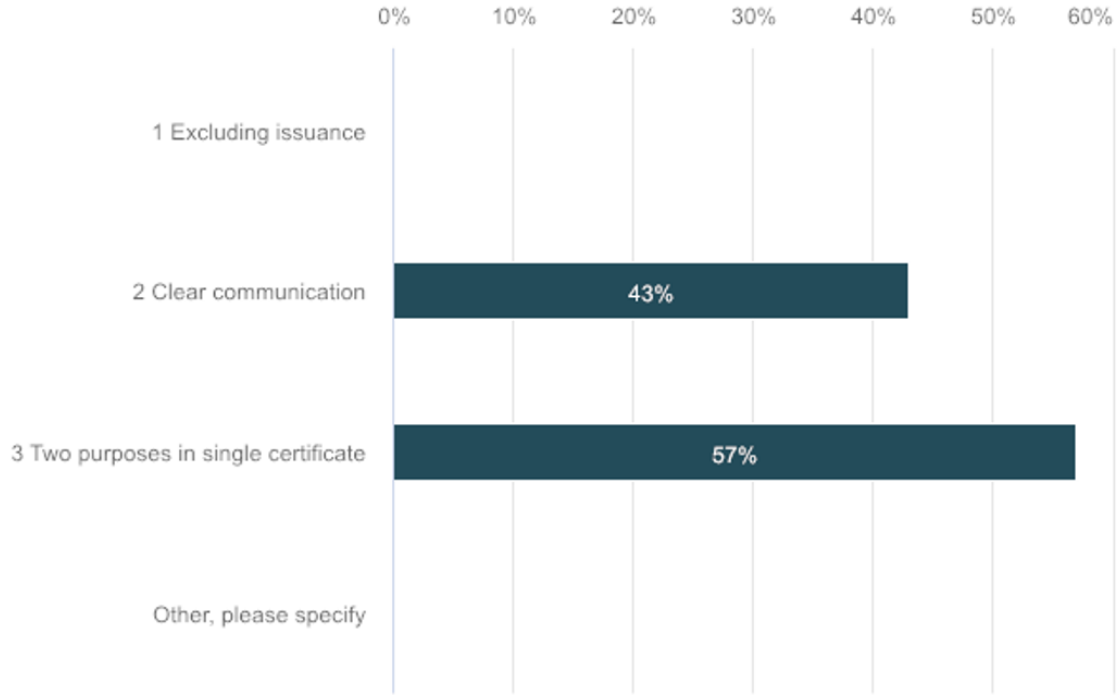
Further, it must be noted that there will be RES production that is eligible for only one of the purposes (origin disclosure OR support OR target counting), hence the certificate system must account for this.

Takeaways from the consultation

Respondents are not all of the same view. All three responding issuing bodies of certificates for gas, however, opt for combining two purposes into a single certificate.

60. Which of the above "options for interlinking" would you propose (1/2/3)? Why?

Number of respondents: 14



From the responses (see Annex 1) it is also evident that a clear communication on separate purposes for both documents (= option 2) is not easy to establish. Paradoxically, for some, it seems to be self-evident to use the sustainability certificate for purposes of disclosing the origin of energy to consumers.

An expert working in establishing joint gas sector views on gas GOs states that it is important to simplify document management for suppliers and consumers and allow the GO - with the sustainability certificate attached - to be the 'universal' document used for different purposes. For example, such a document could be used to prove that biomass fuel is eligible for financial support for consumption (which could also be relevant for the EU ETS); and for compliance with renewable energy obligations (if desirable and if they are introduced in the Member States).

Takeaways towards the revision of EN16325

Preamble 55 of REDII makes it clear that the sole purpose of the GO is to demonstrate to a final customer that a given share or quantity of energy was produced from renewable sources. Therefore, facilitating multiple purposes in a single electronic document can only be done by integrating the GO in an electronic document that can serve more than one purpose. In order to avoid usage of GOs for purposes other than those intended, at the time of issuing it must be clarified for what purpose the electronic document can be used. That can be facilitated by incorporating a data field 'Purpose' on the electronic document where the Authorised Issuing Body fills in the eligible purpose of the document.

Whether it is EN16325 that facilitates such a multipurpose electronic document or a separate agreement between issuing bodies, has yet to be discussed. The structure of EECS in itself facilitates multiple purposes to be handled on a single electronic document.

It could be time consuming to resolve all the modalities for a multi-purpose electronic document and cost more time than available for a timely revision for implementing REDII art.19 before July 1st, 2021.
A concern from the other side is that the architecture of the data fields on an electronic document cannot be revised often:

- Adding data fields in a later revision will be more difficult to implement than adding extra processes or rules.
- National GO registry upgrades are expensive, and timings updates to them are not easy to align.

This could be overcome by providing a data field 'Purpose' on the electronic document, that informs of the eligible purpose(s) for which it can be used (doing so is not inconsistent with the first sentence of current section 0.1 of EN16325.)
Discussing potential values of this parameter, if time consuming, could be left for a later revision of EN16325, or for a separate agreement between issuing bodies.
It could subsequently be considered whether the value of the parameter in this data field should differ for different energy carriers.

11. Using the data on the GO for purposes wider than origin disclosure - EU-ETS

Organisations, notably representing the gas and industry sectors, are discussing the use of the data on the GO for other purposes. Consumers might use the data on the GO for proper accounting of the combusted bioenergy under the EU-ETS. It follows from internationally recognised standards and EU law that biomass and energy produced from biomass will have a 'zero-emission' rate[14] . GOs are also being used in practice for Greenhouse Gas Protocol scope II[15] accounting.
This would increase the market value of the GO certificate, providing producers with an income stream that could go some way to offsetting the reduction of direct support schemes.
It needs further consideration whether additional conditions need to be met, both for reliable origin disclosure and for consistent clean energy support policies.

While the sole use of the GO is to prove the origin of energy production to the final customer, it may be that the customer uses their proof of renewable energy consumption for further purposes and benefits which they can derive from their renewable energy consumption.

In general, the process that leads to the issuing of the GO and disclosure of energy use will also generate and provide data that can be used for other purposes: it would be inefficient to organise this same data collection & verification process multiple times for different purposes. Also, if the GO is used for claimants under other systems than disclosing the origin of the supplied energy, it is worth investigating whether to include these different types of use in the system design.

The GO system management risks of not doing so are twofold:

1) Missing out on efficiency opportunities in the capture of data and recording processes, and thereby adding an overhead cost to the GO system that is too big for the market to carry; and
2) Double counting of the same quantity of energy from renewable sources. Claimants could be mixing up the purposes of different types of certificates.

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[14] In the European Union, emissions from biomass combustion are currently accounted for as zero pursuant to Article 38 of Commission Regulation (EU) No 601/2012. This principle has been confirmed also in the recently approved European LULUCF regulation. (REGULATION (EU) 2018/841, Whereas 15. So, the **"zero rating principle**" for biomass is widely recognised in the EU legislation. More precisely in:

- Directive 87/2003 establishing the ETS
- Monitoring and Reporting Regulation No 601/2012
- Biomass issue MMR guideline document n.3
- REGULATION (EU) 2018/841 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 30 May 2018 on the inclusion of greenhouse gas emissions and removals from land use, land use change and forestry

[15] https://ghgprotocol.org/sites/default/files/ghgp/standards/Scope%202%20Guidance_Final_0.pdf

Using GOs for EU-ETS?

Article 5.2 "Biogas in natural gas grids" in the EU ETS MRR Guidance document No. 3, Updated Version of 27 November 2017 contains the statement:
„If Member States want to make use of biogas in a natural gas grid and want to make the benefits thereof easily accessible to operators of EU ETS installations, they need to establish an appropriate accounting and verification system (e.g. using a biogas registry) which allows the accurate, transparent and verifiable identification of biogas amounts fed into the grid and consumed by installations, effectively avoiding double-counting of biomass. The system also needs to make provisions for avoiding data gaps or double counting if the grid is connected to other grids, including in other Member States."

Challenges when using GOs for purposes of EU-ETS include the following:

- Avoiding double counting in greenhouse gas emission accounting: making sure that when a GO is used as proof of the renewable energy consumption for EU-ETS, no other method is used;
- Linking supervision bodies of EU-ETS with GO Issuing bodies; and
- Impact on national RES policy purposes: there is a clear difference between an EU-wide scheme such as the ETS, and national support schemes which reward for RES through, for instance, tax-cuts. Having national incentives based on internationally tradable certificates needs to be carefully scoped in order to avoid undesired consequences in national policy frameworks.

FaStGO is not in place to decide whether or not GOs can be used for EU-ETS; that is up to policy-makers.
However, FaStGO believes that it is relevant to highlight some aspects that should be taken into account and which could be outcomes of a decision by policy-makers to allow GOs to be used for EU-ETS compliance. These include the data recording, processes and relationships that should be foreseen.

Takeaways from the consultation

From the consultation, it is clear that strong and often opposing views exist amongst respondents. As many relevant aspects with value for policy-makers have been reported by respondents, we recommend reading these in Annex 1 Section 11, page 71-78, which contains consultation responses on this subject. As a brief summary:

The respondents to the consultation who favour the use of GOs in connection with the EU-ETS state that:

- The use of the GO will enable those operating under the EU ETS scheme to not buy emission allowances for the share of combusted fuel which was certified as renewable by GOs. This will help to generate proper price signals for the market and reflect the decarbonisation costs, bringing overall efficiency gains for EU decarbonisation policy;
- Using GOs for EU ETS would increase the market value of the GO certificate, providing producers with an income stream which could go some way to offsetting the reduction of direct support schemes. This will enhance the market for biomethane GOs and create a push to low-emission biogas; and simplify (for EU ETS operators) the process of emissions monitoring and reporting; and
- There could also be synergies in the collection of data for EU-ETS compliance and GO issuing.

Principle opponents to this option state:

- It might undermine real emissions reduction and renewable energy targets; and
- GOs are more likely to be issued for units of energy that have already received state support. These can then be offered more cheaply, which could reduce industry efforts on EU ETS compliance.

Some proponents of the use of GOs in connection with EU-ETS see their opponents' arguments as risks that could be mitigated through appropriate policy measurements. Further, it is often acknowledged that a double-counting risk would need to be properly addressed.

Further viewpoints, which have not been considered above, include:

- An NGO operating a label expresses the advantage of uniformity, explaining that if there is a system, then it makes sense to use it throughout all sub-sectors of climate policy. On the other hand, it considers that there is very little time left to drastically reduce CO2 emissions – the EU does not have time for experimentation and must maximise implementation of policies known to cut emissions. With regard to the EU ETS, it is crucial to limit the available pollution rights to volumes that are in line with the obligations of the Paris Agreement (= 1,5 degrees). The respondent also comments that biomass "isn't zero carbon at all. (…)".
- According to a trader, it is questionable whether the 'zero emission rate' principle should be applicable, as some sorts of feedstock used for renewable gas production could even achieve net negative GHG emissions. The 'net negative' GOs could significantly improve the GHG balance of installations and they could, therefore, carry a premium on the market.

Takeaways for the revision of EN16325

As mentioned, this project will not give a view on whether or not to link the GO system with the EU-ETS. Nor will it go as far as setting out the detail of any required relationship between the competent bodies for the supervision of the EU-ETS, disclosure and issuing of GOs, as this is for policy makers to clarify first.

However, FaStGO does acknowledge that during the revision of EN16325, the voluntary and mandatory data fields on GOs should be carefully re-considered. As it is not easy to change data requirements on the GO, or to incorporate such changes into registries, the opportunity this revision provides should be maximised. Any newbuilds, rebuilds or upgrades of GO registries flowing from the REDII implementation deadline might have a long pay-off time, during which further harmonised adaptations of software for GO registries might be hard to defend for national implementors.

This project has briefly considered the information the GO needs to carry *in case* GOs can be used as proof for the 'zero emission rate' of biomass in the EU-ETS.

Experts responding to the consultation on the question of what data should be recorded on the GO for the abovementioned purpose mention the following elements:

- Whether the energy to which the GO relates complies with REDII sustainability and GHG emission criteria;
- A reference to the voluntary scheme approved by the European Commission, that certified the sustainability criteria have been met according to REDII art. 29;
- The amount of GHG emissions;
- The origin of the feedstock;

- Verification information of the biomass being used, and that the used volumes were delivered via mass balance.

As the experts whose views are mentioned in the above list are all active in the sector of renewable gas certification, it may be that such fields should be voluntary, and for gaseous fuels only.

Adding information, especially on GHG emissions, would require more data to be submitted and verified; and this will increase the time needed to issue GOs. Indeed, it is questionable whether the data could be obtained in time for issuance to take place at an acceptable speed and frequency.

Issuing bodies for electricity currently operate a market that works without GHG emissions on the GO. However, while some large electricity consumers would prefer to relate GHG emissions to GOs, e.g. for Scope II emission accounting in the GHG Protocol, the issuing bodies for electricity GOs have yet to find a harmonised method of doing so. As they operate registries that facilitate secure transactions in large volumes, the case for upgrading the architectures of these registries would need to be convincingly made before actual expenditure could take place.

Finally, it must be noted that the EECS Gas Scheme in section O8 of the EECS Rules has foreseen the above voluntary data fields on the EECS Certificate for Gas. It is recommended that the extent to which these data fields meet this concern be discussed.

3. GO Market

12.Prevention of double disclosure of the origin of sold energy

Challenge

It is vital to maintain (public) trust that an issued GO is the only tool through which a consumer can claim use of the related attributes. If such trust is lost, whether through double issuing, double counting or even the perception that either might occur, the 'raison d'être' of the GO system vanishes.

Affected Areas of GO system operation

Registration, issuing, transfer, cancellation, consumer claims

Directions for solving the matter

Double issuance

Controls must be maintained that prevent the issuance of more than one GO for the same unit of produced energy.

Double transfer

The registration of ownership of a GO as an electronic document must be supervised by a designated competent body. The same applies to facilitating and supervising the transfer of ownership of a GO. It is essential to set up reliable IT systems and data protocols for cross-border trade to avoid GOs being (accidentally or intentionally) copied during the transfer of ownership. Therefore, a GO must be kept in a registry supervised or administered by a trusted competent body at all times, and it can no longer be a GO with the same quality guarantees when it no longer resides in such a registry.

Double cancellation

Controls must be maintained that ensure that GOs can be cancelled only once, and only if they have not already expired or been withdrawn.

Double disclosure

Rules and controls must be maintained and/or introduced that:

- Ensure that a claim on the use of a unit of energy delivered from a system that is within the scope of a GO scheme can only be made through the cancellation of a GO;
- Limit the means by which a claim can be made about the origin of energy (GO cancellation, tracking of supported energy, residual mix), to prevent the same unit of energy for which a GO has been issued being tracked by another tracking instrument such as another certificate system or by means of contract-based tracking;
- The energy origin represented by GOs is correctly accounted for in the residual energy mix, and the use of the residual mix is mandatory for non-tracked commercial offers;
- Prevent claims on more energy than the amount of GOs cancelled, due to an insufficiently precise description of the use in the cancellation statement.

In many EU countries, there is insufficient coordination on whether disclosure information relates to the energy product sold, or to the total supplier mix. This leads to significant amounts of renewable energy being double-counted. The problem will be corrected by the provisions of the new IEM Directive annexe I.5, which specifically requires the disclosure of the electricity provided to the customer (i.e. product mixes) and not the total supplier mix alone. However, since the problem is so significant, and since the implementation of the IEM requirement needs to be coordinated, there is a need to harmonise procedures relating to the disclosure information that is presented.

Double perception

- Media releases sometimes indicate a lack of consumer trust. This can even happen when all legislative requirements have been fulfilled, ensuring that the origin of the supplied energy is disclosed on suppliers' invoices - as proven by the cancellation of GOs. Consumers in net GO exporting countries sometimes make statements which suggest that all domestic renewable production is consumed within their own country. This causes some consumers in net GO importing countries to be cautious about relying on imported GOs, as they understand that the renewable attributes of the imported GOs have already been claimed in the country of origin.
- This challenge shows the limits of what legislation can do. It requires educational efforts to improve public awareness, especially in net GO exporting countries, that exported renewable attributes cannot by any means be claimed to be consumed domestically.
- Consumers must have a clear understanding of what kinds of energy consumption require the cancellation of a related GO. This requires a clear definition of the boundaries of the system to which the GO system applies.
- The level of supervision required to meet the abovementioned requirements should also be defined.

System boundaries

- The GO system enables reliable origin tracking, as long as the boundaries of the system in which the relevant rules apply are maintained. First of all, such boundaries are geographical and political (i.e. the geographical area in which REDII, Energy Efficiency Directive, and joint origin disclosure rules framework (IEM) apply), but also which type of certification/tracking system is in scope.
- Linkages (imports and exports) with another system must mutually incorporate the core principles of the other system. When allowing import and export, the following need to be taken into account:
  - Export = leakage of attributes must be replaced; and
  - Import = ensure that the quality of the imported GO is maintained, and is not disclosed for use in the exporting country/system;
- There must be a clear framework containing the conditions for claims on the origin of energy;
- Conditions: there are power connections, AND harmonised GO systems, AND harmonised origin disclosure systems.

Further specific challenges per sector

Gas:

Implement disclosure legislation

For gas supplies, national legislation in Member States has yet to be enacted which obliges gas suppliers to use GOs to prove the origin of their claims of renewable gas supply. As there is no system in place to regulate proof of the origin of renewable gas

supply claims, this involves a risk of double claims, as suppliers and consumers might use other channels to make claims on using RES gas which has been awarded tradeable GOs.

Note: Disclosure legislation surrounding the GO framework cannot be imposed through the standardisation of GOs alone and requires EU legislative decisions concerning the surrounding framework. A GO scheme will only avoid double disclosure when there is general acceptance that claims cannot be made regarding products from other systems unless GOs have been cancelled (and unless it belongs to the residual mix or to a contractual tracking mechanism which has been set up in such a way that it doesn't cause double counting), since the underlying principle is that energy attributes in the European single market are represented by GOs alone.

Heating and cooling: strengthen disclosure legislation

For heating and cooling:
REDII article 24 provides a disclosure framework for renewable heat in district heating/cooling, thus:
"Member States shall ensure that information on the energy performance and the share of renewable energy in their district heating and cooling systems is provided to final consumers in an easily accessible manner, such as on the suppliers' websites, on annual bills or upon request."
This could be strengthened by requiring the renewable origin to be proven by cancelling a corresponding quantity of guarantees of origin, should these have been issued; and, by ensuring that the same amount of heat cannot be disclosed more than once.

Correlation with other energy certification systems

Besides the system of guarantees of origin provided by article 19 of REDII, there exist other systems which facilitate claims regarding the consumption of energy from RES.

Some organisations claim to facilitate certificate schemes that have a different purpose than energy disclosure, and such schemes may be interpreted differently by users. For example, Solarcoin aims to provide support to producers by awarding them "solarcoins", which are subsequently traded on an open market. However, media reports show that solarcoin buyers sometimes do make claims about the consumption of renewable energy, even though solarcoins never expire; and even if a GO is issued for the same MWh.

In general, it is essential for the maintenance of public trust in the GO system that no claims on the consumption of energy from RES can be made through a mechanism other than GOs, if GOs are allowed to be issued for the same MWh.

Renewable energy communities (REDII art. 22)

It must be kept in scope that where "renewable" energy is transferred within a renewable energy community, and GOs have been issued for the corresponding amount of production, then these must have been cancelled.

Lessons from the consultation

The majority of respondents see that a disclosure system should be put in place for gas.

There is support for extending the coverage of standardisation of GOs to other energy sources than RES, as long as this does not cause a substantial administrative burden.

The technical aspects of GOs are seen as being sufficiently well designed to ensure that double counting does not happen. The harmonisation of robust disclosure practices and education to prevent double perception are seen as more important matters to address. Solutions to these were already presented earlier in this paper, and additional solutions from the consultation are given in the footnote[16].

Double-perception is acknowledged to be a risk for the GO system. The suggestions by the respondents for overcoming this concern deserve thorough consideration from supervisory competent bodies for disclosure (see Annex 1 with the consultation results, answers to questions 75 and 76). This goes beyond the procedures for GO handling and requires effective educational communication with all energy consumers. This detail is relevant for the surrounding framework on reliable disclosure of the origin of a supplied unit of energy, but it goes beyond both the scope of this project and the way in which a standard on GOs can overcome this concern.

Conclusion and takeaways for revision of EN16325

In addition to robust processes for issuing, transferring and cancelling of GOs, adopting a standardised approach for the lifetime of GOs as well as disclosure practices and deadlines is highly important for the avoidance of double disclosure (see rules and controls on double disclosure and double perception above).

It can be concluded that in this regard and others the principles of the revised standard could also be applied to GOs issued for units of energy from non-renewable sources.

[16] e.g. education of consumers and PR, systemisation of disclosure rules and legislation, electronic and robust systems, clear rules for self-consumption, single platform and avoidance of overlap with similar systems (support/sustainability certificates and also new emerging solutions such as Solarcoin), product-level disclosure

13. Double disclosure related to onsite consumption and non-interconnected grids

Electricity: avoid double disclosure of "onsite consumption"

The operators of the guarantee of origin system for electricity have, in most countries, at least 15 years' experience in setting up measures which prevent double counting. EU legislation obliges electricity suppliers to disclose the origin of the electricity they supply on invoices they issue. They have to prove the renewable origin of this electricity through guarantees of origin. This gives the GO system a legal underpinning which ensures that "double disclosure" is avoided.

However, there are ongoing discussions on how to remove the risk of double disclosure related to so-called "onsite consumption" (= electricity consumed at the site of the production device, without it flowing into the grid).
If onsite consumption is eligible for the issuance of tradeable GOs, it must be clear that electricity consumed onsite cannot be claimed as having green/renewable attributes unless the related GOs are issued to the producer and cancelled by the consumer – even if in this case they are one and the same. One way of establishing this is to introduce the principle that tradeable GOs can only be issued for electricity that is made "available to the market for trade", coupled with measures that avoid double-disclosure of the same attributes of the produced energy. Another way of achieving the same result is by ensuring that only grid-injected electricity qualifies for receiving tradeable GOs. Grids here could be defined as distribution systems, transmission systems and closed distribution systems[17] in the meaning of the IEM Directive (EU) 2019/944 and the Gas Directive (EU) 2009/73.
Either way, in order to avoid double-disclosure, the national disclosure framework must incorporate in the residual mix calculation, the GOs that were issued for electricity that was not injected into the grid, and for which tradeable GOs have been issued.

On a larger scale, a similar question arises for electricity injected into islanded grids, where public opinion sometimes struggles to accept the credibility of export and import to another grid, even if accompanied by solid legislation regarding origin disclosure for electricity suppliers and consumers.

Off-grid gas

Similar to electricity injected into islands grids, it is the opinion of some people that it is difficult to accept that renewable gases which have been injected into gas grids that are not connected to a gas grid where the gas is consumed, can be sold as renewable gas consumption. However, by law, GOs facilitate this practice.

Heating grids are not interconnected

Heating grids are not interconnected. This raises the question of whether GOs issued for heating and cooling injected on another heating and cooling grid can be accepted

[17] The concept of Closed Distribution Systems is elaborated in art. 38 of the IEM Directive 2019/944/EU. Art.38.2 states 2. Closed distribution systems shall be considered to be distribution systems for the purposes of this Directive. (…)

for proving renewable heat supply (see also reasoning in topic 17 on cross border transfer of heating and cooling).

Lessons from the consultation on the principle of onsite consumption

A substantial body of the stakeholders is not in favour of tradeable GOs being issued for energy that is consumed at the site of the production device. Another group of stakeholders states this should be possible.
With strong opinions on both sides, all respondents acknowledge that it is important to avoid double-disclosure of the attributes related to the energy for which GOs are issued.

To ensure this avoidance of double disclosure of the same attributes to different consumers, claims on the origin of consumed energy can be made through either the cancellation of GOs[18], or a well-calculated residual mix.

Challenge of clear communication when issuing tradeable GOs for onsite consumed energy

In many site configurations, there is a perception by outsiders that the attributes of energy that is consumed at the site of the production device, are consumed at the same place. Allowing these attributes to be sold elsewhere by issuing and allowing the transfer of GOs causes problems for the credibility of GO systems.

In industry, there are production-consumption configurations where this is less problematic, hence where tradable GOs can be issued for onsite consumption. This requires clear communication to the general audience explaining how double disclosure is avoided.

Challenge for the residual mix calculation when issuing tradeable GOs for onsite consumed energy

For reasons of clarity, this concern is illustrated using the electricity market as an example. The residual mix[19] (RM), is calculated based on overall generation and consumption statistics. It is essential that the quantities of GOs corresponding to both categories to be mutually consistent. Currently, in the RE-DISS and AIB RM calculation method, the generation statistics used to calculate the national domestic residual mix contain the electricity production that is injected into the grid (Distribution or Transmission System). If electricity that is not injected into the grid also receives tradable GOs, then this implies that the attributes of this electricity are consumed elsewhere, and hence the onsite consumption should be taken into account in the overall national consumption numbers used for the residual mix calculation. Failing to do so would lead to the double counting of attributes, as tradable green attributes would "sneak" into the system from separate "isolated" systems which are not considered in the same general realm of disclosure.

[18] Or as long as they exist, and their quality can be guaranteed: other Reliable Tracking Mechanisms. See RE-DISS Best Practice Recommendations www.reliable-disclosure.org. For readability, here abstraction is made on the other Reliable Tracking Mechanisms that exclude double disclosure of attributes.

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

We therefore recommend that the scope for issuance and disclosure must be the same (and correspond to the overall amount of regulated supply for which there is regulatory supervision of disclosure):

- Any consumption of produced energy that is not part of the domain's national consumption statistics, used for the residual mix calculation, should not receive tradable GOs.
- Any consumption of produced energy that is part of the domain's national consumption statistics, used for the residual mix calculation, is eligible to receive GOs, in which case the associated consumption is considered as originating from the residual mix provided the GOs have not been cancelled.

Transfer of energy through another means than a grid

From REDII, tradable GO issuing is not limited to energy injected into a grid. Apart from the energy consumed onsite, there is another relevant aspect to be considered, being transfer of the energy through another means than a grid. This becomes particularly relevant for gases (including hydrogen) transported through other routes than a Distribution or Transmission system. However, the above-mentioned concerns on maintaining GO credibility and avoidance of double counting still apply.

In general, energy transported in batches (which is relevant for gases - including hydrogen) can receive a GO for tracking its origin, as long as its attributes have not yet been disclosed to a consumer, and are not directly linked to a specific consumer as a result of the relation between the production and consumption of this gas.

A suggestion here is that the energy should be physically delivered to a third party via a transfer system that supplies several parties. It is worth considering whether, in a book-and-claim system, a data field should be added to a GO relating to the means of supply, as this may be relevant for consumers (see section 9, which considers the use of a data field on 'means of supply').

Consideration for the revision of EN16325 with regards to energy eligible for issuing tradable GOs

Based on input from the consultation, a principle can be considered in discussions surrounding the delivery of a workable text for the revised EN16325.

As a general principle, it is proposed to issue tradable GOs for the nett energy (of the corresponding energy source mentioned on the GO) that:

1) Is measured in line with regulated settlement procedures AND is injected into:
   - a Distribution or Transmission system, (where Distribution and Transmission are defined as in (EU) 2019/944 for electricity and (EU) 2009/73 for gas); or
   - a heating and cooling grid.

   OR

2) Is conveyed in a gas that is physically delivered to a third party via a transfer system that supplies several parties.

Under point 1) it can be discussed whether this shortlist of eligible systems for injection can be complemented with "another type of grid but released onto the

market for trade". Two considerations and refinements of text that could be made to exclude the abovementioned double disclosure risk, are:

a) what type of grid fulfils the conditions of avoiding double disclosure (= can we ensure that the consumption on this grid is included in the consumption figures used for the residual mix calculation?), and

b) how to phrase 'released onto the market for trade' unambiguously, so that the corresponding numbers are correctly used in the residual mix calculation.

Lessons from the consultation on the principle of non-interconnected grids

Several respondents believe that GO cancellation should only be allowed for consumption on a grid that is connected to the grid into which the energy was injected, and for which the GO was issued. Most respondents, however, acknowledge that REDII does not provide a legal reason for rejecting import or use of a GO for such reason.

The concern by the opponents of the use of GOs from non-interconnected grids can be mitigated by providing consumers with transparent data on the GO so that they can make informed choices. Some consumers will accept GOs from non-interconnected systems, while others might prefer not to do so. Empowering consumers to make an active choice through greater transparency on this matter could be achieved through standardised data fields on the GO, like the country/region of production and the means of supply. =>See also section 9: "Data to be recorded on the GOs: what information is relevant for consumers" when considering a data field 'Means of supply'.

14.Attention points related to GO Cancellation by consumers

Art.19.1 of REDII allows for GOs to be used by/for suppliers and consumers or their representatives. Practical experience raises a few points that need attention:

Multinational energy consumers

Some multinational companies perceive that the rules place an undue burden on multinational energy consumers that purchase GOs from single high-impact projects, for instance through a power purchase agreement ("PPA"). In many cases, companies pursuing PPAs are consuming energy in many countries across the European single market. Many GO registries have fees associated with operating an account, and specific procedures to be followed for account registration, GO transfer, and cancellation. When opting to organise its own GO cancellation (instead of through a licensed supplier), a multinational with operations across Europe is required to open registry accounts in every country in which it operates. Similar to energy consumers and suppliers operating in a single country, this can bring direct and indirect costs to each transaction. Multinational consumers who tend to manage their energy and environmental strategy implementation centrally, perceived this to be more complicated than it should be.

Mitigate the risk of double disclosure

The existing framework set out in EECS requires parties involved in power purchase agreements (PPAs) to cancel GOs in the country of consumption when they claim the renewable nature of the energy. However, in practice, they do not always do this. EFET and RE100 promote the cancellation of GOs in connection with claiming green energy consumption and even promote a model PPA template, but not all companies follow this advice. The risks are twofold:

Consumers not cancelling GOs for their claimed RES consumption

Consumers might not cancel GOs for claiming the renewable origin of energy which has been granted GOs. Legislative requirements for cancelling GOs for RES are imposed upon suppliers, but the same level of requirement is not required from consumers.

Failing to involve the Competent Body of the country of consumption

Energy consumption in another domain may be disclosed without giving notice to the issuing body for the domain where the energy is consumed. Some traders promote the purchase of GOs in non-AIB member countries, cancelling them there and using them for sustainability reporting. The consequences of this include:

- This may not be correctly included in the statistics of the countries involved. It may not be of similar quality, and there is a risk of double counting, given the lack of assessment of the cancelling issuing body – it is unclear how and whether this would be included in the Residual Mix.
- Consequently, the overall European GO statistics, which are based on Member State statistics, are invalidated along with any residual mix calculations that use them (and the work done in producing these statistics is wasted). This means that policymakers and end-consumers are given incorrect information to act upon, which defeats the original purpose of a GO system.
- EECS Rule C7.2.1(e)(iii) does not yet prevent a form of double selling, whereby the quality of the electricity is claimed by cancelling GOs, and by the residual

mix of the country which unknowingly "imports" it by means of such "ex-domain cancellations".

- However, simply deleting this provision from the EECS Rules will only result in market parties continuing their current practice and recording "disclosure" incorrectly – which would be difficult to detect.

Consumers cancelling GOs for use outside of Europe

Some companies cancel GOs in the EU for use outside of the European Single Market – those countries obliged by EU law to use the GO system. For instance, during 2019 GOs were sold to places as far afield as Brazil, Chile, Israel, Japan, Malaysia, Peru, Russia and the United States of America.
This means that the GO accounts for Europe do not balance – that is, the amount of physical 'green electricity' produced for which GOs have been issued exceeds the available GOs. This under-availability of GOs will increase their market price; meaning that European consumers are having to pay more than they should for 'green electricity' evidenced by GOs. It also means that the residual mix is less 'green' than it should be.

Options for solving the matter

What should happen in the existing framework is for GOs to be moved from the selling country to the consumption country, and then cancelled – this is also required in the EFET PPA contract 3.3.b.
An alternative is to overcome the burden of a multinational company needing to enrol in multiple registries through the centralisation, either of the cancellation or of the registries themselves. (see also section 20 "*IT Infrastructure"*)

In addition, action must be undertaken in order to:

a. Acknowledge in the texts setting out the purpose of the GO, that GOs are to be cancelled by consumers (and not always by suppliers), and to design double-disclosure prevention measures accordingly in order to e.g. prevent the same electricity from being disclosed with GOs twice.
b. This should be done in such a way that it takes into account that the legally-required supervision of GOs by Disclosure Competent Bodies (DCBs) is related to the suppliers' disclosure of the origin of their supplied electricity, and not to consumers' disclosure of this, as that would exceed the responsibility of the DCBs in most countries.

To correct the accounting imbalance due to transfer of GOs to non-European single market countries, ex-domain cancellations to non-European countries should be prohibited unless the importing countries are formal participants in European GO markets and bound by EU legislation.

Lessons from consultation

Two respondents say that suppliers should be the only cancelling parties; from which one would recommend some exceptions for restricted groups (e. g. privileged end consumers, who are also subject to labelling according to German law). This, however, is up to national policy makers. FaStGO is charged with simply facilitating art. 19 implementation and must acknowledge that the phrasing of art. 19.1 allows cancellation of GOs by other parties than suppliers.

Some of the consultation views are covered by formal rules. However, concerns remain over supervision of a market with multi-million-unit volumes of cross border transfer, as problems arise exactly when cancelling parties do not follow the rules.

Other consultation respondents think outside the box and provide material for consideration.
Stakeholder reactions and views for addressing the concern, are:

- Allow corporate account holders to enrolment multiple domains: either improve the account opening protocols or utilise existing account holders in respective domains.
- Acknowledgment that IBs will have limited means of regulating consumers. Therefore, it might be more appropriate to require producers of electricity to ensure that all GOs related to electricity marketed directly to consumers are cancelled. This might have to be included in auditing procedures for production devices.
- Generally robust procedures, which are usually already in place under EECS:
    - For Ex domain Cancellations (EDC):
        - EDCs should be limited to the strict minimum; and
        - EDC reporting should facilitate data update at the relevant issuing body when necessary.
    - Build robust and reliable electronic registries that record each activity/transaction related to each GO and effectively cancel each GO when used for disclosure.
- GOs must be carried from the issuing country to the country where the final consumer is located. Issuing bodies should be coordinated to avoid including exported GOs as part of the residual mix.
- A further respondent notes that the added costs of in-country cancellation can directly compete with the quantity and/or quality (regarding environmental impact) of the GOs they purchase:
    - Given the evolving GO market, they ask that cancellation rules be widened to ensure that the full scope of GO consumers and suppliers are able to effectively perform cancellations across Europe, and to abandon the restriction to the role of supplier for cancellation, which is in place in some countries.
    - National policies of restricting GO cancellation to suppliers usually originate from policies that aim to avoid double-counting. As stated above, any upgrades to the cancellation system would need to mitigate and balance both concerns.
    - The respondent also suggests cancelling GOs in a fully centralised system. In their view, this would preclude the need for multinational companies to use multiple registries to account for their GO purchases and cancellations, and would allow the GO accounting infrastructure to be standardised in a way that ensures transparency concerning the location where renewable energy is claimed. However, they acknowledge that this systematic transition could be both politically and operationally complex, particularly in the short term.

  [Comment by the project team: In principle, this seems to offer a viable solution, though it would only work if every member state does the same. In some countries, the follow-up of the process of GO cancellation is coupled with some other activity (e.g. collection of statistics, reconciliation with declared physical supply, …). In addition, some countries do not support 'imports' via ex-domain cancellation. Furthermore, the cost of the existing registries must also be acknowledged. It will not be easy to migrate the existing framework of registries towards the integration of existing national processes with a central European database for cancellation. Finally, the proposed use of EDCs as a stop-gap until such time as a centralised system is put in place may sponsor a secondary market in cancelled GOs and could introduce systematic weaknesses.]

- A mandatory procedure involving the Competent Body of the country of consumption is required.

Consideration for revision of EN16325

- Acknowledge in the texts setting out the purpose of the GO, that GOs may be cancelled by consumers and intermediaries, and not always by suppliers.
- Design double-disclosure prevention measures accordingly.
- The extent to which the concern should be handled in EN16325 or in the detailed protocols and cooperation between Issuing Bodies will depend on the extent to which detail is covered in EN16325; or left up to a separate agreement between issuing bodies.

15.Prevention of financial fraud in GO markets

As with many other markets, GO markets are exposed to risks of market abuse that could threaten their integrity and transparency. Market abuse does not only include unlawful operations within the market aimed at influencing other market participants, but also other activities which use the market as a mechanism to commit financial crimes (e.g. VAT fraud, money-laundering, etc.). Effective measures need to be put in place to prevent and detect unlawful uses of these markets.

Challenge 1: VAT fraud risk

The AIB has been aware of potential VAT carousel fraud in GO markets for several years. As in CO2 markets, which experienced severe VAT fraud issues in 2008, VAT fraud in GO markets was typically attempted by traders 'in the middle of the chain'. They would attempt to use trading companies that only exist for short periods to buy GOs and quickly re-sell them. In doing so, they receive VAT on selling their GOs but do not pass on VAT payments to the tax authorities. By trading huge volumes of GOs in a short period and disappearing afterwards, such traders can make significant financial gains from this fraud.

In a basic VAT fraud scheme, company A (the '*missing trader*') imports goods from another Member State. Since these purchases are cross-border, transactions are zero-rated (VAT free). Company A sells these goods locally to company B at a price that includes VAT. Company A becomes liable for the VAT, which it should pay to its tax authority by the end of the relevant VAT period. On the other side of the deal, company B can export these goods exclusive of VAT (or use different buffers before exporting), creating a tax surplus that can be claimed from the tax authority at the end of the VAT period. However, company A fails to pay the tax to the authority and steals the VAT, creating a loss for the Member State.

A VAT carousel fraud is a sophisticated VAT fraud scheme consisting of a chain of transactions where goods are moved around between a series of companies and jurisdictions, creating a cycle that may be repeated multiple times, allowing a significant increase of the volumes of GOs being traded, which both increases the potential harm of such activities and makes them more difficult to detect (layering effect).

Other schemes may involve contra-trading operations, which consist of combining fraudulent and legitimate chains (not necessarily using the same goods) aimed at disguising the fraud and reducing the chance of detection.

The possibility of executing high volumes of transactions in short periods within multiple jurisdictions and without the requirement to deliver material goods makes certificate systems like GO markets more vulnerable to this type of fraud. This vulnerability is increased by the absence of shared standards on the admission of market participants between different issuing bodies or the harmonisation of methods for detecting potentially fraudulent activities.

Challenge 2: Money laundering risk

In addition to VAT fraud, GO registries are exposed to money-laundering risks. This means that transactions within the registry could be used to introduce money from illicit activities into the economy. This risk might be higher in the GO system where all the trading activity is carried out over-the-counter (OTC), i.e. bilaterally or through

the intermediation of brokers. The absence of a central counterparty and regulated market infrastructures reduce transparency and the possibility of detecting fraudulent schemes. Schemes such as wash trades[20], uneconomical transactions or mechanisms of third-party trading are identified by financial regulators as behaviours that could carry a risk of money-laundering.

Challenge 3: Market manipulation and insider trading

Market manipulation refers to any activity aimed at unlawfully influencing the perception of offer, demand or prices in the market. This may involve trading strategies like collusion between parties, false or misleading prices and dissemination of false information through the media.

Insider dealing refers to the fact of using inside information (i.e. information not publicly available and likely to influence prices) to execute transactions and take advantage of the information asymmetry.

Affected areas of GO system operation

GO Account holder admission,
GO transfer.

Potential options for solving the matter

For several years the AIB has been cooperating with tax authorities and law enforcement authorities at both national and international (e.g. Europol) level to fight VAT fraud. Several individual AIB members have contacts with their national tax authorities, and many AIB members have set up procedures for identifying fraudsters, benefiting from the AIB's best practice guide and standard 'know your customer' (KYC) account application form. In addition, the AIB Hub has installed 'alarm signals' based on the systematic analysis of trading activities. Following on from earlier work in developing the best practice guide and KYC form, in 2018 the AIB established its Task Force Fraud Prevention, where AIB members cooperate on VAT fraud prevention measures.
General measures include methods for GO account holder admission and monitoring of the transfers of GOs.

Coordination and standardisation are essential to effectively fight against risks of financial fraud in the GO markets. High admission standards are efficient entry barriers to deter and prevent access from potential fraudsters to the GO system. Additionally, given that financial fraud might involve complex operations not only inter-registry but also involving cross-border deals, coordinated monitoring involving different jurisdictions is essential. Finally, further cooperation with competent authorities (both locally and at European level) is crucial to prevent and detect risks of fraud.

Note: the outcome of the work and input to the consultation on this subject will be confidential and not disclosed other than to the project team and the European Commission.

[20] Transactions where there is no change of beneficial interest or market risk, or where the transfer of beneficial interest or market risk is only between parties acting in concert or collusion

16.Estimate development of GO market behaviour

Problem Statement / challenge:

The European GO market is opaque. System operators and market participants, particularly new entrants, lack information about the volumes of renewable energy on the market and the prices of attributes related to different types of renewable energy. This lack of transparency can reduce the confidence of users, observers, and operators of renewable energy markets in Europe. There is also an increased risk of fraud in markets that lack transparency.

This lack of transparency also makes it challenging to estimate the development of GO market behaviour. The translation of the Clean Energy Package into national legislation will impact the GO market to a degree that is difficult to quantify in the middle of an implementation period that runs from January 2019 to July 2021. Article 19 addresses GOs and makes many important changes that will affect the development of GO market behaviour. Not least, the article widens the use of GOs from electricity only, to all forms of renewable energy. The article also makes it mandatory for the first time for a national issuing body to issue a GO when requested by a producer – in the past this was voluntary. These important changes could alter both the volume of GOs available and their price – impacting the supply and demand dynamic in significant ways that are difficult to predict.

Affected areas of GO system operation

The lack of transparency described above directly affects the transactions of GOs. The lack of publicly available, easily understood and reliable data about the prices and volumes of GOs means that market participants face several risks, most importantly whether they will be able to buy or sell the amount of renewable energy they have or want at a price with which they are comfortable. System observers and operators also lack an understanding of how to estimate the development of GO market behaviour – i.e. how prices and volumes are expected to change in the coming months and years.

Potential directions (high level) for solving the matter

Given that the challenge is a lack of data, the clearest solution is the provision of more data. However, if this data is to increase the confidence of market participants and the understanding of market operators and observers, then it must be consistent, reliable, public, comparable and open to examination. This would require that all Member State issuing bodies release information for the same periods and frequencies (i.e. whether the data is released monthly for each month, or released quarterly for each month, or even daily for each hour). This information should be based on the same definitions of key terms such as 'issued', 'transferred', 'expired', 'withdrawn' and 'cancelled', and address whether it refers to GOs issued by this issuing body, or whether it refers to GOs held on this registry, regardless of their origination. Finally, the information released by issuing bodies must address whether such data refers to the time of the transaction (e.g. when a GO was issued, transferred or cancelled etc.), or the time when the associated energy was produced. GOs are issued after the period of production, but their period of validity relates to the production period rather than the date of issuance. So, electricity might be produced in November of year N, the associated GO issued in January of year N+1 (perhaps after correction), transferred several times during year N+1, and then cancelled late in year N+1.

A further consideration is the form in which data is provided to interested parties. While it can be provided in its raw form, then at what level of detail should this be –

while market parties will always want the maximum level of detail, this might reveal the detail of individual trades. Also, should it also be provided in graphical form (in which case precisely which graphs would be useful?); or should web-enabled software facilities be provided to enable interested parties to analyse the data as they wish?

As regards reliable and publicly available price information, this is made particularly challenging by the fact that many GO trades are bilateral, with details that are known only to the parties involved. Some price information is made public, such as that released following national auctions of GOs. However, this data could be made more granular, including the crucial aspect of the difference in prices for different volumes of GOs (buying 100MWh as compared to 10,000MWh).
Mandatory GO price reporting per transaction to the Issuing Body would enable the latter to publish aggregated average prices. This price reporting obligation is currently only available under Flemish legislation, where it results in publicly available monthly statistics[21] on price.

Lessons from the consultation:

Protection of confidential data was seen of utmost importance and any new reporting requirements should not reveal information on individual actors or trades.

Collection and reporting of price information of individual trades was seen as unfeasible by issuing bodies for lack of a legislative mandate to request and publish it. However, market parties have divergent views on whether disclosing price information is desirable. In any event, price information from public GO auctions and e.g. the general marketplace could be published.

Several market actors see room for improvement in the current transaction data reporting in order to generate a better view on the market balance of GOs. More granular information about transactions per production year is considered valuable. In general, instead of providing more information on market prices, the respondents to the consultation would prefer better functioning and more granular transaction statistics.

On the other hand, it must be taken into account that the designated issuing bodies don't always have the mandate nor the resources for providing more information that serves the GO market.
It is also acknowledged that issuing bodies need further detail in the definition of data they are asked to provide, in order to contribute to a harmonised understanding of the content of the statistics.

Conclusion

The GO market highly appreciates the availability of statistical data on GO transactions.
The standardisation of statistical reporting by issuing bodies is essential, in order to have a harmonised understanding from each data provider on the data they provide. This reporting could be based on the current practice of the AIB and be amended according to recommendations from Work Package 4.2 of this project.
The general data points needed are the GO transactions (issuance, transfer, export/import, cancellation, withdrawal and expiry), which can be split at least per

[21] https://www.vreg.be/nl/steuncertificaten-groene-stroom-wkk-en-garanties-van-oorsprong

transaction time, generation time, domain, energy source, technology or combination of those.
Reporting requirements should prevent revealing information on individual actors or trades.
While such reporting requires a central organisation processing the statistical data and will need flexibility in its data management, it is not yet proven to be desirable to incorporate standardisation of statistical reporting at this stage into EN16325.

17.Cross-border trade of heating and cooling GOs

Origin disclosure of heating and cooling

The Renewable Energy Directive (2018/2001) stipulates that only GOs shall be issued for the purpose of demonstrating to final customers the share or quantity of energy from renewable sources and that no other form of proof is acceptable. Further, it requires each MS to recognise GOs issued by other MS. This includes GOs for renewable heating and cooling.

However, while Directive 2019/944 on the internal electricity market requires suppliers:

- to disclose the origin of electricity supplied; and
- to use GOs for disclosing the renewable nature of the supplied electricity,

the corresponding requirements in the REDII[22] for renewable origin disclosure for the supply of heating and cooling do not relate to GOs.

The question then becomes: how to secure the reliability and credibility of claims made regarding the origin of a supply of heating and cooling? Since the issuance of GOs for these energy carriers is not linked to a requirement to also cancel them for disclosure, there is a risk of double-counting.

Further, it may be difficult to convince final customers that they were supplied energy with particular attributes where there is no possibility for such energy to actually physically reach them.

Cross-border trade of renewable heating and cooling

REDII art.19 requires Member States to accept heating and cooling GOs as imported from other Member States, except where they can substantiate reasons for doubting their accuracy, reliability and veracity. This means that Member States are bound to facilitate cross-border trade of heating and cooling GOs.
The above-mentioned absence of a fool-proof disclosure system may, however, make mutual recognition of heating and cooling GOs difficult across national borders.
For the same reasons, it remains to be seen whether there is interest in cross-border trade in renewable heating and cooling.
Low market interest reduces the case for investing in the infrastructure and systems for reliable cross-border trade, which then becomes another reason to question the reliability of the import.
Hence, a general question is how to carry system development costs for the international exchange of heating and cooling related energy attributes.

Case studies from domains with a legislative GO scheme for heating (and cooling)

In the Netherlands, a GO scheme for renewable heat has already been established. There, GOs for renewable heat can only be used to disclose the origin of heat supplied through a grid to which both the production device *and* the consumer are connected.

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[22] REDII article 24. Origin disclosure for heating and cooling: (only for district heating/cooling and only for share of renewable origin*): "Member States shall ensure that information on the energy performance and the share of renewable energy in their district heating and cooling systems is provided to final consumers in an easily accessible manner, such as on the suppliers' websites, on annual bills or upon request."*

Our translation of art. 25a, subparagraph b of the Dutch Regulation on guarantees of origin (https://wetten.overheid.nl/BWBR0035971/2020-01-01#Paragraaf6_Artikel25) is as follows:
"For the purpose of art. 77a of the Electricity Act 1998 (as amended) and art. 25, subparagraph 1, a GO for heat produced from renewable energy sources shall only be proof of supply to a final customer ***connected to the same grid as that into which the heat was injected.****"*
This principle could be applied for cross-border trade, meaning that such trade would be useful for heating and cooling grids that are either situated on multiple sides of the borders of Member States or at least connected across such borders. For the time being, this may limit the extent to which actual heating and cooling GO trade takes place (which may influence Member States' willingness to invest in an infrastructure that enables such trade). This may change if and when heating and cooling grids become interconnected on a larger scale throughout Europe.

In Belgium, Flemish legislation integrated GOs for heating and cooling in spring 2019, and implementation is ongoing. An English translation of the Flemish GO legislation, incorporating GOs for heating and cooling is available at: https://www.vreg.be/sites/default/files/wetgeving_inzake_gos.pdf.

Some of the conditions are:

- The heat or cold must be injected into a grid or a system that supplies more than one consumer.
- Heating and cooling GOs are only issued to production devices with a capacity of 300kW or more. This is the threshold above which an environmental licence of operating is required by law. It avoids also practical administrative problems by not incorporating all small household wood pellet stoves.
- Heating and cooling GOs can be used for claiming renewable heat consumption on another heating and cooling grid.
- On the GOs, there are additional fields, especially for heating and cooling:
    - Type of heat carrier; and
    - Temperature range of the heating and cooling.
- Disclosure legislation is foreseen at two levels:
    - Already in place: "*The supply of heating or cooling in the Flemish Region as heating or cooling generated from renewable energy sources shall be permitted where the quantity of heating or cooling supplied in this way corresponds to the corresponding number of MWh of the guarantees of origin for heating and cooling from renewable energy sources having been submitted to the central database, as referred to in Article 7.1/1.1, § 3.*"
    - In primary legislation, but not yet in force and not yet elaborated in secondary legislation:
        - All invoices and printed and electronic promotional material of a heating or cooling supplier supplying heating or cooling via a heating or cooling network shall include the following information:
            1. The percentage of each energy source in the total fuel mix supplied in the preceding calendar year by the heating or cooling supplier via heating or cooling networks in the Flemish Region;
            2. The percentage of each energy source in the heating or cooling product of the customer in question supplied in the previous year by the heating or cooling supplier via heating or cooling networks in the Flemish Region. (…)

The remaining question is: what is required for consumers to trust GOs transferred to them?

Potential solution

Disclosure of heating and cooling from RES needs to be accompanied by the cancellation of GOs.

Consumer trust enhancing

Transparency with extra data fields on the GO could enhance consumer trust, as it allows consumers to make an informed choice. For a heat consumer of 800°C heat, a GO issued for warm water at 60°C has no credible value, as the high-temperature heat has a higher energetic value than the low-temperature heat. When heat temperature intervals are mentioned on the GOs, an industrial consumer of 800°C heat will probably look for GOs issued for a corresponding credible temperature range. Information that influences public opinion on the quality of a GO, in whatever direction, is relevant to be mentioned on a GO. On electricity GOs, a lack of such transparency has given rise to mistrust among consumers and in wider public opinion. By standardising extra data fields on the GOs, relevant for public trust, cross-border trade could be facilitated.
This project cannot oversee whether cross-border trade for heating and cooling GOs will take place but can look at what is required to enable such trading.

Takeaways from consultation

The number of respondents is limited, from which we learn that either we have not addressed sufficient parties on heating and cooling, or they didn’t find the time, or that they are not (yet?) concerned about GOs. There is not (yet?) an international market for heating and cooling GOs.
Three respondents observe no demand for heating and cooling GOs, while three do see a demand. However, this might for now still be a limited demand. Cross border demand and cross-heating grid demand is only seen by two respondents.

18. Sector coupling and Energy Carrier Conversion => influence on GO market price for different energy carriers

Challenge:

In European markets, we see different orders of magnitude for the prices of GOs of different energy carriers. While electricity GOs are being traded in 2019 at between one and two euros, gas certificates often trade at prices at least ten, if not twenty times higher.
GOs enhance both the market and consumer awareness. The difference in the price of GOs of various energy carriers might at some point in time become a driver for energy carrier conversion.
A particular point of attention regarding the issuance of GOs for energy carrier conversion is the need for caution so as not to interfere with any policy intentions behind existing support systems for a specific energy carrier. If care is not taken, a given energy producer might receive windfall profits, and the policy budget for necessary additional investments could be consumed by projects not needing it.

Affected areas of operation

Conversion, issuing, transfer, total production counting

Potential directions for solving the matter

Surrounding framework, consciously designed legislation.

Lessons from the consultation

On the opportunity side, clear energy carrier conversion rules foster technical development (PtG) and thereby promote diversification and decarbonisation of the entire energy sector. The risks entailed mainly relate to the possibility of double issuance / counting of renewable energy and possible loopholes concerned with energy carrier conversions.
Some respondents advise policy makers to install conditions to avoid windfall profits and to establish clear regulations and rules for the operation of the GO market.

Takeaways for revision of EN16325

None. This section merely identifies that policy makers could consider the potential impacts of installing GOs for multiple energy carriers on market behaviour. Market knowledge has to grow with a growing market for GOs for multiple energy carriers.
For standardising technical rules, the recommendations under the topic "*Determining the attributes of energy from production devices with multiple inputs and/or multiple outputs*" should be considered.

4. Cross-border cooperation amongst Competent Bodies for Issuing GOs and for supervising Disclosure

19. Using the Residual mix

The electricity disclosure legislation in the Internal Energy Market Directive obliges electricity suppliers to disclose the origin of their supplied electricity.
For supply not covered by the cancellation of guarantees of origin, the use of the residual mix is advised by REDII art.19.8. The calculation of the residual mix, as advised in the Best Practice Recommendations of the RE-DISS projects, requires aggregating figures on power generation and GO handling across borders to an EU-wide perspective.
After the RE-DISS Projects I and II, the AIB took over the calculation of the Residual mix.

Needing every European country on board for a synchronised practice

In order to keep the disclosure mechanism reliable, in this age of high volumes of cross-border GO trade, it is important that every country involved uses the same method for calculating this residual mix.
The Annex 1.5 of the Internal Energy Market Directive 2019-944 stipulates that every Member State reassures the supervision of this disclosure obligation. There is however no legislative mechanism requiring these Disclosure Competent Bodies (DCBs) to align their approach on the calculation of the residual mix.
Given problems that have arisen through current practice, the AIB is working to establish an updated residual mix calculation method that it hopes all designated competent bodies (DCBs) will voluntarily agree to adopt.
As there is no formal platform for gathering DCBs (yet), it is challenging to establish this, as the AIB can only facilitate and advise but not require the wide adoption of any new methodology.

The revised RM calculation methodology is available here: https://www.aib-net.org/facts/european-residual-mix.

Note: a webinar was organised on 10th of March 2020, which set out the Revised methodology for calculating the residual mix.

Beyond the current legislative framework

The RE-DISS Best Practice Recommendations start from the legislative framework in place at the time of the RE-DISS project, which ended in 2015. Hence, it proposes RM figures for individual countries, while sourcing data from a European Attribute Mix (EAM). While EAM calculations are done at the pan-European level, there are still calculations for individual countries' residual mixes.
Another way forward could be to calculate the RM on an EU-wide basis. This would mean that European consumers buy the European blend rather than the national blend. However, whether this is appropriate depends on the level of participation of all involved countries, which is hard to establish without a legislative framework establishing such.

Lessons from the consultation

The methodology for residual mix calculation is in general supported. For gas, the need for a residual mix only emerges if the disclosure of energy origin becomes mandatory. Respondents, however, question whether a residual mix is relevant at all

for gas, assuming that all gas not accompanied with a GO will have a fossil origin.

20.IT Infrastructure

History of EECS Transfer mechanism

The Renewable Energy Certificate System, RECS, was the first international voluntary renewable energy certificate transfer mechanism. As a result of this initiative, the AIB and RECS International were founded in 2002.
The RECS transfer system went live soon after the first registries (the registry shared by the Nordic countries and the Dutch registry) emerged in 2001. In the beginning, the transfer of GOs was supported by a data protocol to move XML files over secured emails from one registry to another. As the number of registries grew, peer-to-peer connections became too difficult and the first interconnector hub was introduced in 2007 by the AIB. Since its introduction, the hub has been rebuilt twice; first in 2011 and again in 2016. The hub remains a software application that enables certificates to be transferred between national registries in a standardised and secure way, from an account holder in one registry to an account holder in another registry. The sale and purchase of these certificates is totally separate from their transfer and is mostly carried out by over-the counter (OTC) trades between market parties, sometimes with the assistance of brokers and other market facilitators. In its most recent iteration, more centralised elements have been added to the hub to overcome most evident problems of the strongly distributed infrastructure. Such central elements include a centralised account holder database, fraud prevention reports and collection of statistics (being developed at the time of writing this report).

IT infrastructure requirements have grown with the growth of the system

Despite many improvements and the long history of the AIB registry network, and partly because of it, the current infrastructure – consisting of a hub and separate national registries – faces challenges that need to be addressed to enable the market to develop to the next level.

The strengths of the current IT architecture are that:

- All AIB members, have been involved in the design of the systems architecture over 20 years, allowing operational experience and best practice to be built into the overall concept, and fostering a strong concept of 'ownership';
- The system is based upon a standardised certificate scheme developed to support international creation, exchange and use of GOs, and which is again the intellectual property of the members, who developed and maintain it;
- The Hub concept:
    - allows international transfers to be monitored for statistical and anti-fraud purposes and to assist in dispute resolution;
    - provides a central point for the collection and dissemination of national information;
    - ensures that data validation is enforced rigorously; and
    - offers an efficient way of reacting to the challenges imposed by change of membership, and of the amendment of individual registry software;
- Full responsibility for transfer operations lies at Member State level, where the legal responsibility also lies;
- There is a recognised, effective and secure protocol for the transfer of certificates;
- National registry systems are carefully integrated with other national systems for energy measurement, energy settlements and so on;
- The architecture supports effective integration with other national data management systems;

- The management methodology ensures that any proposals for change are considered carefully to identify and overcome potential effects on member registries and only implemented with the full support of members, and to agreed timescales.

The reasons for the current architecture were partly the result of the organic development of the system's architecture, and partly due to member countries needing to:

1) Exercise direct control over the build, support and operation of their own registries, and encourage competition in software development at a national level;
2) Keep investment in software development and operation within their own national boundaries;
3) Integrate their systems directly with:
    a. data collection services - e.g. for meter reading and settlements; and
    b. renewable energy support and energy taxation systems;
4) Set their own rules for operating an energy certificate system, in a way which offers national flexibility, coordinates with national support mechanisms and reflects national policy initiatives.

The question now is whether to stay with this architecture or to move to one which is partly or fully centralised.

The main challenges for the current IT architecture are:

1) Inflexibility and high cost of change occasioned by the need to coordinate across many national implementation models;
2) How to support the diversity of national legislations and infrastructures, while:
    - allowing reliable cross border trade of GOs,
    - integrating and/or reconciling with systems for: energy measurement, financial settlement between market parties, administration of taxation and public support, facilitating national and international markets etc.
    - doing so according to national and international timelines;
    - permitting member states to build in their own interpretations on international and national legislation and supplement functionality; while
    - at the same time protecting the confidentiality of national data; and
    - doing so in a way which stimulates competition between software developers;
3) Ensuring that providers of registry software development and operational services provide high quality of service and apply appropriate political, operational and financial controls to ensure that the service provided does not favour any specific market sector or national interests, ensures best practice and operational security, and best value for money;
4) Harmonisation, due to national subsidiarity and misunderstandings;
5) Opacity of GO trade in the market and for system operators, due to difficulty in obtaining meaningful information about market activity;
6) Complex technical dispute resolution;
7) Adequacy of market supervision, including fraud detection;
8) Barriers of entry due to needs for the specification of system requirements and tendering regulations;
9) Inhibition of free movement of GOs, due to the need for multinationals to register on each registry;
10) Speed and integrity of transactions and data duplication due to moving GOs from registry to Hub to registry;
11) Maturation of the market requiring increasing technical support;
12) The cost of developing and operating the European hub/registry network over a normal lifecycle suggests costs which must be balanced carefully against the

costs of a central registry, with all of the requirements for customisation to 28 member states plus EEA and contracting parties to the Energy Community, and against those of a mature commodity market;

13) Identification of chain of custody of GOs in support of market supervision (including anti-fraud measures); energy carrier conversion; monitoring and controlling interplay between GOs (REDII art. 19) and sustainability certificates (REDII art. 25-31), and between GOs and EU-ETS; and improved market intelligence.

The timeframe for implementing any revision in the architecture should take these challenges into account.

The consultation responses on this subject, will be taken into consideration in FaStGO Task 3.

Takeaways from the consultation

Preferred registry configuration

The majority of respondents prefer a national registry, all but one of them supporting inter-connection via a Hub, and three favouring a central transaction log and reporting; although two of them were prepared to reconsider if it was cost-justified.

Only two respondents (both active in the gas sector) favoured a centralised registry, but even these acknowledged that such a registry would need to take into account national policies.

The general sentiment was that moving towards a single European registry would be politically difficult, as it was felt that REDII placed responsibility for operating a registry on individual member states. Further, this would introduce risks in the form of high cost of maintenance and onward development, complex governance in order to meet the needs of the different states and markets. Costs may be lower than a network of national registries, but they could be difficult to allocate. Further, this architecture raised concerns about a higher risk of cyber-attacks and frauds due to focusing all GO market activity on a single point.

Conversely, there was fairly broad support for holding GOs in national registries, which are closer to national stakeholders. Respondents felt that they ensure a greater degree of comfort concerning transparency, integrity, compliance and integration with national systems and legislation. Once they have sufficient size, these registries should foresee in automated processes for issuing GOs based on verified measurement data, and for supporting their transfer and cancellation etc. They should be linked to other European registries in order to reassure that the veracity of guarantees of origin is at all times controlled under the supervision of a competent issuing body. However, it was acknowledged that there was room for improvement in the current functioning of national registries.

Each Member State has its own legislative basis setting out the requirements for national registries, which need to support a register of energy production plants, GO accounts and subaccounts, disclosure supervision, administration, cost allocation, national languages and interface to systems administering matters such as energy measurement and settlements, national financial support policies and so on.
In order to facilitate efficiency in the handling of international transfer of GOs and the related checks on data security, quality and reliability, efforts can be centralised. In order to facilitate multilateral connections efficiently for so many connected registries,

the linkage to other registries should be connected by a Hub, which would be used to collect information about all transfer activity in order to detect and prevent fraud and to improve security.

Consolidated or separate registries or hubs for each energy carrier (e.g. electricity, gas …)

Where 4 respondents (representing market parties and a gas certificate issuing body) felt that separate registries or hubs for the different energy carriers were favourable, they mention this was out of their concern to acknowledge the following aspects:

- the different production processes and separate energy grids and markets;
- avoidance of cross-subsidy;
- possible difficulties in gaining sign-on to such a system by national governments;
- the different stakeholders for each energy carrier (i.e. distributors for electricity and gas, network operator for district heating, …); and
- impact of developing and amending systems to address more than one energy carrier on other energy carriers.

They stressed that inter-operability processes should be developed to support conversion of one energy carrier to another, and that costs need to be evaluated as voluntary registrants in various member states would in effect fund the system as a whole.

However, one of them felt that common registries for the different energy carriers could be implemented with separated facilities for each energy carrier, to minimize costs and boost efficiency.
Two respondents do not favour managing the different energy carriers in separate registries or hubs per energy carrier.
Handling of energy carrier conversion processes were not in the focus of the respondents. Given that energy carrier conversion with GO cancellation is not yet taking place, experiences yet have to develop on this field.
While there are issuing bodies in Europe who operate a registry for GOs for multiple energy carriers, these were not taking part in the consultation, and their views are not represented.

It becomes clear that member states will individually decide whether or not to handle GOs for different energy carriers in the same registry. In general, centralization requires higher level evaluation and successful harmonization between all Member States.

Suggestions raised by some respondents to overcome the above challenges

Despite being "extremely pleased by the operability and reliability" of all registrars they were using, and never having had any worries or problems, one software developer questioned the security of national registrars when faced with increasing volumes traded and numbers of market participants, and the associated potential losses due to failure.

Furthermore, a respondent from the gas sector felt that developing European verification standards for auditing production devices would be beneficial for producers with plants in several Member States, as they would have a single standard with which to comply, rather than those of each Member State.

Finally, there have been some comments by proponents of blockchain technology. While certain aspects of this are attractive (the use of smart contracts, chain-of-custody, low-cost/low-hassle involvement of small producers, automated expiry, …),

to date the challenges which GO system administrators have faced relate more to issuance and usage of GOs than to their transfer.

Such fundamental change is unlikely to be supported in this round of change, as the current Directive simply does not provide the platform for it. Also, several of the proposals supported by a blockchain approach, while attractive, may not be sustainable under EU financial services and other legislation; and would need fundamental change to the energy sector in Member States.

21. Compliance and alignment of designated competent bodies for issuance of GOs

The credibility of a GO system in a country also implies credibility of the GOs imported into that country. A country can scrutinise a foreign GO system from which it allows imports. However, when there are many countries from which imports are allowed such scrutiny becomes a significant burden. This burden is even greater if scrutiny has to be repeated whenever a country updates its systems. Given that every country will have to undertake its own scrutiny, this multiplies the administrative cost for ensuring reliability across all European countries and calls for burden-sharing of such scrutiny activities. On the other hand, countries may have differences in interpretation and different implicit or explicit criteria on reliability.
A Member State has to reassure its consumers regarding the quality of the imported GOs.

Lessons from practice

DG ENER

The Commission (DG ENER unit C1) conducts two levels of study of member state transposition of directives. Each transposition study can lead to infringement proceedings if substantial errors are found in national law and practice:

1) At implementation, the transposition of the Directive into national law is checked to ensure that the provisions of relevant Directive(s) have been properly supported; and
2) After implementation, operational monitoring takes place of whether the transposition into practice of national law(s) relating to the relevant Directive(s) has been properly achieved; and that these law(s) are effective and embody the spirit of the Directive(s). Such operational monitoring is performed ad hoc, in response to issues requiring resolution that have been identified in member state progress reports; or by complaints raised by other member states or market parties.

Transposition studies of Member States' implementations of Directives are conducted by the Commission and are confidential to the Commission and the Member State in question, although some of the findings may be made public. For this reason, while not all of the output of such studies may be shared with any auditor of Member States' GO operations, such as that currently provided by the AIB's auditors, the reports of audits such as those conducted by the AIB may be used to trigger further investigations by the Commission.

Consequently, EN16325 might be expanded to set out the requirements of a future auditor, which could be an organisation such as the AIB. Note that such an organisation would need to be adopted as the result of joint action by Member States.

The transposition study for REDII is likely to commence after mid-2021, when Member States are legally obliged to transpose it into law.

The AIB

Within the AIB, a 'member audit' system has been implemented to ensure that quality is maintained in practice, and this audit is repeated every 3-years. This results in an observation report. Such report facilitates two judgements:
- Compliance with the EECS Rules, the standard to which all AIB members have committed; and

- Individual considerations per country (or region) concerning specific topics, based on the information in the neutral observations.

An AIB audit is performed by a two-person team, consisting of an AIB member and a professional reviewer. The AIB has established a Professional Reviewer Group (PRG), providing a pool of the professional reviewers who take the lead on every audit. In the PRG, the reviewers practice peer-to-peer learning and share knowledge and experience in order to ensure a common approach to, and quality of, audits. The PRG has created systemised processes for conducting member audits, including an audit checklist and a list of good practices. A member audit is always set up in a constructive atmosphere, as a mutual learning experience for both reviewee and reviewer.

Lessons from this experience are positive. Even with an extensive set of agreements amongst AIB members, almost every member audit brings forward some issues that can be improved. In our experience, issuing bodies find this useful as it enables them to improve the quality of their operations. From the AIB's perspective, many lessons are learned about on-site practices from member audits. Often, member audit discussions result in further refinement of the EECS Rules and practices in the respective country.

This also shows the value of having a practical set of regulations for support and enforcement in addition to EN16325: an agreement between issuing bodies which is flexibly adaptable to changed circumstances ensures that both the formal standard and the means of its application are enforced, identifying any issues for resolution and improvement, and so promotes the efficient operation of the GO system across Europe.

1. Many issues can be captured in such member audits, although it is not possible to capture all such issues as the audit of an issuing body is designed to be non-disruptive. Given the volumes concerned, inspection is by sampling, so not all instances of operational activity can be reviewed. Inevitably, this means that some areas of non-compliance may not be detected.
2. When a breach in the agreement between issuing bodies is noted, it is not always easy for a membership-based association like the AIB to take action. Member States have the authority (and responsibility) to set up their own GO schemes, but not to make decisions on those of others - even when they are heavily impacted by them and believe that they could cause reputational damage to the GO system.

CertifHy

CertifHy has solved the compliance issue in another way: a central system was designed, with the CertifHy scheme being centrally managed under a single operator, applicable over many countries. This way, the need for a compliance check by other issuing bodies is redundant, although it does strengthen the need for a rigorous audit of the system operator. Where CertifHy connects to other schemes, this question re-appears.

ERGaR

All registries must follow the rules and regulations of the scheme, the set quality requirements and provide for harmonisation of operations.

The registries are only admitted to the scheme if they pass an initial audit, as carried out by independent auditors following the instructions of ERGaR and the related audit checklists. During operation, yearly production device audits are performed by independent auditors. The complex system of internal and external audits, inspections, risk assessment and sanctions secure the quality of certificates forwarded by every registry.
There is no ongoing cross-registry control system (yet).

Takeaways from consultation

While it is valued by AIB members, it is clear that the quality assurance system of the AIB, with centrally organised auditing of the participating GO schemes, and the rectifications it has achieved to mitigate identified issues of concern for other Domains, is not well known by all stakeholders.

22.Synchronising discussion fora for gas GO issuing bodies

Synchronising gas GO issuing bodies fora:

There has been, for many years, a common forum within the AIB for discussion of the certification and cross-border trade of certificates and GOs in the electricity sector. This forum currently gathers together 27 officially designated competent bodies for electricity from 24 EU Member States, plus some applicants and observer countries. The annual Open Markets Committee, which AIB and RECS International co-organise, also provides a forum for market parties and issuing bodies to share concerns and seek positive developments.

However, the discussion fora to facilitate discussion of origin certification and cross-border trade of gases are not synchronised. Certification bodies for gases use different methods and standards in their systems, and not all of these result in the issuing of guarantees of origin. Some officially designated bodies follow the EECS standard, which consists of a generic energy certificate system with schemes that provide for energy carrier-specific data, while others have carried forward a separate scheme within ERGaR. ERGaR includes both issuing bodies and market participants in its membership, along with other stakeholders.
The hydrogen sector has developed its fundamentals for a GO system under the CertifHy projects, funded by the Fuel Cell and Hydrogen Joint Undertaking, that Hinicio coordinates.

By legislating for the certification of all renewable energy, REDII has for the first time triggered a real need for alignment between these different bodies, and for provisions that support efficient cross-border trade of all renewable energy certificates.

Facilitating a joint framework for issuing bodies of GOs of different energy carriers:

As the energy transition gathers pace, there is more and more interaction between different energy sectors. Energy will be transferred from one energy carrier to another - gas will be used to fuel electricity production, electricity will be used to produce hydrogen and so on. The REDII reflects this reality by providing for the design of a European GO system with a common basis for all GOs. When the GOs for different energy carriers are developed in the same design structure and format, energy carrier conversion can be accompanied by the conversion of GOs. GOs for a newly generated energy carrier will use the data on the GOs that are cancelled to prove the origin of the converted energy carrier (see sections 7 and 25 on conversion rules and conversion admin).

Takeaways from consultation

All respondents endorse this text (ten in full, two partly).

Respondents encourage closer cooperation between the respective competent bodies. They note the following measures will help synchronise the existing discussion fora for gas issuing bodies:

- The evolution of the GO electricity system can be used as a blueprint for the development of biogas GOs
- Effective communication between gas issuing bodies;
- Coordination of joint efforts to reach consensus regarding discussion for the coordination and development of a common design structure and format for the easy transfer and conversion of GO every time an energy conversion process takes place.

23. Complementing a solid GO standard with a flexible agreement between Issuing Bodies

A reliable GO system requires detailed rules to be agreed amongst Issuing Bodies. However, going down to a deep level of detail in a formal standard like EN16325 risks being too inflexible in changing circumstances, where speed of reaction may be essential – for instance, where system or data security is paramount.
Ideally, EN16325 will contain a basic package of solid rules, to be complemented with a separate agreement between issuing bodies for organising the detailed implementation of reliable cross-border GO transfer.

24.Challenges facing issuing bodies in making collective decisions

The experience of AIB and ERGaR shows that organisations performing the same functions in their home countries can cooperate effectively.
Also, high value is placed on collaboration between issuing bodies, their harmonised GO handling practices, and the constant updating of the jointly agreed ruleset - flexibly responding to changing circumstances.
The AIB now facilitates a market that transfers more than 600 million GOs across national borders in Europe, through an association of TSOs, market operators, energy agencies, environmental agencies, regulators, public companies and others, all of which have a similar mandate.
It must be acknowledged that Issuing Bodies are all dependent on their legal status (government agency, TSO, DSO, company, association, etc.). Even if issuing bodies in different countries are assigned the same task, the way such a task is addressed may differ depending on the type of organisation that is mandated to execute it.
In small, less mature organisations, this often enriches the value of the jointly created content. Growing large as an association has many advantages of scale. However, when the highest decision-making body is an organism of more than 27 members, this sometimes challenges the ability of the AIB to be suitably agile. Consisting of many decision-making parties, in addition to the fact that each such party is subject to a different framework of rules, it can be time-consuming to agree ways forward for specific issues. Further, some issuing bodies have time constraints imposed upon them for consultations and approval by ministries etc., which impact the speed at which the association can move, as well as limiting its flexibility. This calls for continuous organisational and process realignment to react to changing conditions.
Facilitating autonomous decision making on energy carrier specific aspects for the Electricity and Gas Scheme Groups respectively, is the latest development in the AIB to enable action on specific concerns.

25. Sector coupling & Energy Carrier Conversion => supervision of the issuing process and data management between different organisations

Challenge: install practical procedures for energy carrier conversion

Applying the conversion rules from section 7: 'Energy Carrier conversion: Rules for GO issuing related to energy carrier conversion in practice', inhibits some new procedures to be implemented in the GO system. This is particularly the case where roles for different energy carriers are allocated to different organisations, and further analysis is needed to provide insight as to how this might be organised.

GO issuing after conversion, in line with the proposals in section 7: 'Energy Carrier conversion: Rules for GO issuing related to energy carrier conversion', requires procedures for thoroughly checking whether the correct amount of input energy carrier GOs have been cancelled, and for passing on data from the cancelled GOs to be noted on the newly issued GOs.
One challenge is the need to overcome the perceived administrative complexity of data handling and checking the monthly amount of GOs cancelled for each input energy carrier(s).

Affected areas of operation

Issuing, cancellation, synchronising operations of registry operators / issuing bodies for various energy carriers.

Potential directions for solving the matter

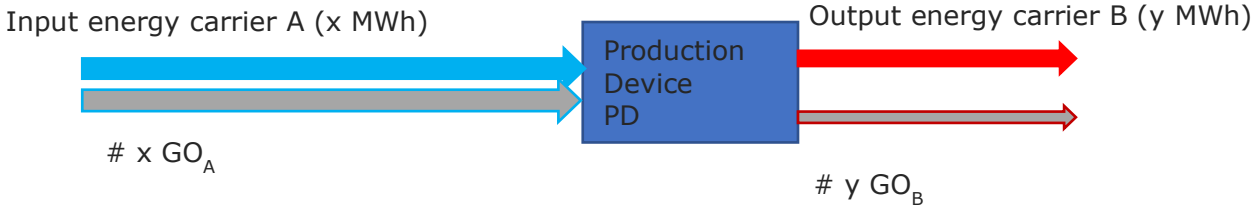
Starting from the proposed rules for the administration of energy carrier conversion in section 7 'Energy Carrier conversion: Rules for GO issuing related to energy carrier conversion', the following steps of the GO issuing process are affected when the origin of energy conversion is to be proven using cancelled GOs:

1) The process of GO application: the producer (owner of the conversion device) applies for GOs to an issuing body;
2) The data input in the registry of the issuing body (or its agent) in charge of GOs for the resulting energy carrier;
3) The conditions for issuing GOs in the case of conversion (of which the origin is proven with cancelled GOs);
4) The data content on the GOs to be issued in the case of conversion (of which the origin is proven with cancelled GOs); and
5) The amount of GOs to be issued containing a specific set of data.

The following text sets out how these steps could be managed.

Process steps for GO issuing in the case of conversion of which the origin is proven with cancelled GOs:

1) Applying for GOs:
    a. Issuing body /Production registrar handles the application for GOs for fossil production device PD like a normal GO application. Including Inspection of meters, energy flow diagram, ...
    b. Additional in the application: producer's commitment to submit monthly GOs: e.g. by a statement to be signed (issuing body could foresee a template for this).
2) Data Input in the registry of the energy carrier B Issuing Body (or its agent):



a. The following measurement data is registered in the registry of the issuing body (or its agent):
    i. Measured input: x MWh
    ii. Measured net output y MWh (= that gives entitlement to GOs from energy carrier B on condition #x GOs for energy carrier A are cancelled).
b. In order to enable GO issuing, some checks must take place:
    i. Have sufficient (x) GOs been cancelled for input energy carrier A?
    This check seems easy, but in case of large numbers of conversion devices, the issuing body may meet managerial constraints:
        1. Does it have access to the registry where the x GOs of energy carrier A are cancelled?
        2. Can it see that these x GOs have been effectively cancelled?
        3. Is it confirmed to the IB that these x GOs of energy carrier A are cancelled for the purpose of the energy conversion in this specific production device PD and for this specific period of production of energy carrier B?
    ii. Do the cancelled GOs meet the requirements?
        1. Check Parameters of alpha: Energy carrier == A
        2. Production period still valid
        3. Energy source criteria,
        4. ….

    iii. In case the GOs of both energy carriers A and B are managed in the same registry, these checks can be easily automated in the software of the registry using the Software rule: "Above measured input can lead to issuing of b GOs for energy carrier B, **if** the producer submits x GOs of type A and characteristics alfa, then y GOs may be awarded for energy carrier B with characteristics beta."

    iv. In some countries, for historical reasons, it is not self-evident to organise the issuing of GOs in a single registry per country. In that case, procedures need to be set up for communication between the different registries that hold the GOs for energy carriers A and B respectively. Depending on the allocation of roles to organisations within a country, the organisation of this communication might be different, hence this document does not elaborate in detail on the options on this subject. It should be discussed at a national level whether it is up to the producer to prove the above checks can be confirmed, or up to the different issuing bodies involved for A and B to design a framework. In any case, the system must be designed in such a way that no

double counting can occur, and the issuing body for energy carrier B needs to be sure that this is the case.

3) Conditions for actual issuing of GOs of energy carrier B:
   a. Condition to be confirmed: Production registrar of energy carrier B has approved an application from production plant PD;
   b. How many GOs of energy carrier B to be issued? => Link to measured production y of energy carrier B based on a registered production installation fed with energy carrier A.
4) What data to mention on the GO of energy carrier B:
   See Conversion rules under section 7: *"Energy Carrier conversion: Rules for GO issuing related to energy carrier conversion"*.

5) GOs of energy carrier A from different installations/production periods => how many GOs of energy carrier B with each attribute data set?

   => Pro rata allocation and completion
   x1 / x = y1 / y GOs with the characteristics of the submitted x1 GOs
   x2 / x = y2 / y GOs with the characteristics of the submitted x2 GOs
   xn / x = yn / y GOs with the characteristics of the submitted xN GOs

   With
   x = measured input, y = measured net output that is entitled to GOs, and
   x = (x1 + x2 + ... + xn)
   y = (y1 + y2 + ... + yn)

   The pro rata allocation is both applicable for the cases where x>=y and for where x <y.

Takeaways from stakeholder consultation

The topic was not broadly commented on during the stakeholder consultation (only 3 experts responded). It could be understood that for most stakeholders this concept may be too new to comment for now.

One stakeholder adds to the challenge above by mentioning the following challenges, for countries where roles are distributed over different organisations:
- Effective communication between governmental agencies and/or issuing bodies responsible for different types of GO, depending on the energy carrier; and
- Effective data transfer for issuing and cancelling of GOs from different energy carriers.

Recommendations for the revision of EN16325

The allocation of roles is to be decided in national policy, not in the standard.

There is however a benefit in standardising the issuing and cancellation procedures related to energy carrier conversion, in order to maintain credibility for exported GOs that result from energy carrier conversion. The section here above considers how this can be done.

5. Other

26. Impact of GOs for low-cost RES procurement on non-supported RES technologies

From the stakeholder consultation the following additional challenge was named:

- The coexistence of different GOs for different technologies should be examined in light of the mutual impacts between them. The existence of GOs facilitating low-cost renewable energy procurement strategies (e.g. using GOs from legacy investments or massively subsidised installations) has an impact on the procurement strategies based on non-supported or developing technologies.

This is a topic that touches several areas that are elaborated in this document. As this is about the policy development behind GOs and less about the management of the GO system, it goes beyond the scope of this project.