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 4
The development of systems for EU based market supervision statistics

Task 4.1
Statistics Design Specifications

FaStGO
Facilitating Standards for Guarantees of Origin

Authors:

Markus Klimscheffskij
Adam White
Katrien Verwimp
Phil Moody
Annie Desaulniers
Marika Timlin-de Vicente
Milenko Matosic
Martin Standera
Liesbeth Switten

Table of contents

Table of figures

1. Framework

1.1. The FaStGO project

The FaStGO project has the objective of providing 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 basis of Dir (EU) 2018/2001."

1.2. What and why

Taking into account the legislative frameworks, the operational experiences of the current system, and the additional requirements based on a revised EN16325, FaStGO Task 4 addresses the development of systems for market supervision statistics for GOs in the European single market.

Task 4.1 identifies potential enhancements to the development and specification of statistics that could be published at EU and Member state level to support and enhance the functioning of the GO market.

1.3. Methodology

In the first phase of the work, the current AIB statistics were carefully analysed (chapter 3) and discussed with the AIB Information Systems Unit (ISU).

Based on this first phase, the project team compiled an online survey for market participants and competent bodies to gather views on market needs for improved statistics. Through this survey, the project team sought to improve their understanding of how stakeholders of GO markets and systems could be better, or more optimally, informed. A summary of the survey results is presented in chapter 4, with the full results set out in Appendix 1: Analysis of Survey responses.

The FaStGO project team drew on the survey results to make specific recommendations on potential enhancements to GO statistical data (chapter 5). These recommendations were then shared with issuing bodies with experience and expertise in the publication of statistics, who were specifically asked to comment on their feasibility.

Finally, the results of the work were presented in a stakeholder workshop on 29th October 2020 in order to gather final feedback so that conclusions and recommendations could be developed, and the work finalised.

1.4. Glossary

AIB	Association of Issuing Bodies
EECS	European Energy Certificate System
GO	A guarantee of origin in the meaning of article 19 of REDII
REDII	The Renewable Energy Directive 2018/2001/EU
RES	Renewable energy sources

2. Executive summary

Market participants and other stakeholders are known to greatly appreciate the AIB's publications of consistent, standardised, and synchronised statistics on GO transactions, as is confirmed by the survey in appendix 1 to this document. Nevertheless, the FaStGO project team, together with key stakeholders, have identified seven major improvement opportunities for statistical reporting. The project team believes that providing more data in an easy-to-use format and at a relevant level of granularity could significantly improve the transparency of the GO market.

The stakeholder survey assisted the project team in defining areas for improvement of the usability and content of GO statistics. Thirty-three stakeholders responded to the survey. Overall, they endorsed the current statistics provided by the AIB and provided constructive feedback for how they could be improved. Based on this feedback and the internal work by the project team, the FaStGO experts divided opportunities for improvement into the following seven major categories:

1. Improving the usability of the current statistics;
2. Introducing new data elements and categorisation structures with regards to EECS GO statistics;
3. Facilitating new tools for retrieving statistical data;
4. Mapping the market outside of EECS;
5. Including price information in the statistics;
6. Facilitating market statistics of GOs for non-electrical energy carriers; and
7. Miscellaneous opportunities for improvement.

Opportunity 1: Improving the usability of the current statistics

Survey respondents called for the use of pivot-format statistical reporting to enable dynamic processing of the data and graphs by the user. Another often-repeated request was for monthly rather than quarterly updates of statistical information by the AIB, as recently implemented. Other ideas for improving the usability of the current statistics include the provision of convenient informative graphs and data analytics of historical trends in the published spreadsheets. These requests for improvement can be satisfied in the short-term.

Opportunity 2: Introducing new data elements and categorisation structures with regards to EECS GO statistics

Respondents supported proposals for adding new data elements to the AIB statistics, such as:

- volumes per counterparty domain;
- whether and what type of support a generation device receives;
- more data based on production time
- the type of generation; and
- plant characteristics.

Fulfilling these stakeholder requests would require the central collection of new data from the issuing bodies, compared to what is already available in their national registries. Other means of adding to the data available to stakeholders include reporting of transaction information (number of transactions instead of certificate volumes); as well as domain-specific general information on the number of Account Holders and Production Devices.

The requested domain-specific general information is already published in the AIB Annual Report, but the same information could be included in the statistics spreadsheet (with information updated in the same cycle as the annual report). These

improvements could be addressed in the medium-term, apart from the last, which can be addressed in the short-term.

Opportunity 3: Facilitating new tools for retrieving statistical data

Access to raw data on EECS GO market statistics could be facilitated by using new tools such as an Application Programming Interface (API). This would enable much more data to be reported than is currently the case. Using an API could also reduce the work associated with data processing, by the person using the data. The FaStGO project team considers that an API for EECS GO market statistics could be implemented in the longer term.

Opportunity 4: Mapping the market outside of EECS

While GO market data from AIB Member countries are reported consistently and reliably, this is not necessarily the case for non-AIB member countries, which include important GO markets such as the UK and Poland. This lack of GO market data from some internal market countries means that stakeholders cannot easily develop a full understanding of the European renewable energy market as a whole. The relevant authorities, including the European Commission, ENTSO-E, ENTSO-G, and national authorities will need to work together to ensure that the GO statistics of all internal market countries are reported consistently and clearly. Furthermore, centralised energy production statistics at a European-level is lacking. Such centralised data would be of benefit in determining the full market potential of GOs, the market penetration level as well as the residual mix calculation.

Opportunity 5: Including price information in the statistics

The possibility of providing price information in GO market statistics has long been discussed among stakeholders. These discussions have, at times, been contentious due to the different vested interests of new market entrants, existing market participants, commercial market facilitators, and public authorities or agencies. The survey responses set out below point to the wide range of opinions on this matter. Therefore, the FaStGO project team is unable to make a firm proposal on the inclusion of price information in GO market statistics. It does, however, encourage all stakeholders to work together to see if common ground can be found on this matter, given the potential benefits of greater market transparency.

Opportunity 6: Facilitating market statistics of GOs for non-electrical energy carriers

International markets for non-electrical energy carrier GOs are still evolving. It is, therefore, important to clearly separate the statistics per energy carrier and to distinguish cancellations made for the purpose of energy carrier conversion. In the future, it would also be beneficial to ensure that the same basis currently used for collecting electricity GO statistics is also applied to GOs for all other energy carriers. If required, additional data elements, such as information on feedstock (for gas), geographical origin (for gas), and temperature levels (for heating and cooling), should also be collected and published. The full range of GO system / market participants would need to engage with this recommendation for it to be successfully implemented.

3. Background on GO market statistics

3.1. How statistics provide GO market transparency

In all markets and systems, stakeholders benefit from high-quality and reliable information. This is the case for GOs, where both system operators and market participants appreciate high-quality GO statistics that provide a clear overview of how the market is developing. In particular, to operate as efficiently as possible, market actors require a clear understanding of the balance between the supply of, and demand for, GOs.

Competent Authorities and Issuing Bodies use GO statistics for reporting purposes as well as for market surveillance and detection of possible anomalies, including possible fraud. Based on the consultation in Task 1.3[1], market participants and other stakeholders highly appreciate the AIB's publications of consistent, standardised, and synchronised statistics.

Nevertheless, system operators and market participants, particularly new entrants, seek additional information about the volumes of GOs available on the market at any given time, both in total and by subcategory, along with indications of the prices of attributes relating to different types of renewable energy. This missing data might reduce not only the understanding, but also the confidence of users, observers, and operators of renewable energy markets in Europe. This 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.

The provision of more data, in an easy-to-use format and at a relevant level of granularity, could significantly improve the efficiency of the GO market. This would rely strongly on the ability of all issuing bodies to provide transaction statistics with agreed, harmonised, and consistent data content at common time intervals.

3.2. GO market statistics available today in EECS

Today, under the provisions of the EECS Rules, all AIB Members are obliged to provide online statistics of EECS GO transactions[2]. This can be done through a dynamic online report or a static report in pdf published on the issuing body's website. This data is publicly available and is aggregated so that details of individual trades by EECS GO Market Participants are not disclosed.

Apart from national publication of the statistics, AIB Members are obliged to report statistical data to the AIB (through an automated facility on the AIB Hub). The following data fields are collected per month, per energy source (EECS Fact Sheet 05) and per technology (EECS Fact Sheet 05):

- **PRODUCTION PERIOD BASED STATISTICS (Production date):**

  These statistics relate to when the energy associated with the EECS GO was produced. The reporting Domain is required to identify, for every reported month, the GOs having a "Production Period To" date belonging to the specific month, and to report the transactions done to those certificates within the

[1] *https://www.aib-net.org/news-events/aib-projects-and-consultations/fastgo/project-deliverables*

[2] *Number of certificates issued, internally transferred, exported, imported, cancelled, and expired both in relation to the time of the transaction as well as the time of energy production. Also, the volume of certificates imported through bilateral connections (with non-EECS countries).*

Domain (regardless of the time when the transaction was done). These statistics indicate how many active certificates (active certificates = Issue – Cancel – Expiry – possible Withdrawals) there are in the market for that specific period. A year after the relevant month, the volume should be close to zero across the AIB since GOs have a lifetime of 12 months (this will not be the case in a single Domain, due to imports and exports):

1. **Issue**: The quantity of GOs issued by the reporting Domain (for energy production within the reporting Domain only);
2. **Cancel**: The quantity of GOs cancelled by the reporting Domain, including those cancelled for use in other Domains (regardless of where the GOs were issued); and
3. **Expire**: The quantity of GOs expired by the reporting Domain (regardless of where the GOs were issued).

- **TRANSACTION DATE BASED STATISTICS**: Relates to when the EECS GO was issued, transferred, cancelled, expired, or withdrawn (action based). The reporting Domain should identify, for each reported calendar month, the quantity of GOs issued, transferred, imported, expired, withdrawn, or cancelled:

  1. **Issue**: The quantity of GOs that has been issued by the reporting Domain in the specific calendar month;
  2. **Transfer**: The quantity of GOs transferred between Account Holders in the reporting Domain in the specific calendar month;
  3. **Export**: The quantity of GOs transferred from reporting Domain to accounts in another Domain in the specific calendar month;
  4. **Import**: The quantity of GOs transferred from accounts in another Domain to the reporting Domain in the specific calendar month;
  5. **Expire**: The quantity of GOs expired in the reporting Domain in the specific calendar month;
  6. **Withdraw**: The quantity of GOs withdrawn in the reporting Domain in the specific calendar month. Reporting of this item is optional, but should be considered when reporting other values (e.g. if there is a withdrawal due to wrongly issued certificates, then quantity reported on issued GOs should be reduced); and
  7. **Cancel**: The quantity of GOs cancelled per consumption year and per consumption domain.

Based on the above statistics, the AIB compiles an overview of EECS GO transactions per domain, energy source (using groups of energy sources, rather than the individual energy sources listed in EECS Fact Sheet 05, in order to keep reporting understandable and manageable). This report is published every month as a spreadsheet containing the following transactions:

- Issuing, Cancellation and Expiry of GOs by date of **production** of the related energy;
- Issuing, National Transfer, Import, Export, Cancellation and Expiry of GOs by date of the **transaction**.

The AIB also provides several (static) graphical presentations of common data for all countries, and by individual country. These statistics allow users to gain a general overview of EECS GO systems and markets in Europe. They show, for example, that every year the amount of issued, transferred, and cancelled GOs is steadily increasing. Furthermore, through the provision of detailed information on a per-country basis, users are able to see the main dynamics between countries in terms of import and export. Figures 1 to 4 below show the graphs that are provided using this data.

Figure 1 Sample of aggregated activity statistics by AIB (main page)[3]

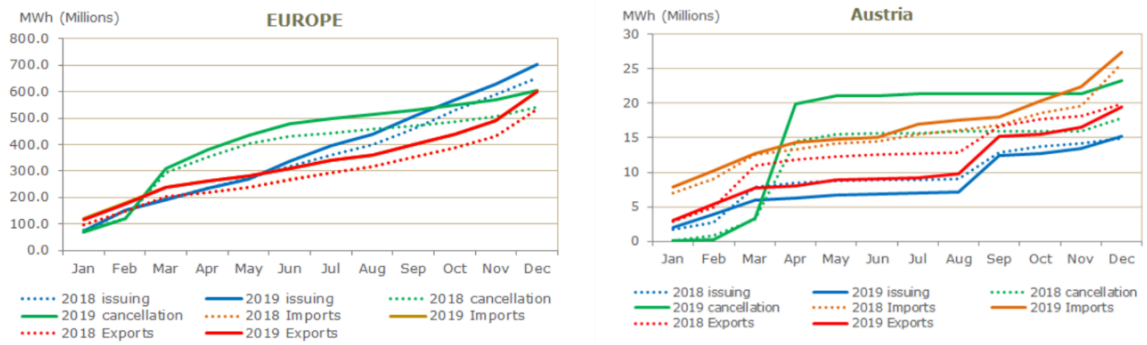


Figure 2 Sample of monthly accumulated transaction volumes per country by AIB

[3] *https://www.aib-net.org/facts/market-information/statistics/activity-statistics-all-aib-members*

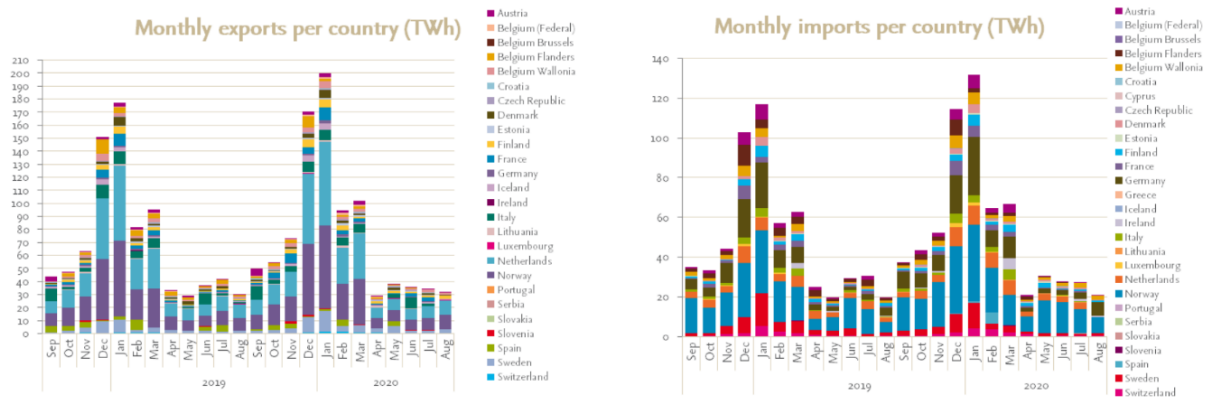


Figure 3 Sample of Monthly export and import volumes per country, published by AIB

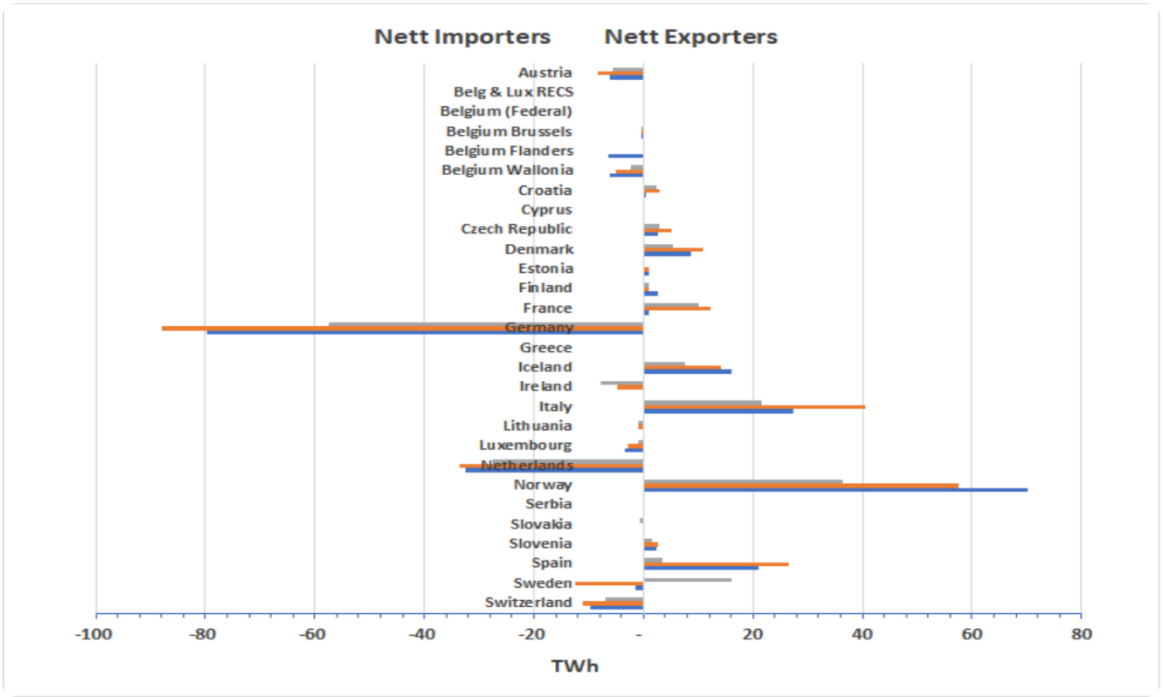


Figure 4 Sample of export/import balance per country, as published by AIB (different colours indicate different years)

Furthermore, the AIB publishes information on ex-domain cancellations (EDC) by origin and destination (consumption) domain/country. Ex-domain cancellations are those cancellations made in one domain for the disclosure of the energy origin of consumption in another domain or country. Within the AIB, ex-domain cancellations are only permitted if transfer to the country of consumption is impossible for technical reasons, and on condition that there is a written agreement between the relevant competent bodies in which both agree to such cancellations taking place. Where there is an exception to this rule, the reasons for doing so are clearly stated.

3.3. GO market statistics outside EECS

3.3.1. Public sources of GO market statistics other than the AIB – Geographical coverage: non-EECS domains

The data collected and provided by the AIB and its member Issuing Bodies is arguably the most accessible, user-friendly, and consistent GO data gathered and published within the European single market. Non-AIB members also individually collect data on the GO systems and markets within their jurisdictions. Between 2014 and 2019, RECS International published an annual report on the Development of the Guarantees of Origin market, with the last edition covering the years 2009-2018[4]. This report used the following data sources to compile its findings:

- Renewable electricity production volumes by technology from ENTSO-E and national sources;
- Issuing and cancellation volumes of national GOs (from country reports) and of EECS-GOs from AIB's statistics; and
- Data from reports on electricity production that, under some national rules, is not–eligible for certification because it benefits from a support scheme.

Unfortunately, in 2020, ENTSO-E ceased to publish data on electricity production volumes by fuel source and technology. This made it too resource-intensive to develop and publish a 2020 edition of the report. It is not clear whether ENTSO-E will return to publishing this data in the future, but this currently seems unlikely. Particularly for the calculation of the residual mix, which builds on grid injection and grid consumption data, this introduces a risk of inaccuracy.

3.3.2. Private sources of GO market statistics

As is noted in the survey responses set out in detail in appendix 1, a number of private sources of GO market statistics exist. These private providers can be grouped into two categories; those who generate data based on public information and trades that they broker or make directly, and those who generate data based on public information and anonymised information from market participants who report to them. Much of this data is only available as a paid service or to the counterparties of a given GO trade. The main value-added benefit of these private sources of statistics over the public sources is that they also include price information, little of which is available publicly. Making GO price information available is discussed in more detail later in this paper, when it discusses survey results and development opportunities (Chapters 4 and 5).

3.3.3. Non-electrical energy carriers

The EECS statistics currently address transactions of GOs for electricity. While there are certificates being transferred relating to claims concerning the energy origin of gas, there are no pan-European initiatives facilitating aggregation of the data provided at national level in individual countries. This is associated with a lower degree of harmonisation in the definition of these types of certificates, which makes it harder for a market party to make any estimate on its relative position in the European market.

Readily available useful data is essential for the GO market uptake of non-electrical energy carriers, such as gas, hydrogen, heating, and cooling. Keeping record of statistical data of gas GOs on a European level would increase the decision power of the relevant stakeholders because they would have valuable data to take informed decisions that would boost their businesses and, consequently, the GO market and overall market for that specific energy carrier. Yet, the challenge still remains on the creation of efficient

[4] https://www.recs.org/documents/go-monitoring-2018-report

statistical data repositories for non-electrical energy carriers that are both informative and functional for their potential users.

4. Main takeaways from the market participant survey

4.1. Background

As is stated above, Task 4.1 of the FaStGo project seeks to propose general ideas on how the collection and publication of data on GOs could be strengthened both in terms of their content and their usability. The main tool for understanding the needs of market participants and system operators regarding such data, and thereby for developing these general ideas, is a detailed survey. The results of this survey are set out below.

4.2. Methodology

This survey was developed by members of the FaStGO project team. It was disseminated through the membership email list of the Association of Issuing Bodies, the Newsletter of RECS International, and the LinkedIn posts of both organisations. The survey was first disseminated on 16th September 2020, and further reminders were sent on 28th and 29th September 2020. The survey closed at the close of business on 30th September 2020.

4.3. Respondents

In total, thirty-three responses to the survey were submitted. In the first section of the survey, respondents were asked to register with their contact details, the name of their organisation, their country of work, and the year from which they had been active in a field relating to GOs. All participants provided this registration information, acknowledged that they had read the survey's privacy statements, and gave permission for the FaStGO project to retain their personal data. The sectors of operation represented by the survey respondents (question 1) is a good reflection of GO markets and their participants. Equally, the areas of activity represented by the survey respondents (question 2) shows a good balance between system operators and market participants.

4.4. Questions

The survey asked the following questions:

Question	Text
1	What is your organisation's sector of operation?
2	What is your organisation's area of activity?
3	How often do you use the AIB GO Statistics?
4	Do you use other data sources than the AIB statistics?
5	If you do use other data sources, which do you use?
6	What do you use the AIB GO statistics for?
7	How satisfied are you with the content of the AIB GO statistics?
8	Open comments on the data content of the AIB GO statistics
9	Are you interested in the central collection of GO statistics from non-AIB member countries?
10	How satisfied are you with the outlook and useability of the AIB GO statistics?
11	Open comments on the outlook and usability of AIB GO statistics
12	Would your organisation benefit from the possibility of retrieving statistical data using an Application Programming Interface (API)?
13	Open comments on the possibility of retrieving statistical data using an API?
14	How important is it to have statistical price information on GOs?
15	Would you report prices at which you traded your certificates?
16	Open comments on why you would or would not report prices at which you traded your certificates?
17	Does reporting basis for electricity GO statistics also accommodate reporting needs regarding GO statistics for other energy carriers?
18	Open comments on whether the reporting basis for electricity GO statistics also accommodates reporting needs of other energy carriers

4.5. Results

The survey results presented in this section are a summary of the responses received. A detailed analysis of the responses to these questions is provided in appendix one.

4.5.1. AIB statistics well-appreciated especially for a general overview

Overall, the survey found that almost all the respondents used AIB GO statistics, a clear majority of whom accessed them on a quarterly basis (*question 3*). This indicates a strong and regular demand for AIB GO statistics, which in turn indicates that these statistics are a valuable source of information to stakeholders. That said, just over three-quarters of respondents also use other data sources than the AIB for GO statistics (*question 4*). This indicates that the AIB GO statistics do not provide all the information that stakeholders seek on GO markets and systems. Those needing additional information sought to find it through a mix of commercial and national data providers (*question 5*).

As regards the use of AIB GO statistics, almost four-fifths of respondents stated that they use them to gain an overview of the market (*question 6*). This is to be expected given that the AIB statistics were in the past updated each quarter (AIB changed very recently to monthly updates) and, as such, are unlikely to be used to gain a more detailed understanding of GO markets and systems. This lack of more regular reporting, and the stated need to seek complementary data from other sources, could be part of the reason behind only 57% of respondents stating that they were satisfied with the

data content of the AIB GO statistics (*question 7*). When given the opportunity, respondents primarily asked for the data to either be **more frequently updated** and/or provided with a more granular breakdown (*question 8*). A clear majority (67%) also called for the central collection of GO statistics from non-AIB member countries (*question 9*).

4.5.2. Improvement potential in the usability and outlook

This task recognises that it is one thing to provide data, but that it is a different matter to provide it in a clear and useable way. Less than half of the respondents were satisfied with the clarity and useability of the GO statistics provided by the AIB (question 10). When asked to give further comments on this, respondents primarily called for the data to be provided in a format that could support pivot tables and the application of filters, along with more user-friendly and clearer graphs providing an overview of historic market and system developments (*question 11*). The ability to download the files with the included data was also included in order for users to be able to make their own analyses and plots.

In addition to seeking a general understanding of stakeholders' views on the content and provision of GO market data, the survey sought feedback on specific proposals for strengthening both.

Respondents were asked whether their organisation would benefit from being able to retrieve statistical data using an API. The result was split, with 31% responding yes, 28% responding no, and 41% responding 'don't know' (*question 12*). The responses of those who took the subsequent opportunity to provide open comments to this question showed that while there was some support for this proposal it was tempered by scepticism as to how it could be delivered in practice (*question 13*). **Therefore, it is recommended that system operators and market participants join with other engaged stakeholders to assess both the usefulness and the feasibility of making GO statistical data retrievable through an API.**

4.5.3. Divergent views on collecting and publishing price information

The next sequence of questions focused on price information for GOs. Whereas around 70% of respondents placed some importance on the availability of price information, a sizable minority of 30% placed little or no importance on this possibility (*question 14*). Perhaps most interestingly, similar proportions of respondents said the information would be especially important, as said it would be unimportant. This result reflects the different interests of stakeholders in GO markets and systems, with some seeking to facilitate the market through more public information, and others seeking to do it by meeting client needs through proprietary data. **This report recommends working with all stakeholders to seek a middle ground in which market participants can still support clients by leveraging their knowledge while those new to the market or not actively trading within the market can still gain a good understanding of how it is developing.**

Looking at this topic in more detail, the next questions asked whether respondents would or would not report prices at which they trade certificates, and why (*questions 15 and 16*). More than half of the respondents to this question (nineteen of thirty-three (58%)) said they did not trade certificates. Only three of the fourteen respondents who do trade GOs said they would share price data against nine who said they would not. The main reason given for not reporting was the confidentiality of bilateral trades which make up a large share of GO markets. Some respondents also expressed doubt that reported price data would be accurate because of an incentive for market participants to falsely report in an effort to influence markets in their favour. The combination of responses to questions 14, 15, and 16 shows the need for caution around price reporting, particularly for independent organisations like the AIB.

The importance of price information was also addressed in the stakeholder webinar organized by the FaStGO project team in October 2020, where the stakeholders indicated it being slightly more important than facilitation of new tools or introducing new data from outside the AIB (Figure 5)

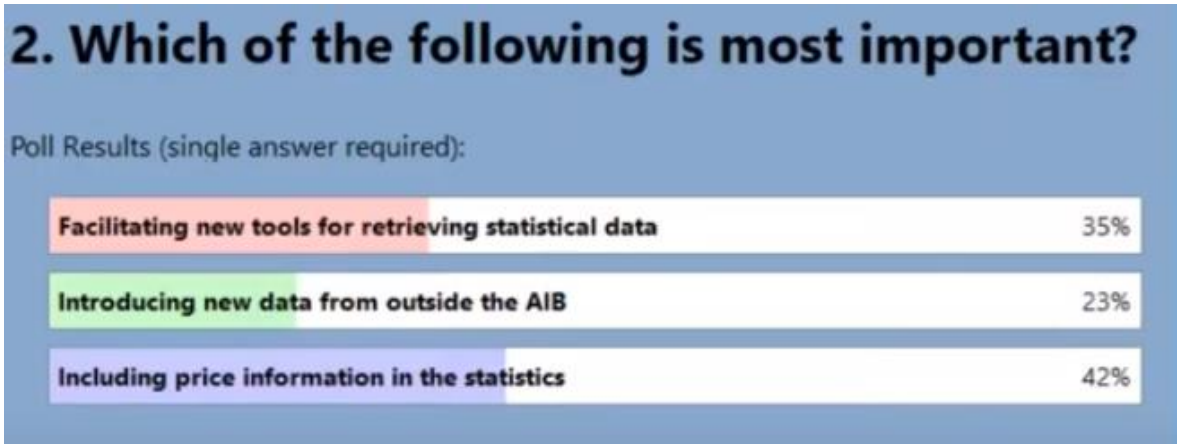


Figure 5 Poll question in October 2020 stakeholder webinar

If further work is done to try to achieve more price reporting, this report recommends that a cautious approach is taken, with full engagement of all relevant stakeholders.

4.5.4. Statistics for non-electrical energy carriers are not yet mature

The final survey questions asked whether the reporting basis for electricity GO statistics would also accommodate reporting needs regarding GO statistics for other energy carriers, and why (*questions 17 & 18*). While a small majority responded positively to this question, and only one responded negatively, twelve out of thirty-two respondents said that they did not know either way. So, despite some confidence in the reporting basis for GO statistics, there remains a notable amount of uncertainty on this matter, which is explained both by the novelty of non-electricity GO systems as well as the scope of organisations not extending to those.

Again, further stakeholder engagement is recommended, particularly to address points such as the need to recognise that each energy carrier has its own characteristics and that any conversions between energy carriers must be accurately reflected.

5. Recommendations based on survey results

5.1. Improvement opportunity categorisation

The following paragraphs outline a list of possible options for improvement of the GO statistics, based on the expertise of the FaStGO project team and the results of this task's public survey on statistics. In this report, statistical data development opportunities are categorised into seven main categories (figure 6 below)

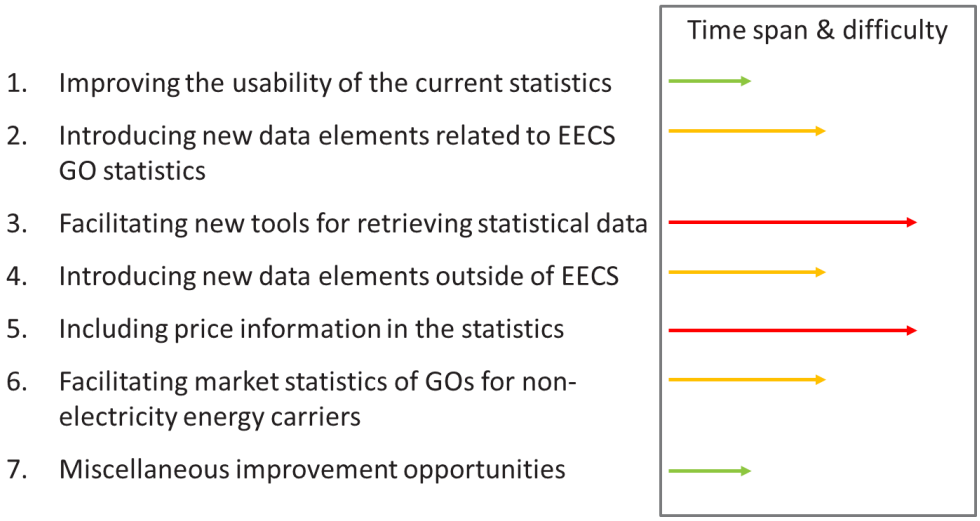


Figure 6 Categories for improvement opportunities

Each of the main categories of opportunity are elaborated in section 5.3 below.

These suggestions have yet to be subjected to assessments of the potential technical, financial, and legal (confidentiality) limitations versus possible benefits for the market parties and authorities. The topic of improving the statistics has also been addressed in Task 3 (IT system specifications) and Task 5 (prevention of financial fraud) reports of the FaStGO project.

5.2. General Constraints for further developing the market statistics

The fact that certain data exists does not necessarily imply that it can, and should, be published to the market. In assessing the development opportunities, certain technical, financial, and legal constraints need to be carefully assessed:

- The published information should not reveal the details of individual trades or market participants. In Task 1.3 (consultation), this was the primary concern of consultees, and any improvement should not override this principle.
- Issuing Bodies may face technical limitations as to what information they can efficiently retrieve, and regularly provide, from their systems. It must be taken into account that the designated issuing bodies do not always have the mandate or the resources to provide more than the minimum required information, especially if they have to comply with a national regulation or law on data protection. Setting up clearer specifications for statistical data reporting would, to some extent, alleviate the concern of providing a stronger mandate to improve statistical reporting based on a common framework.
- While such reporting requires a central organisation processing the statistical data, and will need flexibility in its data management, it would be beneficial to standardise the collection and publication requirements, as is currently done to a certain extent in AIB. Once a pan-European framework ensures that ALL issuing

bodies cooperate in central processing of all statistics across Europe, the statistics content will be more complete. Such framework can either be set by the legislator, or by a voluntary cooperation between issuing bodies, if they all participate. It calls for a central organisation to collect, process and publish the statistics. When all issuing bodies are connected via such a central organisation, joint pan-European statistics can be published and requirements for statistical reporting might, over time, be integrated in the formal CEN/CENELEC standard on GOs, EN16325. The revision of EN16325 is currently open, and under high time pressure, given the approaching implementation deadline for REDII. Statistical data reporting may be an element of a subsequent revision of this standard.

- Finally, since GO markets are dominated by bilateral trades, the collection of reliable price information is challenging to impose unless legal frameworks mandate it (Belgium-Flanders is the only known domain with a legal framework which obliges the issuing body to publish monthly average GO prices and trade volumes, based on mandatory GO price reporting by sellers).

5.3. Opportunity 1: Improving the usability of the current statistics

The development opportunities set out under this heading do not require the adding of any new data. Instead, they focus on how the current data is presented and made available to stakeholders.

5.3.1. Introduce graphs of current data into the spreadsheet

Often, the AIB's EECS GO statistics are downloaded to compile graphical representations of the data (e.g. to illustrate the development of the EECS GO market over time or transactions of a given year). In most cases, it would be possible for such graphs to be readily included in the spreadsheet, perhaps on a separate sheet. This would avoid each user having to compile the graphs for themselves.

Where possible, such graphs could include the option of manually editing the displayed content (see the recommendation to include pivot charts). Introducing graphs in the spreadsheet could also enable their ability to be downloaded in better resolution than from the current web page. The following suggestions for specific graphs should not be considered as an exhaustive list, but merely as ideas which can be built upon.

Such graphs could include e.g.:

- Line/column diagram on the development of total volumes per transaction over the last ten years
    - y-axis = energy (in TWh), x-axis = year, legend: "transaction type"
    - a separate graph only including GOs from renewable energy sources

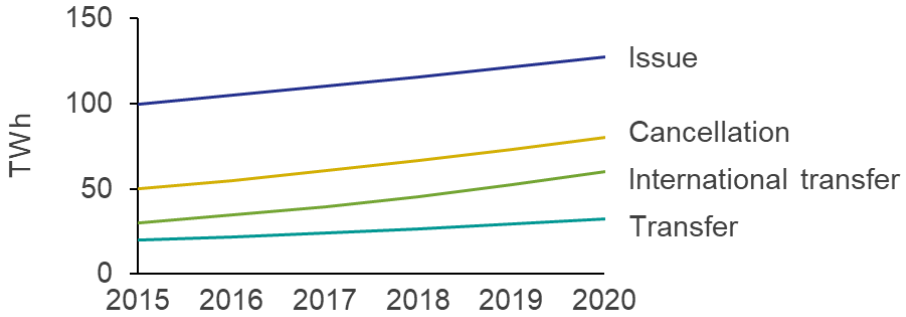


Figure 7 Development of total volumes of RES GOs per transaction over the last ten years

- Line diagram on the development of issuing and cancellation (separate graphs) volumes per country over last 10 years
    - y-axis TWh, x-axis year, legend: country
    - Could be indexed to avoid small domains from being invisible.

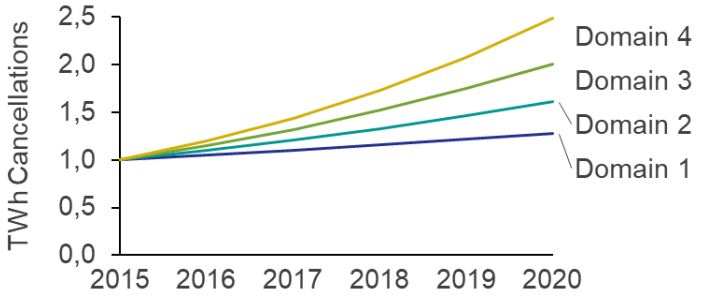


Figure 8 Development of total volumes of RES GOs per issuance and cancellation per country over the last ten years

- Line diagram on the development of issuing and cancellation (separate graphs) with separation of main energy sources
    - y-axis TWh, x-axis year, legend: energy source (hydro, wind, geothermal, solar, biomass, RES unspecified, nuclear, NUC Unspecified, Hard coal, Lignite (or brown coal), Oil, Natural Gas).

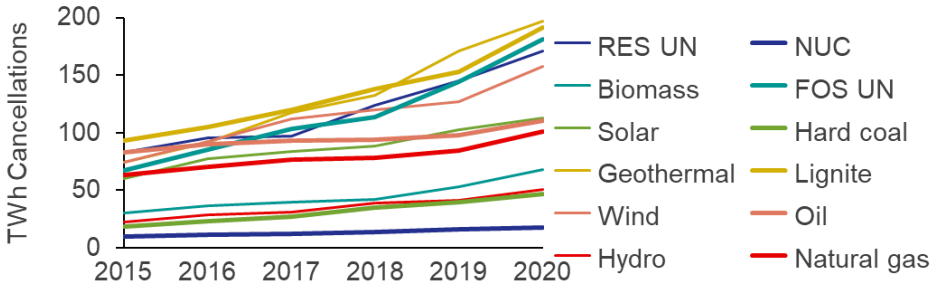


Figure 9 Development of total volumes of RES GOs per issuance and cancellation per energy source over the last ten years

- Column diagram on last year's transaction volumes by country and type of transaction (could only include RES)
    - y-axis TWh, x-axis country, legend: transaction type.

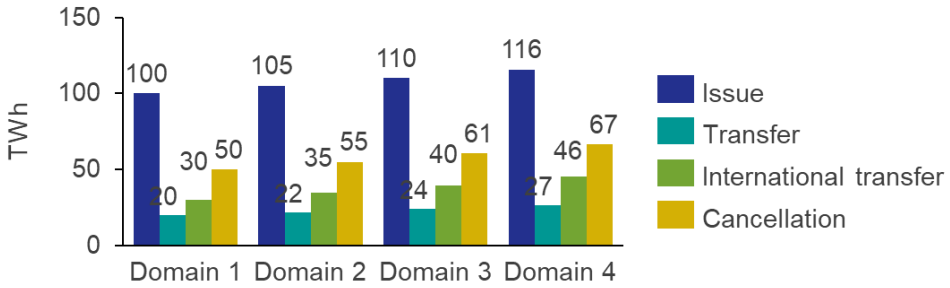


Figure 10 Last year's transaction volumes by country and type of transaction

In order to make it graphically feasible to fit in one page while there are many domains to display, a filter could be applied by the user to select the domains to be shown.

Alternatively, AIB could seek to include key graphs in the statistics webpage into the spreadsheet.

5.3.2. Data in pivot format

This development opportunity is intricately linked to the previous one. Including data in the spreadsheet in pivot format would enable dynamically altering graphs and data content according to the users' needs. This would greatly increase the amount of freedom and flexibility in deriving convenient graphs from the central spreadsheet. Pivot-format data would also enable the use of slicers and filters in studying the data.

Introducing data in pivot-form with the data AIB currently has available would include the following columns:

- Period (Year-Month in format YYYY-MM)
- Energy Source Code 1 : Mechanical or other, Unspecified, Heat, Biomass, Fossil
- Energy Source Code 2: Wind onshore, Wind offshore, Wind unknown, Hydro/marine …
- Energy Source (from EECS Fact Sheet 05)
- Technology (from EECS Fact Sheet 05)
- Registry
- Issuing Body
- Domain
- Energy carrier
- Production Date Based: Issue
- Production Date Based: Cancel
- Production Date Based: Expire
- Transaction Date Based: Issue
- Transaction Date Based: Transfer
- Transaction Date Based: Export
- Transaction Date Based: Import
- Transaction Date Based: Expire
- Value (number of GOs)

To begin with, it would be valuable for AIB to publish the pivot-data as is (if feasible in light of data confidentiality) and consider the following possible improvements to the current structure later on:

- Split between year and month column
- Energy Source Code 1: RES, NUC, FOS would be more informative than the current
- New Energy Source Code: hydro, wind, geothermal, solar, biomass, RES unspecified, nuclear, NUC Unspecified, Hard coal, Lignite (or brown coal), Oil, Natural Gas (categorisation from current domain-level data)
- The indication whether the data relates to Production and Transaction time could be separated by a different column instead of each "time-transaction type" combination constituting its own column.

ES Code 1	ES Code 2	ES Code 3	Domain	Transaction type	Transaction time def.	Year	Month	Value
RES	Wind	Wind-onshore	Domain 1	Issue	Production	2020	January	100
RES	RES UN	Wind-onshore	Austria	Issue	Transaction	2001	January	
NUC	Biomass	Wind-offshore	Belgium	Transfer	Production	2002	February	
FOS	Solar	Wind-unknown	Switzerland	Import		2003	March	
	Geothermal	Hydro/marine	Cyprus	Export		2004	April	
	Wind			Cancellation		2005	May	
	Hydro			Expiry		2006	June	
	…	…	…			…	…	
3 fields	12 fields	46 fields	30 fields	6 fields	2 fields	20 fields	12 fields	

46*30*6*2*20*12 --> Roughly 4 Million Rows

Figure 11 Illustration of possible pivot input data[5]

Implementing the above pivot would not fit into an spreadsheet (number of rows) and would make the file overly large. Therefore, it is advisable to reduce the number of codes, for example by removing ES Code 3, which is also currently not disclosed at a monthly level. Removing ES Code 3 would reduce the number of rows to approximately 90 000. If the pivot is still too heavy for the same file, it could be considered added as a separate spreadsheet for more advanced users.

Data in pivot format would also support use of Power BI for data processing.

5.3.3. Analytics on historical trends

The statistics could include indicators of market growth in terms of transaction volumes by types and by country over a given time period (possibly per energy source at a high level). For example, for each country (and total) and transaction type, the statistics could include:

- growth from start of the EECS domain;
- growth from last year;
- growth over last 5 years; and/or
- growth over last 10 years.

These growth rates could be presented both per annum and absolute growth over the time period.

[5] *ES Code 1 and ES Code 2 do not increase the number of possible combinations*

5.3.4. Other improvement opportunities related to the display of data

These are as follows:

- The order of the annual data is somewhat counterintuitive. The cumulative volumes should appear in the right-most column (last). The order of columns could be: Year N, Year N-1 … Year 1, Cumulative N+N-1, Cumulative total;
- More frequent updates of statistical data (NB: monthly updates have already very recently been implemented by the AIB);
- It is sometimes unclear that total volumes include also non-RES GOs. The main data (annual by country) could also be represented, excluding non-RES GO transactions (or having a filter in pivot);
- More refined colour schemes and clearer legends could be used (e.g. consistent use of colours per energy sources); and
- Aggregate pie charts showing key data (suggestion not detailed further).

5.4. Opportunity 2: Introducing new data elements and categorisation structures with regards to EECS GO statistics

The development opportunities set out under this heading focus on increasing the granularity of the AIB's GO statistics by adding new data elements. These opportunities are cross-related to opportunities related to introducing data in pivot format and facilitating new tools for retrieving statistical data. Many of the opportunities presented here would exponentially increase the amount of data thereby (partly) exceeding the limits to what is achievable in a spreadsheet and what can be required from the registries.

Regarding the opportunities presented in this chapter, confidentiality of data is of utmost importance (see chapter on general constraints). Opportunities presented here entail certain technical and financial implications, but most importantly they should be analysed from the point of view of avoidance of disclosing information on individual trades, as they significantly granularise the data currently available. Although this constraint is not repeated in every instance, it should be kept in mind throughout the report.

5.4.1. Import, export, and cancellation data by counterparty domain and originating domain

Today, the AIB statistics do not include data at a county-to-country level (except for ex-domain cancellations, where this is identified), which would allow the identification of volumes of GOs transferred between country x and country y. Having such a possibility could yield benefits in assessing trading patterns as well as defining market balances.

Transaction statistics per originating domain are not currently collected by the AIB and would require additional categories to be included in data collection. The data is available in the domains, but as it would multiply the amount of information to be collected, it requires automated statistics collection tools, both for the issuing bodies and for the collection body. Adding production domain to data collection would provide information on the demand of domestic versus foreign GOs. The publication of this data would greatly benefit from the use of a pivot format where 3 domain columns could be used instead of 1:

- production Domain of the energy;
- originating Domain of the transaction; and
- target Domain of the transaction.

5.4.2. New data based on production time

All transaction data (also import, export and withdrawal) could be reported by both transaction and production time. At the same time, the delay in producing production time-related statistics should be minimized.

5.4.3. Adding number of transactions

The volumes quoted in the currently published statistics relate to volumes of GOs traded and not the number of transactions. Including such transaction figures could give an indication of the number of GOs traded per transaction. However, this would require collection of additional information by the AIB (this data is available in registries, so it is a question of whether the interest in collecting it outweighs the cost of doing so).

5.4.4. Increasing granularity of reported time period

Provided it is feasible in terms of data confidentiality, it would be technically possible to increase the granularity of transaction time information from distinguishing transaction volumes on a monthly aggregate (as at present), to perhaps reporting them at a weekly level. This would only be recommended if such an increase does not significantly increase the workload associated with data collection. This could be achieved by adding a third time column (=week) in the pivot data.

5.4.5. Adding data granularity of statistics by certificate attributes

This might include the split of volumes by:

- Support type (introduce column support type in pivot data);
- Age of production device (introduce column commission year in pivot data);
- Production device capacity range (introduce column capacity range in pivot data);
- Energy code, as in EECS Fact Sheet 5 / Annex A of draft EN16325[6] (introduce new Energy Source Code column in pivot data) (Already included in recent update of the collected data by AIB); and
- FS5 technology code (introduce Technology column in pivot data)) (Already included in recent update of the collected data by AIB).

The two first opportunities above were identified by the stakeholder survey. Granularity of data could also be added by other certificate information fields if this were seen to add value. However, this would require additional data collection by the AIB, and would increase the amount of data collected, retained, and published.

5.4.6. Adding domain specific general information

The statistics could include certain non-certificate related information per domain, such as:

- number of account holders in the domain;
- number of production devices in the domain (per technology); and
- capacity of production devices in the domain (per technology).

This information is already published for every domain in the AIB annual report; it is recommended that this be published together with the activity statistics.

5.5. Opportunity 3: Facilitating new tools for retrieving statistical data

[6] *Draft text for a revised EN16325 standard for guarantees of origin in the FaStGO text proposal of 8/7/2020. See FaStGO report for Task 2 part 2.*

The use of Excel as a reporting tool enables disclosure of information in a format that can be viewed and refined by almost all individual stakeholders. Given their wide use, Excel or .csv format reporting should continue to be the platform for centralised aggregate data.

However, the use of other tools such as an Application Programming Interface (API) would enable disclosure of much more granular data because it is easier to integrate such data directly into the back-end-systems of companies and other stakeholders. An API would allow a user to export selected raw data lines by using queries and to use this raw data directly in the user's own systems without manual processing.

In the short term, an API would most likely only be used by a certain subset of stakeholders, and would not provide much extra value if the amount of statistical data does not increase (at least if the data is also available in pivot format). Dynamic online reports and graphs (by pivot) provide a contemporary alternative to the long-existing current solution, whereby each country and aggregate transactions are represented by an individual static graph. However, if the statistical reporting expands, an API would allow better use of the data as well as significantly reducing the amount of time taken by market actors and competent bodies to process the data. Also, it should be kept in mind that 32% (ten) respondents to the survey answered that enabling an API would be beneficial.

5.6. Opportunity 4: Introducing new data from outside the AIB

There is currently no single source of GO market data from all internal market countries, and while AIB membership covers most of the market, some significant countries are missing from the data, including the UK and Poland. The FaStGO project team calls on the relevant authorities, including the European Commission, ENTSO-E, and national authorities to work together to ensure that the GO statistics of all internal market countries are reported consistently and clearly.

In particular, it will be important to gather energy production data for each internal market country centrally, in order to understand the full potential volume of the European GO market. Comparing the total production per energy source compared to the total issuance for each source would show the overall market penetration of GOs and support the calculation of the Residual Mix.

5.7. Opportunity 5: Including price information in the statistics

Price is the main piece of information which a substantial number of parties feel to be currently lacking from the GO statistics. The lack of publicly available, easily understood, and reliable data about the prices at which GOs are traded 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.

The collection of price information is seen to be challenging, since most[7] GO trades are bilateral, with details that are known only to the parties involved. Hence, collection of information would rely on the willingness of market actors to report correct information for each trade. Furthermore, a single trade transaction can include a variety of GOs, potentially all priced differently, which could complicate such reporting. Also, GOs are often traded in forward contracts several years before physical settlement, which would have to be considered, especially in the market analysis based on the collected data.

[7] *Except where GOs are auctioned by the issuing body and the published auction results include price reporting*

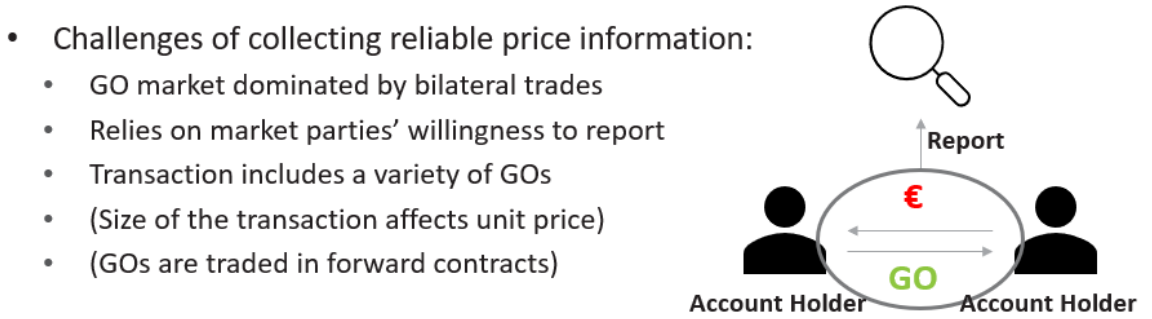


Figure 12 Challenges in collecting price information of GO transactions

Mandatory reporting of GO prices per transaction to the Issuing Body would enable the latter to publish aggregated average prices. This price reporting obligation is currently available in Europe only under Flemish legislation, where it results in publicly available monthly statistics[8] on price.

Also, in other domains, some price information is made public, such as that released following national auctions of GOs. However, this data could be made at a greater level of granularity, including the crucial aspect of the difference in prices for different volumes of GOs (buying 100MWh as compared to 10,000MWh). Furthermore, the dynamics applying to auction pricing may be different from those present in bilateral transactions.

It should also be acknowledged that price publication may become a self-fulfilling prophecy, as it will be influenced mainly by the biggest market participants.

Based on the T1.3 consultation, the collection and reporting of price information for individual trades were considered unfeasible by issuing bodies due to the lack of a legislative mandate to request and publish it. If the collection of price information is desired, this mandate should be set to formalise requirements and justify resource usage. Market parties have divergent views on whether disclosing price information is desirable, but as shown in figure 5, the information was seen important in the stakeholder webinar in October 2020. In any event, price information from public GO auctions can be published.

5.8. Opportunity 6: Facilitating market statistics of GOs for non-electrical energy carriers

Volumes of cross-border transfer of GOs for non-electrical energy carriers are lower than for electricity. The certificates which are currently transferred cross-border are mostly certificates for biomethane and are usually embedded in a system for mass balancing. This inherently provides a less liquid certificate market, as the certificate market has a closer link to the physical commodity that is being traded. However, the book-and-claim system of GOs allows for a separate GO market operation. An example of this is the successful cross-border trade of biomethane GOs among some ERGaR members, such as Dena, AGCS and GGCS. These trades are a result of bilateral cooperation agreements that have proved that there is great interest for a market of biomethane GOs. As a consequence, ERGaR has launched the ERGaR Certificate of Origin (CoO) Scheme that will allow the trade of biomethane CoOs on a book & claim basis.

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

With Article 19 of REDII yet to come into force, a real functioning market for GOs for non-electrical carriers has yet to kick-off. Therefore, similar statistics should be considered for transfers of GOs for these carriers.

Biomethane GOs are widely available and are transferred within countries where possible. A centralised organisation and data collection system does not yet exist because those transfers are made through bilateral agreements. The price of biomethane is, among others, dependent on the feedstock used and the type of support it receives. Hence, price and support type should also be included in the statistical information, whenever the national legislations allow for the publication of prices agreed between market parties. Thus, a central data collection system is needed if there is to be an efficient statistical data repository that provides valuable information to market participants. Given the different mechanisms and support schemes, a uniform statistics standard would be useful as a starting point for reporting the information to a central system. Unified definitions on volumes, types of support received, and feedstocks used - among others - would help compare data on a common basis.

Hydrogen GOs were issued under the CertifHy 2 project. As it concerned only four production devices, it would harm the market party confidentiality principle to publish, in the current stage, statistics on the transfers and cancellations. Once hydrogen GO figures increase, in general the abovementioned recommendations for the electricity GO statistics are also valid. Attributes to be added to hydrogen GO statistics may relate to whether the hydrogen was transported by vehicle or over a network, and to carbon footprint (range) information.

Heating and Cooling GO systems are currently scarce. The Netherlands is the only country with long-standing operation of a heat GO system, though there is no ability to make cross-border transfers in this system. If this were to take place with significant volumes, the temperature range of the heat for which the GO was issued could be a relevant attribute to add.

When introducing statistics for the GOs of other energy carriers, certain high-level requirements should be met:

- *First and foremost,* there should be a clear distinction between GO statistics per energy carrier, using the definitions from the EN16325 standard. This distinction has already been introduced by the AIB;
- Statistics should distinguish cancellations (e.g. by different purpose or an X) made for energy carrier conversion to avoid the same energy from being considered cancelled for final use several times;
- New GO information fields introduced in the draft EN16325[9] (e.g. on feedstock type (gas GOs), and temperature levels (heating and cooling)), might have different market values and hence it would be important to report these in the statistics;
- Given the interference with mass-balancing systems for transport fuel target compliance and potential other purposes, it will be important for any statistics to indicate the purpose of the certificates for which the transactions are reported, and whether it relates to single purpose or multipurpose certificates; and
- The relevance of transmission and distribution losses is higher in the gas as well as the heating and cooling sector than in electricity and might require considerations on how such losses are statistically reported. Note that for electricity grid losses are currently considered as consumption, for which the grid

[9] *As proposed by FaStGO in the report for Task 2 part 2*

operator may choose to either or not cancel GOs. For non-electrical energy carriers, it seems the most logical way forward to act in a similar way and leave it up to the distribution party to take responsibility for the energy source to be related to its distribution losses.

5.9. Opportunity 7: Miscellaneous improvement opportunities

Certain miscellaneous wishes from the stakeholder survey and FaStGO project team are compiled in the list below:

1. Automated checks and alerts should be introduced on the correctness of statistics (significant changes per domain and/or energy source and technology; same number reported for different transaction type; match in overall balance of imports and exports; at year N+1 issue + import = export, cancel, expire, withdraw for production year based data in a domain; if possible checking that issuance does not exceed energy production from a given energy source)
2. Definitions of categories should be clearer to avoid misunderstandings during data collection and interpretation. In particular, it should be clarified that e.g. category 'Production – Issued in January 2020' in the current AIB activity statistics means that the production period end date of the energy for which the certificate was issued is in January 2020;
3. Information by product type should be included (by distinguishing between source and technology. This refers to separating the statistics of GOs for high efficiency cogeneration (HEC / technology type GOs) from the other electricity GOs);
4. There should be more transparency in the technology and fuel code grouping used in the current statistics (publish clearly how the groupings are made); and
5. Data per country should also be available on a separate sheet or workbook in order to avoid downloading the master file each time, where the user is only interested in a single country.

The AIB does not intend to provide automated or expert-based forecasts on future transaction volumes, as this implies making a judgement, and this is a matter for market parties to analyse rather than issuing bodies.

6. Feasibility assessment and conclusion

In conclusion, this report provides an overview of the development opportunities for GO market activity statistics, that, if implemented, could increase transparency in the GO market. It recommends discussion between issuing bodies to balance out costs against market benefits and confidentiality and seeks efficient ways to implement the opportunities highlighted in this report.

The following paragraphs set out considerations as to how to maximise the potential of the abovementioned development opportunities.

6.1. Survey support on development opportunities

Overall, the survey showed appreciation for the AIB's current EECS GO market activity statistics and support for more detailed and clearly presented statistical information on GOs. In particular, as regards the AIB's statistics reports, there was strong interest from respondents in having more granular data, and data from all internal market countries – not only AIB member countries. There were also numerous calls for a more frequent publication schedule than the previous quarterly publication of statistics, although this request has already been addressed by the AIB in the meantime by increasing the frequency of data gathering, processing and publishing from quarterly to monthly publication.

The responses to this survey were, collectively, much less clear on whether the AIB should engage in any way in gathering and reporting GO prices. Furthermore, it is particularly challenging that respondents were having diverging views as to how GO price information could or should be gathered and communicated.

6.2. Technical and financial feasibility of the development opportunities

All improvement opportunities should now be carefully assessed in terms of their technical and financial feasibility and additional workload for Issuing Bodies and the AIB as the central collection and publication body of EECS GO market activity statistics. A special point for attention is the consideration on data confidentiality and the avoidance of revealing information on individual trades if the amount and granularity of data were to increase.

The listed opportunities **should not be** automatically considered as directly deployable recommendations of the FaStGO project but it is advisable that the specific recommendations made here are discussed and processed within the AIB in order to refine them.
Regarding development opportunity 1 ("*Improving usability of current statistics*"), it is clear that many quick-wins reside in the display of data and compilation of convenient graphs. Also, increasing the frequency of statistical data publication would add value (although as noted above, this has already taken place, with the frequency of the AIB's data gathering and reporting increasing from quarterly to monthly). Most importantly, if feasible from the perspective of data confidentiality, publishing data in pivot form would help certain type of users of the statistics to dynamically compile the graphs and data they seek in their own form.

Regarding development opportunity 2 ("*Introducing new data elements and categorisation structures related to EECS GO statistics*"), the proposed solutions divided roughly into new transaction data and categorising statistics based on attributes on the certificates included in the transaction. Implementing such solutions would significantly increase the amount of reported data and would especially show their value if publication is in pivot format, a modern dashboarding tool or in some cases behind an API. They

would also entail significant additional work in the collection of data by the Issuing Bodies and the AIB because new data elements would need to be are included.

Development opportunity 3 ("*Facilitating new tools for retrieving statistical data*") is a solution aimed for a more distant future, although it should be kept in mind that 32% of the respondents to the survey considered an API already adding value. However, the value is most likely realised if the amount and granularity of data increases. Otherwise pivot-data is likely to suffice while being significantly more cost-effective.

The FaStGO project team recognises that development opportunity 4 ("*Having a central repository of GO market data from all internal market countries*") would provide significant benefits for GO market and system stakeholders. However, achieving this aim would require the cooperation of internal market countries who are not currently members of the AIB on a voluntary basis, or the integration in a formal EU institution and legal statistics reporting obligation on all GO issuing bodies. As such, the engagement of European authorities or agencies, such as the European Commission, is likely to be needed.

Development opportunity 5 ("*Including price information in the statistics*") is the most contentious, for the reasons set out elsewhere in this report. The positive engagement of a range of stakeholders will be needed in order to make it happen. In order to ensure that all interests are accurately represented, it could be valuable to establish a stakeholder dialogue on this matter to better understand and mutually clarify what exactly are the desired outputs and whether or how to feasibly pursue them.

In terms of opportunity 6 ("*Facilitating market statistics of GOs for non-electrical energy carriers*") these markets are still evolving with few international transfers today. When centralised collection of statistics of non-electrical energy carrier GOs begins it is primarily important to clearly separate the statistics per energy carrier and to distinguish cancellations made for the purpose of energy carrier conversion. Besides these basic principles, introducing statistics for new energy carrier GOs could categorise market activity statistics in addition to the categories mentioned for electricity, based on certain energy carrier specific data fields such as: information on feedstock, carbon footprint (e.g. category), and temperature level. Statistical information on carbon footprint will be relevant if the GO design is taking such as a basic attribute. In such case, statistics could display the number of GOs issued, transferred, cancelled with specific carbon footprint categories.

6.3. How to get there?

The different opportunities as mentioned in section 5.3 come with recommendations for action by different parties.

6.4. Recommendations for the central statistics publication body

After careful assessment of the opportunities in section 5.3, recommendations to the AIB relate to: publishing more data; presenting data in an upgraded way through pivoting graphs; and giving better insights in general market trends for instance by using a modern dashboarding tool to present the gathered information in a more user-friendly way. Further, collecting additional data categories requires upgrades to the data collection templates as well as the processing and displaying tools.

Among its other functions, the AIB is a central statistics collection and publication body, and can in principle publish all the data that is available from the issuing bodies. Hence the key questions to consider are the availability of funds for accurate data collection, data confidentiality issues and proper displaying the information. To address such questions the AIB could use its central role in the EECS GO market by starting and facilitating constructive discussion among various stakeholders on these topics.

Furthermore, the AIB can provide higher transparency and alignment on the category definitions of its collected activity statistics as of today.

6.5. Recommendations for individual issuing bodies

Recommendations to issuing bodies relate to the reporting frequency and provision of additional data to the central collection body - currently the AIB. This requires alignment between issuing bodies on the value of each additional reporting category, and an upgrade of the data collection template as well as implementation timelines. Dialogue is encouraged between issuing bodies to discuss the development opportunities in section 5.3 of this report; and to upgrade the collection template in accordance with their cost-benefit analysis.

Reporting frequency is easier to increase now that the AIB has recently implemented an automated statistics data collection tool. Furthermore, the recent switch to monthly gathering and publication of statistics is seen adequate for most stakeholders. Collecting additional data fields on the other hand will impose costs on every individual issuing body. Hence, publishing new data categories (besides those new categories included in the recent updates by the AIB) will probably take place in the longer run.

Today AIB is an organisation consisting of 29 members, each with their own IT system and national practices. Hence it should be understood that any change, albeit sounding small, requires a significant effort and coordination to be correctly applied throughout the registries of the issuing bodies. The AIB is open for dialogue with stakeholders on improvements, though it has to be mindful for resources of the association and of each of the members. Hence stakeholders should not expect all wishes to be addressable in the short term.

6.6. Recommendations to the legislative framework

Recommendations to the European Commission on observed needs for market transparency focus on increasing the geographic area for which there are jointly published statistics. Ideally, all single market countries should be required to provide their statistics to a single platform and in a harmonised way, including for GOs for non-electrical energy carriers. Institutional and funding challenges will arise with a single collection organisation as long as not all issuing bodies are either connected to this organisation as a member or legally required to provide statistical data in a defined quality. If GO market activity data were available from all member states and for GOs for all energy carriers, the European Commission is recommended to impose an obligation to report statistics regarding GOs to all member states and to provide a clearer mandate to an organisation or EU institution to collect and publish such information.

It is also important to gather *energy production data* for each internal market country centrally, both for electricity and gas, in order to understand the full potential volume of the European GO market. Comparing the total production per energy source compared to the total issuance of GOs for each source would show the overall market penetration of GOs and would support the calculation of the Residual Mix.

Appendix 1: Analysis of Survey responses

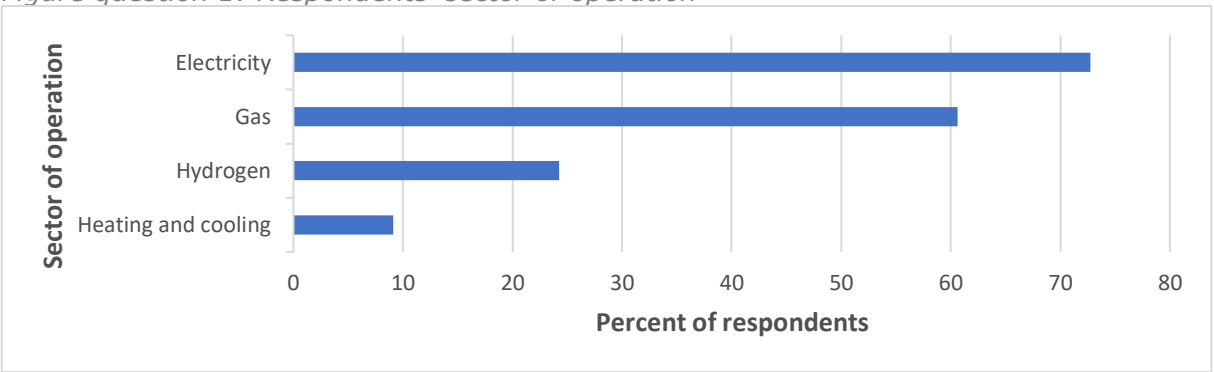
Question 1: What is your organisation's sector of operation?

Respondents were asked to indicate their organisation's sector of operation and could select more than one of the options provided. All thirty-three respondents answered this question, and fifty-five options were selected. The table and Figure for question 1 below show the breakdown of these responses.

Table question 1: Respondents' sector of operation

Sector of operation (multiple responses possible)	Number of responses	Per cent of respondents
electricity	24	73
gas	20	61
hydrogen	8	24
heating and cooling	3	9

Figure question 1: Respondents' sector of operation



The sectors of operation represented by the survey respondents is a good reflection of GO markets and their participants. Historically, only the electricity sector has used GOs, and this is the sector that is most engaged with these markets. However, with the entry into force in December 2018 of Article 19 of the Recast Renewable Energy Directive (RED-2), all renewable energy generators must be issued with GOs if they request them. The strong showing of the gas and hydrogen sectors among respondents reflects this expansion of GO use, and the subsequent positive engagement from these sectors. It is not fully clear why there is a limited number of respondents stating that their organisations work in the heating and cooling sector, but this could reflect the greater complexity of using GOs within these markets.

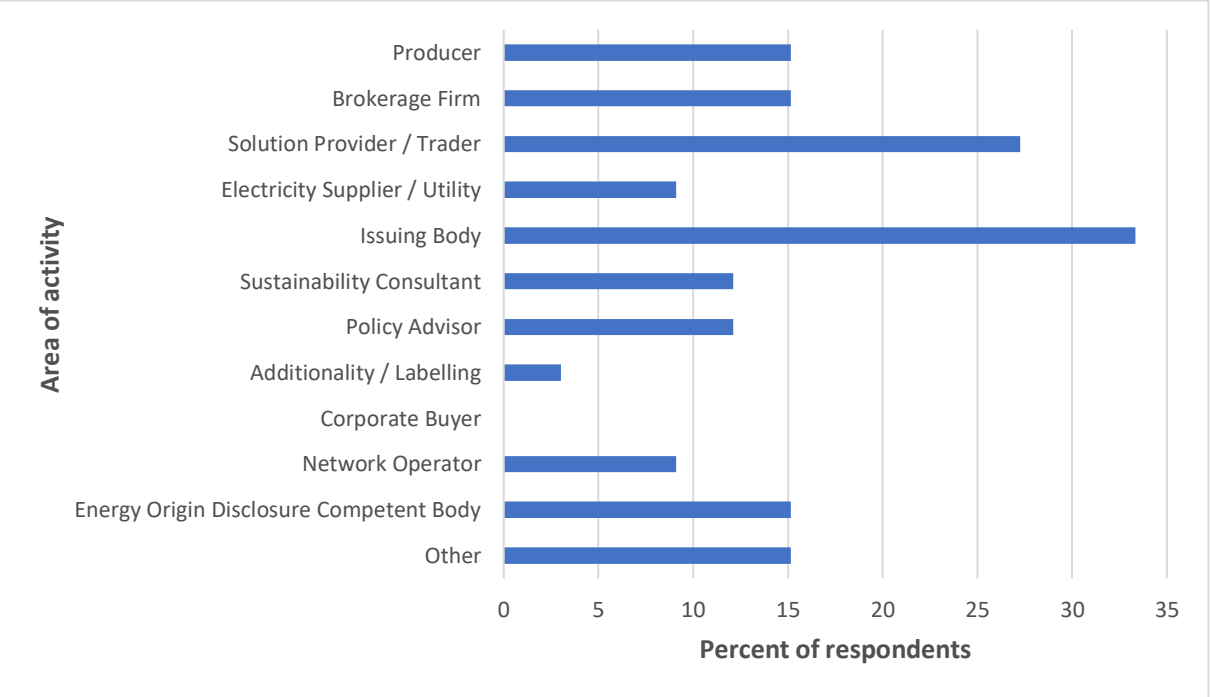
Question 2: What is your organisation's area of activity?

Respondents were asked to indicate their organisation's area of activity and could again select more than one of the options provided. All thirty-three respondents answered this question, and again fifty-five options were selected. The table and figure for question 2 below show the breakdown of these responses.

Table question 2: Respondents' area of activity

Area of activity (Multiple selections possible)	Number of responses	Per cent of respondents
Producer	5	15
Brokerage Firm	5	15
Solution Provider / Trader	9	27
Electricity Supplier / Utility	3	9
Issuing Body	11	33
Sustainability Consultant	4	12
Policy Advisor	4	12
Additionality / Labelling	1	3
Corporate Buyer	0	0
Network Operator	3	9
Energy Origin Disclosure Competent Body	5	15
Other, please specify	5	15

Figure question 2: Respondents' area of activity



The areas of activity represented by the survey respondents shows a good balance between system operators and market participants. This is considered important as both groups will have to engage with the general ideas this task will propose as to how to strengthen both the collection and publication of data on GOs. The five respondents who

selected the 'Other' category specified the following areas of operation for their organisations: IT supplier, registry operator (three), and research.

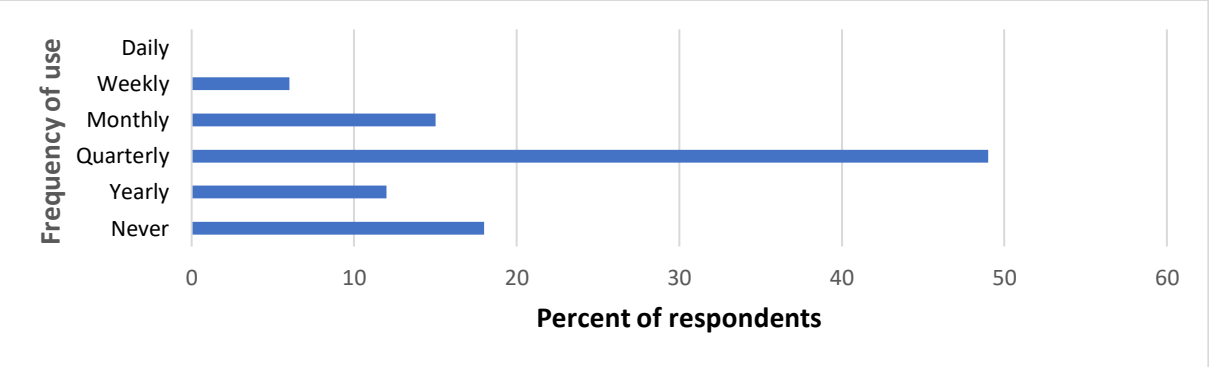
Question 3: How often do you use the AIB GO Statistics?

Respondents were asked to indicate how frequently they use the GO statistics provided by the Association of Issuing Bodies. All thirty-three respondents answered this question. The table and figure for question 3 below show the breakdown of these responses.

Table question 3: Frequency of use of AIB GO Statistics

Frequency of use	Number of responses	Per cent of respondents
Daily	0	0
Weekly	2	6
Monthly	5	15
Quarterly	16	49
Yearly	4	12
Never	6	18

Figure question 3: Frequency of use of AIB GO Statistics



With only six respondents stating that they never use the GO statistics provided by the AIB, and over 70% of respondents saying they use them at least quarterly, there is a clear demand for this information. Almost half of the respondents stated that they use this data quarterly, which is logical as they were in the past collected and published each quarter (changed very recently to monthly updates by AIB).

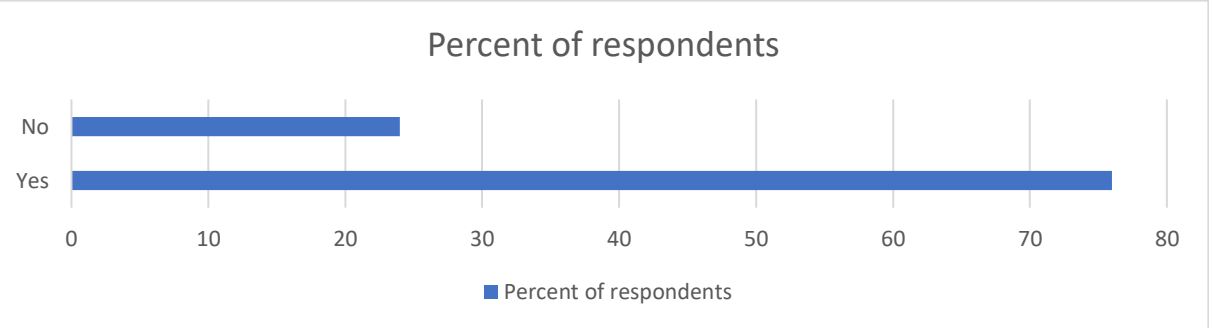
Questions 4 and 5: Do you use other data sources than the AIB statistics, and, if so, which?

These questions are taken together. First, respondents were asked if they use other data sources than the AIB statistics for gaining an overview of the GO market. All thirty-three respondents answered this question, with twenty-five (76%) responding yes, and eight (24%) responding no. The table and figure for question 4 below show these responses.

Table question 4: Do you use other data sources than the AIB for GO statistics?

Uses other data sources	Number of responses	Per cent of respondents
Yes	25	76%
No	8	24%

Figure question 4: Do you use other data sources than the AIB for GO statistics?



Of those responding yes, 23 stated the other data sources they use. These include both commercial data providers such as Greenfact, ECOHZ, Platts, Argus and Montel or public data providers such as national registries, regulators, and issuing bodies. Despite the frequent use of AIB statistics by those responding to the survey, other data sources are also valued.

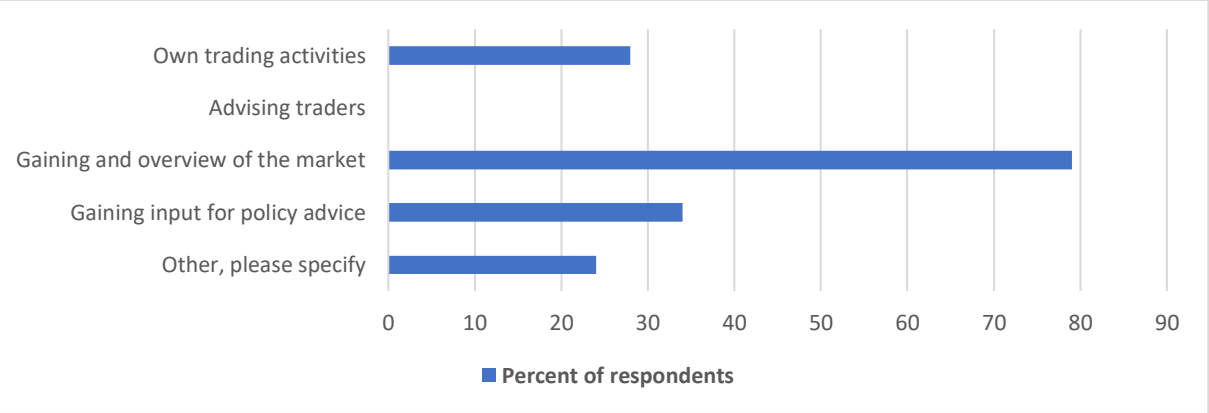
Question 6: What do you use the AIB GO statistics for?

Respondents were asked to indicate what they use AIB Statistics for. They were allowed to select multiple answers. Twenty-nine respondents answered this question, and forty-eight options were selected. The table and figure for question 6 below show the breakdown of these responses.

Table question 6: Use of AIB GO Statistics

Use of AIB GO Statistics	Number of responses	Per cent of respondents
Own trading activities	8	28
Advising traders	0	0
Gaining an overview of the market	23	79
Gaining input for policy advice	10	34
Other, please specify	7	24

Figure question 6: Use of AIB GO Statistics



Based on these survey responses, AIB GO statistics are primarily used to gain an overview of the market. This indication is supported by the answers of those respondents who replied 'other' – they highlighted wanting to know the residual fuel mix and checking for supply and demand trends. This finding could be interpreted as supporting the findings of answer 3, 4, and 5 which show a trend of quarterly use of AIB statistics alongside the use of data from commercial and national data providers which is likely to be more granular, and/or, more frequently published.

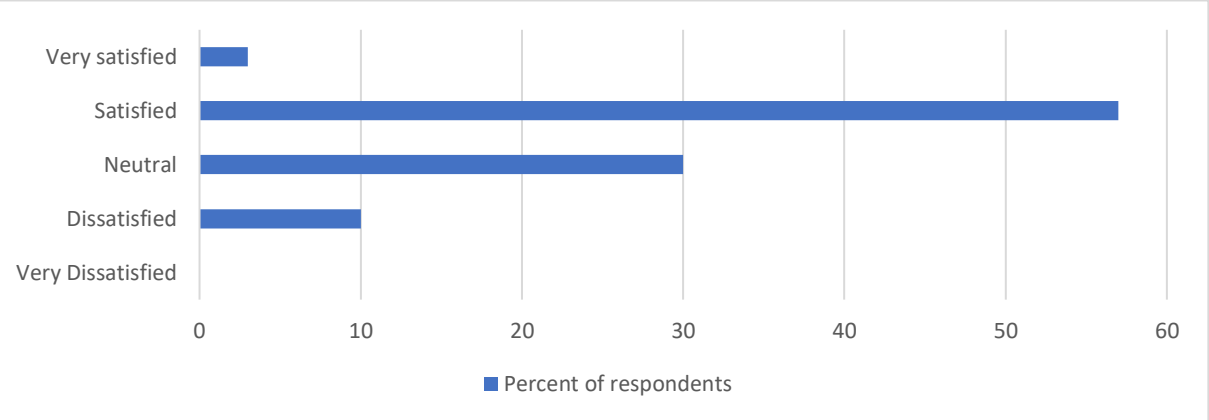
Question 7: How satisfied are you with the data content of the AIB GO statistics?

Respondents were asked to indicate how satisfied they are with the data content of the AIB statistics. Thirty respondents answered this question and only one option was available. The answers seem to further reflect the findings of the previous questions, with only one respondent being very satisfied with the data provided by the AIB, while seventeen (57%) were satisfied, nine (30%) were neutral about the data, and three (10%) were dissatisfied with it. These results are shown in the table and figure for question 7 below.

Table question 7: How satisfied are you with the data content of the AIB statistics?

Level of satisfaction with AIB data	Number of respondents	Percentage of respondents
Very satisfied	1	3
Satisfied	17	57
Neutral	9	30
Dissatisfied	3	10
Very dissatisfied	0	0

Figure question 7: How satisfied are you with the data content of the AIB statistics?



Question 8: Open comments on the data content of the AIB GO statistics

Eighteen respondents took the opportunity provided by question 8 to give comments on the data content of the AIB statistics. As is indicated by the findings above, these comments primarily asked for more data to be provided, either in the form of more frequent updates, a more granular breakdown of the data (e.g. by technology), the inclusion of price information, data sheets by individual countries, and data on the movement of GOs between AIB countries. Some respondents also highlighted weaknesses in the data due to differences in the definition of data points in different countries.

Concrete proposals:

New information

- **Volume of GOs cancelled and imported in a country split by exporting and originating country**
- **Volume of imports and exports by production date**
- **Split of volumes per supported / non-supported production GOs**
- **Split of volumes per age of plants**
- **Inclusion of other energy carriers in the statistics**
- **Inclusion of price information**
- **Inclusion of cost information for the Issuing Bodies to provide the service in their countries**
- **Raw data to allow own analysis (e.g. detailed analysis by technology and country)**
- **Number of transactions and average volume of GOs per transaction**
- **Number of Account Holders, Production Devices, Capacity etc… per domain**

Analytics, Outlook, and dissemination

- **More frequent updates**
- **Future forecasts as part of statistics**
- **Ready-made graphs and plots in the spreadsheet**
- **Ready-made comparison between current and past years (e.g. to show growth trends automatically)**
- **On sheet annual the order of the years should start from N, N-1, N-2…Total 1 - N, Total N-1 - N**
- **Separate workbooks for each country**
- **Clearer separation of GOs for renewable and non-renewable sources in the aggregated data**
- **The grouping of technology and fuel codes to be made more transparent**
- **Coherent interpretation of "production date" across countries and reducing the delay in production time specific statistics**
- **EDC information included in the central statistics file**
- **Avoiding gaps in data (sometimes, some countries missing without apparent reason)**

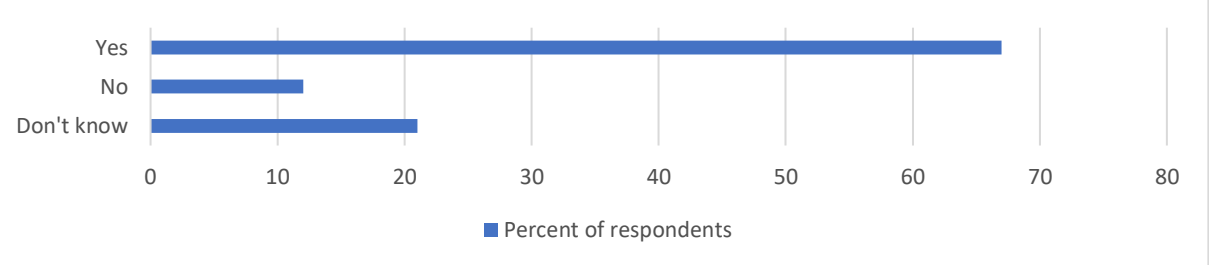
Question 9: Are you interested in the central collection of GO statistics from non-AIB member countries?

A clear majority of respondents, twenty-two of thirty-three respondents (67%) stated that they were interested in the central collection of GO statistics from non-AIB member countries such as the UK and Poland. Of the remaining eleven respondents, only four were not interested in the central collection of such data, and seven did not know whether they were or not. Overall, the response to this question and previous questions indicates that the respondents have an appetite for strengthening the content of GO statistics. These results are shown in the table and figure for question 9 below.

Table question 9: Are you interested in the central collection of GO statistics from non-AIB member countries?

Are you interested in the central collection of GO statistics from non-AIB member countries?	Number of respondents	Percentage of respondents
Yes	22	67
No	4	12
Do not know	7	21

Figure question 9: Are you interested in the central collection of GO statistics from non-AIB member countries?



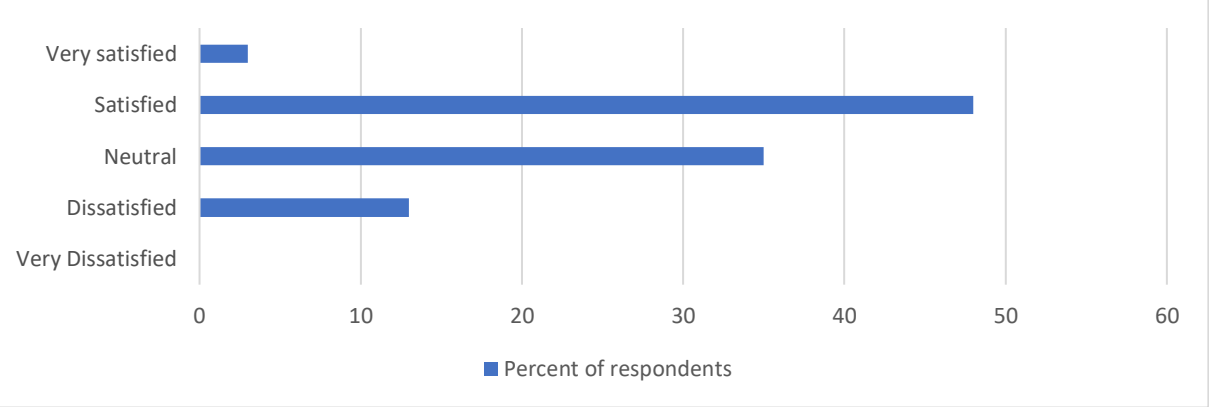
Question 10: How satisfied are you with the outlook and useability of the AIB GO statistics?

As with question 7, only one respondent stated that they were very satisfied with the outlook and useability of the AIB GO statistics, while fifteen (48%) declared that they were satisfied, eleven (35%) responded that they were neutral about the data's outlook and useability, and four (13%) were dissatisfied. None were very dissatisfied. Again, this answer shows that while respondents are generally appreciative of the statistics provided by the AIB, but that there is room for improvement. These results are shown in the table and figure for question 10 below.

Table question 10: How satisfied are you with the outlook and useability of the AIB GO statistics?

How satisfied are you with the outlook and useability of the AIB GO statistics?	Number of respondents	Percentage of respondents
Very satisfied	1	3
Satisfied	15	48
Neutral	11	35
Dissatisfied	4	13
Very dissatisfied	0	0

Figure question 10: How satisfied are you with the outlook and useability of the AIB GO statistics?



Question 11: Open comments on the outlook and usability of AIB GO statistics

When given the opportunity, only twelve respondents chose to provide comments on how they would improve the presentation of the AIB's GO data. These responses largely focused on the presentation of the data, calling for it to be more clearly visualised and easier to work with, for example through the inclusion of interactive graphs and charts through with users can identify the information of greatest interest to them.

Concrete proposals (in addition to those already mentioned):

- **Data in a format which supports pivot tables, application of filters**
- **User friendly graphs, which could be downloaded**
- **Overview of historical development**
- **More refined colour schemes, clearer legends**

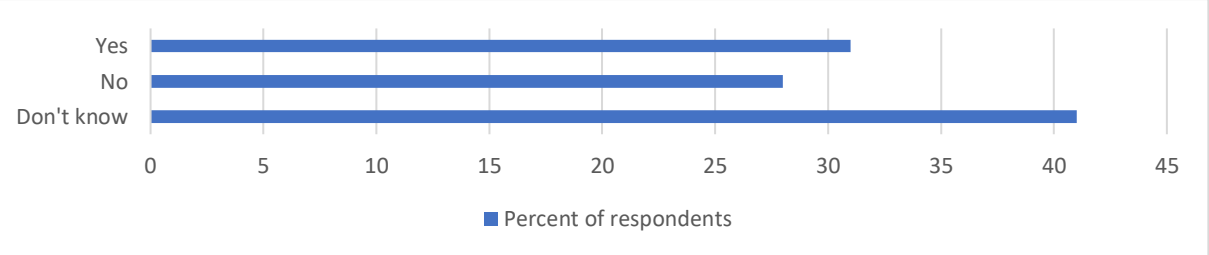
Questions 12 & 13: Would your organisation benefit from the possibility of retrieving statistical data using an Application Programming Interface? (API) and open comments on this possibility

When asked whether they felt they would benefit from being able to retrieve statistical data using an API for direct processing in their organisation's systems the respondents did not provide a clear collective answer. Thirty-two respondents answered, with ten (31%) saying they would benefit from such a set-up, nine (28%) saying they would not benefit from it, and thirteen (41%) stating that they did not know if their organisations would benefit or not. The open comments were cautiously positive about the possibility of an API for AIB GO statistics, but there was also some caution about how it could be implemented and used. This ambiguous response suggests that further engagement is required with stakeholders before an investment is made in the development of an API for the AIB's GO statistics. These results are shown in the table and figure for question 12 below.

Table question 12: Would your organisation benefit from being able to retrieve statistical data using an API?

Would your organisation benefit from being able to retrieve statistical data using an API?	Number of respondents	Percentage of respondents
Yes	10	31
No	9	28
Do not know	13	41

Figure question 12: Would your organisation benefit from being able to retrieve statistical data using an API?



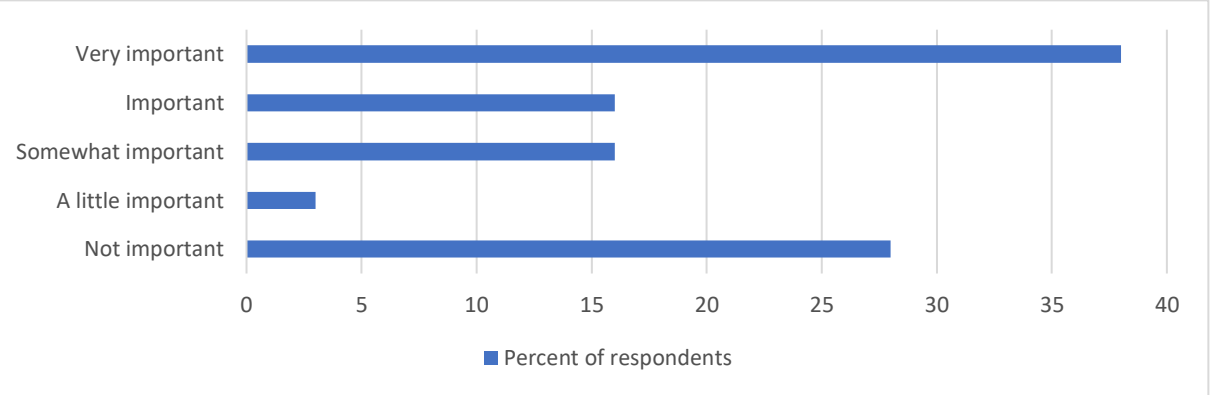
Question 14: How important is it to have statistical price information on GOs?

This question also delivered a somewhat ambiguous response. Thirty-two respondents answered this question, with twelve (38%) saying they felt it would be very important to have GO price information, five (16%) said it would be important, with a further five (16%) saying it would be somewhat important or a little important. Ten (31%) respondents said it would be of little or no importance to have price information. Therefore, while around 70% of respondents placed some importance on the availability of price information, a sizable minority of 30% placed little or no importance on this possibility. Perhaps most interestingly a similar proportion of respondents said the information would be particularly important as said it would be not important. This, again, suggests that further engagement with stakeholders is required before an investment in the development of price information is developed. This is supported by responses to question 15, set out below, which also indicates the reasoning behind any doubts on price information. The results for question 14 are shown in the table and figure below.

Table question 14: How important is it to have statistical price information on GOs?

How important is it to have statistical price information on GOs?	Number of respondents	Percentage of respondents
Very important	12	38
Important	5	16
Somewhat important	5	16
A little important	1	3
Not important	9	28

Figure question 14: How important is it to have statistical price information on GOs?



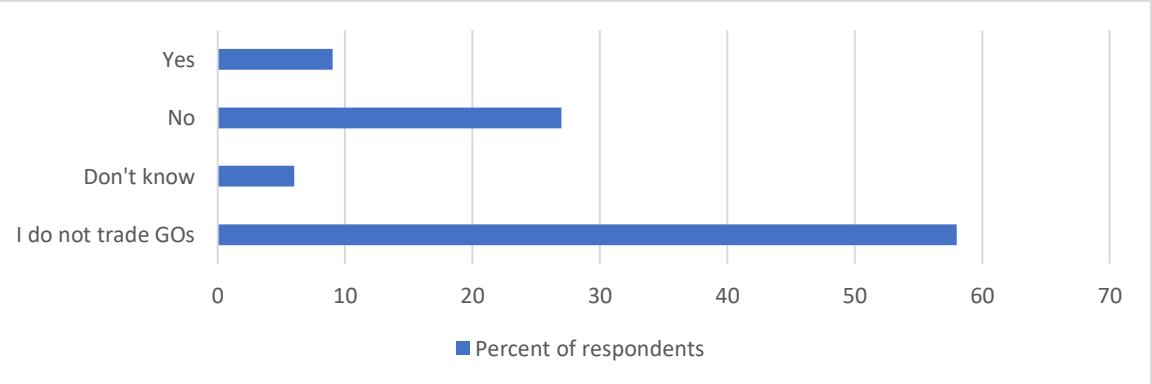
Questions 15 & 16: Would you report prices at which you traded your certificates? and open comments as to why

All thirty-three respondents answered this question, of which nineteen (58%) said they did not trade certificates. Of the fourteen respondents who do trade GOs, three (9% of all respondents and 21% of respondents who trade) said they would share price data but nine (27% of all respondents and 63% of respondents who trade) said they would not. Two respondents said they did not know if they would share price information or not. Eighteen respondents provided comments on their answers, with several expressing doubt that it would be possible to report prices accurately or consistently because of the confidentiality of bilateral trades which make up a large share of GO markets. Some also expressed doubt that reported price data would be accurate because of an incentive for market participants to falsely report in an effort to influence GO market prices in their favour. Other respondents also said that an independent body like the AIB should not engage in price reporting because it could be seen as leading the market and could therefore compromise the independence of such organisations. In general, the open comments were doubtful of the possibility of collecting price information in the GO market, dominated by bilateral trades. The results for question 15 are shown in the table and figure below.

Table question 15: Would you report prices at which you traded your certificates?

Would you report prices at which you traded your certificates?	Number of respondents	Percentage of respondents
Yes	3	9
No	9	27
Do not know	2	6
I do not trade GOs	19	58

Figure question 15: Would you report prices at which you traded your certificates?



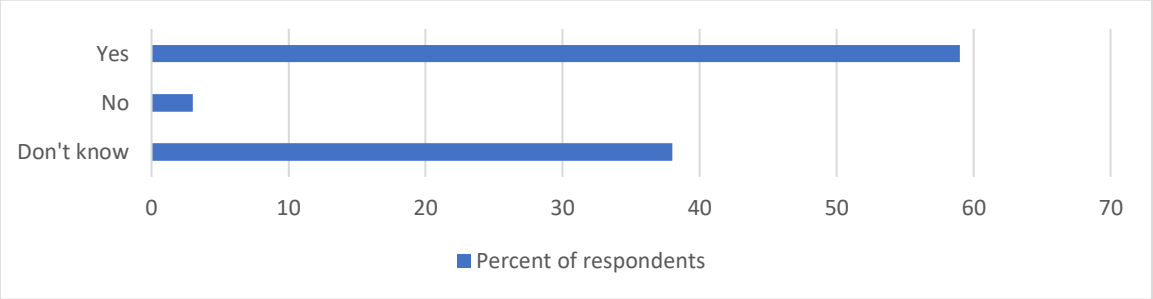
Questions 17 and 18: does the same reporting basis as for electricity GO statistics also accommodate the needs regarding GO statistics for other energy carriers? and open comments

Of the thirty-two respondents who answered this question, a small majority of nineteen (59%) gave a positive response. However, while only one respondent stated they did not believe that the same reporting basis as for electricity GO statistics would also accommodate the needs regarding GO statistics for other energy carriers, twelve respondents said that they did not know either way. These responses appear to show general confidence in the reporting basis for GO statistics. However, there remains a notable amount of uncertainty among respondents on this matter, which could be addressed through further stakeholder engagement. When providing further comments to their answers, several respondents highlighted that each energy carrier has its own characteristics, which should be taken into account in reporting rules and processes. Furthermore, respondents highlighted the importance of reflecting any conversions between energy carriers in the process of reporting GO statistics. The results for question 17 are shown in the table and figure below.

Table question 17: does the same reporting basis as for electricity GO statistics also accommodate the needs regarding GO statistics for other energy carriers?

Does the same reporting basis as for electricity GO statistics also accommodate the needs regarding GO statistics for other energy carriers?	Number of respondents	Percentage of respondents
Yes	19	59
No	1	3
Do not know	12	38

Figure question 17: does the same reporting basis as for electricity GO statistics also accommodate the needs regarding GO statistics for other energy carriers?



Concrete proposals:

- **Separation of cancellations for the purpose of energy carrier conversion (to avoid the same energy from being considered cancelled for final use several times)**
- **Considering that GOs do not cover the entire renewable energy volume for other energy carriers (e.g. biofuel quota)**
- **New categories might be needed (e.g. on substances and raw materials, temperature levels)**
- **Finding a harmonised methodology for transmission and distribution losses, given their higher relevance in gas and heating and cooling.**