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ANNUAL REPORT 2017

AIB
association of issuing bodies

NEWSLETTER 30

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We hope you had a successful 2018, and wish you all the best for 2019.

AIB is still dedicated to continuous quality assurance and improvement.

"AIB – guaranteeing the origin of European energy"

SYNOPSIS OF ARTICLES

The OMC 2018 in Madrid

The Open Market Committee took place in Madrid on 21 September. The AIB appreciates that we have a long-standing cooperation with RECS International, which has enabled to us to set up a forum for the issuing bodies, the AIB, and to meet market participants of the market for Guarantees of Origin (GOs), the OMC.

Blockchain and Energy Tracking

One area in which BLOCKCHAIN may have a role to play is in documenting the ORIGIN of electricity generation, and thus allowing consumers to choose. But before BLOCKCHAIN is coined the Holy Grail of future ORIGIN tracking, it is critical that the provided value proposition is based on current market realities.

RE-Source event on 20-21 Nov

The second RE-Source event took place in Amsterdam on 20 and 21 November, with over 800 attendees! Read more about this international conference where the term 'guarantees of origin' was mentioned so often.

Rewarding members

The AIB is a voluntary driven organisation, dependant on the contributions from all members for a functioning and continuously improving Hub, quality assurance and enforcement of the EECS rules, and providing the European Attribute Mix and the National Residual Mix, to mention just the core responsibilities. We are aware of the members' efforts and in this newsletter; we would like to express our gratitude by writing about the very active members in 2017/2018.

Overview of EECS members

AIB members provide the services of helping newcomers and observers, and to guiding them through the process of joining the organisation. By October 2018, the members of the AIB numbered 24 Issuing Bodies from 21 Member States of the EU, and several countries are approaching AIB, even from outside the EU.

Statistics

The latest activity statistics, showing continued growth in the market and the effect of the introduction of new members. Again with the new method: the statistics will show a monthly summary by technology group per country.

Follow

The Open Market Committee 2018 in Madrid

▲ Jared Braslawsky
◄ Audience

The Open Market Committee took place in Madrid on 21 September. The AIB appreciates the long-standing cooperation with RECS International, which has enabled us to set up a forum for issuing bodies, the AIB, and to meet market participants of the market for Guarantees of Origin (GOs), the OMC.

Last year in Vienna, Austria, we changed the shape of the OMC, extending the duration, improved the structure leaving more room for debate and exchange of views and experience.

When asked whether last year's OMC had inspired the participants or triggered actions, several participants confirmed that they had undertaken action or gained new insights. It is good to see that the OMC delivers results!

The AIB presented some recent results and some ongoing projects. In 2017, we focussed on quality assurance and our Hub. In 2018, we welcomed a new member, Litgrid, and we are now busy renewing our website. Finally, we plan to automate our statistics in 2019. The OMC clearly indicated the value of the statistics prepared by the AIB, which bring transparency and understanding of the market for GOs.

Next issue was the Clean Energy Package (CEP) and specifically the new Renewables Directive, RED II. Although the CEP is not fully decided yet, the political agreement on RED II has been public since the end of June. The text brings a lot of progress, strengthening the GO and broadening the scope of the instrument to gas from renewable sources, like bio methane and hydrogen made from renewable energy. However, some questions and challenges remain open: the mandatory nature of the CEN/CENELEC standard and the impact of the CEP on the European Attribute Mix (Residual Mix) and on disclosure information in general: the information received by electricity consumers regarding the origin of the electricity supplied to them.

When the CEP is fully agreed, we will (hopefully) have a clearer framework for using GOs in the context of disclosure information.

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The Open Market Committee 2018 in Madrid

>> After the AIB took over the two operational tasks from the RE-DISS project, it became ever more evident that a platform is necessary in order to handle the two other tasks. How else should the task of overseeing disclosure information for consumers be coordinated and be aligned with the work of the issuing bodies? The new framework provided by the CEP can only make this need more stringent.

RECS Int'l and its members then provided insights on the market developments. The world of the GO market has been changing dramatically. Gone are the times of the cheap and plentiful GO, as demand is now higher and more and more specific. Consumers are asking for green electricity, but are not ready to settle for any old type of GO. Some prefer local, some prefer newly build, some prefer a certain technology (wind, solar, hydro,…) and some require a mix of specific characteristics.

We then moved into a panel discussion on the sense or nonsense of blockchain technology, with contributions from Norway and the Netherlands. While different examples pointed to the potential of blockchain to speed up or to bring down costs of the operations of GO-registrars and registries, or to bring GOs to smaller scale producers, there was also scepticism about the yet to be proven at large scale technology. I am sure we will be coming back to this topic in future OMCs!

As the demand for GOs is rising, the price for GOs is also rising rapidly. Though it is difficult, maybe even impossible, to make general statements, numbers were mentioned ranging from 1 € up to 7 € per GO for Dutch wind. How will this affect behaviour? Will consumers opt out from green electricity contracts if the premium for these contracts rises too much? Will corporate buyers of GOs change their strategies? And will this rise in prices attract new – potentially less well-intentioned – traders to the market?

Cyber security and VAT-fraud detection is high on the list of AIB's priorities, but as pointed out during the discussion, fraud detection is a shared responsibility. The AIB has joined the call for maintaining the reverse VAT-charging mechanism that was launched by EFET. You can find the statement here.

▲ Panel Discussion

Blockchain and Energy Tracking

The development of BLOCKCHAIN as a relevant IT technology is exciting and may in time have the power to spur change and transition in the energy sector. With the promise of securely connecting energy consumers directly with power generators of all sizes, BLOCKCHAIN easily creates enthusiasm.

One area in which BLOCKCHAIN may have a role to play is in documenting the ORIGIN of electricity generation, and thus allowing consumers to choose. But before BLOCKCHAIN is coined the Holy Grail of future ORIGIN tracking, it is critical that the provided value proposition is based on current market realities.

Today, tracking systems allowing consumers & companies to purchase and document their choice of power – selecting the ORIGIN based on technology, location, producer profile or other things – already exist. And they have actually been around for more than 15 years. In Europe, the Guarantee of Origin (GOs) system is well-established and regulated by the EU. North America uses different REC standards (RECs) and a fast-growing group of countries in Asia, Africa and Latin-America is endorsing the International REC standard. The common term for GOs, RECs and I-RECs is Energy Attribute Certificates (EACs).

Adding to the above scope, Energy Attribute Certificate (EAC) systems not only exist, they actually work well. Most would still argue that improvements are possible and should be welcomed.

Some key facts that should be used as basis for a further discussion:

- On a global basis, we estimate that almost a billion EACs (each 1 MWH) are purchased and paid for annually, to enable the consumer to document their renewable choice
- Key markets are growing – volume-wise - at a brisk 15-20% annual pace – providing a growing money flow back to renewable producers
- EACs are information-rich, transparent & secure – allowing for real consumer choice
- Real energy data at the meter level is made available
- Guarantees that no double issuing, double selling or double counting takes place
- EACs are accepted as "THE" standards for documenting renewable claims for CO_2 accounting among leading independent stakeholders like CDP and the Green House Gas Protocol.
- In Europe, the GO system is also adopted and regulated on a national level - allowing consistent use in calculating annual national fuel disclosure.

Despite the positive developments described, of course not everything is working perfectly. Some market parties may perceive that things are complicated & less transparent than they should like. In many instances the underlying cause is not necessarily technology driven, but rather regulatory and policy constraints – because governments use EACs actively to achieve other energy objectives. By only focusing on the technology part, BLOCKCHAIN risks being sidelined. The policy, regulatory and compliance elements are critical to recognize and address.

BLOCKCHAIN environments need to rethink the goal of their technology – moving in a direction which is less disruptive to existing systems, and rather more toward providing improvements to current systems. It is critical that BLOCKCHAIN advocates include policy makers and regulators in their thinking.

The EAC systems are not technology dependent, but rather technology agnostic, and the industry should seek to utilize the best underlying technology available at any time to provide the best possible service/product.

This means that BLOCKCHAIN should not necessarily seek to replace current EAC systems but might provide a compelling value to the market by providing a better and improved underlying technology infrastructure.

If BLOCKCHAIN can be proved to justify its claims that it provides an infrastructure which is cheaper and more efficient to operate, more transparent and more secure, while creating more value for the market participants – then BLOCKCHAIN should be embraced by the industry.

But if BLOCKCHAIN is positioned as an alternative policy tool to current Energy Attribute Certificate Systems, there is a high risk that years of hard work will be jeopardized, creating confusion among customers, weakening credibility among stakeholders, and increasing the risk of creating double counting. This must be avoided at all costs.

By Tom Lindberg, ECOHZ

ECOHZ
ORIGIN MATTERS

Some impressions from the RE-Source event 2018

The second RE-Source event, which took place in Amsterdam on 20 and 21 November, beat the first edition in several important areas. First of all, over 800 people attended the event, much more than the already very impressive number of attendees in Brussels last year. Secondly, the 'buzz' the event created was even bigger. If you are looking for a case study on the use of (social) media for getting attention, look no further. Thirdly, I have never been in an international conference where the term 'guarantees of origin' was mentioned so often! Moreover, it was clear that the instrumental role of the guarantee of origin (GO) in the context of corporate sourcing of electricity from renewable sources in Europe is now generally being recognised and supported. This was much less the case a couple of years ago. Gone are the days when mentioning GOs triggered mostly frowns and scepticism!

Clearly, the whole discussion on the European Clean Energy legislative Package did a lot to bring the instrument of the GO into the spotlights. Even if from the corporate side, this debate was motivated to a large extend by the rejection of the proposal to auction off GOs that would be issued for production that also would receive some sort of public support, it helped to identify that whenever a consumer (whether a corporate buyer or a household) makes a claim that 'green' electricity is being used, such a claim is only credible if it is substantiated by the cancellation of a GO. So corporate sourcing of electricity from renewable sources – whatever the chosen strategy is – relies on GOs.

The organisers of the event, the RE-Source Platform created under the impulse of SolarPower Europe and Wind Europe and to which the AIB is an associate partner, focus on Corporate Renewable Power Purchasing Agreements (RPPAs). These RPPAs take many forms, but in general include one or several companies willing to (partly) finance an investment in renewable electricity production by a project developer and then for the first 15 to 20 years use the electricity produced. In order to be able to prove that they are indeed consuming the electricity from the project, they rely on GOs.

With regards to policy, the word that was most used was 'harmonised'. The market needs a clear coherent framework, so implementation of the Clean Energy Package needs to be done in a harmonised way. Bulgaria and Poland were given a place in the spotlights, showing great ambition in the area of renewable electricity investments.

On the corporate buyers' side, IKEA pointed out their daily business is already suffering from the consequences of global warming: higher cooling needs, flooding and extreme weather affects the company. That's why IKEA owns more wind turbines than stores. CEFIC pointed out that the chemical industry is moving towards the circular economy fast, but this will require double the amount of electricity. Combine that with decarbonisation and you have good prospects for renewable energy. Michael Liebreich gets the final quote from the opening session: "Enough discussion, we need robust GOs".

The break-out sessions were too rich in content to do any justice to them here. Check out the RE-Source website for an overview.

All in all, I stepped away from the event with a lot of positive energy, albeit also with a hoarse voice from having chatted to so many people. It's clear the momentum of clean energy cannot be turned around anymore!

Finally, there was a declaration, calling for removal of barriers to renewable energy procurement in support of Europe's climate and energy goals, that was launched at the RE-Source event and which is also supported by the AIB, along with almost 100 other organisations and companies.

AIB says 'Thank you!' to highly contributing people

Rewarding AIB members and observers for their efforts in 2018

In the organization (AIB), there are three working groups whose members work on some specific topics related to the different areas of responsibilities. Among others, we can here underline some of them:

1. for Working Group Internal Affairs the responsibilities are the development, maintenance and enforcement of operational rules for a harmonised, efficient and reliable energy certification system compatible with national schemes and legislation and European legislation;
2. for Working Group System the responsibilities are development of the AIB Hub and working on the EECS system (AIB Hub) efficiency and enhancement and
3. for Working Group External Affairs to provide information (by annual reports, newsletters,...) to members and non-members, including stakeholders, government, NGOs in the field of guarantees of origin and electricity disclosure in Europe.

All AIB members are invited to (voluntary) join any of these working groups depending on their interest and benefits for their company. Since this is a voluntary approach, sometimes it is very complicated for members to balance between their working load hours for the company they work for and for the AIB (Working Group).

The AIB is aware of the members' efforts and for many years, there have been several activities to honour and appreciate highly contributing members. In this newsletter, we would like to express our gratitude by writing about the active members in 2017/2018.

One of those active members is **Almir Muhamedbegovic** who works for the Operator for RES in the Federation of Bosnia and Herzegovina as the Issuing Body for the Federation of Bosnia and Herzegovina, but still as an observer in the AIB. The WGEA interviewed Almir regarding his contribution to the AIB and this is what Almir told us about himself:

Would you tell us more about yourself, your position within the AIB and your company?

Since my graduation in electrical power engineering, I have been working within various fields of electrical engineering, from industrial engineering design and electricity production through quality assurance in manufacturing and production, electrical preventive maintenance in the chemical industry as well as consulting on electrical design installation at capital construction projects.

Starting from June 2014 I have been working as a power engineering specialist at the Operator for RES in the Federation of Bosnia and Herzegovina (FBiH), which is an issuing body for GOs in FBiH. It is an institution, established by the Government of FBiH, which is primarily responsible for implementation of an operative system for incentivised production of electricity from RES.

On behalf of the Operator for RES, which has been an Observer in the AIB since February 2016, I have been actively participating in the WGIA meetings, trying to contribute to the organization (AIB) in finding the answers to challenges raised from various topics regarding GOs.

Please tell us about what and why you like working with topics related to GOs and in general issues which the AIB is responsible for and involved in. Especially, tell us more about your membership to the Sounding board, and why you like it.

If you are convinced that your work can contribute even a little to creating a better world, no matter how small a piece you add to the big puzzled picture, you will definitely like your job. During AIB's WGIA meetings, we are discussing topics relating to EECS Rules, Quality Assurance of the GO system, upcoming Renewable Directives and the Internal Energy Market Directive. During these meetings, I have been witnessing good spirit as a common driving force among AIB members. This indicates that all participants are truly dedicated to find solutions regardless of their different points of views. All of us in the AIB find the importance of GOs being a reliable source for electricity disclosure. All of us strongly believe that renewable energy is definitely the best answer to global intensive pollution challenges. We all understand that European consumers must know where the electricity they are consuming derive from and that GOs are reliable information for this.

In the year of 2017, as a mature organization, the AIB started a project on its organizational transformation by process changes. The Sounding Board, joined with Consultant Project team, made of several AIB members' representatives and one observer's representative, started their activities in February 2018. This group has been trying to determine organizational change proposals which will determine the future direction of AIB's activities. Being a member of the Sounding Board I consider as an honor and of course, as a recognition for my previous participation to the AIB. Joint meetings of this group are very vibrant and constructive. All participants are aware of the consequences that potential changes could bring to our organization. Everybody's opinion, suggestions and ideas are considered carefully.

Almir Muhamedbegovic

Sometimes outsider's point of view is useful for an organization. Comparing to usual approach of old member, newcomers may bring a different approach to old topics due to that different point of view.

In which way benefits your company/organisation from your involvement in the AIB?

As an issuing body for Guarantees of Origin (GO), Operator for RES, we have been aware of its lack of experience related to guarantees of origin as well as the new challenges brought by opening of the electricity market in Bosnia and Herzegovina. Therefore, we have identified the AIB

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>> as the correct address to see how GOs standardized solution works across Europe and how to implement the RES Directive, especially its article 15. The status of an Observer to the AIB provides us valuable experience from members regarding the implementation of EECS rules. Also, transfer of that knowledge and exchange of experience can save us from repeating some mistakes that some member countries had made before. On the other hand, the benefit of great AIB member's network is precious.

In which way is your work for the AIB accepted in your company?

All my activities within the AIB are focused in two directions: giving and receiving. Logically, as a newcomer to the organization, I am receiving more than I am giving. The experience and knowledge, which I am getting, is becoming useful only if I distribute it and use it within the Operator for RES. In this way my institution is given real insight what is the actual situation with GOs in Europe, and what is to expect regarding GOs in future EU legislation, electricity market opening and ECCS rules. The most important, what FBiH needs to do regarding its legislation's changes to synchronise with EU regulation concerning GOs.

What challenges did you meet since you/your company have been an observer?

Currently Operator for RES is facing two main issues: synchronisation of domestic legislation (RES Law in particular) with the RES Directive as well as finding reliable methodology for electricity disclosure. Also specific administrative organization of Bosnia and Herzegovina (with two entities and one district) in terms of electricity distribution networks sometimes make our situation very challenging.

What are the backwards that you have faced so far?

In June of 2018 with technical assistance of GIZ, the Operator for RES started to work on creation of the first version of EECS Electricity Domain protocol for the Federation of Bosnia and Herzegovina and disclosure's secondary legislation. We expect this work to be finished by the end of this year.

Since you come from the country outside of the EU, but within Energy Community countries, do you see your work as the possibility to broaden the energy certification knowledge to your colleagues in other (Energy Community) countries?

Sharing of knowledge is always a good approach. All countries which are Energy Community's (EC) members are supposed to implement EU Directives in the energy sector including the RES Directive. I consider sharing energy certification knowledge as a logical step, which could bring benefits to all these countries. The idea is to use EC as a main force to unite members to follow EECS Rules in their countries so they could have GOs, which are standardised with the RES Directive. This will also contribute to unification, standardisation and integration of the electricity market in EC countries.

Finally, GOs for electricity circulating within EC member states and EU basically means added value of this unique „goods". Desire to have goods with added value can speed up the market opening process as well.

Do you have something to add? Maybe some suggestions or wishes for the future work?

I wish the AIB to grow bigger and stronger, hoping that full integration of all EC countries will be part of that process.

Katja Merkel

Another AIB member we would like to put in the spotlight is a member from the Working Group Systems: **Katja Merkel** who works for the German Environment Agency (UBA) as the Issuing Body for Germany.

Katja contributed to the user acceptance test of the new hub and she is a regular follower of WGS. Being too busy with her daily work and now on awell-deserved long holiday, she could not do the interview. But anyhow she deserves to be mentioned and thanked.

Overview of EECS members

In 2016 and 2017, the number of members increased to 22 and 23 respectively. By October 2018, the members of the AIB numbered 24 Issuing Bodies from 21 Member States of the EU (the Belgian regions of Brussels, Flanders and Wallonia each have their own issuing body, as has Federal Belgium, which has responsibility for offshore production).

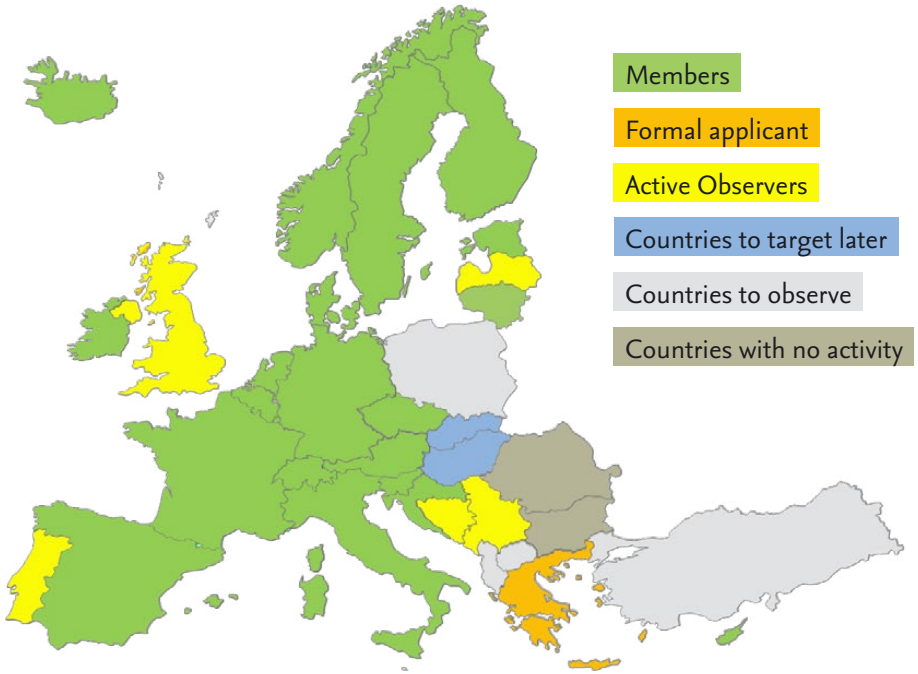
These members are – in terms of implementation of the system of Guarantees of Origin, Directive 2009/28/EC – mainly regulatory agencies and transmission system operators, plus market operators and energy agencies.

Current status as of October 2018 includes the following 24 members (see table 1).

The Issuing Body from Lithuania – Litgrid AB (TSO) – became an AIB member at the General Meeting in June 2018.

The current status of some AIB observers was changed during 2018:

- DGEG (the Director-General for Energy and Geology) from Portugal appointed a team for the setting up of the Portuguese Issuing Body for GO (IB), a major priority is to start recognizing imported GOs
- LAGIE from Greece will split into 2 entities: The Energy Exchange and DAPEEP. DAPEEP becomes Issuing Body for GOs and Competent Authority for Disclosure and has applied for membership.



▲ Figure 1. Map of Europe with AIB activities

COUNTRY	AIB MEMBER
Austria	E-Control
Belgium	Federal - CREG
Belgium	Brussels - Brugel
Belgium	Flanders - VREG
Belgium	Wallonia - CWaPE
Croatia	HROTE
Cyprus	TSO-CY
Czech Republic	OTE
Denmark	Energinet
Estonia	Elering
Finland	Finextra
France	Powernext
Germany	UBA
Iceland	Landsnet
Ireland	SEMO
Italy	GSE
Lithuania	Litgrid
Luxembourg	ILR
Netherlands	TenneT - CertiQ
Norway	Statnett
Slovenia	AGEN-RS
Spain	CNMC
Sweden	Energimyndigheten
Switzerland	Pronovo

▲ Table 1. The list of AIB members in October 2018

There are a few countries with "old" and "new" observer status that started the process of joining the AIB in previous years:

- EMS (TSO) from Serbia
- Ofgem (Regulator) from the UK
- Operator for Renewable Energy Sources and Efficient Cogeneration (Market Operator) from Bosnia and Herzegovina and
- Turkish Regulator (Turkey has a special status as an observer, but not a candidate for membership, given that the scope of the AIB is limited to Europe).

The map of Europe, showing AIB activities, demonstrates that the countries have different status - whether it is a member, a formal applicant for membership or a country which has shown an interest in the AIB's work, or a country to which the AIB has made a first approach. However, there are a few countries with no activity, as the AIB has had little or no official contact with them so far – these are Albania, Bulgaria, FYROM, Hungary, Montenegro, Poland, Romania, Slovakia and UNMIK.

AIB members provide the service of helping newcomers and observers to guide them through the process of joining the organisation – we call this a SPOC (Single Point Of Contact). It includes teleconferences, emails, or any other communication, and also a physical meeting if appropriate and possible, regarding distance or budget. For example, this helped the observers from Serbia and Bosnia and Herzegovina to become more involved in the Association, as a result of which they became very active observers.

Statistics

Methodology

Frequency of reporting

Statistical data is collected and reported quarterly. Where available, data has been collected for all months since 2000, as this permits a high level of reconciliation between individual and total figures.

Data items recorded

Data is collected for each domain and month, and relates to single energy sources or groups of energy sources. For each domain / month / source the following is recorded:

a. **By production date:** issued, expired and cancelled - this lets the market know how many certificates of each vintage are available for trade, so informing price setting.
b. **By transaction date:** transferred within domain, imported, exported, expired and cancelled - this helps in judging the level of market activity, and making certificate expiry dates visible further informs pricing and trading strategy; and also enables AIB to calculate it membership fees.

Energy source codes

The list of codes has been prepared by reference to the codes used by all registries, and member preferences. EECS Rules Fact Sheet 5 provides the definitive list of energy source codes, aggregating reported codes into higher-level codes where codes: are **inactive** (e.g. hydro and wave power will be aggregated until such time as wave power becomes more widely used); are **unknown** (e.g. sold renewable fuel may be used where conversion between codes has resulted in the original code becoming unknown); are **not demanded** by the market (e.g. Orimulsion is simply reported as "Fossil").

Analysis

Where possible, the statistical reports will provide a disclaimer explaining shortcomings in the data. This might include domains that do not provide certain items of data, and those that have not contributed to the latest report. The value of publishing data which contains such shortcomings is felt to outweigh the absence of such data.

Some items may solely be useful at a pan-European level (e.g. domains will not know if certificates they issued and exported have been cancelled). Hence it will be possible to know the length of the market across Europe, but not necessarily for certificates issued in a specific country.

Certificates withdrawn by the issuer (perhaps those issued in the wrong quantities or for the wrong technology) are statistically insignificant, and have therefore been ignored.

Further data is available on our website.

General

All certificates are 1MWh. As metering data is the basis for issuing certificates, there is always some delay in gaining accurate statistics for the corresponding data for a specific month, so the most recent quarter's issuing activity will always be understated and consequently this information should be treated with caution.

Statistics for certificates issued in a specific month are not presented, as the value of this data is not clear. In general, "issued by transaction date" will be similar to, but slightly later than, "issued by production date", due to the inevitable delays in processing meter data. Currently, close to 100% of the certificates for energy produced in a month will be issued within the following 6 months.

Explanatory notes to statistics

Date of collection of data

These statistics were completed on 21 November 2018 and based on statistics gathered either from statistics published AIB member websites, or where such data is not available, from data provided to the AIB by individual members.The data itself was provided between 1 October 2018 and 6 November 2018 on the following days:

Aggregation of data

In some cases detailed data has been aggregated. For instance "manure" also refers to "pig manure", and "fossil" also contains "unknown source". Further, unspecified renewable energy contains that which originates from technology codes T05000000 (combustion) and T07000000 (known).

Completeness of data

The Grexel registries (DK, HR, IE, IS, LU, NO and SE) provide all required information. However, information from these domains relating to periods prior to the adoption of this version of the registry is not always available. For instance, the previous registries did not record the quantity of cancellations by production date that had taken place during the life of these registries.
The Austrian registry does not currently provide expiry data.

The difference between total exports and imports is the result of absences in the information gathered, and due to exports to Belgium needing to be accepted by the importer, introducing delay registering the transaction (and which is potentially treated differently by different registries).

Country	Collected	Source
Austria	29 October 2018	website (password protected)
Belgium - Federal	29 October 2018	spreadsheet provided by CREG
Belgium - Brussels	06 November 2018	spreadsheet provided by Brugel
Belgium - Flanders	18 October 2018	spreadsheet provided by VREG
Belgium - Wallonia	01 October 2018	spreadsheet provided by CWaPE
Croatia	08 October 2018	website
Cyprus	19 October 2018	spreadsheet provided by TSO-CY
Czech Republic	09 October 2018	spreadsheet provided by OTE
Denmark	08 October 2018	website
Estonia	17 October 2018	spreadsheet provided by Elering
Finland	02 October 2018	spreadsheet provided by FinExtra
France	30 October 2018	spreadsheet provided by Powernext
Germany	06 November 2018	website
Greece		Not yet available
Iceland	08 October 2018	website
Ireland	08 October 2018	website
Italy	12 October 2018	spreadsheet provided by GSE
Lithuania		Not yet available
Luxembourg	08 October 2018	website
Netherlands	04 October 2018	spreadsheet provided by CertiQ
Norway	08 October 2018	website
Portugal		Not yet available
Slovenia	10 January 2012	Only one market party currently, so publication of data would expose their trading position. Data will be published when other market parties commence trading.
Spain	18 October 2018	spreadsheet provided by CNMC
Sweden	04 October 2018	website
Switzerland	01 November 2018	website (password protected)

Please note

New data

The latest version of the statistics now provides:

- Relating to electricity produced during a specific year: the number of certificates issued, expired and cancelled
- Relating to the date when transactions actually took place: the number of certificates transferred, exported, imported, expired and cancelled.

The number of domestic and international certificate transfers have not been reported by production year, as this information does not seem to have a use. For the same reason, the number of certificates actually issued during each month is not reported.

Fuels

The fuels displayed reflect those used by member registries, normally at the most detailed level. Due to the more detailed information now being kept, some information is at a high level. For instance, "Solid - unspecified wood" might contain forestry products, energy crops and so on. Similarly, "liquid - renewable fuels" may contain black liquor. However, when this has been recorded, then it is displayed as such. Hopefully, over time, all registries will provide information at the more detailed level, enabling more accurate analysis.

As other certificates are issued for fuels not on the current list, so these categories will be added and reported against.

Missing and seemingly contradictory data

A further point for consideration is that the new data has only been collected by registries since last year, so it will be absent in earlier data; and for those countries where the registries have yet to capture and report this information. However, given the recent restriction on the lifetime of certificates, this matter should be corrected in the next year or two.

This explains a number of anomalies - for instance, the difference between the total number of certificates cancelled for all production years, and the total number of certificates cancelled by year of transaction: while all registries report when certificates are cancelled; not all registries report the production year to which they relate.

Production and Transaction statistics

Production statistics refer to the month and year when the electricity was produced, whereas Transaction statistics refer to the month and year when the transaction took place.

Thus Production → issue is the number of GOs issued for electricity produced in a specific month, while Transaction → issue is the number of GOs issued during a specific month, regardless of when the associated electricity was produced (note that GOs are issued one or more months after the electricity is produced).

Similarly, Production → cancelled is the number of GOs cancelled which relate to electricity produced in a specific month, while Transaction → cancelled is the number of GOs cancelled during a specific month, regardless of when the electricity was issued.

For each of the above (Production and Transaction):

Issue	=	GOs created in a month for electricity produced in an earlier month
Transfer	=	GOs transferred within a country or region
Export	=	GOs transferred to another country
Import	=	GOs transferred from another country
Cancel	=	GOs which have been made non-transferrable by the holder of the account in which they reside (or its agent)
Expire	=	GOs which relate to electricity produced more than a year ago, and which have consequently been cancelled.

Statistical report

During the third quarter of 2018, market activity continued to increase, as has the use of guarantees of origin (GOs) for disclosure purposes – which is again appreciably higher than it was at this time of the year in any preceding year. These graphs illustrate activity in two ways:

1. **Activity by production date** – this shows the quantity of GOs issued, expired and cancelled which relate to **electricity produced in a given year**; and indicates those which either remain on the market or are otherwise unaccounted for.
2. **Activity by transaction date** – this shows the quantity of certificates **actually** issued, transferred within that country or region, transferred internationally, expired and cancelled in a given year.

Issue, transfer and cancellation continue to increase over preceding years.

Further growth is expected as new countries are connected to the Hub, and as activity increases within existing members – Lithuania joined over the summer.

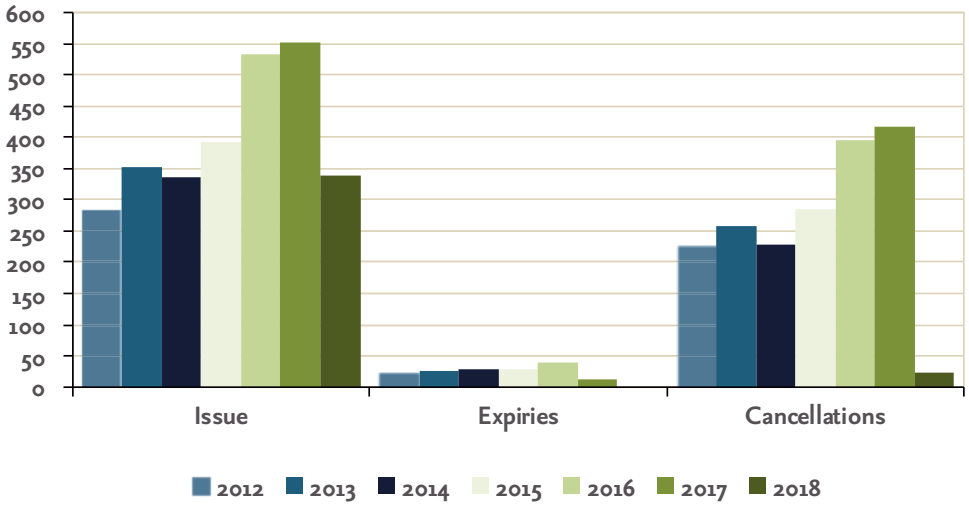
Note that Cyprus continues to test its registry against the AIB Hub and has yet to commence issuing.

LAGIE of Greece and EMS of Serbia have applied for membership, while OKTE of Slovakia is about to apply for membership, and all will probably become active within the next year.

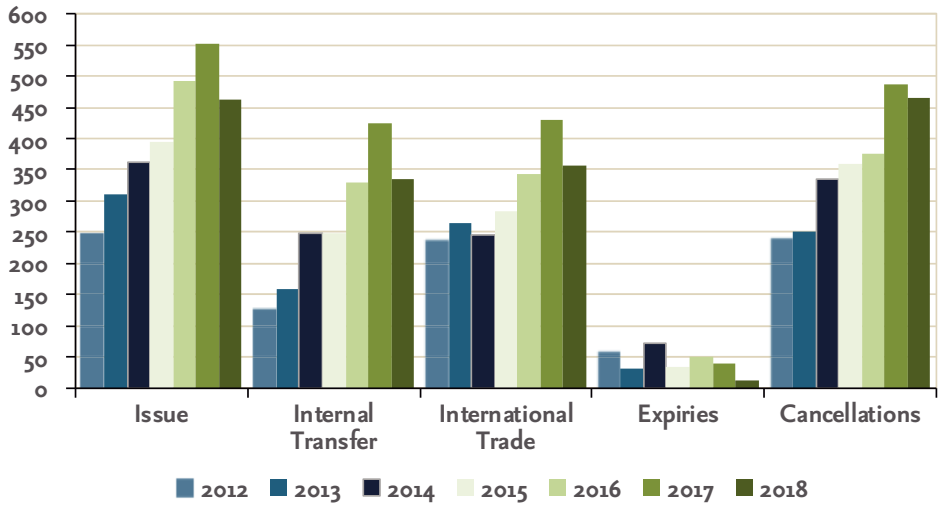
Ofgem of the United Kingdom, RES Operator of Bosnia and Herzegovina, AST of Latvia and DGEG of Portugal are official observers; and contact continues with interested parties in Poland, Kosovo, Hungary and Montenegro. Turkey is interested in implementing a compatible system of GOs.

Issuance in 2017 exceeded that for 2016, while the number of GOs cancelled and transferred internationally continues to grow markedly and 2018 looks set to exceed the previous year's record levels appreciably, demonstrating the increased use of GOs for purposes of selling products for differentiated energy sources.

Annual EECS transactions by production date (TWh)



Annual EECS transactions by transaction date (TWh)



The small monthly discrepancy between exports and imports is due to not all transfers being instantaneous, so hence trades which commence in one month can complete the following month; however, the general shape of the import and export graphs is similar.

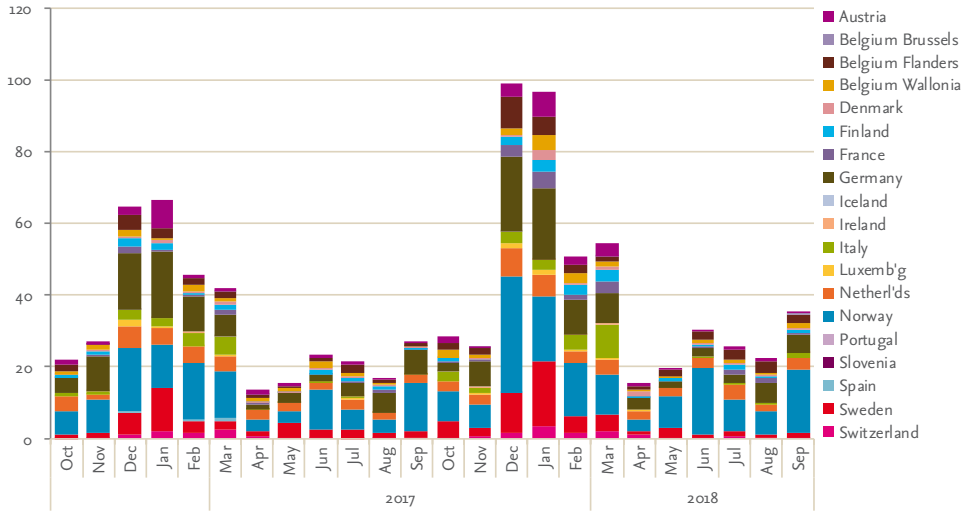
In 2017, exporting countries were predominantly Nordic plus Italy, France and Belgium; while the Nordic countries, Benelux and Germany as the major importers, followed by Italy and Austria.

So far in 2018, the major exporters and importers have been broadly the same as for 2017.

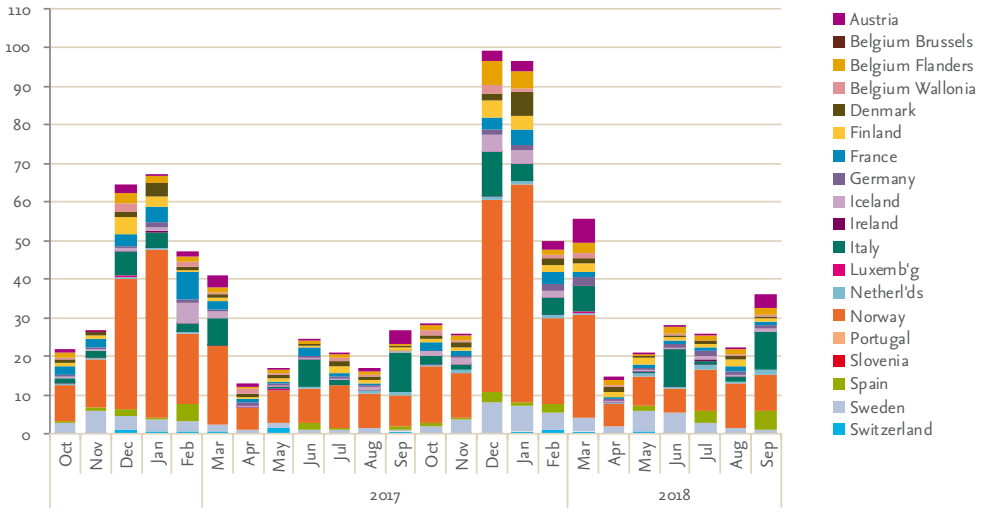
During both years, some countries figure in both exports and imports, suggesting trading activity or account-holders transferring GOs to other countries to take advantage of better registry facilities and transaction fees.

These charts show the large role that the Nordic region has in this market, and the interest in renewable products elsewhere in Europe, particularly Germany and Benelux.

Monthly imports per country (TWh)



Monthly exports per country (TWh)



There are still trades where certificates are cancelled in one country for use in another: these are known as "ex-domain cancellations (EDCs)". The EECS Rules only permit this where transfer is technically impossible, so this does not occur between member countries - less than one percent of all EDCs are between member countries. EDCs may also occur where the account holder either does not reveal (or perhaps conceals) the country for which GOs are being cancelled: this damages the accuracy of residual mix calculations, and is therefore something which the AIB and its members are keen to detect and prevent.

EDCs can and do occur between member countries and non-member countries, to the extent that so far in 2018, almost 93 percent of all EDCs went to non-member countries in Europe, less than one percent of EDCs being used outside of Europe. The remaining EDCs were largely due to Swiss law requiring the supply of fossil and nuclear energy to be evidenced by GOs and other countries not accepting these, and Lithuania not being connected to the Hub until summer 2018.

The following table gives an indication of the countries for which ex-domain cancellations were executed in 2018.

Ex-Domain Cancellations by country : 2018

Destination \ Source	BEF	CH	DK	EE	FI	FR	NO	TOTAL
Albania	0	0	0	0	0	0	29.685	29.685
Australia	0	0	0	0	0	0	38	38
Bosnia	0	0	0	0	0	0	5	5
Brazil	0	0	0	0	0	0	1.100	1.100
Bulgaria	0	0	0	0	0	0	32.459	32.459
Chile	0	0	0	0	0	0	900	900
Germany	0	1.938.293	0	0	0	0	0	1.938.293
Greece	0	0	640	0	0	0	43.412	44.052
Hungary	0	320.956	0	0	0	0	107.620	428.576
Italy	0	176.328	0	0	0	0	0	176.328
Latvia	0	0	0	44.034	30	0	7.048	51.112
Lithuania	0	0	0	664.535	0	0	22.907	687.442
Peru	0	0	0	0	0	0	8.000	8.000
Poland	0	0	10.000	0	22.585	0	299.449	332.034
Portugal	0	280.343	3.546	0	146.046	0	63.966	493.901
Romania	0	0	0	0	0	0	40.835	40.835
Russia	0	0	0	0	467	0	120.289	120.756
Saudi Arabia	0	0	0	0	0	0	4.065	4.065
Serbia	0	0	0	0	0	0	42.192	42.192
Slovakia	0	169.568	0	0	0	639.413	34.372	843.353
Sweden	0	0	0	0	0	0	8.479	8.479
Turkey	0	0	0	0	0	0	900	900
UK	20.000	3.418.630	3.978.740	0	405.259	26.883	19.086.155	26.935.667
Ukraine	0	0	0	0	0	0	2.748	2.748
United Arab Emirates	0	0	0	0	0	0	37	37
United States	0	0	0	0	0	0	20.622	20.622
TOTAL	4.134.260	3.952.456	2.358.787	292.127	935.257	15.640.622	4.834.732	32.243.579

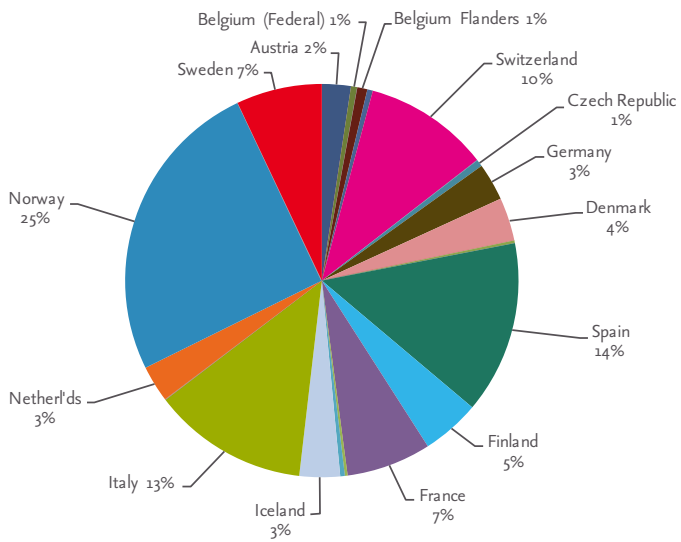
- Ex-domain cancellations to Germany were for fossil and nuclear electricity, and UBA does not accept fossil and nuclear GOs
- Ex-domain cancellations to Italy were for nuclear source electricity, and GSE does not accept nuclear GOs
- Ex-domain cancellations to Lithuania due to Litgrid not at that time being connected to the Hub
- Ex-domain cancellations to Sweden were for [not known]

EDCs to member countries

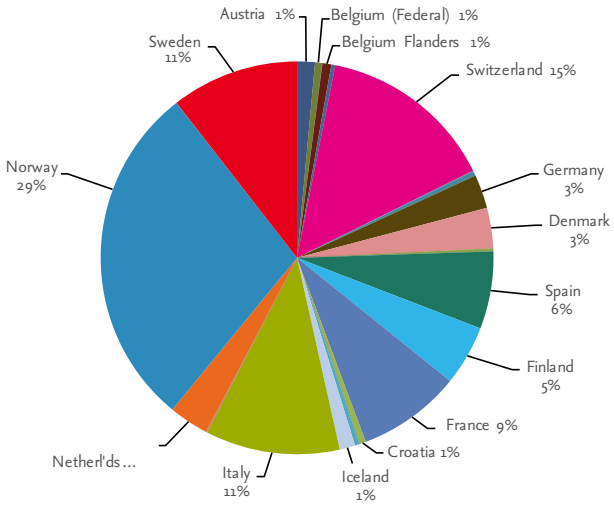
	TOTAL		Q1		Q2		Q3		Q4	
EDCs to member countries	2.123.100	6,59%	-	0,00%	1.979.621	8,47%	143.479	11,05%	-	0,00%
EDCs to European non-member countries	29.964.061	92,95%	7.162.151	98,80%	21.391.167	91,48%	1.106.412	85,19%	304.331	99,60%
EDCs to Europe	32.087.161	99,54%	7.162.151	98,80%	23.370.788	99,95%	1.249.891	96,24%	304.331	99,60%
EDCs outside of Europe	148.418	0,46%	86.686	1,20%	11.669	0,05%	48.841	3,76%	1.222	0,40%
EDCs to unknown destination	-	0,00%	-	0,00%	-	0,00%	-	0,00%	-	0,00%
TOTAL	32.235.579		7.248.837		23.382.457		1.298.732		305.553	

The following graphs are based on specific "vintages" of certificate (i.e. associated with electricity produced in a particular year), and show the final destination of GOs associated with electricity produced by each member country in a year.

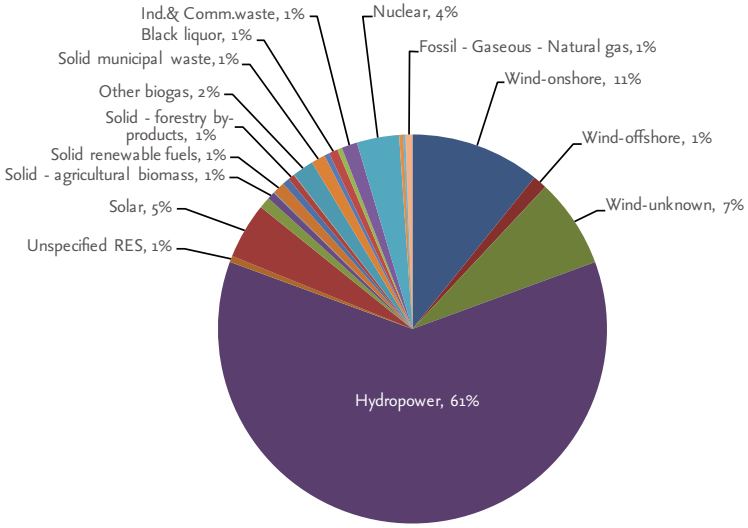
2017 Issue



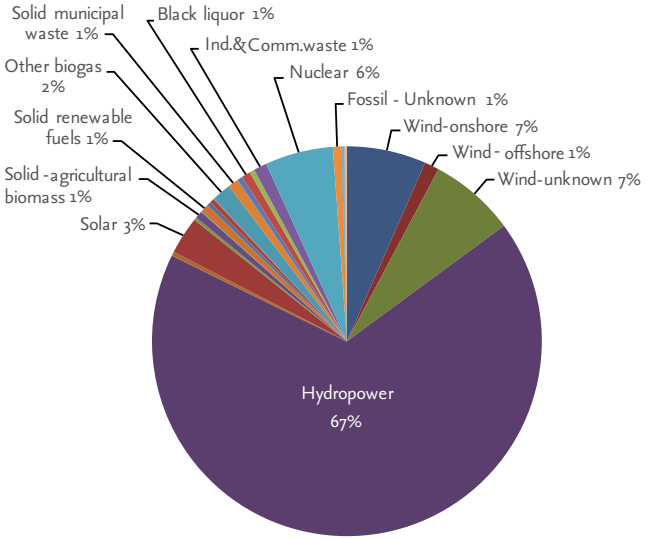
2018 Issue



2017 Issue

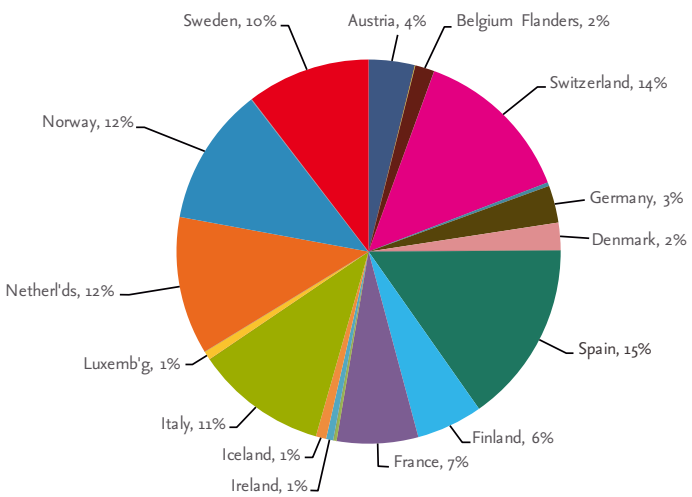


2018 Issue

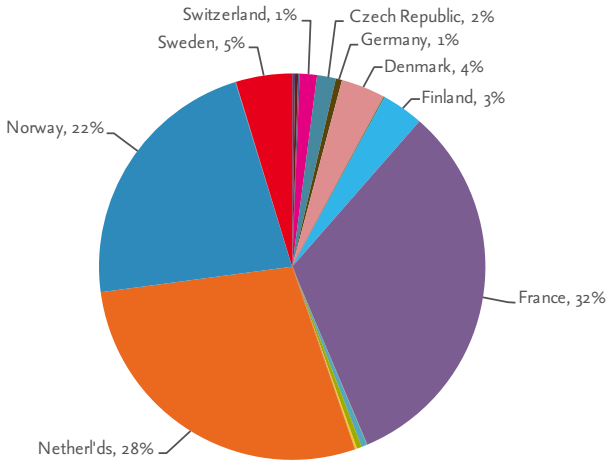


For renewables, hydropower remains by far the prevalent supplied renewable energy source, followed by wind, biomass and then solar; although the low reservoir levels over summer have led to a substantial increase in the proportion of windpower in the mix on previous years.

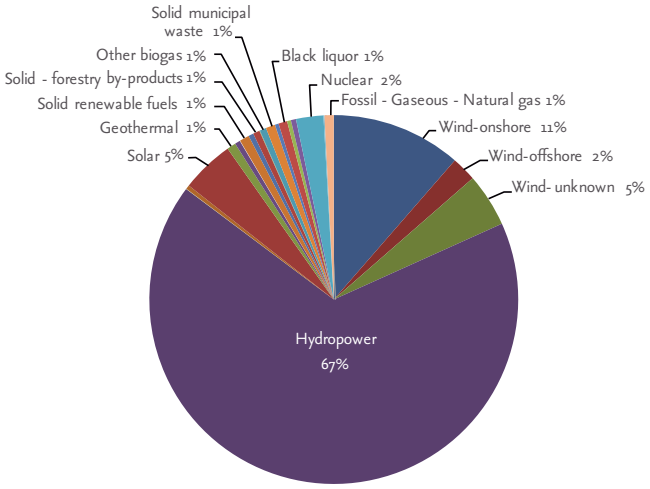
2017 Cancel



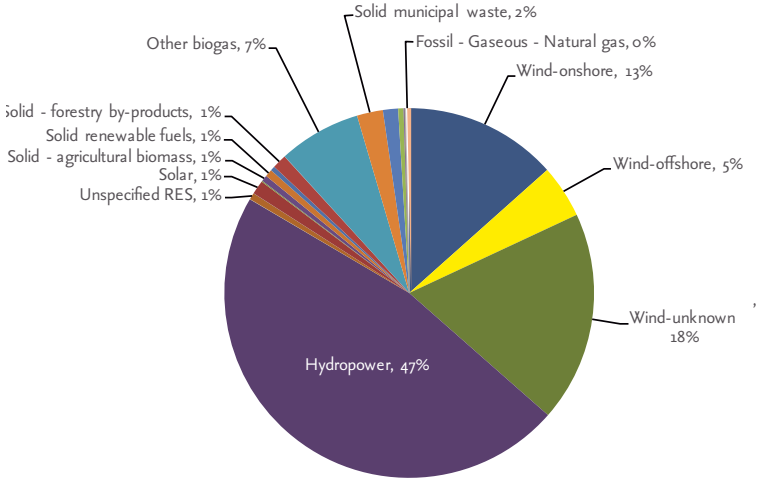
2018 Cancel



2017 Cancel



2018 Cancel



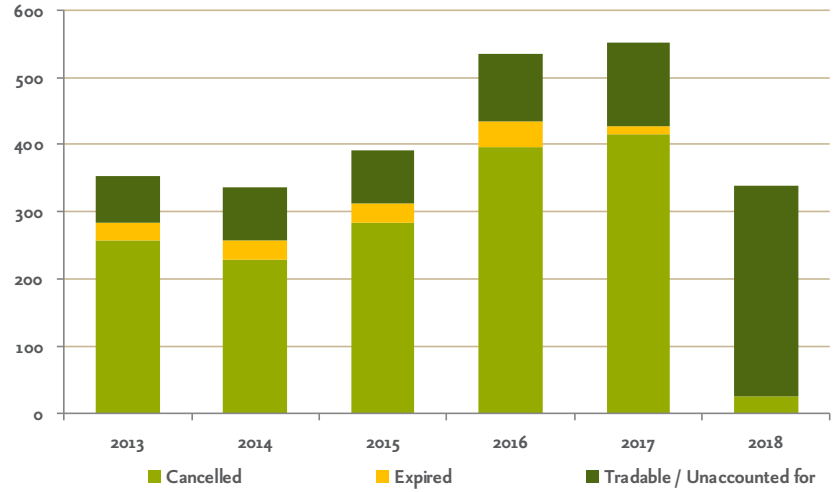
Comparing the status of different vintages of EECS certificate, we can see what has happened to the certificates that were issued for energy produced in the last six years - that is, whether the certificates have:

- been cancelled as evidence of supply;
- expired due to it being more than one year since the associated energy was produced (as required by Directive 2009/28/EC); or
- whether their whereabouts is unknown. This may mean that they remain available for trade, but it could also be that they have been transferred to a registry that does not currently report expiry and cancellation by the date of production.

Two graphs are shown. In the first, actual numbers of certificates are given; while the second illustrates the proportion of certificates in each category.

The picture is becoming clearer as more and more registries support expiry, while the substantial rises in the price of GOs seem to indicate that accountholders are increasingly aware of the benefit of using GOs rather than letting them simply expire.

Usage of EECS Certificates



Proportion of EECS Certificates available

The following tables display the raw data by domain at a yearly level. Aggregated totals are given for the period since records began (2000); and for the period from January 2017 until the date of collection of the data (during November 2018 – although note that not all registries can provide the required information upon request – see also "Explanatory notes to statistics" in this statistical report).

Issuing, Trade & Redemption for all Fuels

	Total : 2001 to 2018									2016 to 2018								
	Production			Transaction						Production			Transaction					
	Issue	Expire	Cancel	Issue	Transfer	Export	Import	Expire	Cancel	Issue	Expire	Cancel	Issue	Transfer	Export	Import	Expire	Cancel
Austria	86.707.868		122.809.836	89.646.090	151.963.578	113.111.812	190.742.147		155.270.076	30.237.238		33.682.568	35.126.568	54.299.139	45.212.806	61.581.630		55.116.966
Belgium (Federal)	9.146.911			9.146.911						7.083.597			7.667.173					
Belgium Brussels	440.595		326.592	77.388	13.237.719	14.800	11.958.826	5.390	23.895.725	279.721		224.551		8.462.686		445.005	5.390	6.716.622
Belgium Flanders	38.133.159	5.618.728	53.981.512	34.411.427	115.637.137	125.510.846	275.429.829	8.374.296	165.947.894	11.266.135	1.063.294	17.875.601	12.223.689	49.983.366	49.798.701	76.317.627	2.232.183	25.152.348
Belg & Lux RECS	113.390						2.031.496		2.048.355									
Belgium Wallonia	15.748.238	120.406	7.002.388	12.130.820	64.659.202	43.187.493	114.341.119	1.999.395	61.015.660	5.947.094	91.270	3.123.274	7.732.823	33.994.339	24.103.794	40.753.531	895.955	12.569.122
Belgium	63.582.293	5.739.134	61.310.492	55.766.546	193.534.058	168.713.139	403.761.270	10.379.081	252.907.634	24.576.547	1.154.564	21.223.426	27.623.685	92.440.391	73.902.495	117.516.163	3.133.528	44.438.092
Switzerland	387.006.999	58.282.022	295.479.715	388.478.591	102.015	41.670.986	77.342.294	105.387.775	315.333.232	163.833.084	14.905.503	106.040.057	168.907.094		15.243.191	32.343.054	27.907.330	153.964.400
Cyprus	472.080			456.305				385.627		472.080			456.305				385.627	
Czech Republic	7.146.023	316.174	5.465.307	7.241.459	6.155.290	3.049.745	2.029.832	360.279	5.485.441	5.859.898	70.297	2.655.883	6.005.962	4.035.788	3.049.745	367.735	160.288	3.606.565
Germany	104.110.617	5.085.115	202.266.223	102.733.578	333.555.541	49.851.864	599.257.799	13.629.740	610.588.195	43.230.132	218.165	27.272.998	46.194.956	130.701.899	22.966.902	225.456.271	5.222.692	267.147.783
Denmark	124.253.638	8.616.182	54.856.861	114.450.759	47.731.774	83.644.363	34.776.385	8.616.042	56.683.306	46.901.370	405.197	18.798.884	49.027.849	19.850.566	39.971.477	18.539.850	1.151.981	23.467.104
Estonia	4.009.422		436.356	6.934.262	11.208.491	4.248.407	5.364.912	1.005.210	4.353.717	3.106.830		325.642	5.130.549	9.856.250	3.503.905	5.093.993	480.864	4.006.700
Spain	200.598.109	5.313.315	137.267.345	190.359.633	144.722.484	33.503.738	1.541.623	2.423.295	147.658.469	185.911.967	5.313.315	137.267.345	186.924.480	144.722.484	27.938.565	1.483.243	2.423.295	141.114.881
Finland	235.645.658	8.387.326	155.864.917	174.111.398	54.267.863	242.040.595	212.319.108	8.387.326	171.321.627	68.612.956	267.762	47.639.094	73.921.357		49.388.253	40.602.817	363.240	61.956.655
France	231.604.398	14.954.223	97.068.597	209.001.826	29.124.599	111.364.517	52.614.123	19.787.647	144.982.104	111.164.371	737.453	55.829.825	123.008.781	13.174.961	65.363.637	26.748.072	2.193.213	64.053.231
Croatia	4.393.206	60.576	2.260.106	4.393.206	2.121.203	658.340	191.766	60.576	2.260.106	4.258.247	52.693	2.121.960	4.324.828	2.121.203	658.340	168.753	60.137	2.237.532
Ireland	7.883.411	57.645	8.095.067	7.720.997	3.935.671	1.163.674	2.650.544	57.400	8.095.067	5.399.471	51.494	5.235.125	5.745.597	3.740.866	1.139.635	2.338.544	57.400	7.703.642
Iceland	76.242.343	1.005.856	7.615.903	75.564.036	7.191.011	67.912.588	1.307.925	1.005.856	7.615.903	38.507.590	2.808	6.184.923	40.650.930	4.250.934	34.186.855	289.482	18.750	7.284.949
Italy	303.242.859	31.519.901	147.690.260	281.097.081	362.494.517	134.288.843	79.114.327	53.118.432	244.317.476	180.928.276	19.047.367	87.005.450	204.016.213	237.758.999	109.941.381	50.801.254	48.096.484	124.439.555
Luxembourg	557.006	431.797	20.884.854	557.006	8.256.973	2.568.286	23.699.582	431.795	20.884.854	337.164	10.703	6.369.247	362.422	2.675.917	1.573.961	8.613.770	22.761	9.086.977
Netherlands	153.906.602	5.825.443	276.323.945	68.370.772	104.349.350	44.760.301	364.825.567	5.825.454	450.862.219	41.367.958	938.997	104.247.330	43.321.236	27.234.409	16.446.539	108.306.049	1.649.368	134.350.049
Norway	1.473.539.680	69.207.591	227.219.445	992.598.589	648.074.922	1.367.426.440	445.495.686	68.859.066	364.293.529	372.514.806	6.639.948	90.516.311	375.061.388	266.062.507	528.055.498	314.242.989	8.926.280	113.404.434
Portugal	1.455.576		422.472	477.440		1.064.056	371.468		487.048									
Sweden	503.932.043	28.675.735	258.451.763	239.900.953	96.453.703	272.046.917	273.294.416	28.622.736	437.058.038	98.912.319	418.227	84.329.170	111.850.313	75.387.845	87.457.640	113.690.759	1.045.515	109.834.754
Slovenia	4.002.666					668.004	117.018		1.927.200									
UK	90.158																	
Total	**3.974.680.185**	**243.478.035**	**2.081.789.464**	**3.010.157.783**	**2.205.537.778**	**2.743.756.615**	**2.770.817.792**	**328.343.337**	**3.402.385.241**	**1.426.429.834**	**50.234.493**	**836.745.238**	**1.507.957.769**	**1.088.608.893**	**1.126.000.825**	**1.128.184.428**	**103.298.753**	**1.327.214.269**

Issuing, Trade & Redemption for all Fuels

	2018									2017								
	Production			Transaction						Production			Transaction					
	Issue	Expire	Cancel	Issue	Transfer	Export	Import	Expire	Cancel	Issue	Expire	Cancel	Issue	Transfer	Export	Import	Expire	Cancel
Austria	4.967.451			13.767.917	12.894.289	17.619.938	18.400.958		15.903.840	13.123.720		16.159.371	10.852.721	20.876.381	13.879.422	20.905.980		17.387.018
Belgium (Federal)	1.991.872			2.785.546						2.776.613			2.503.789					
Belgium Brussels	57.372		58.217		1.303.825		211.283		589.029	112.521		166.334		4.010.512		14.146		3.101.288
Belgium Flanders	2.486.539		62.930	3.494.481	13.520.869	15.651.652	23.853.464	446.716	3.857.960	4.584.399	444.031	6.747.958	4.545.514	15.905.987	17.801.789	26.048.300	1.088.120	14.004.404
Belg & Lux RECS																		
Belgium Wallonia	1.102.450		31.351	2.063.650	10.170.028	5.740.713	12.878.014	231.351	3.812.658	2.510.897	42.521	61.420	2.971.077	12.347.852	9.109.856	13.764.476	319.047	3.007.737
Belgium	5.638.233		152.498	8.343.677	24.994.722	21.392.365	36.942.761	678.067	8.259.647	9.984.430	486.552	6.975.712	10.020.380	32.264.351	26.911.645	39.826.922	1.407.167	20.113.429
Switzerland	49.371.697		352.338	54.634.560		3.446.213	11.119.044	5.114.354	55.949.965	56.936.261	4.051.779	56.511.194	56.028.209		4.942.710	11.406.404	10.721.069	47.874.247
Cyprus	167.500			166.770				161.063		208.400			210.614				224.564	
Czech Republic	1.339.573		385.245	2.488.149	1.733.732	1.818.013	95.680	27.177	778.962	3.133.233	25.784	1.282.157	2.897.117	2.159.194	1.231.732	144.585	88.541	1.343.365
Germany	9.438.823		127.525	15.225.467	39.903.055	9.340.889	57.853.076	839.553	91.390.414	17.009.651	40.025	13.051.196	16.347.808	44.298.553	7.765.002	87.305.142	1.776.004	91.739.136
Denmark	11.271.042		902.653	13.619.727	5.026.780	13.290.409	6.425.767	67.710	8.688.755	19.668.993	31.807	9.578.393	19.371.001	5.491.178	14.285.934	5.139.728	370.556	6.590.533
Estonia	867.209		9.528	1.407.057	2.540.642	1.451.597	678.334	67.469	918.300	1.251.181		110.658	2.031.853	3.822.020	1.398.725	2.095.516	226.842	2.184.793
Spain	21.605.741		17.879	60.553.893	53.790.755	12.411.702		1.421.721	66.357.095	78.482.943	2.183.705	63.871.836	78.875.350	71.631.112	12.520.719	1.330.000	1.001.574	74.757.786
Finland	16.743.641		851.769	23.409.478		14.815.737	14.732.407	176.522	19.826.954	26.511.501	169.236	23.194.399	25.603.169		14.554.562	10.577.306	100.166	20.884.867
France	28.943.662		7.879.693	37.986.064	5.736.911	14.741.367	13.966.250	449.265	26.240.657	38.488.614	413.901	28.482.036	45.206.289	4.292.389	25.666.327	8.018.716	1.214.170	21.980.930
Croatia	1.843.520		8.267	1.983.262	1.120.854	345.101	19.896	52.331	1.159.790	1.269.074	8.030	1.224.498	1.738.230	979.391	176.952	50.357	362	961.670
Ireland	1.296.773		117.297	1.547.564	1.394.664	555.111	636.642	22.956	2.335.114	2.064.629	18.180	2.481.929	2.021.089	941.678	491.224	904.634	34.434	2.287.547
Iceland	4.335.144			11.372.972	368.328	9.474.655	100.478	2.808	3.601.744	18.428.126	2.808	3.601.748	20.081.290	1.961.511	17.115.364	164.004	14.670	2.583.179
Italy	37.510.432		99.948	59.066.826	67.759.425	36.560.680	19.444.486	294.353	45.016.263	70.898.905	294.388	46.255.907	71.273.042	83.592.879	47.854.870	19.753.834	18.752.979	40.626.542
Luxembourg	79.607		46.000	108.639	822.697	308.257	1.831.397		2.674.673	119.410	2	3.100.421	106.055	1.409.839	881.484	3.168.096	10.701	3.018.938
Netherlands	11.103.381		6.887.100	13.782.478	8.677.912	7.559.425	30.505.852	374.438	36.956.080	16.628.438	339.833	48.337.210	15.701.121	11.062.802	4.930.827	40.275.465	681.877	49.363.455
Norway	96.825.124		5.483.650	101.649.733	74.280.356	156.580.710	107.557.783	3.015.817	41.454.018	139.635.419	3.344.028	48.698.975	134.952.185	102.795.732	209.602.452	129.013.909	3.295.472	39.280.356
Portugal																		
Sweden	35.689.632		1.151.367	40.992.224	34.154.104	32.472.306	35.753.501	49.549	36.899.277	38.939.861	116.764	43.302.847	39.473.491	37.284.308	25.681.278	48.971.674	384.730	43.010.681
Slovenia																		
UK																		
Total	339.335.715	0	24.472.757	462.403.713	335.493.961	354.184.475	356.064.312	12.815.153	464.411.548	552.782.789	11.526.822	416.220.487	552.791.014	424.863.318	429.891.229	429.052.272	40.305.878	485.988.472

Similar to the "by country" data above, the following tables display the raw data "by technology" at a yearly level.

See also the AIB website at Statistics for Excel spreadsheets in Excel 2010 format, containing the detailed data since records began, summarised by year and by month; and also analysing certificate activity by fuel source grouping per country, and giving details of the number of GOs that have been cancelled for use in other countries ("Ex-Domain Cancellations"), along with their source and destination. Further analysis of market activity can be obtained from a variety of sources, including those identified at: https://www.aib-net.org/en_US/sources-of-price-information and from market actors such as those identified at https://www.aib-net.org/en_US/facts/market_information/certificate_market_facilitators .

Issuing, Trade & redemption for all countries

	Total : 2001 to 2018									Total : 2016 to 2018								
	Production			Transaction						Production			Transaction					
	Issue	Expire	Cancel	Issue	Transfer	Export	Import	Expire	Cancel	Issue	Expire	Cancel	Issue	Transfer	Export	Import	Expire	Cancel
Wind - onshore	217.048.670	5.345.153	156.617.290	162.434.063	153.095.787	56.376.771	82.439.360	4.756.896	206.880.202	134.966.246	3.576.081	112.693.460	138.389.945	104.179.850	28.981.392	36.931.765	2.308.151	126.405.971
Wind - offshore	24.206.615	984.484	27.934.434	19.359.946	21.709.956	9.815.990	25.531.634	1.057.998	33.617.942	15.192.319	204.436	17.584.775	16.003.319	16.913.713	6.953.760	17.164.327	457.807	22.597.315
Wind - unknown	175.930.594	13.908.161	105.849.121	179.488.012	124.350.097	187.670.182	148.474.207	10.818.557	110.440.834	96.243.629	1.139.202	55.756.949	102.184.302	81.688.659	123.628.498	106.379.563	2.919.777	68.832.262
Wind	417.185.879	20.237.798	290.400.845	361.282.021	299.155.840	253.862.943	256.445.201	16.633.451	350.938.978	246.402.194	4.919.719	186.035.184	256.577.566	202.782.222	159.563.650	160.475.655	5.685.735	217.835.548
Hydro/marine	2.917.450.242	138.117.256	1.461.187.251	2.148.483.847	1.593.230.558	2.237.496.585	2.253.064.177	198.481.102	2.569.924.013	912.508.792	13.557.708	497.071.892	967.544.388	693.727.957	791.063.461	794.661.239	32.994.639	901.976.622
Unspecified mechanical/other	23.126	41.731	202.593	69.580	100.877	34.757	5.994.323	1.561	5.984.280	1.410		15.616	2.086	76.514	17.276	97.280	835	137.168
Unspecified renewable energy	12.199.452	1.498.336	6.840.239	10.793.015	6.200.880	8.005.016	15.471.375	2.382.744	7.426.935	6.063.080	82.492	3.784.050	6.216.306	4.415.063	5.972.247	5.858.805	687.439	5.149.799
Unspecified heat	23.215		6.065	14.272		1.167	128		8.247	23.215		6.065	14.272		1.167	128		8.247
Solar	62.849.208	5.861.524	47.598.130	64.102.950	82.948.240	49.465.976	49.480.255	15.770.013	50.159.084	57.755.728	2.193.831	42.592.441	59.035.219	78.859.810	47.567.471	47.551.087	12.322.150	47.300.208
Geothermal	34.592.166	415.229	17.090.011	28.974.881	17.588.475	31.256.150	31.282.875	426.146	33.976.713	11.211.956	66.615	7.435.450	12.569.882	8.173.444	14.876.045	16.501.548	162.672	15.304.380
Other	109.687.167	7.816.820	71.737.038	103.954.698	106.838.472	88.763.066	102.228.956	18.580.464	97.555.259	75.055.389	2.342.938	53.833.622	77.837.765	91.524.831	68.434.206	70.008.848	13.173.096	67.899.802
Solid - agricultural biomass (inc. energy crops)	17.323.787	466.104	12.866.022	15.019.491	6.346.646	17.259.925	19.293.280	513.783	15.152.595	8.174.196	149.156	5.465.060	8.428.628	4.861.422	12.960.369	14.055.519	191.049	6.764.341
Solid - agricultural products	1.741.108	115.798	1.039.081	1.491.372	541.877	1.684.821	1.490.659	104.992	1.097.939	871.867	32.213	398.269	895.007	354.968	1.398.776	1.185.946	19.928	596.437
Solid - renewable fuels (inc. For&Ag bp & w)	71.280.453	4.428.811	18.333.528	30.656.829	48.253.941	30.469.700	27.587.095	5.480.367	62.627.161	13.174.517	1.287.013	7.336.425	16.289.258	14.538.766	9.699.462	8.532.200	2.629.835	11.817.550
Solid - forestry products	18.144.655	428.339	10.624.023	13.874.121	8.228.579	5.963.601	5.262.305	763.256	12.716.045	7.823.008	33.169	3.570.313	7.637.739	2.214.975	2.121.580	1.947.510	273.625	5.113.416
Solid - forestry by-products & waste	18.404.043	744.287	10.266.971	13.667.618	8.769.552	6.500.243	5.960.618	1.026.329	13.517.722	6.724.154	86.436	4.756.480	7.314.977	4.276.619	3.383.218	3.146.098	229.068	6.368.903
Gas - landfill	4.775.064	141.721	1.395.026	1.535.624	3.413.698	338.626	418.254	182.344	3.630.446	415.268	15.260	317.114	535.895	542.656	86.604	79.656	50.772	527.202
Gas - sewage	770.255	50.673	193.035	731.190	17.643	31.603	30.615	262.955	223.908	385.355	9.715	102.695	404.726	8.051	27.262	26.274	15.914	151.272
Gas - other biogas	33.240.074	8.071.125	18.174.178	30.891.284	29.770.330	25.566.265	25.181.768	14.836.320	20.882.392	23.863.958	7.005.953	12.247.916	25.128.828	23.784.097	23.884.656	23.558.876	13.644.521	13.677.282
Solid - municipal biogenic waste	40.596.589	3.804.463	21.466.953	25.776.815	24.639.053	17.465.577	16.740.958	5.014.749	31.559.538	14.963.423	2.041.887	9.155.593	16.340.807	13.161.993	10.065.727	9.626.287	3.325.035	11.645.410
Liquid - renewable fuels (inc. Mun.waste)	7.507.947	881.929	5.304.891	7.724.637	8.084.207	6.945.327	7.840.176	1.660.946	6.557.561	6.193.344	751.146	3.885.660	6.454.394	6.122.015	6.055.626	6.344.883	1.176.082	4.766.014
Liquid - black liquor	19.623.120	121.201	14.505.039	19.689.966	4.225.413	7.465.622	5.870.250	145.740	15.301.626	10.075.230	13.696	6.464.339	10.659.036	2.276.969	5.212.122	4.378.545	46.719	8.714.250
Solid - unspecified wood	10.562.824	487.327	8.219.567	11.736.285	4.818.312	7.352.891	7.258.000	439.324	9.133.392	5.149.265	85.542	3.196.834	6.921.660	3.330.542	5.447.869	5.239.111	201.129	5.177.100
Solid - industrial & commercial waste	40.530.184	7.387.039	15.510.942	31.014.113	31.555.998	17.216.637	16.965.727	14.750.633	25.425.816	20.107.279	6.532.993	8.173.417	21.989.977	17.334.349	14.169.170	13.942.496	13.566.188	9.796.623
Biomass	284.500.103	27.128.817	137.899.256	203.809.345	178.665.250	144.260.839	139.899.706	45.181.738	217.826.141	117.920.864	18.044.179	65.070.115	129.000.932	92.807.422	94.512.441	92.063.401	35.369.865	85.115.800
RENEWABLE	3.728.823.391	193.300.691	1.961.224.390	2.817.529.911	2.177.890.120	2.724.383.432	2.751.638.040	278.876.755	3.236.244.391	1.351.887.239	38.864.544	802.010.813	1.430.960.651	1.080.842.432	1.113.573.758	1.117.209.143	87.223.335	1.272.827.772
NUCLEAR	213.395.604	44.641.590	102.694.688	158.203.721	903.163	2.510.284	1.020.370	44.280.592	146.256.867	58.802.400	9.294.400	26.698.113	60.786.590	903.163	2.321.518	831.604	13.691.137	44.862.620
Unknown	7.537.085	279.938	96.590	7.264.570	497.631	6.455.097	273.434	229.620	90.201	5.024.854	84.284	3.900	5.035.609		4.558.112	200.004	175.659	5.960
Solid - Unknown	303		303	3.750				3.447	303	303		303	3.750				3.447	303
Solid - Hard coal	2.238.808	1.989.226	1.298.582	2.238.808	1.380.582	249.582	1.939.582	1.989.226	1.298.582			209.000		691.000		1.250.000	47.714	609.000
Solid - Brown coal																		
Solid - Peat	48.129	5.417	17.009	75.286	21.387	26.897	21.750	34.381	29.510	43.011	5.417	11.891	59.961	15.080	23.234	18.087	34.381	23.203
Solid - Municipal solid waste	4.370.778	1.817.487	1.477.783	4.510.821	41.994	168.836	252.089	1.897.219	1.586.783	2.847.086	972.138	715.099	3.105.918	41.994	165.130	122.858	1.409.274	1.048.711
Solid - Industrial and commercial waste	298.824	26.208	243.102	323.045		27.569	27.560	31.637	243.244	147.799	688	119.646	158.432		21.200	21.200	4.313	147.465
Liquid - Unknown	16.189	500	7.726	16.189				186	7.726	9.276	500	813	9.276				186	813
Liquid - Crude oil	11.074	10.656	418	11.074	418	418	418	10.656	418									
Liquid - Natural gas	261.476			607.817	141.900	708.098	2.496.759		944.467	159.621			607.817	141.900	708.098	2.496.759		944.467
Liquid - Petroleum products	153.612	12.729	113.709	202.664	113.742			72.366	113.747	129.546	10.590	113.709	134.500	113.742			5.675	113.709
Gaseous - Unknown	166.352			18.076		23.002	87.250	2.270	167	166.350					23.000	87.250		
Gaseous - Natural gas	17.358.560	1.393.593	14.615.164	19.152.051	24.546.841	9.203.400	13.060.540	914.982	15.568.835	7.212.349	1.001.932	6.861.951	7.095.265	5.859.582	4.606.775	5.947.523	703.632	6.630.246
Gaseous - Coal-derived gas																		
Gaseous - Petroleum products																		
Gaseous - Municipal gas plant																		
Gaseous - Process gas																		
Heat - unknown																		
Heat - Process heat																		
FOSSIL	32.461.190	5.535.754	17.870.386	34.424.151	26.744.495	16.862.899	18.159.382	5.185.990	19.883.983	15.740.195	2.075.549	8.036.312	16.210.528	6.863.298	10.105.549	10.143.681	2.384.281	9.523.877
Total	3.974.680.185	243.478.035	2.081.789.464	3.010.157.783	2.205.537.778	2.743.756.615	2.770.817.792	328.343.337	3.402.385.241	1.426.429.834	50.234.493	836.745.238	1.507.957.769	1.088.608.893	1.126.000.825	1.128.184.428	103.298.753	1.327.214.269

Issuing, Trade & redemption for all countries

	2018									2017								
	Production			Transaction						Production			Transaction					
	Issue	Expire	Cancel	Issue	Transfer	Export	Import	Expire	Cancel	Issue	Expire	Cancel	Issue	Transfer	Export	Import	Expire	Cancel
Wind - onshore	22.284.188		3.281.585	48.198.912	40.221.532	13.599.819	15.115.523	967.088	56.398.553	59.664.089	1.516.502	58.003.587	53.797.972	42.227.182	10.955.665	12.676.349	1.130.061	55.394.645
Wind - offshore	4.155.432		1.135.747	5.474.616	5.497.450	2.216.957	3.550.135	44.104	5.418.274	6.477.724	37.891	7.396.389	6.017.649	7.005.694	2.596.234	8.259.806	287.228	10.591.121
Wind - unknown	24.156.285		4.511.412	33.706.995	27.171.987	46.711.263	44.611.407	262.621	27.907.078	41.144.373	181.236	29.895.670	38.319.349	28.372.341	44.861.063	37.745.113	1.109.896	22.761.817
Wind	50.595.905		8.928.744	87.380.523	72.890.969	62.528.039	63.277.065	1.273.813	89.723.905	107.286.186	1.735.629	95.295.646	98.134.970	77.605.217	58.412.962	58.681.268	2.527.185	88.747.583
Hydro/marine	228.534.580		11.496.731	288.394.956	194.919.520	217.206.976	218.266.251	5.150.465	290.725.316	338.323.133	4.138.395	236.503.502	348.827.788	274.578.840	300.994.294	301.718.214	12.083.636	325.446.771
Unspecified mechanical/other			4.293			6.561	15.132		8.571			6.341		70.446	6.438	81.825	835	128.025
Unspecified renewable energy	1.095.010		142.050	1.988.174	1.854.050	2.862.042	2.691.401	86.389	2.304.364	2.835.050		2.260.006	2.789.966	1.660.145	2.062.195	2.119.394	391.096	1.704.592
Unspecified heat	15.314		2.914	13.105			40		8.159							88		88
Solar	10.553.894		298.210	17.750.527	22.887.724	13.831.494	13.810.058	785.847	19.556.757	25.714.140	847.937	23.241.366	23.443.951	27.579.045	21.591.785	21.795.764	1.119.706	22.537.561
Geothermal	826.110		23.000	2.377.998	1.381.085	3.406.497	4.391.022	3.704	5.907.675	5.231.356	3.704	3.416.960	4.886.655	2.768.886	6.291.089	6.833.404	77.581	3.795.537
Other	12.490.328		470.467	22.129.804	26.122.859	20.106.594	20.907.653	875.940	27.785.526	33.780.546	851.641	28.924.673	31.120.572	32.078.522	29.951.507	30.830.475	1.589.218	28.165.803
Solid - agricultural biomass (inc. energy crops)	2.063.820		129.962	2.600.296	2.348.449	6.068.129	5.972.918	15.495	2.864.619	3.482.323	14.066	2.629.101	3.446.311	1.821.504	5.458.202	6.392.422	152.543	2.237.753
Solid - agricultural products	203.759		392	277.726	192.464	457.057	356.472	1.606	277.646	389.424	1.606	275.626	355.005	156.128	842.702	737.356	12.498	184.648
Solid - renewable fuels (inc. For&Ag bp & w)	2.391.860		157.982	4.244.611	3.469.417	3.368.663	3.436.693	341.138	4.886.856	5.538.264	106.091	3.518.937	6.937.239	5.170.993	4.907.038	4.148.214	1.142.606	4.102.020
Solid - forestry products	1.084.710		98.187	2.066.154	771.462	897.715	814.914	86.623	1.507.050	3.305.513	7.870	1.788.585	3.538.156	1.274.920	634.330	621.089	46.574	2.160.410
Solid - forestry by-products & waste	1.321.846		305.961	2.141.148	1.622.583	1.118.045	1.108.264	27.371	1.894.787	2.893.817	25.534	2.346.906	2.863.818	1.579.388	1.502.565	1.240.676	121.290	2.806.903
Gas - landfill	60.368		1.755	116.557	141.334	20.672	20.672	6.349	127.296	150.129	5.576	126.362	176.876	175.667	27.208	27.192	13.992	199.845
Gas - sewage	101.091		4.327	134.709	4.631	6.105	5.108	4.291	50.286	141.171	3.050	53.426	127.135	2.737	11.826	1.934	6.900	55.179
Gas - other biogas	5.344.242		1.763.937	7.358.455	11.013.761	13.217.417	13.041.666	54.860	9.371.030	9.777.660	48.025	8.786.564	9.030.226	10.418.649	10.274.212	10.130.273	7.041.939	2.773.862
Solid - municipal biogenic waste	2.965.085		556.306	4.495.114	6.104.238	5.287.815	5.260.494	321.344	4.846.804	6.403.635	341.889	4.965.069	6.442.880	4.933.400	3.808.515	3.380.650	1.552.846	3.982.817
Liquid - renewable fuels (inc. Mun.waste)	1.517.384		323.491	2.305.246	2.683.375	2.574.964	2.787.988	13.895	2.324.017	2.381.731	13.837	1.972.549	2.337.940	2.353.463	2.463.455	2.417.432	657.397	1.592.530
Liquid - black liquor	2.466.471		613	4.027.647	1.043.900	2.781.332	2.294.056	30.579	2.534.122	4.061.979		3.279.121	3.862.911	497.683	488.109	488.109	13.696	3.716.998
Solid - unspecified wood	1.413.291		113.720	2.167.370	1.790.278	2.575.063	2.475.117	70.765	1.901.025	2.184.310	66.633	1.815.572	2.826.299	1.135.879	1.571.743	1.444.515	16.184	1.656.711
Solid - industrial & commercial waste	3.721.446		29.320	4.964.717	7.860.667	9.094.015	8.952.226	52.223	5.751.739	7.199.242	44.113	6.067.184	7.722.740	7.501.991	4.334.246	4.222.487	6.489.306	2.184.370
Biomass	24.655.373		3.485.953	36.899.750	39.046.559	47.466.992	46.526.588	1.026.539	38.337.277	47.909.198	678.290	37.625.002	49.667.536	37.022.402	36.324.151	35.252.349	17.267.771	27.654.046
RENEWABLE	316.276.186		24.381.895	434.805.033	332.979.907	347.308.601	348.977.557	8.326.757	446.572.024	527.299.063	7.403.955	398.348.823	527.750.866	421.284.981	425.682.914	426.482.306	33.467.810	470.014.203
NUCLEAR	19.138.044			20.703.783	903.163	641.564	664.507	3.687.629	14.317.053	19.430.819	3.068.095	14.316.302	19.160.112		1.594.050	81.193	5.924.812	11.615.035
Unknown	2.430.427		274	3.179.762		2.761.589	40.000	38.904	2.018	1.774.867	43.450	1.742	1.249.167		928.382	160.000	41.120	1.886
Solid - Unknown	303		303	303					303								3.447	
Solid - Hard coal							600.000											
Solid - Brown coal																		
Solid - Peat	9.054			12.041				6.435	4.653	8.164		4.653	11.129	2.439	7.871	7.871	22.591	
Solid - Municipal solid waste	827.097		444	1.024.864		50.367	12.749	536.504	376.799	1.044.657	464.236	348.246	1.079.022	41.994	95.596	110.109	493.849	409.783
Solid - Industrial and commercial waste	31.269		4.799	44.092				1.251	61.820	63.269	280	61.994	56.463		21.200	21.200	408	56.652
Liquid - Unknown	6.381		758	7.410				186	813	2.895	500	55	1.866					
Liquid - Crude oil																		
Liquid - Natural gas				607.817	141.900	708.098	2.496.759		944.467									
Liquid - Petroleum products				61.948	41.478			4.991	60.139	80.609	10.457	60.139	57.967	72.264			237	53.570
Gaseous - Unknown						23.000	87.250											
Gaseous - Natural gas	616.954		84.284	1.956.660	1.427.513	2.691.256	3.185.490	212.496	2.071.459	3.078.446	535.849	3.078.533	3.424.422	3.461.640	1.561.216	2.189.593	351.604	3.837.343
Gaseous - Coal-derived gas																		
Gaseous - Petroleum products																		
Gaseous - Municipal gas plant																		
Gaseous - Process gas																		
Heat - unknown																		
Heat - Process heat																		
FOSSIL	3.921.485		90.862	6.894.897	1.610.891	6.234.310	6.422.248	800.767	3.522.471	6.052.907	1.054.772	3.555.362	5.880.036	3.578.337	2.614.265	2.488.773	913.256	4.359.234
Total	339.335.715	0	24.472.757	462.403.713	335.493.961	354.184.475	356.064.312	12.815.153	464.411.548	552.782.789	11.526.822	416.220.487	552.791.014	424.863.318	429.891.229	429.052.272	40.305.878	485.988.472

Forthcoming events

12-13 March 2019	Amsterdam, The Netherlands	REC Market Meeting 2019
15 March 2019	Brussels, Belgium	AIB General Meeting
14 June 2019	Stockholm, Sweden	AIB General Meeting
17-21 June 2019	Brussels, Belgium	EUSEW 2019