



# **Summary report with recommendations for introduction of the Guarantees of Origin in Ukraine**

**International Consultant, Senad MRKALJEVIC**

February 2022

**Deliverable 1:** Summary report with analysis of legal acts on the Guarantees of Origin (GOs) in the EU with best practices and lessons learned (parts 1, 2, 3)

**Deliverable 2:** Summary report with analysis of EU regulation and/or local legislation of the EU and EER countries on Guarantees of Origin (GOs) implementation as a financial instrument. It should include best practices and lessons learned with recommendations for Ukraine (part 4)

**Deliverable 3:** Summary report with analysis of practices on creation of the Guarantees of Origin (GOs) registers in the EU and EER countries. It should include lessons learned with recommendations for Ukraine (part 5)

**Deliverable 4:** Summary report with analysis of the practice on trading of the Guarantees of Origin (GOs) (including as a financial instrument) in the OTC and exchange markets (including clearing and settlement) in the EU and EER countries (part 6)

**Deliverable 5:** Final study report to incorporate prepared materials with findings and recommendations for Ukraine (parts 7 and 8)

### **Disclaimer**

The views expressed in this publication are those as presented by the author and do not necessarily represent those of the United Nations Development Programme

# Contents

---

<b>List of abbreviations</b> .....	5
<b>List of figures</b> .....	6
<b>List of tables</b> .....	7
<b>Background</b> .....	8
<b>Objectives of the assignment</b> .....	9
<b>1. Guarantees of Origin in the EU legal context</b> .....	10
1.1. Eligibility criteria for GOs .....	11
1.2. Competent Body or Authorized Issuing Body.....	12
1.2.1. Production Registrar .....	13
1.2.2. Production Auditor .....	13
1.2.3. Measurement Body .....	13
1.3. Informative content of a GO .....	13
1.3.1. Disclosure of energy sources .....	13
1.3.2. Cross-border trade .....	14
1.4. Membership in the Association of Issuing Bodies (AIB).....	15
1.5. How to ensure that national registries are compatible with each other – European Energy Certificate System (EECS).....	16
1.6. Inter-registry communication Hub .....	16
1.6.1. GO fees of AIB members’ registries .....	17
1.7. General procedures for registration the Production Device and issuing EECS Certificate .....	17
<b>2. Renewable energy sector of the Ukraine</b> .....	21
2.1. Renewable energy sector in the Ukraine .....	21
2.2. Overview and analysis of the legal acts on Guarantees of Origin in the Ukraine .....	22
2.3. Legal elements of GO system in Ukraine: compared with the main elements of EU Directives and recommendation.....	25
<b>3. Legal acts of the EU countries (including EER ones) and Serbia as a Contracting Party of the Energy Community on establishment of national registries for GOs</b> .....	27
<b>4. Legal acts of the EU countries (including EER ones) and Serbia as a Contracting Party of the Energy Community to trade Guarantees of Origin (GOs) (including as financial instruments)</b> .....	40
4.1. Guarantees of origin as tradable financial instruments.....	41
4.2. Trade of Guarantee of Origin: market trade and auctions.....	45
4.3. Prices of GOs in the EU countries.....	47
4.4. What GO value means for the market of goods.....	51

<b>5. Practices of the EU countries (including EER ones) and Serbia as a Contracting Party of the Energy Community on creation of registries for Guarantees of Origin (GoOs) .....</b>	<b>52</b>
5.1. Responsibility of institutions in nation GO register .....	52
5.2. Elements of national Domain protocol.....	54
5.3. Elements of national methodology for calculation of residual mix.....	55
5.4. Implementation of national digitalized GO registry .....	57
5.5. Connection of national digitalized GO registry with AIB Hub .....	58
<b>6. Analysis of practice on trading of the Guarantees of Origin (GoOs) registers in the OTC and exchange markets (including clearing and settlement) in the EU countries (including EER ones).....</b>	<b>65</b>
6.1. Exchange market and GO trading in Croatia.....	66
6.2. Exchange market and GO trading in France .....	69
6.3. Exchange market and GO trading in Portugal.....	72
6.4. Exchange market and GO trading in Italy .....	75
<b>7. Best practices and lessons learned of the EU countries (including EER ones) and Serbia as a Contracting Party of the Energy Community on establishment of national registries for GO .....</b>	<b>79</b>
7.1. Establishment of national GO registries .....	79
7.2. GOs as tradable financial instruments (in the meaning defined in part 4) .....	80
7.3. Creation of GO registry .....	82
7.4. Trading of the GOs .....	90
<b>8. Study findings and conclusions.....</b>	<b>92</b>

## List of abbreviations

---

AIB	Association of Issuing Bodies (an umbrella organization for Issuing Bodies in EU Member States)
Account Holder	Any natural or legal person in respect of whom an account is maintained in the Registry.
CPs	Contracting Parties
CROPEX	Croatian Power Exchange
DP	Domain Protocol - a legal document of AIB which is following the EECS Rules
EAC	unbundled energy attribute certificates
ECC	European Commodity Clearing
EECS Rules	European Energy Certificate System – a voluntary standard created and maintained by the AIB
EER	European Entrepreneurial Region
EEX	European Energy Exchange
EnC	Energy Community
ENTSO-E	European association for the cooperation of transmission system operators (TSOs) for electricity
Energoatom	National Nuclear Energy Generating Company of Ukraine
EPEX SPOT	European Power Exchange
FiTs	feed-in tariffs
GOs	Guarantees of Origin
GoU	Government of Ukraine
IB	Issuing Body
IBM	Issuance Based Method
MSs	EU Member States
PD	Production device
PPA	Power Purchase Agreement
PRO	Principles and Rules of Operation
RED	Renewable Energy Directive
REMIT	Regulation on Wholesale Energy Market Integrity and Transparency
RES	Renewable energy sources
SAEE	State Agency on Energy Efficiency and Energy
TB	Transaction Based Method
TSO	Transmission System Operator

## List of figures

---

Figure 1	The institutional role of every Issuing Body as a member of AIB.....	12
Figure 2	Simplified scheme of GO system at national and international level.....	15
Figure 3	PD Registration.....	18
Figure 4	Life cycle of EECS Certificate (within 12 month of validity).....	19
Figure 5	Total renewable energy capacities in Ukraine.....	22
Figure 6	Models for corporate sourcing of renewable electricity.....	41
Figure 7	Impact of supply and demand imbalances on GO prices.....	42
Figure 8	Price elasticity of GO supply.....	42
Figure 9	Price-setting equilibria of different elasticities.....	42
Figure 10	Annual GOs transaction (%) per domain, AIB statistics on November 2021.....	43
Figure 11	Impact of new renewables capacity on energy mix.....	44
Figure 12	GO prices for hydro, wind, solar, biomass GO for different compliance period (Argus; 17th Dec 2021).....	47
Figure 13	GO prices for hydro and wind for a different compliance period (Argus; 17th Dec 2021)	47
Figure 14	GO prices in Croatia upon GO auctions conducted by IB HROTE (EUR/MWh).....	49
Figure 15	GO prices in Portugal upon GO auctions conducted by IB REN, TSO (EUR/MWh)	49
Figure 16	GO prices in Slovakia upon GO auctions conducted by IB OKTE (EUR/MWh).....	50
Figure 17	GO prices in Luxembourg upon GO auctions conducted by IB ILR – The Regulatory Agency (EUR/MWh).....	50
Figure 18	Companies with “environmentally friendly” products.....	51
Figure 19	Authorities involved in GO system.....	52
Figure 20	The overview of matching the Guarantees of Origin system and disclosure.....	55
Figure 21	Transaction Based Method for Residual Mix Calculation in a specific country.....	56
Figure 22	Issuance Based Method for Residual Mix Calculation in a specific country.....	56
Figure 23	Overview of needed steps to be conducted in order to establish national GO registry and connect it with AIB Hub.....	83
Figure 24	Overview of needed steps to be conducted in order to establish national GO registry and connect it with AIB Hub.....	93

## List of tables

---

Table 1	Overview of relevant EU Directive and connection with missing elements of Ukraine Decree on GOs .....	25
Table 2	Overview of legal acts and its elements on GO in the European countries – Part 1...	28
Table 3	Overview of legal acts and its elements on GO in the European countries – Part 2...	33
Table 4	Overview of legal acts and its elements on GO in the European countries: GO Registers and procedures for issuing GO.....	36
Table 5	Overview of legal acts of the European countries on GOs as tradable financial instruments	40
Table 6	List of service provider for AIB members .....	58
Table 7	The list of domains and their registries .....	58
Table 8	Overview of relevant parties in GO system .....	60
Table 9	Overview of procedures for GO registry functioning .....	61
Table 10	Clearing and settlement in Croatia.....	67
Table 11	Clearing and settlement in France .....	70
Table 12	Clearing and settlement in Portugal.....	72
Table 13	Clearing and settlement in Italy .....	75
Table 14	Best practice and lessons learned: establishment of national registries.....	79
Table 15	Overview of lessons learned and recommendations for Ukraine.....	81
Table 16	Best practice and lessons learned: establishment and operation of national GO registry	82
Table 17	Best practice recommendations .....	84

## Background

---

Due to the COVID-19 pandemic, public and private sector stakeholders on the global level pay due attention to the non-financial risks by following the so-called “The Great Reset” approach – consider Environmental, Social and Governance (ESG) factors while elaborating recovery packages<sup>1</sup>. Building a green economy will contribute significantly to the improvements in the above-mentioned dimensions. Based on the UN Development System assessment of the situation in Ukraine, the Project “Supporting Green Recovery in Ukraine: Effective Development Cooperation Solutions for the SDGs” (in the following “the Project”) is clearly linked to the high-level policy dialogue meeting between the UNDP Administrator, Achim Steiner, and MFA chief, Dmytro Kuleba and follows up on the green economy aspect of the agreements reached throughout the discussion on priorities for possible UNDP Ukraine interventions during and after the COVID-19 crisis, specifically:

- assistance with sectoral and cross-cutting strategic analysis on the socio-economic impact of COVID-19 for Ukraine and development of policy-proposals within select Ministries;
- commitment to the Green Economy Agenda and conflation of environment, economy, and digital instruments;
- support to MSMEs as one of the core economic lynchpins of Ukraine’s economy with particular attention to issues of climate change and environment protection;
- gender equality and empowerment and digital transformation; and
- promotion of the foreign trade relations with the main partners.

To address the above-mentioned challenges and commitments, **the Project** will provide an important stimulus for transition to a greener economy and more sustainable financial system – support implementation of the new business models, creation of the new green jobs, improved social inclusion of the citizens and unlock private green and sustainable finance. This objective will be achieved through delivery of the following outputs:

- improved legal framework on the national level for a better green transformation of the economic and financial relations,
- reduced transaction costs on the green finance market; and
- better evaluation and management of the climate-related risks on the corporate level.

The overall focus of the **Ukraine Energy Efficiency Secretariat and Expert Hub Project** will be on energy security in the context of 2035 Energy Strategy for Ukraine, energy efficiency and renewable. Building up on the results of the previous phase of the UNDP- MFEA cooperation, the Project will continue to strengthen the capacity of the Government of Ukraine (GoU) to develop and implement the energy security and energy efficiency policy during the critical time of transition of transforming the national energy markets.

The Project will provide the GoU with technical, expert assistance and advisory services to implement the action plan to strengthen Ukraine’s energy security (ES), and further assist Ukraine in implementing the EU-Ukraine Association Agreement as related to Energy Cooperation.

The Expert Hub will continue to provide advisory support to the State Agency for Energy Efficiency and Energy Saving of Ukraine on energy efficiency reform.

All Project activities will be executed exclusively via the Energy Security Expert Hub modality following the success of the previous phases of the Project. UNDP Ukraine will manage relevant implementation, indicators, budgets, and experts in partnership with the GoU.

---

<sup>1</sup> Schwab K., and Malleret T. (2020). COVID-19: The Great Reset, Geneva, The World Economic Forum.

## **Objectives of the assignment**

The main objective of the assignment is to provide support in developing GOs to facilitate private investment in renewables in Ukraine.

To achieve previous objective, developed is “Summary report with recommendations for introduction of the Guarantees of Origin (GOs) in Ukraine” (in the following “Report”) which provides insight, lessons learnt and recommendations relating to the potential introduction of GOs in Ukraine. Report is focused particularly on strengthening the GO system to deliver real investments, while maintaining compliance with the EU Acquis.

Document contains:

- i. Overview and analysis of the legal acts on the Guarantees of Origin (GOs) in the EU (in terms of the Guarantees of Origin (GOs) registers);
- ii. Overview and analysis of EU regulation and/or local legislation on the Guarantees of Origin (GOs) implementation as a financial instrument in the EU and EER countries;
- iii. Overview and brief analysis of practices on creation of the Guarantees of Origin (GOs) registers in the EU and EER countries;
- iv. Overview and brief analysis of the practice on trading of the Guarantees of Origin (GOs) (including as a financial instrument) in the OTC and exchange markets (including clearing and settlement) in the EU and EER countries and
- v. Best practices, lessons learned and recommendations for Ukraine.

## 1. Guarantees of Origin in the EU legal context

---

The term « guarantee of origin » was introduced for the first time in the Renewable Electricity Directive (2001/77/EC). The 2001 Renewable Electricity Directive encouraged establishing reliable GO schemes to be set up by the EU Member States (MSs) without describing in detail how they should look like.

Clear definition of GOs was provided in its subsequent Directive (RED I) eight years later:

*'guarantee of origin' means an electronic document which has the sole function of providing proof to a final customer that a given share or quantity of energy was produced from renewable sources as required by Article 3(6) of Directive 2003/54/EC; (Council Directive 2009/28/EC, 2009, Article 2(j), p. 27).*

It is important to underline that the GO system was voluntary. It was thus left to the eligible power producers to decide if they want to request GOs for their renewable production or not (Council Directive 2009/28/EC, Art 15(2)). Subsequently it is up to the power producer whether to ask for entering the GO system in the national registry. Having that it could happen that some of the renewable electricity stays non-certified. This is important for understanding how residual mix (RM) is calculated (the rest of consumed electricity that is not certified).

To get the full understanding of the GOs definition, it is needed to get an insight into the Article 3(6) of the Directive 2003/54/EC which concerns the common rules for the internal market in electricity. The Article 3(6) of the Directive 2003/54/EC, called « Public service obligations and consumer protection », describes the role of the electricity retailers and says:

*6. Member States shall ensure that electricity suppliers specify in or with the bills and in promotional materials made available to final customers:*

*(a) The contribution of each energy source to the overall fuel mix of the supplier over the preceding year;*

*(b) At least the reference to existing reference sources, such as web-pages, where information on the environmental impact, in terms of at least emissions of CO<sub>2</sub> and the radioactive waste resulting from the electricity produced by the overall fuel mix of the supplier over the preceding year is publicly available. (Council Directive 2003/54/EC, 2003, Article 3(6), p. 42).*

In other words, the GOs have been created to enable electricity retailers to document the renewable electricity they sell and therefore to help them to fulfill their obligation of disclosure of all energy sources to the customers as required by this article.

The 2018 Renewable Energy Directive (RED II) further elaborates on GOs by strengthening and expanding this system further. The most important changes in Article 19 of RED II include:

- An important word change happened. The new Directive stipulates that electricity retailers shall use GOs to prove the share of renewable electricity they sell. Changing the word *may* to *shall* makes the use of GOs mandatory for any renewable claim and disclosure (Council Directive 2018/2001, Article 19(18)).
- Extending GOs coverage to all energy produced from renewable sources instead of only electricity.
- Extension of the GO system to renewable gases such as biomethane and hydrogen and still allows MSs to implement full disclosure if they wish to do so. When it comes to the supported renewable electricity, it is still left to MSs to decide if they allow the issuance of GOs for supported electricity. Yet, if GOs are issued for supported production, the new Directive requires the market value of the GOs to be accordingly considered in the relevant support scheme (Council Directive 2018/2001, Article 19(2)).

For instance, for support schemes in the form of a tendering procedure or tradable green certificates, if the producers consider the value of GOs while making their bids, it will lower the need for financial support and avoid overcompensation.

- When it comes to lifecycle of the GOs, their validity period will remain 12 months from the production of the corresponding electricity, but companies and retailers will have up to six months after the end of the validity period to cancel them. Hence, MSs shall make sure that the GOs not cancelled, expire within a maximum period of 18 months from the electricity production date. Furthermore, MS are now required to enclose the volume of expired GO in their RM calculation (Council Directive 2018/2001, 2018, Art 19(3)).
- EU MSs and designated bodies must comply with standard CEN-EN 16325 when issuing, transferring and cancelling GOs. CEN EN 16325, which is under revision, is a pared down version of the EECS standard currently in place, which is a voluntary standard created and maintained by the Association of Issuing Bodies (AIB) and its 30 European members, who are all government-appointed issuing bodies for GOs.
- Introducing a threshold for the size of installations (50kW) below which GOs can provide less detailed information.
- Restrictions on the trading of GOs with third countries, arguably including Energy Community CPs.

Article 19(11) includes a prohibition to recognize GOs issued by a third country except where the Union has concluded an agreement with that third country on the mutual recognition of GOs issued in the Union and compatible GO systems established in that third country, and only where there is direct import or export of energy. Although both the Energy Community Treaty<sup>2</sup> and preamble 40<sup>3</sup> of REDII seem to indicate that the Contracting Parties (CPs) are not to be considered third countries in general terms, it is unlikely that EU will follow such an interpretation. Allowing access to the EU's market for GOs will have to be addressed in the framework of the upcoming revision of the REDII and its incorporation in the Energy Community. Otherwise, the CPs will be considered as third countries as soon as the REDII comes into force in the EU in July 2021. In that regard, the Energy Community Secretariat submitted its contribution to the Public Consultations on the Review of REDII.

### 1.1. Eligibility criteria for GOs

The eligible RES for issuing GOs are: "wind, solar, aerothermal, geothermal, hydrothermal and ocean energy, hydropower, biomass, landfill gas, sewage treatment plant gas and biogases" (Council Directive 2009/28/EC, Article 2(a), p. 27). The Directive 2009/28/EC extended the GOs system compared to the Directive 2001/77/EC by introducing GOs for heating and cooling activities based on the RES. However, in this case, the issuance of GO may be conditional to a minimum capacity. Moreover, since 2012, GOs can also be issued

---

<sup>2</sup> According to the text of art.41 of the Energy Community Treaty, quantitative restrictions on imports, exports or measures having equivalent effect shall be prohibited between the Contracting Parties with the nuance that this shall not preclude quantitative restrictions or measures having equivalent effect, justified on grounds of public policy or public security, the protection of health and life of humans, animals or plants, or the protection of industrial and commercial property

<sup>3</sup> Preamble (40) – It should be possible for imported electricity produced from renewable sources outside the Union to count towards Member States' renewable energy shares. In order to guarantee an adequate effect of renewable energy replacing non-renewable energy in the Union as well as in third countries, it is appropriate to ensure that such imports can be tracked and accounted for in a reliable way. Agreements with third countries concerning the organization of such trade in renewable electricity will be considered. If, by virtue of a decision taken under the Energy Community Treaty (11) to that effect, the Contracting Parties thereto are bound by the relevant provisions of this Directive, the measures of cooperation between Member States provided for in this Directive should be applicable to them.

for electricity produced from high-efficiency cogeneration, also called high efficiency combined heat and power production (Council Directive 2012/27/EU, Annex X).

It is important to note that MSs have a certain freedom in the implementation of the GO system. The Directive can be seen as providing guidelines and is interpreted differently by the MS. As an example, the eligibility criteria vary considerably across MS. Some countries have decided to use GOs to document all energy sources and therefore issue GOs for non-renewable sources as well, others have decided to issue GOs only for renewable sources; and some have decided to add that GOs can only be issued by generators of renewable energy that do not benefit from a support scheme.

## 1.2. Competent Body or Authorized Issuing Body

The issuance, transfer and cancellation of GOs are incumbent to one or more Competent Bodies that can be freely appointed by each MS, as long as they are separated from the production, trade and retail of electricity and have separate geographical obligations (Council Directive 2009/28/EC, (Art 15(2)). The Renewable Energy Directive also requires each MS or their Issuing Bodies to ensure the accuracy, reliability and validity of the GO system (Council Directive 2009/28/EC, Art 15(5)). In most cases, the Competent bodies are the TSO, electricity regulators or energy market operators (please see **Figure 1 The institutional role of every Issuing Body as a member of AIB**).

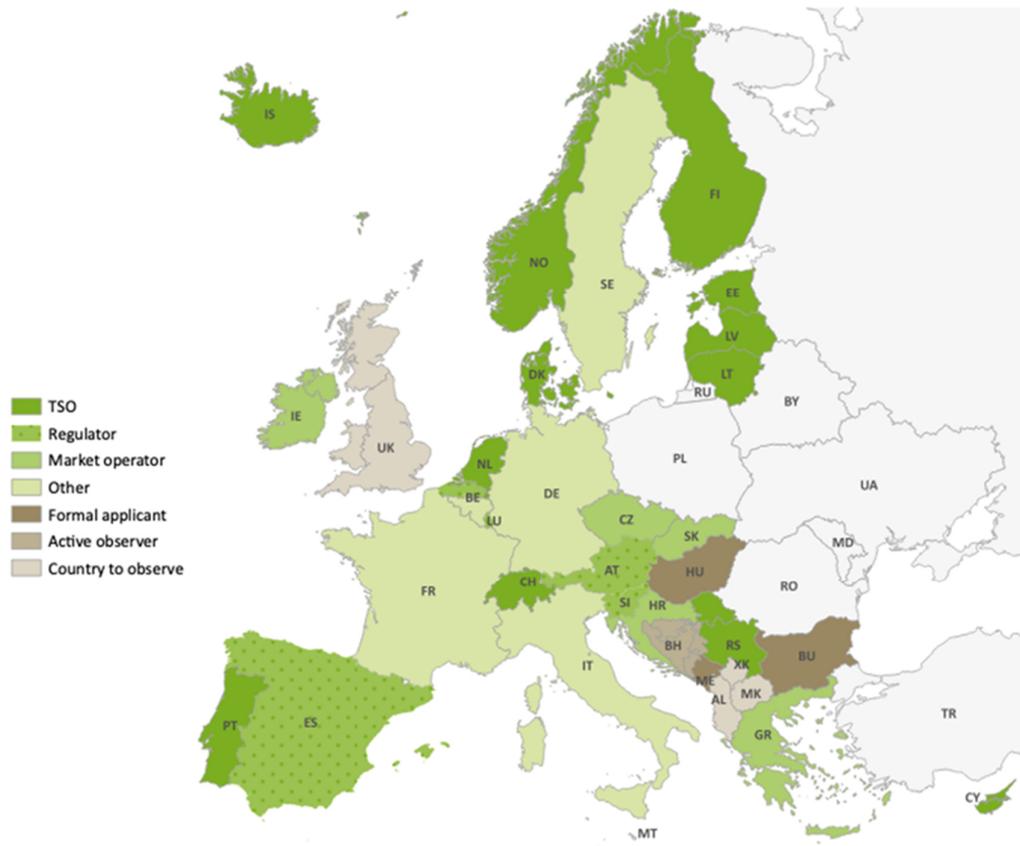


Figure 1 The institutional role of every Issuing Body as a member of AIB

Note: The map outlook was dated before Hungary and Montenegro joined AIB as the full members.

#### 1.2.1. Production Registrar

The Authorised Issuing Body or such other person as the Domain Protocol provides is responsible for assessing applications to register Production Devices in the Registry.

This role could also take the Measurement Body or the Regulator Agency.

#### 1.2.2. Production Auditor

Such Approved Body as the relevant Authorised Issuing Body appoints to audit information provided by Registrants in Production Declarations by reference to the records of, or made available by, the Registrant (or, if different, the owner or operator of the relevant Production Device) and, where appropriate, by inspecting the relevant Production Device.

Production auditors could be Regulatory body or Issuing body or any other third party entitled for this role by the law.

#### 1.2.3. Measurement Body

A body that is responsible for collecting and determining (on behalf of the Registrant) measured values of the Output of a Production Device, and which has been approved by the the legislation to conduct specified functions in relation to the EECS Rules.

Measurement body are system operators, but also could be a third party entitled for this role by the law.

### 1.3. Informative content of a GO

The minimum information that a GO must provide is defined in Article 15(6) of the Directive 2009/28/EC:

*6. A guarantee of origin shall specify at least:*

*(a) The energy source from which the energy was produced and the start and end dates of production*

*(b) Whether it relates to:*

*(i) electricity; or*

*(ii) heating or cooling;*

*(c) The identity, location, type and capacity of the installation where the energy was Produced*

*(d) Whether and to what extent the installation has benefited from investment support, whether and to what extent the unit of energy has benefited in any other way from a national support scheme, and the type of support scheme;*

*(e) The date on which the installation became operational; and*

*(f) The date and country of issue and a unique identification number (Council Directive 2009/28/EC, Article 15(6), pp. 34-35).*

In the case of GOs for high efficiency cogeneration, the minimum information that must be disclosed is defined in the Council Directive 2012/27/EC.

#### 1.3.1. Disclosure of energy sources

Directive on Common Rules for the Internal Market for Electricity (2009/72/EC), requires in its Article 3 the contribution of each energy source to the overall energy mix to be specified. It was replaced by Directive (EU) 2019/944 on common rules for the internal market for electricity, which in Annex I, point 5, requires MSs to introduce “disclosure of energy sources” schemes for electricity sold to final consumers. This refers to information an electricity

supplier is bound to display on its invoice, with regards to the contribution of each energy source to the electricity purchased by the final customer and to the overall fuel mix of the supplier, as well as to inform consumers of the environmental impact, at least in terms of CO<sub>2</sub> emissions and radioactive waste. For non-electrical energy carriers like hydrogen, gas, heating and cooling, the legislative framework for disclosure is not yet equally elaborated.

Currently, in the EU each electricity supplier is obliged to disclose to its customers the origin of all electricity sold. In most countries, this information is typically only based on cancelled guarantees of origin for the share of electricity that is explicitly sold as originating from renewable sources. The origin of the remaining supply is covered by the residual mix. The need for a residual mix stems from the fact that electricity disclosure is mandatory for all electricity sold, but GOs typically exist only for a part of the volume, namely the renewable part.

### 1.3.2. Cross-border trade

In a nutshell, when an end-consumer (a private household or a company) decides to buy green electricity backed with GOs, they pay extra for the green certification to the producers who were granted the GOs. However, in reality, it is impossible to guarantee the buyer of renewable electricity that what they receive is only from green sources since electricity from all sources (including non-renewable) are fed into the grid, and there is no way exists to track electrons. To put it another way, GOs ensure that the renewable electricity is effectively produced, but not that it is physically consumed by the buyer.

Considering that GO trading is completely decoupled from the physical power trading, no barriers should hamper their cross-border trade. For that reason, the Directive 2009/28/EC requires MS to accept the GOs issued by another MS. Should a MS have a “*well-founded doubt about its accuracy, reliability and veracity*” (Directive 2009/28/EC, Article 15(9), p.35), then the Directive authorizes the refusal of a foreign GO upon a notification to the Commission, justifying the refusal. In case the Commission does not agree with the claims, they may require the MS concerned to accept the foreign GO (Directive 2009/28/EC, Art15(10)).

A lack of clarity on the valid justifications for a refusal was presumed by experts to cast doubts among market participants and national Issuing Bodies on how to handle the cross-border transfers of GOs. Thus, this was considered as being a restraint to the cross-border trade. In that context, to harmonize the use of GOs and to facilitate cross-border trade, the Association of Issuing Bodies (AIB), launched the European Energy Certificate System (EECS) in 2007. Today it is composed of 30 active European Issuing Bodies (2021).

The EECS system is the European Standard for GOs. It aims at facilitating the cross-border trade of GOs by providing an established electronic hub and by supporting the issuance, transfer and cancellation of the GOs. The EECS standards are governed by the principle and rules of operations, which are implemented by each country by means of their “Domain Protocol”. In fact, each country willing to take part in the EECS system and its electronic hub must first set up a Domain Protocol defining how the EECS rules will be implemented in the country and the latter has to be approved by the AIB before the issuance, transfer and cancellation of GOs.

Fulfilment of the RES share according to the RED II Directive is not linked with GO statistics. Issuing GOs does not influence meeting the goals for one country. Therefore, electricity for which the GOs have been issued is calculated into the national targets.
--

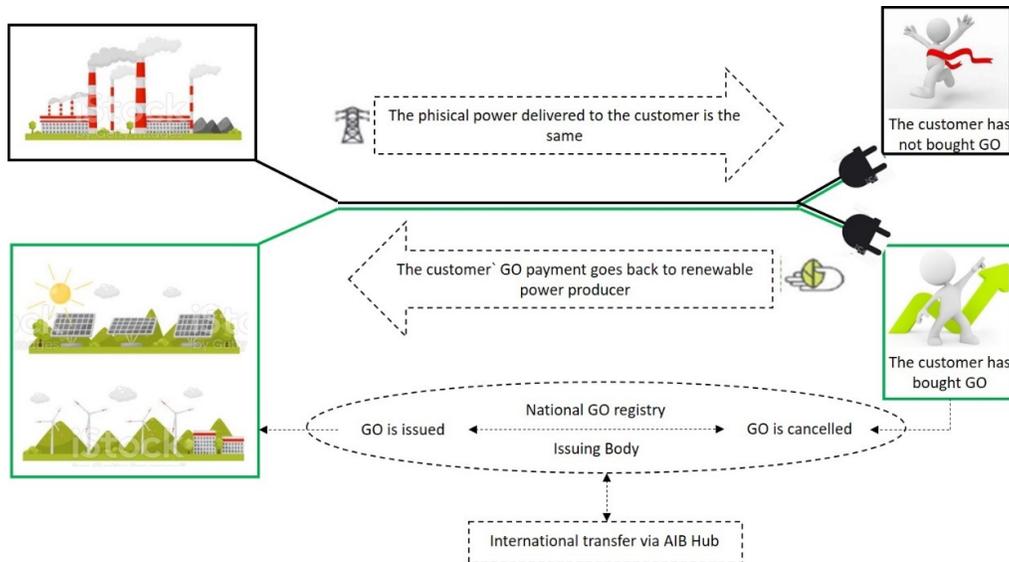


Figure 2 Simplified scheme of GO system at national and international level

#### 1.4. Membership in the Association of Issuing Bodies (AIB)

The Association of Issuing Bodies (AIB) is the organization that has been constituted to organize all issuing bodies across EU for certification processes of electricity (and other carriers lately).

The purpose of the AIB is to develop, use and promote a standardized system of energy certification for all energy carriers: the European Energy Certificate System (in the following "EECS").

EECS is based on structures and procedures which ensure the reliable operation of energy certificate schemes in Europe. These schemes satisfy the criteria of objectivity, non-discrimination, transparency and costs effectiveness, in order to facilitate the international exchange of guarantees of origin. In order to further facilitate this, the AIB operates an inter-registry communications Hub. AIB's members are the Competent Bodies for the administration of Guarantee of Origin schemes in 30 countries (EU, EEA and Energy Community member states). Two more countries are likely to join by the end of 2021. In 2019, 707 million certificates (707 TWh) were issued, while 613 million were transferred internationally and 613 million were used and cancelled. The market for electricity GOs continues to grow at about 10% per year. The AIB also provides a knowledge center for energy certificate authorities across Europe, providing and sharing advice and guidance.

The EECS Rules (previously 'the Basic Commitment' or 'the PRO' - the 'Principles and Rules of Operation') is the AIB's formal statement of its principles and rules of operation.

If the country wants to join AIB and be linked with its inter-registry communication Hub with other registries in EU, it should have a Domain Protocol in place, which is the legal document and follows the EECS Rules.

Membership of the AIB consists of two parts: (1) AIB membership and (2) membership of the EECS Electricity and/or EECS Gas Scheme.

Any issuing body with legal personality under its national law that fills out the application form and agrees to comply with the EECS Rules can apply for AIB membership. Detailed procedure for achieving AIB membership is provided on AIB web page.

#### 1.5. How to ensure that national registries are compatible with each other – European Energy Certificate System (EECS)

The EECS Rules<sup>4</sup> govern the European Energy Certificate System. This forms an integrated framework for issuing, holding, transferring and otherwise processing electronic energy certificates (EECS Certificates) in Europe. These certify, in relation to specific quantities of energy, attributes of its source and/or the method and quality of its production.

The EECS Rules establishes a harmonized standard for the creation, maintenance, transfer, cancellation and other processing of EECS Certificates. The EECS Rules and the Hub Participant Agreement require Members to adopt these standards as a pre-condition for participation (as a Scheme Member) in individual EECS Schemes: the parts of the EECS framework which relate to specific types of energy output, such as electricity, gas etc. EECS Certificates may be based on guarantees of origin issued pursuant to European Community legislation as implemented by Member States. They may also be issued in connection with other legislative certification schemes or under other, entirely voluntary, arrangements. Every EECS Certificate is processed under the same requirements described in the EECS Rules. In addition, the EECS Rules impose requirements specific to electricity or gases (whether these are biomethane, hydrogen or other gases).

For a Member to become a member of an individual EECS Scheme (electricity or gas), the rules applicable in that Member's Domain - its Domain Scheme - must satisfy both the general requirements of the EECS Rules and the specific requirements for that EECS Scheme. A Domain Scheme consists of the applicable legislation and administrative arrangements regarding the issue of certificates, together with a Domain Protocol and the Member's Standard Terms and Conditions. A Domain Protocol describes how the EECS system is implemented in a specific Domain. It supplements the local laws and regulations, making sure that the Domain Scheme is in line with the general and specific requirements of the EECS Rules. The Standard Terms and Conditions contractually oblige the Member's customers to comply with the Domain Protocol. Standard Terms and Conditions also deal with commercial matters such as service provision and the Member's fees. Account holders are not bound by the EECS Rules itself, but by the applicable legislation in their Domain and their contractual obligations to comply with relevant Domain Protocols.

#### 1.6. Inter-registry communication Hub

In order to make the certificates tradable (i.e. transferable), all national registries are connected through the AIB Hub – the main connection point.

The AIB Hub enables member registries to inter-communicate, in order to transfer certificates. Among the many benefits that this confers are the following:

- Registry operators have a single point of contact with other registry operators
- Registry operators only need to test that their registry can communicate with the Hub - the Hub takes care of communications with other registries
- The Hub provides a reliable source of information concerning certificate transfers, enabling aiding dispute resolution
- Access to the Hub is restricted to only registered users.

The country that applies for the AIB and the AIB SuperUser (one person who is the expert in AIB) will need to test the proper integration of the registry software and the AIB Hub in order to ensure that the transfer of certificates to and from other EECS registries is both secure and reliable (i.e. known as the technical audit). For information about the registry compliance

---

<sup>4</sup> The EECS Rules can be find at: <https://www.aib-net.org/eecs/eecsr-rules>

testing, all communication goes via the SuperUser who will administer the testing process on behalf of the AIB.

#### 1.6.1. GO fees of AIB members' registries

The fees for charging GO Registry service for every country are published annually and can be found on the following web page of AIB: <https://www.aib-net.org/facts/aib-member-countries-regions/aib-member-tariffs>.

#### 1.7. General procedures for registration the Production Device and issuing EECS Certificate

EECS Certificates can only be issued to the owners of Production Devices (PD) that have been successfully registered for an EECS Scheme. Registration involves formal application. Application for registration under EECS requires the owner of a PD to provide information about itself and the PD, including the relevant technology and possible energy sources, commissioning dates and capacities and details of any public support received. Such applications must also include details of the arrangements for measuring energy sources and outputs, including the presence of any Production Auxiliaries, storage facilities and onsite demand. Registration requires the PD to comply with legal requirements and the requirements of the relevant EECS Scheme, as set out in the Domain Scheme – the Scheme Member is entitled to inspect the PD to confirm this. Registrants are held responsible for notifying the local Scheme Member of any changes to the PD.

The first step is for the applicant to submit the request for registration the production device (PD). The applicant/producer should have opened account into the Registry. After he pays the fee (if legislation requests so, since it is up to every country what costs are charged) and with approved needed documentation, the PD is registered and afterward is available for GO to be issued.

Auditing is required as it is stipulated by the law, however every 5 year it needed to re-register the PD.

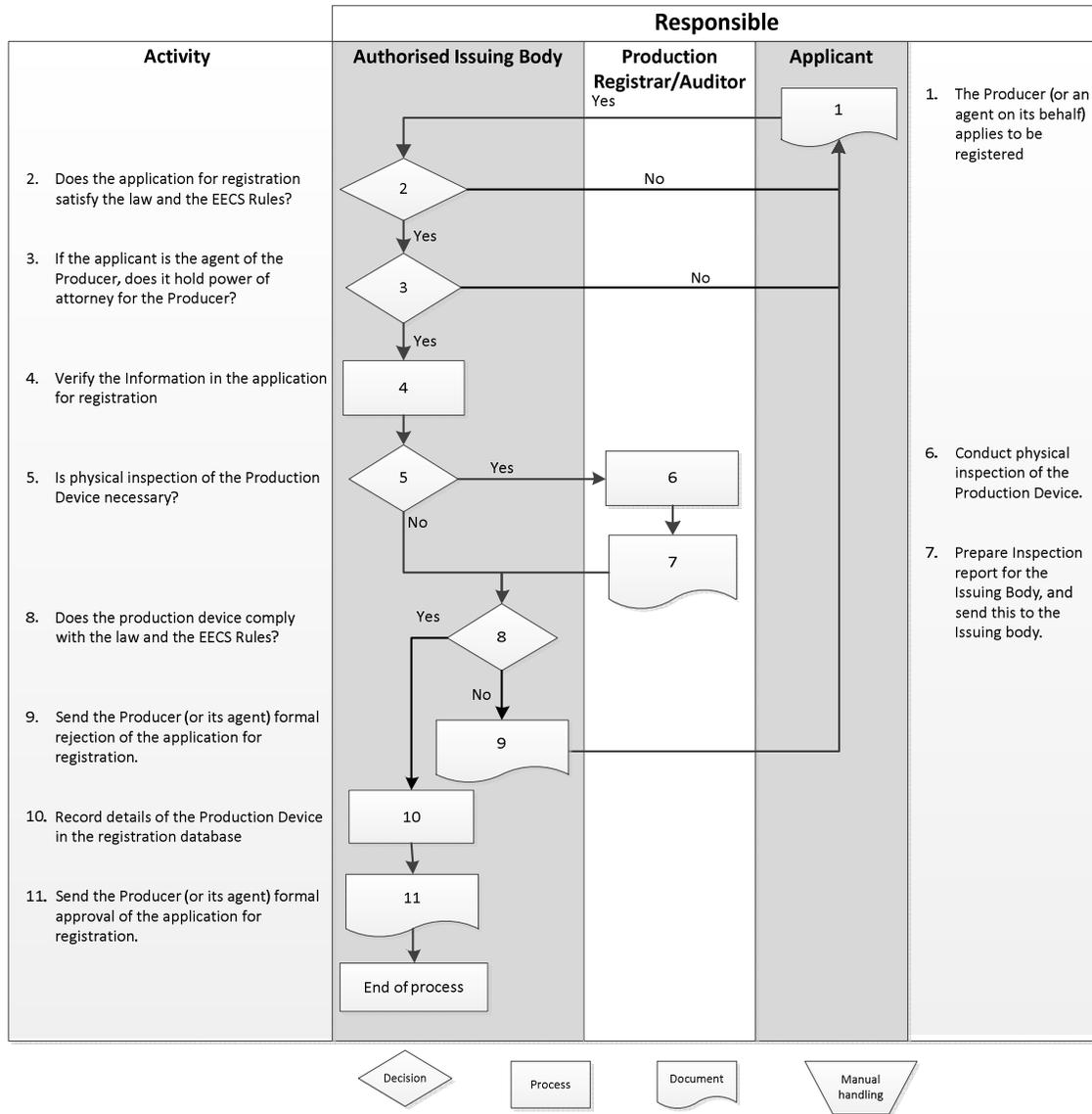


Figure 3 PD Registration

Once a PD has been registered, then it is eligible to issue EECS Certificates. Measurements of the energy created (and used, where fuels have been used) will be taken by the body approved to do so by the Scheme Member or authorised to do so by the Competent Body appointed by government to take such measurements for that Domain. The EECS Certificates that are released onto the market for trade are those which represent energy flowing into the grid. These will have been produced net of any energy used by Production Auxiliaries or lost by storage auxiliaries. Certificates representing the source of the energy used by Production Auxiliaries and lost by storage auxiliaries will be automatically cancelled upon issue.

The life cycle of an EECS Certificate encompasses three phases: issuance, transfer, and cancellation. The way in which a certificate transits between these three major states is shown in the following diagram:

## EECS Certificates: state transition

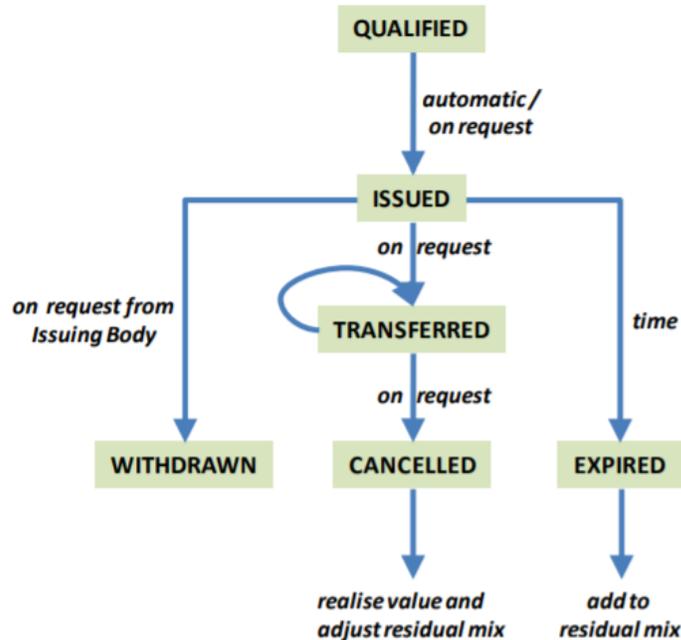


Figure 4 Life cycle of EECS Certificate (within 12 month of validity)

Electronic EECS Certificates are issued on registries operated by, or on behalf of, AIB Members in respect of the output of PD registered in connection with national legislation or, otherwise, specifically for the purposes of an EECS Scheme.

Once a Production Device has been registered, then it is eligible to issue EECS Certificates.

Measurements of the energy created (and used, where fuels have been used) will be taken by the body approved to do so by the Scheme Member or authorized to do so by the Competent Body appointed by government to take such measurements for that Domain.

The EECS Certificates that are released onto the market for trade are those which represent energy flowing into the grid. These will have been produced net of any energy used by Production Auxiliaries or lost by storage auxiliaries.

Certificates representing the source of the energy used by Production Auxiliaries and lost by storage auxiliaries will be automatically cancelled upon issue.

The issuing GO is done after the measurement data are delivered to the Issuing Body. Hydro power plants with storage and high-efficient cogeneration biomass/biogas plants should have Consumption Declaration. This official document is the proof that GO is issued only for the net produced electricity is feed into the grid and for the UPE above 10%.

Whether the issuing starts on 1<sup>st</sup> of the month or any data in the month and measurement frequency depends of the legislation.

These Certificates may be transferred from the account of the producer to that of a trader, and so on; either within the country of origin or to other registries through a Hub operated by the AIB operated by, or on behalf of, AIB Members or Hub Users that have concluded a Hub Participant Agreement with the AIB across Europe.

Cancellation is the mechanism whereby the EECS Certificate is removed from circulation and that happens within 12 months from the last day of production respective electricity. Cancellation occurs at the point at which the value of the Certificate is realised. Examples of circumstances in which the Cancellation of an EECS Certificate may occur include: in

connection with payment from a consumer in recognition of the qualities it represents; in connection with the award by government of a financial incentive, such as a tax rebate; or by way of discharge of a contractual or legal obligation. The EECs Rules provides for EECs Certificates to be Cancelled only once, at which point they may (support certificates) realize their value and/or (disclosure certificates) be used to adjust any residual mix.

The diagram also illustrates two other states:

- Withdrawal. Certificates that have been issued in error may be withdrawn from the market, only if the certificate has not exported to another domain and remains in the national registry;
- Expiry. Certificates that have not been cancelled by a deadline and have thus been automatically cancelled are said to have expired. At this point, they can not be traded anymore but they may be used for calculation of the residual mix.

## 2. Renewable energy sector of the Ukraine

---

### 2.1. Renewable energy sector in the Ukraine

Ukraine is the Contracting Party (CP) of the Energy Community with the largest energy market. Despite producing significant volumes of natural gas, the country is still dependent on gas (and oil) imports and is a major transit route for Russian gas exports towards Europe.

The country's transmission system operator is engaged with European association for the cooperation of transmission system operators (TSOs) for electricity (ENTSO-E) for the synchronization of the main grid with the one of continental Europe, which is planned for 2023. The organized day-ahead and intraday electricity market is operational. Bilateral, day-ahead, intraday, balancing and ancillary services markets are also operational, but subject to many regulatory interventions. Non-compliant public service obligations and regulated prices of state-owned generation companies are impeding competition. Regulation on Wholesale Energy Market Integrity and Transparency (REMIT) has not been transposed yet.

Losses are procured by the transmission system operator on the market, but distribution system operators are obliged to buy a significant amount of their losses from state-owned Energoatom in contravention of the acquis. National Nuclear Energy Generating Company of Ukraine (Energoatom) of the Ukraine is the state enterprise operating all four nuclear power stations in Ukraine and provides about 55% of Ukraine's need for electricity (during autumn-winter periods this figure reaches 70%).

Consumers are free to choose their suppliers, but households (and some other categories of customers) lack incentives to switch their supplier, being supplied at low prices under the public service obligation scheme.

The renewable energy sector has been rising fast in the last years due to increasing investment. In 2019, Ukraine's share of energy from renewable sources reached only 8,1%, well below the indicative trajectory of 10,1%. The indicative trajectory for the electricity sector was almost reached, while contributions of renewable energy in heating and cooling and transport remain lower than planned. From 2020, only wind projects with installed capacity up to 5 MW and other technologies up to 1 MW are granted administratively set feed-in tariffs (FiTs). Auctions envisaged by legislative amendments adopted in December 2019 are yet to be implemented. A new draft law on renewable energy was published for public consultation in August 2021 and has not been on disposal for this project. Therefore in case it consists the significant procedures for GO they are not included.

Although a new premium scheme has not been implemented yet, the country increased significantly its renewable energy capacities. In 2020, annual growth of renewable energy capacities was almost 2 GW. The most significant growth was in solar PV capacities, which reached 5.363 MW, followed by wind (1.111 MW) and small hydro (192 MW).

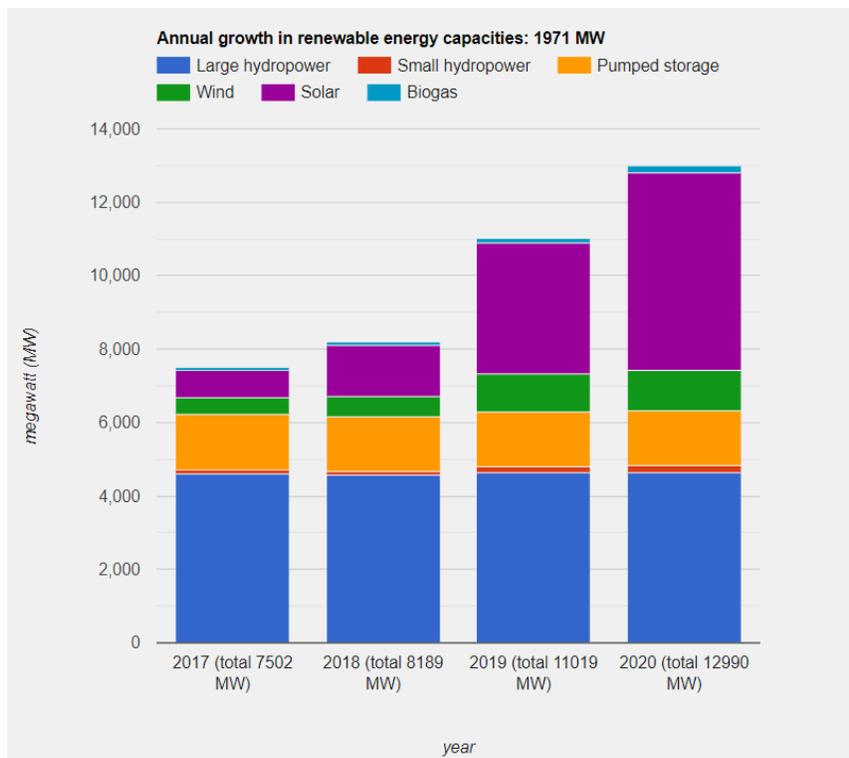


Figure 5 Total renewable energy capacities in Ukraine<sup>5</sup>

## 2.2. Overview and analysis of the legal acts on Guarantees of Origin in the Ukraine

The Ministerial Council of the Energy Community, by Decision 2012/04/MC-EnC of 18 October 2012, incorporated Directive 2009/28/EC of 23 April 2009 on the promotion of the use of energy from renewable sources. Based on Article 15 of the Directive, Ukraine have developed legislation and assigned designated bodies to enable the implementation of guarantees of origin (GOs). Designated body is State Agency on Energy Efficiency and Energy Savings (SAEE).

Relevant legislation on GOs in Ukraine was adopted in 2013: “Decree on approval of the procedure for issuance, use and termination of the GOs of electricity for economic entities that produce electricity from alternative energy sources”. As stated in the latest Energy Community (EnC) implementation report from November 2020, the State Agency on Energy Efficiency and Energy (SAEE) as the designated body has failed to implement an electronic system compatible with the European Energy Certificate. EnC encouraged Ukraine to establish the GOs system without further delays.

The State Energy Efficiency of Ukraine continued to work on implementation of GO system in the country. In 2020, Chairman of the State Energy Efficiency Agency of Ukraine, held the first online meeting of the working group on the implementation of a system for guaranteeing the origin of energy from renewable sources. The working group included representatives of the Ministry of Energy, the Ministry of Economy, the Ministry of Finance, NKREKP, Ukrenergo, State Enterprise "Guaranteed Buyer", bioenergy associations of Ukraine, the Association of Solar Energy of Ukraine, the Office of the Renewable Energy Ambassador and other stakeholders.

In 2021, EnC secretariat has issued a Discussion Paper on the implementation of the GOs system in the EnC, proposing to Contractual Parties (CPs) a regional/ EnC-wide approach

<sup>5</sup> <https://www.energy-community.org/implementation/Ukraine.html>

to the GOs implementation. Under such approach, EnC secretariat would assist in setting up a regional GOs system, covering the national markets of all or selected CPs. Secretariat would also centrally procure a software provider of a regional electronic registry software and possibly help with negotiating better conditions with insurance companies. At the same time, the EnC secretariat would facilitate an “observer status” for the CPs in the AIB and enable AIB countries to export their GOs to the CPs’ national markets (while the opposite direction would not be available until disclosure rule – the rule for calculation the residual mix on national level, is in place). In the essence, the AIB and the EnC regional GOs market would co-exist for some time and once the EnC countries reach sufficient level of maturity and readiness (ready to fulfil the EECS requirements), the two markets would merge.

Overview of Ukraine legislation and identified elements of GO system are identified in following paragraphs.

**Law on alternative energy sources of Ukraine** (Vidomosti Verkhovnoi Rady Ukrainy (VVR), 2003, № 24, p.155) identified guarantees of origin of electricity for produced electricity from renewable energy sources:

*a document issued by an entity authorized by the Cabinet of Ministers of Ukraine at the request of the producer of electricity, which confirms that the share or a certain amount of electricity produced from renewable energy sources (and using hydropower - only micro, mini- and small hydropower plants) (Section I General Provisions, Article 1).*

To confirm the origin of electricity the Law proscribed that the Competent Body issues a guarantee of origin of electricity at the request of the business entity - the producer of electricity from renewable energy sources.

Procedure for issuance, use and termination of the guarantee of origin for electricity is not further elaborated within the Law. It is identified that it will be proscribed by the Cabinet of Ministers of Ukraine separately.

Definitions within the Law didn't not identify Competent body or GOs register.

Further elaboration of elements needed to establish GO system in Ukraine was provided in the **Decree on approval of the procedure for issuance, use and termination of the GOs of electricity for economic entities that produce electricity from alternative energy sources** (від 24 липня 2013 р. № 771).

Decree provided additional definition of GO as:

*guarantee of origin of electricity (hereinafter - the guarantee) - an electronic document issued in accordance with the Law of Ukraine "On Electronic Documents and Electronic Document Management" free of charge at the request of the electricity producer, which confirms that part or a certain amount of electricity produced in Ukraine energy sources.*

Decree envisaged that GOs are issued from the power plants (production devices) which are registered within the electronic register. The registration would be carried out by the Competent Body on the basis of an application submitted by the business entity. Competent Body was named as the State Agency for Energy Efficiency.

Application of the business entity for issuance of GO should contain data on:

1. name, location and contact details of the applicant;
2. name, location, nominal power and date of commissioning of the generating installation;
3. detailed information on devices that measure the amount of electricity produced, released and consumed for own use;
4. types of energy sources that may be used by the generating installation for the production of electricity, with reference to the types of energy sources and technologies listed in Annex 1 of Decree;
5. a simplified line diagram of the generating installation, including the location: measuring instruments of the produced and released into the electric network of electric energy for the generating installation, measuring instruments of electric energy consumed by the generating unit, transformer substations of the generating installation.
6. a description of how the amount of generated electricity released into the electricity grid will be calculated, taking into account the data read from commercial metering devices;
7. the method of calculation of the share in the electricity released into the electricity grid of energy storage facilities by type of fuel that was used during production (in the case of using combined energy sources for electricity production).

Validity period of issued GO would be 12 months.

GO register was defined as electronic registry based on web system used for keeping record on GOs. Creation and maintenance of the register would be conducted by SAEE. The registration of the facility in the electronic register would be canceled within five years from the registration date, if the business entity would not applied for renewal.

SAEE would be issuing a GOs in electronic form in accordance with the Law of Ukraine on Electronic Documents and Electronic Document Circulation in the form according to Annex 4 of the Decree.

The grounds for termination of the GOs would be: expiration of the validity period or revocation of the license for the right to conduct business in the production of electricity.

### 2.3. Legal elements of GO system in Ukraine: compared with the main elements of EU Directives and recommendation

In practice, GOs of the EU countries provide the proof that energy has been generated from renewable sources (as defined in the RES Directive), specifying the source of the energy; the dates when it was produced; the identity, location, type and capacity of the production facility; whether the GO relates to electricity or heating or cooling; whether and to what extent the installation has benefited from support; the date when the installation became operational; the date and country of issue; and a unique identification number.

Ukraine legislation provided definition and limited the purpose of a GO on electricity produced from renewable energy sources. In addition to this, the basic conditions for issuing a GO are elaborated without laying down the ground rules for the supervisory body of GO system. Competent Body SAEE is identified with responsibility for creation and maintenance of the GO register.

#### **GO system of Ukraine didn't:**

- identify content of GO for high efficiency cogeneration,
- need for preparation of Disclosure rules and Methodology for calculation of residual mix,
- lay down the conditions under which application for GO from other countries can be refused.

#### **The list above are the Ukraine list which needs to do it first as part of recommendation.**

In addition to these elements, missing fragments of Ukraine Decree on GOs are identified in following table and need to be updated as part of the recommendations.

Table 1 Overview of relevant EU Directive and connection with missing elements of Ukraine Decree on GOs

EU Directive	Missing elements/Recommendations of Ukraine Decree on GOs
<p>Directive 2018/2001/EC, Article 19(2):</p> <p><i>A guarantee of origin shall be of the standard size of 1 MWh. No more than one guarantee of origin shall be issued in respect of each unit of energy produced. Member States shall ensure that the same unit of energy from renewable sources is taken into account only once.</i></p>	<p>Adopted Decree of Ukraine should define standard size of GO and connect it with each unit of produced energy. In addition to this, it is needed to identify a provision that the same unit of energy from renewable sources is taken into account only once.</p>
<p>Directive 2018/2001/EC, Article 19(3):</p> <p><i>For the purposes of paragraph 1, guarantees of origin shall be valid for 12 months after the production of the relevant energy unit. Member States shall ensure that all guarantees of origin that have not been cancelled expire at the latest 18 months after the production of the energy unit. Member States shall include expired guarantees of origin in the calculation of their residual energy mix.</i></p>	<p>Adopted Decree of Ukraine should identify provision on cancellation of GO at the latest 18 months after the production of the energy unit.</p>
<p>Directive 2018/2001/EC, Article 19(4):</p> <p><i>For the purposes of disclosure referred to in paragraphs 8 and 13, Member States shall ensure that energy companies cancel guarantees of origin at the latest six months after the end of the validity of the guarantee of origin.</i></p>	<p>Ukraine Decree identified the grounds for termination of the GOs would be (expiration of the validity period), but it didn't identify exact time period upon which GO will be canceled.</p>

EU Directive	Missing elements/Recommendations of Ukraine Decree on GOs
<p>Directive 2018/2001/EC, Article 19(6):</p> <p><i>Member States or the designated competent bodies shall put in place appropriate mechanisms to ensure that guarantees of origin are issued, transferred and cancelled electronically and are accurate, reliable and fraud-resistant</i></p> <p>Directive 2018/2001/EC, Article 19(5):</p> <p><i>Member States or designated competent bodies shall supervise the issuance, transfer and cancellation of guarantees of origin. The designated competent bodies shall not have overlapping geographical responsibilities, and shall be independent of production, trade and supply activities.</i></p>	<p>Issuing/Competent Body is currently responsible for Issuing, transferring ownership of and cancelling and expiring GOs in Ukraine.</p> <p>To achieve fraud-resistance, inspection of all plants (that wish to participate in GO system of Ukraine) should be added as new responsibility of the I/C Body.</p> <p>If Ukraine decide to become AIB member or member of regional GOs system, Issuing/Competent Body should prepare and adopt Domain Protocol which:</p> <ul style="list-style-type: none"> <li>- describes transparent rules and clear information's for issuing GOs,</li> <li>- facilitate assessment of compliance and permissible variance from EECS,</li> <li>- facilitate audits,</li> </ul> <p>translate national rules on energy sector, renewable energy and GOs in a single format.</p>
<p>Directive 2018/2001/EC, Article 19(7):</p> <p><i>Simplified information may be specified on guarantees of origin from installations of less than 50 kW</i></p>	<p>Ukraine Decree is missing elements on providing simplified content of GOs for installations less than 50 kW.</p>
<p>Directive 2009/72/EC, Article 3(9):</p> <p><i>Member States shall ensure that electricity suppliers specify in or with the bills and in promotional materials made available to final customers: (a) the <b>contribution of each energy source to the overall fuel mix</b> of the supplier over the preceding year in a comprehensible and, at a national level, clearly comparable manner.</i></p>	<p>If Ukraine decide to start issuing national GOs, Issuing/Competent Body should prepare and adopt Methodology for calculation of the share of certain source of energy used in the production of electricity which is sold to end consumer.</p> <p>This methodology: (i) determine the principles and basic elements for identification of electricity origin in a country, (ii) identify method of identification the electricity structure generated from Renewable Energy Sources (RES), (iii) identify the method of determining the structure of total residual electricity.</p>

### **3. Legal acts of the EU countries (including EER ones) and Serbia as a Contracting Party of the Energy Community on establishment of national registries for GOs**

---

This chapter covers results of analysis of legal acts of six (6) European countries selected for analysis on establishment of national GO registries:

1. Greece – among the latest countries joined AIB with large GO volume in future and good practice example.
2. Denmark – one of the first countries joined AIB and first implemented support schemes with good practice example.
3. Germany – one of the countries with largest GO import and with good practice example.
4. Serbia - this country, like Ukraine, is a Contracting Party of the Energy Community. Therefore, understanding her experience is extremely important in order to prevent wrong steps.
5. Netherlands - the most advanced country in terms of the variety of certificates and the purposes of their application.
6. Poland - one of the countries with which Ukraine has one of the largest electricity exports and imports. In addition to this, Poland is not member of AIB.

Analysis was focused on identification of:

- primary and/or secondary legal framework which established elements of GO system in every country,
- definition and purpose of GOs,
- qualifications for issuing GOs,
- designated institution as Competent/Issuing Body at national level,
- business which can apply for obtaining GOs,
- definition of GO registers and its structure,
- responsibility for operation, maintenance and upgrade of GO register,
- definition of energy Producer,
- procedures for issuing GOs,
- good practice in operation of GO register,
- Status of country with AIB membership.

Table 2 Overview of legal acts and its elements on GO in the European countries – Part 1

Country	Relevant legal act(s) on GO	Definition of GO	Purpose of the GO	Competent/Issuing Body (IB)	Qualification for GO
Greece	<p>Law No 3468/2006 "Electricity Production from Renewable Energy Sources and High Efficiency Cogeneration of Electricity and Heat and other provisions", Official Government Gazette, First Bulletin, Sheet No.129, June 27, 2006</p> <p>Ministerial Decision No. D6/F1/oik.8786, on "Implementing the System of Guarantee of Origin of Electricity from RES and HE-CHP systems and assurance mechanisms", Official Government Gazette, Second Bulletin, Sheet No. 646, May 14, 2010</p>	The electronic certificate issued by the competent issuing body which certifies the origin of 1 MWh electricity produced from RES or HEC in a facility for a specified period.	To prove to the end consumer the proportion or amount of electricity produced from RES or HEC without RES that is included in the energy mix of an electricity supplier.	<p>The responsible issuing body as defined in Article 16 of Law 3468/2006 for electricity generated from RES: The Hellenic Transmission System Operator (HTSO)</p> <p>However, later on it was decided to structure a new daughter company <b>DAPEEP SA - Operator of RES &amp; Guarantees of Origin</b> (<a href="https://www.dapeep.gr/">https://www.dapeep.gr/</a>) as the Issuing Body for Greece</p> <p>DAPEEP has been properly appointed as an Authorised Issuing Body for GOs under Law 3468/2006, paragraph 1a of Article 16 as amended by Law No 4296/2014, Article 5.</p>	<p>Guarantees of Origin (GO) are issued for electricity generated in the following facilities:</p> <p>a) In facilities that generate electricity from renewable energy sources, excluding any energy produced by storage systems of the station;</p> <p>b) In hydroelectric plants that use pumping systems to fill the storage tank, only for the difference between the electricity produced from hydropower and the electricity absorbed by the System or Grid to fill the storage tank.</p> <p>c) In Cogeneration facilities, only for the amount of energy produced by high efficiency cogeneration (HEC),</p> <p>d) Electricity generation facilities that use a form of renewable energy and fossil fuels, only for the energy produced from renewable sources, excluding any energy generated by the storage systems of the station.</p>
Denmark	Rules regulating that the one requesting guarantees of origin will meet the necessary costs of issuance, transfer and cancellation of guarantees of origin and the control and supervision of the accuracy of the	The electronic certificate issued by the competent issuing body which certifies the origin of 1MWh electricity produced from RES or HEC in a facility for a specified period.	A guarantee of origin can be used by an electricity supplier, which must declare its electricity supply to a final customer on the declaration of the source of electricity to consumers	Energinet.dk is the Issuing Body and a member of AIB. Energinet.dk has in this context made a domain protocol that describes the rules governing the	All producers of electricity from renewable energy sources have the right to obtain guarantees of origin, from renewable energy as: wind power, solar energy, aerothermal, geothermal,

Country	Relevant legal act(s) on GO	Definition of GO	Purpose of the GO	Competent/Issuing Body (IB)	Qualification for GO
	<p>information - entered into force on March 23, 2012</p> <p>Order No. 1323 of 30 November 2010 on the guarantee of origin of Veelektricitet (Notice on the guarantee of origin)</p> <p>Notice of origin for electricity from high efficiency cogeneration entered into force on February 16, 2007.</p>		<p>(Elmærkningsbekendtgørelse n - "Guidelines for preparation of individual labels ", available at <a href="http://www.energinet.dk">www.energinet.dk</a> ).</p> <p>Guarantees of origin are issued in Denmark electronically and according to the voluntary common European standard "EECS" (European Energy Certificate System).</p>	<p>issuance of electronic guarantees of origin in Denmark ("GoO RES-E Certificates, RECS Certificates and Cog-GO Certificates Domain Protocol for Denmark")</p>	<p>hydrothermal and ocean energy, hydropower, biomass, landfill gas, sewage treatment plant or biogas.</p>
Germany	<p>UBA acts exclusively on a legal basis: The German legislator implemented the requirements of Art. 15 of the Directive 2009/28/EC by § 55 of the Renewable Energy Sources Act 2012 (ErneuerbareEnergien-Gesetz, EEG 2012). § 55 EEG 2012 had been superseded by § 79 EEG 2014 w</p> <p>EEG 2014: <a href="http://www.bmwi.de/English/Redaktion/Pdf/renewable-energy-sourcesact-eeg-2014,property=pdf,bereich=bmwi2012,sprache=en,rwb=true.pdf">http://www.bmwi.de/English/Redaktion/Pdf/renewable-energy-sourcesact-eeg-2014,property=pdf,bereich=bmwi2012,sprache=en,rwb=true.pdf</a>,</p> <p>EEG 2017: <a href="http://www.bmwi.de/Redaktion/EN/Downloads/E/eeg-2017-gesetzen.pdf?__blob=publicationFile&amp;v=2">http://www.bmwi.de/Redaktion/EN/Downloads/E/eeg-2017-gesetzen.pdf?__blob=publicationFile&amp;v=2</a>.</p> <p>Using § 64d EEG 2012 (now § 92 EEG 2017) the Federal Ministry for the Environment, Nature Conservation and Nuclear Safe in 2012 enacted the GO Ordinance (HkNV). With effect of 1 January 2017 the regulatory content of the HkNV has been implemented into the Renewable Energy Sources</p>	<p>The face value of one (1) GO is one (1) MWh.</p>	<p>GO is used for electricity disclosure. Suppliers are obliged to provide an electricity disclosure statement to their final costumers.</p>	<p>UBA is appointed by law as Competent Authority of Guarantees of Origin for RES-E Production in Germany. The interim period for handling GO for RES-E production before end of 2012 will end on 31st December 2013. By that date, Öko-Institut, the former competent body, will resign as Authorised Issuing Body for EECS-GO. On January 1st 2013 the Federal Environment Agency (Umweltbundesamt – UBA) started the operation of the Register of Guarantees of Origin for Renewable Energy Sources (Herkunftsnachweisregister – HKNR). From that date UBA is the sole competent body in Germany to issue, transfer and cancel GOs</p>	<p>The following renewable energy sources are regarded as renewables:</p> <ul style="list-style-type: none"> <li>a) hydropower including wave, tidal, salinity gradient and marine current energy,</li> <li>b) wind energy,</li> <li>c) solar radiation energy,</li> <li>d) geothermal energy,</li> <li>e) energy from biomass including biogas, biomethane, landfill gas and sewage treatment gas and from the biologically degradable part of waste from households and industry, (Art. 3 no. 21 EEG 2017).</li> </ul>

Country	Relevant legal act(s) on GO	Definition of GO	Purpose of the GO	Competent/Issuing Body (IB)	Qualification for GO
	<p>Ordinance (ErneuerbareEnergien-Verordnung – EEG). It enables UBA to create further and detailed regulations.</p> <p>UBA used this provision to enact the GO and Regional GO Implementing Ordinance (HkRNDV, <a href="https://www.gesetze-im-internet.de/hkndv/BJNR214700012.html">https://www.gesetze-im-internet.de/hkndv/BJNR214700012.html</a> and the GO and Regional GO Fees Ordinance (HkRNGebV, <a href="http://www.gesetze-im-internet.de/hkngebv/BJNR270300012.html">http://www.gesetze-im-internet.de/hkngebv/BJNR270300012.html</a>).</p>			from Renewable Energy Sources (EECS-GO for electricity from renewable energy sources only).	
Serbia	<ul style="list-style-type: none"> <li>• Energy Law (Official Gazette of Republic of Serbia no.145/2014), (<a href="http://www.mre.gov.rs/doc/efikasnost-izvori/EnergyLaw.doc">http://www.mre.gov.rs/doc/efikasnost-izvori/EnergyLaw.doc</a>)</li> <li>• Regulation on Guarantee of Origin (Official Gazette of Republic of Serbia no.82/2017), which describes, in more detail, the content of the Guarantee of Origin, the procedure for issuing, transferring and end of life cycle of a Guarantee of Origin, the process of registry administration and maintenance, the process of submitting data of the produced electricity measured at the delivery point from the transmission, distribution and closed distribution system, supervision, as well as other processes in accordance with the law, (<a href="http://www.ems.rs/page.php?kat_id=670">http://www.ems.rs/page.php?kat_id=670</a>)</li> <li>• Disclosure regulation (Official Gazette of Republic of Serbia no. 96/2017), which prescribes the way in which the end consumer information is calculated and shown, the share of all types of</li> </ul>	The guarantee of origin is issued to the producer for a unit net quantity of 1 MWh of produced electricity from renewable energy sources.	Supplier Fuel Mix Disclosure in Serbia is based on cancelled GOs and the National Residual Mix. In accordance with Article 196 of the Energy Law the supplier shall determine, calculate and disclose the share of all types of energy sources of the electricity sold to its end consumers.	EMS JSC Belgrade is the Transmission System Operator for Serbia. However, it is the Issuing Body for guarantees of origin in Serbia according to article 82 of the Energy law (Official Gazette of Republic Serbia no.145/2014) EMS JSC Belgrade business processes will cover Registration, Issuing, Transferring, Importing, Exporting, Cancellation, Expiry and Withdrawal of GO related to Serbian Domain. EMS JSC Belgrade is the operator of the Registry.	GO is issued for renewable energy sources.

Country	Relevant legal act(s) on GO	Definition of GO	Purpose of the GO	Competent/Issuing Body (IB)	Qualification for GO
	<p>energy sources of the sold electricity, as well as the calculation control and verification, (<a href="http://www.ems.rs/page.php?kat_id=670">http://www.ems.rs/page.php?kat_id=670</a>)</p> <ul style="list-style-type: none"> <li>Information on fees for issuance, transfer and end of life cycle of Guarantees of Origin, (<a href="http://www.ems.rs/page.php?kat_id=670">http://www.ems.rs/page.php?kat_id=670</a>)</li> </ul>				
Netherlands	<p>The Dutch Electricity Act 1998 ('Elektriciteitswet 1998'), as amended, implements Directives. The Ministerial Regulation on Guarantees of Origin for energy from renewable energy sources and electricity from high-efficiency cogeneration ('Regeling garanties van oorsprong voor energie uit hernieuwbare energiebronnen en HR-WKK-elektriciteit'), as amended, contains all rules for GO.</p>	<p>Exactly one EECS Certificate shall be issued for each whole megawatt-hour of qualifying Output.</p>	<p>The Ministerial Regulation on Guarantees of Origin for energy from renewable energy sources and electricity from high-efficiency cogeneration requires suppliers to cancel guarantees of origin to prove the origin of any renewable electricity that they supply to end-consumers in the Netherlands.</p>	<p>The functioning of the system for Guarantees of Origin is supervised by the Authority for Consumers and Markets as the Regulator. The Authority for Consumers and Markets is also the Competent Authority for Disclosure in the Netherlands.</p> <p>Such a mandate was given to TenneT TSO B.V. (hereinafter: TenneT), CertiQ's parent company, as per 1 January 2015. TenneT, in turn, has given a mandate to CertiQ.</p> <p>CertiQ has been properly appointed as an Authorised Issuing Body for EECS-GOs under the Electricity Act. Its role is to administer the EECS Registration Database and its interface with the AIB Communications Hub.</p>	<p>The way the amount of renewable electricity eligible for Guarantees of Origin is determined:</p> <ul style="list-style-type: none"> <li>(i) for renewable electricity produced from hydro, solar or wind: 100% of the electricity that is fed into the grid;</li> <li>(ii) for renewable electricity produced from waste: the amount of electricity that is fed into the grid, multiplied by a percentage that is annually fixed by the Minister of Economic Affairs (see C.5.1 below for more information);</li> <li>(iii) for renewable electricity from other biomass: the amount of electricity that is fed into the grid, multiplied by the Energy Input Factor (see E.4 below for more information); and</li> </ul> <p>nett of any auxiliary and onsite consumption;</p>

Country	Relevant legal act(s) on GO	Definition of GO	Purpose of the GO	Competent/Issuing Body (IB)	Qualification for GO
Poland	<p><i>RULES FOR THE GUARANTEES OF ORIGIN REGISTER</i> maintained by Towarowa Gielda Energii S.A. Text approved by virtue of the Resolution of the Management Board No. 262/28/20 of 19 May 2020 effective as of 19 May 2020</p> <p>The issuance and division of guarantees of origin take place in accordance with the principles set out, in the Renewable Energy Sources Act of 20 February 2015 (Journal of Laws of 2015, item 478, as amended) or in the Act of 14 December on the Promotion of Electricity from High-Efficiency Cogeneration (Journal of Laws 2019 item 42).</p>	<p>Certificates of origin are issued by the Energy Regulatory Authority, in a digital form for a specific volume expressed in MWh.</p>	<p>The instrument was established to provide consumers with a tool for selecting the preferred source of electricity while supporting electricity producers. The guarantees of origin allow businesses to demonstrate their care about the environment and commitment to the reduction of carbon footprint of their products and services.</p>	<p>In 2003, TGE (Polish Power Exchange) was the first (and so far the only) entity to have obtained a licence from the Polish Financial Supervision Authority (at that time the Securities and Exchange Commission) to operate a commodity exchange.</p> <p>TGE keep the records of Guarantees of Origin for each GOR Member</p>	<p>The guarantees of electricity origin are an element of the EU's environmental policy, which aims at disclosing and certifying to the end consumer that a certain amount of electricity delivered to the distribution network or transmission grid was generated from renewable energy sources or in the process of high-efficiency cogeneration (CHP, i.e. Combined Heat and Power).</p>

Table 3 Overview of legal acts and its elements on GO in the European countries – Part 2

Country	Account holder of GO	GO Register	Membership in AIB
Greece	<p>Any natural or legal person, Producer or Supplier, who conduct Registration in GO Register</p> <p>Note: in Greece legislation, Account holder of GO is known also as “Share holder”</p>	<p>The special register maintained by the Issuing body for the recording of the GO data as provided for in the provisions of para 6 of Article 17 of Law 3468/2006 and Article 5.</p> <p>GO register provides possibility for registration process of the Scheme Member and management of GO Register, including updating and reporting.</p> <p>Note: in Greece legislation, GO Register is defined as Facilities Register</p> <p><b>Responsibility for operation, maintenance and upgrading</b> DAPEEP SA is responsible for the operation, maintenance and upgrading of the GO Register. GO Register is in house software.</p> <p><b>Content of data and data record</b> GO Register records all relevant information related to the GO, including: particulars of their owners, and any data transfer, modification or revocation thereof. The GO Information System maintains the necessary data, which are the IB's responsibility. All information on GO, including data of the facility, are kept for at least ten (10) years after the GO is revoked.</p>	<p>from December 2019</p>
Denmark	<p>Any legal person who can be i) owners of production devices, ii) agents behaving on behalf of the owner or iii) traders. The same application procedure is used for all types of applicants.</p>	<p>The GO Register is being operated by Grexel Systems Ltd. - it can be accessed via the website <a href="http://cmo.grexel.com">cmo.grexel.com</a></p> <p>A prerequisite for receiving guarantees of origin is that the electricity producer or its authorised agent has, before issue, created an account code at the registry. Account holder shall at all times act in accordance with the rules of "Goo RES-E Certificates, RECS Certificates and Cog-GO Certificates Domain Protocol for Denmark 3.2 Deadlines for requesting issuance". The request must be received by Energinet.dk, by the 10th of the month following the month of production. If this date can only be issued by the subsequent month's issue.</p> <p>If an electricity producer or its authorised agent wishes to request the issue of production at several plants, this may be accompanied by a request for each plant. However, it is also possible to send one request which applies to all plants. As a minimum, the following information is disclosed: GSRN/GS1 number (if wind: both the park and the individual plants), plant owner's name and address, plant owner CVR / CPR number and the installed power.</p>	<p>From 2002</p>
Germany	<p>Any – legal or natural – person or association of natural persons which is given legal capacity by the law. The law differentiate between the following roles:</p> <ul style="list-style-type: none"> <li>• plant operators,</li> <li>• electricity suppliers,</li> <li>• traders,</li> <li>• service providers/agents,</li> <li>• grid operators,</li> <li>• environmental auditors and auditing organisations.</li> </ul>	<p>Federal Environment Agency (Umweltbundesamt – UBA) is designated for operation of the Register of Guarantees of Origin for electricity from Renewable Energy Sources (Herkunftsnachweisregister – HKNR). GO Register is in house software.</p> <p>UBA is Germany's central federal authority on environmental matters. It is a scientific environmental authority under the jurisdiction of the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, responsible for the most diverse range of topics. appoints UBA to act as the competent authority for the GO-Register in Germany.</p> <p>A very important player within German HKNR is the grid operator. He sends the measurement data how much electricity the plant produces. For the communication between UBA and the grid operators the EDIFACT-standard is used, laid down in an reference book and made binding by the Federal Network Agency. This secures data of a high quality in a standardised format and sent by an actor who does not have any monetary interests in sending wrong data.</p>	<p>From 2001</p>

Country	Account holder of GO	GO Register	Membership in AIB
Serbia	Only electricity producers from renewable sources registered at the Ministry, suppliers and wholesale suppliers with an active license issued by NRA can be registered as Account Holders in Serbia. The registration process begins when the applicant completes and sends the Account application form (Annex 2a) to EMS JSC Belgrade, duly signed by an authorised representative.	<p>The guarantee of origin shall be issued for the produced electricity from renewable energy sources delivered to the system after the registration of the producer and his production device is successfully completed in the Registry.</p> <p>The agreement that producers sign with the Ministry states that they agree not to claim EECS-GO and that they must exit the Support Scheme should they wish to receive EECS-GO (and cannot re-enter).</p> <p>GO Register is being operated by Grexel Systems Ltd. - it can be accessed via website <a href="http://cmo.grexel.com">cmo.grexel.com</a></p>	Serbia is the first contracting party of the Energy Community which joined the AIB. AIB has invited the Energy Community Secretariat to be an observer in order to open the door for other contracting parties. Following a kick-off workshop with AIB and the Energy Community in November 2020, AIB will discuss further the details of future cooperation with other countries. Therefore it is good example how the system has been set up
Netherlands	Any legal person who is not a member of the Association of Issuing Bodies or such member's affiliate or agent can apply for a transferable account or an end-user account.	<p>The electronic system is in place for issuing and registering guarantees of origin for electricity from renewable sources and from high-efficiency cogeneration.</p> <p>GO Register is in house software which is run by the Issuing Body Certiq.</p>	From 2002
Poland	<p>The following entities may become the Register Members:</p> <p>a) entities entitled to obtain the Certificates of Origin;</p> <p>b) entities obliged to acquire and redeem the Certificates of Origin;</p> <p>c) entities authorised to act as an intermediary in trading transactions in Property Rights (brokerage houses, commodity brokerage houses, entities representing other entities of the same holding group within the meaning of Article 3(1)(44) of the Accounting Act of 29 September 1994 (Dz.U.2108.395, 398 and 650));</p> <p>d) entities acquiring Property Rights through the entities referred to point c).</p>	<p>The guarantees of electricity origin are an element of the EU's environmental policy, which aims at disclosing and certifying to the end consumer that a certain amount of electricity delivered to the distribution network or transmission grid was generated from renewable energy sources or in the process of high-efficiency cogeneration (CHP, i.e. Combined Heat and Power).</p> <p>The Polish Register of Guarantees of Origin (GO) for guarantees of electricity origin from renewable energy sources was launched at TGE on 3 November 2014. On 2 October 2019, a module for guarantees of origin from high-efficiency cogeneration sources was added.</p> <p>Currently, the Register offers the following functionalities:</p> <ul style="list-style-type: none"> <li>• entry of guarantees of origin to the application,</li> <li>• sale of guarantees of origin between the GO members,</li> <li>• redemption of guarantees of origin for the end consumer.</li> </ul> <p>In Poland, generators may apply for guarantees of origin for individual months, periods of several months or for the whole calendar year. The documents are issued by the President of the Energy Regulatory Authority and subsequently uploaded to the TGE's IT system. Each guarantee has a unique number and validity date. The guarantees of origin from RES are valid for 12 months from the electricity generation end date, while the guarantees of origin from CHP are valid for 12 months from the date of issuance by the Energy Regulatory Authority.</p>	Not member of AIB

Country	Account holder of GO	GO Register	Membership in AIB
		The Register of Guarantees of Origin for electricity generated from RES went live at TGE on 3 November 2014, with cogeneration technologies added on 2 October 2019.	

Table 4 Overview of legal acts and its elements on GO in the European countries: GO Registers and procedures for issuing GO

Country	Relevant legal act(s) on GO	Procedures for issuing GO	Good practice
Greece	<p>Implementing the System of Guarantee of Origin of Electricity from RES and HEC systems and assurance Mechanisms (Decision D6/F/10/ik.8786, 14th May 2010)</p>	<p><b>Preconditions for issuing GO</b>                      To register the data of a plant in GO Register, the responsible IB shall inspect if the Facility Declaration is complete and the information contained there are identical to the data of the license or certificate issued by the responsible Administrator for the activation of the station's connection and the measuring devices, (other than those located at the boundaries of the Grid or System) which have been installed by the Producer and whose measurements are taken into account in the calculation of the energy produced, meet the standards established by the IB.                      For the issuance of GO for a power plant, the first step is to make registration in the GO Register. To identify a power plant as a "Facility" in the GO Registry, the applicant must submit a Facility Declaration and the power station's license.                      For plants generating power from RES or HEC, for which a power station license is not required, the responsible Grid Administrator shall submit a certificate that proves that the station's connection has been activated (i.e. for some specific power station the license is not required, but only approval by the "certificate" from Grid Administrator (the formal document from the Grid Administrator).                      To register the data of a plant in the GO Registry, the responsible IB shall inspect if:                      i) the power station falls into any of the following cases:                      a) In facilities that generate electricity from renewable energy sources and the total energy produced over a specific period of time, excluding any energy produced by storage systems of the station;                      b) In hydroelectric plants that use pumping systems to fill the storage tank, only for the difference between the electricity produced from hydropower and the electricity absorbed by the System or Grid to fill the storage tank.                      c) In Cogeneration facilities, only for the amount of energy produced by high efficiency cogeneration (HEC)                      d) Electricity generation facilities that use a form of renewable energy and fossil fuels, only for the energy produced from renewable sources, excluding any energy generated by the storage systems of the station.                      ii) the Facility Declaration is complete and the information contained therein are identical to the data of the license or certificate issued by the responsible Grid Administrator for the activation of the station's connection                      iii) the measuring devices, (other than those located at the boundaries of the Grid or System) which have been installed by the Producer and whose measurements are taken into account in the calculation of the energy produced, meet the standards established by the IB.                      In the case of autonomous power stations, IB shall also inspect whether the provisions for measuring the station's output meet the standards in force for measuring devices used in the power stations connected to the Grid of the same power, and whether they operate reliably.                      The all above specifications can be also examined by an onsite inspection performed by the IB or their delegated person. If the above are met, the IB shall register all data contained in the Facility Declaration in the Facilities Register, except for the information contained in the Facility diagram (the electrical scheme of the Facility).</p>	<p>If the Facility uses, among other fuels, biomass or solar energy based on another technology than photovoltaic technology and non-renewable energy source or is a hydroelectric plant using a pumping system for filling of the storage tank, , the information contained in the Consumption Declaration<sup>6</sup> must also be submitted.</p> <p>For a Cogeneration Facility the Producer must submit a report issued by a certified body (auditor), which will include a certificate for the accuracy of the measurements and the information referred to in the Consumption Declaration.</p> <p>From time to time, inspections may be carried out at any time, even without notice. The period between two inspections may not exceed five (5) years.</p>
Denmark	<p>Order No. 1323 of 30 November 2010 on the guarantee of origin of Veelektricitet (Notice on the guarantee of origin)*</p>	<p>Guarantees of origin are issued on the basis of net production, and on the basis of the measurements used in the electricity market. By issuing guarantees of origin on the basis of gross production, Energinet.dk will require the establishment of adequate measurements for the issuance, if these measurements have not already been sent to Energinet.dk in accordance with current regulations. Guarantees of origin for production which is used for the electricity producer's own consumption will be cancelled immediately by Energinet.dk, and can only be used for declaring of this consumption. Notice that this is not common in other countries in EU (only a few of them issue GO for gross production).                      When an electronic guarantee of origin is registered as having been used, it will be cancelled (cancellation in standard terms). This is a process initiated by the owner of the guarantee of origin and implies that the guarantee of origin can no longer be traded but can only be used as documentation for the consumption of a specified amount of electricity. The system that handles the electronic guarantees of origin can be recorded on a document "Cancellation Statement", containing the origin in information and text, as the owner chooses. Text describing an object, i.e., the electricity supply guarantee of origin must document (e.g.) the customer, country and consumption year. The cancellation must be made in the register in the country of consumption. Should a guarantee of origin be used to declare consumption in a country other than Denmark, then the guarantee of origin is transferred to an account in this country before it is cancelled. If it is not technically possible to transfer the GO, the cancellation message should indicate that the guarantee of origin covers consumption in a given country and indicate the customer (known as a "ex-domain cancellation" in EECS). Should a guarantee of origin be used for declaring consumption in Denmark, the guarantee of origin must be similarly cancelled in the Danish registry, unless this is not technically possible (e.g. due to lack of coupling of the registers).                      Any use of a guarantee of origin shall take place within 12 months of the calendar month wherein the power generation takes place. Energinet.dk will delete guarantees of origin issued but not used within this period. These are shown not as cancelled, but expired.                      An electricity producer or its authorized agent is eligible to receive guarantees of origin and applies for issue by completing the standard form "Request on the issue of guarantees of origin for renewable electricity", and sending this to Energinet.dk. The standard form is available at <a href="http://www.energinet.dk/oprindelsesgarantier-ve">www.energinet.dk/oprindelsesgarantier-ve</a> , which contains instructions for its completion.                      A forwarded request from an authorised agent must also enclose proof of its authorization (i.e. power of attorney).</p>	<p>Any request for issuing guarantees of origin for waste incineration plants result in the issue of guarantees of origin on the basis of two calculation methods:                      1. For installations which generated a separate time series of RE share of waste to Energinet.dk, will prove the renewable energy share in this time series.                      2. For plants which have not generated a time series to Energinet.dk, the documentation could accrue Energinet.dk in form of an audited balance per desired issuing period.                      If the renewable energy share of electricity for waste incinerator cannot be substantiated, then it will be set at 60% of electricity.</p>

<sup>6</sup> Consumption Declaration - according to EECS rules this is the proof that those facilities are using the primary source in an appropriate manner.

Country	Relevant legal act(s) on GO	Procedures for issuing GO	Good practice
Germany	Renewable Energy Sources Act (EEG)	<p>UBA issues GOs upon request of the plant operator. He may apply for every single issuing procedure but also make use of a standing order. According to the net electricity a production device produces and feeds into the grid UBA issues GOs (§ 79 (5) EEG 2017). The grid operator sends UBA data not only on the amount of electricity but also on the kind of marketing of the electricity (that is the information whether the PD operator requests support for the electricity and if so, which kind of support).</p> <p>It is impossible to receive the feed-in-tariff or a premium and get GOs issued for the same amount of electricity. A quantity of electricity produced by a production device which is less than one Megawatt hour may be carried over on the "electricity account" into the next period until one Megawatt hour is completed. UBA will inform the account holder of the issuance of any GO into that account holder's transferable account and of that GO's details and make all information available to that account holder. UBA, allows for additional criteria if the environmental auditor confirms them:</p> <ul style="list-style-type: none"> <li>- additional criteria, if the production device is constructed or operated in an environmentally friendly way (cf. § 8 (2) HkRNDV</li> <li>- "optionale Kopplung" (optional linking between GO and electricity produced): The owner of the production device may sell his GO to the same electricity supplier he delivers the electricity to via his virtual "accounting grid" (cf. § 8 (3) HkRNDV).</li> </ul>	<p>Non-German residents can choose whether to prove their identity by uploading a coloured copy of their ID or passport or by following the PostIdent-procedure. The reliability of each applicant (domestic and foreign) is checked according to the registers' security policy which relies on the same criteria than the AIB KYC-form. This security policy requires to cross-check the information given to HKNR by the applicant against the information we have from the applicant or other (public) sources and/or to ask the applicant for further information, explanation and/or documentation to enable us to verify his/her reliability.</p> <p>Production auditors are environmental verifiers accredited according to the Umweltauditgesetz (UAG – Environmental Audit Act) which implements the EU EMAS Regulation in Germany. Accreditation is granted to environmental verifiers by the German supervising body for environmental verifiers Deutsche Akkreditierungs- und Zulassungsstelle für Umweltgutachter mbH – DAU. DAU publishes a list of all accredited environmental verifiers in the internet: <a href="http://www.dau-bonn-gmbh.de/dauAdrList.htm?cid=209">http://www.dau-bonn-gmbh.de/dauAdrList.htm?cid=209</a>. Environmental verifiers can register in the HKNR. Registered environmental verifiers may be appointed by the registrants to audit information made available to them by the registrants (or, if different, the owner or operator of the relevant Production Device) and, where appropriate, by inspecting the relevant Production device.</p>
Serbia	Energy law (Official Gazette of Republic of Serbia no.145/2014) By-law legislation about Guarantees of Origin (Official Gazette of Republic of Serbia no. 82/2017) Disclosure regulation (Official Gazette of Republic of Serbia no. 96/2017)	<p>The guarantee of origin is issued by the transmission system operator on the basis of the producer's request and data on the electricity production. The producer's request for the issuance of a guarantee of origin shall be submitted electronically in a manner determined by the transmission system operator. The data on the produced electricity to the transmission system operator shall be submitted by the distribution system operator, or the operator of closed distribution system, depending on which system the producer's production device is connected. The transmission system operator shall obtain the data on the produced electricity by producers from production devices connected to the transmission system ex officio.</p> <p>The transmission system operator cannot issue the guarantee of origin if the producer has not previously registered the production device, in which the electricity that is subject of the issuing request is produced, in the Registry.</p> <p>The content of the request for issuance of a guarantee of origin, the manner of the request submission and required conditions and the manner of issuing the guarantee of origin shall be determined by the transmission system operator in the Domain protocol for Serbia.</p> <p>The cancellation of a guarantee of origin, for the purposes of this Regulation, is carried out in order to provide an evidence to the end consumer, by the supplier with whom it has concluded the supply contract, that a certain amount of consumed electricity is produced from renewable energy sources. The supplier may cancel the guarantee of origin if he is registered in the Registry and if he, at the moment of submitting the request for the cancellation of guarantee of origin, is the owner thereof.</p> <p>The supplier shall initiate the procedure for cancellation of guarantees of origin by submitting a request for the cancellation of a guarantee of origin to the transmission system operator.</p> <p>The guarantee of origin can only be cancelled once.</p> <p>The Energy Agency of the Republic of Serbia (the Agency) supervises the transmission system operator, distribution system operator, suppliers and other entities (hereinafter: the supervised entity) from the aspect of fulfilling the obligations determined by the Energy law, this Regulation and the Domain protocol for Serbia.</p> <p>The Agency performs the supervision over the transmission system operator from the aspect of Registry administration and maintenance.</p> <p>From the aspect of supervision, the Agency is authorized to:</p> <ol style="list-style-type: none"> <li>1) request, as necessary, from the supervised entity a report that contains an overview of the implementation of the Energy law and this Regulation;</li> <li>2) request from the supervised entity to provide all the necessary data and documentation for further consideration;</li> <li>3) Assess the state of fulfilment of obligations and performance of operations, warn on the detected irregularities, determine the measures and the deadline for their resolution.</li> </ol>	<p>If the Republic of Serbia with an international agreement with a non-member state of the European Association of Issuing Bodies provides the mutual recognition of guarantees of origin in accordance with Article 83, paragraph 1 of the Energy law, and there is no technical possibility to export the guarantee of origin to that country, guarantee of origin may be cancelled in the Registry for the needs of the end consumer from that country in accordance with the provisions of this Regulation, unless otherwise is provided by an international agreement.</p> <p>If the Republic of Serbia with an international agreement with a non-member state of the European Association of Issuing Bodies provides the mutual recognition of guarantees of origin in accordance with Article 83, paragraph 1 of the Energy law, and there is no technical possibility to import the guarantee of origin into the Registry, a guarantee of origin issued in that country may be cancelled in the registry of guarantees of origin of that country for the purpose of providing an evidence to the end consumer in the Republic of Serbia that a certain amount of consumed electricity is produced from renewable energy sources, unless otherwise is provided by an international agreement.</p> <p>Cancellation statement issued for the guarantees of origin referred to in paragraph 2 of this Article shall be used by the supplier of end-consumer in accordance with the Disclosure regulation.</p>

Country	Relevant legal act(s) on GO	Procedures for issuing GO	Good practice
Netherlands	Dutch Electricity Act 1998	<p>The Ministerial Regulation on Guarantees of Origin for energy from renewable energy sources and electricity from high-efficiency cogeneration ('Regeling garanties van oorsprong voor energie uit hernieuwbare energiebronnen en HR-WKK-elektriciteit'), as amended, contains the rules mentioned under (f) above, which include:</p> <p>(a) the information to be included in Guarantees of Origin; being:</p> <ul style="list-style-type: none"> <li>(i) the energy medium (Electricity) to which the Guarantee of Origin relates;</li> <li>(ii) the energy source used;</li> <li>(iii) where such energy source is biomass, the type of biomass;</li> <li>(iv) the start and end dates of production;</li> <li>(v) the identity, location and electrical capacity of the originating Production Device, and the type of device;</li> <li>(vi) the date on which the originating Production Device was commissioned;</li> <li>(vii) whether and to what extent the Production Device has benefited from support, and the type of support;</li> <li>(viii) a unique identification number;</li> <li>(ix) the date and country of issuance;</li> </ul> <p>(b) additional information to be included in Guarantees of Origin issued for electricity produced from high-efficient cogeneration:</p> <ul style="list-style-type: none"> <li>(i) the thermal capacity of the Production Device;</li> <li>(ii) the lower calorific value of the energy source used;</li> <li>(iii) the amount of heat produced together with the electricity, and the way such heat was used;</li> <li>(iv) primary energy savings in accordance with EU Directive 2012/27;</li> <li>(v) the nominal electrical and thermal efficiencies of the Production Device;</li> </ul> <p>(c) the lifetime of a GO, being one year after the end date of production</p> <p>(d) the way the amount of renewable electricity eligible for Guarantees of Origin is determined:</p> <ul style="list-style-type: none"> <li>(i) for renewable electricity produced from hydro, solar or wind: 100% of the electricity that is fed into the grid;</li> <li>(ii) for renewable electricity produced from waste: the amount of electricity that is fed into the grid, multiplied by a percentage that is annually fixed by the Minister of Economic Affairs;</li> <li>(iii) for renewable electricity from other biomass: the amount of electricity that is fed into the grid, multiplied by the Energy Input Factor and net of any auxiliary and onsite consumption;</li> </ul> <p>(e) the way the amount of electricity produced from high-efficiency cogeneration and eligible for Guarantees of Origin is determined: in accordance with EU Directive 2012/27.</p> <p>Contrary to EECS Rules section C2.2.3, and in accordance with section 2, paragraph 3 of the Ministerial Regulation on Guarantees of Origin for energy from renewable energy sources and electricity from high-efficiency cogeneration, Registrants of production devices with nominal capacities &lt; 15 kW need not re-register those production devices every five years (Note: any other domains requires to re-register the production devices every 5 years).</p> <p>The Production Device shall be identified in the application using the unique number assigned to it by the Production Registrar in accordance with GS1 numbering (<a href="http://www.gs1.org">www.gs1.org</a> )</p>	<p>The role of Production Auditor is performed in the Netherlands:</p> <ul style="list-style-type: none"> <li>(a) for Production Devices which generate electricity from biogas, and of which the Nominal Capacity does not exceed 2 MW: by an accredited metering company (listed here);</li> <li>(b) for other Production Devices which generate electricity from biogas and/or biomass: by an accredited accountant. The register of accredited accountants is kept by the Royal Netherlands Institute of Chartered Accountants.</li> <li>(c) for all other Production Devices: by the TSO and DSOs.</li> </ul> <p>Where the Production Device can be fuelled by more than one Source of Input the Registrant must submit a Consumption Declaration for that Production Device for every calendar month and to specify therein the Energy Input Factor for each type of Input used during the calendar month to which that Consumption Declaration relates. This is done by entering the Energy Input Factors directly into myCertiQ.</p> <p>Within four months after the end of each calendar year, the Registrant must submit a statement from a Production Auditor, verifying the Consumption Declarations submitted to CertiQ in relation to the prior calendar year.</p> <p>CertiQ will check the Consumption Declarations submitted by the Registrant against the statement from the Production Auditor. Where an Energy Input Factor confirmed by the Production Auditor exceeds the Energy Input Factor submitted by the Registrant, CertiQ will issue additional EECS Certificates. Where an Energy Input Factor confirmed by the Production Auditor is exceeded by the Energy Input Factor submitted by the Registrant, EECS Certificates will be withdrawn in accordance with section E.7.2 below to compensate for the discrepancy.</p> <p>Measured volumes are collected by the Measurement Body and submitted to CertiQ electronically. All measurement data so submitted is automatically verified by myCertiQ against the registered capacities of the relevant Production Devices. In accordance with legislation, the Measurement Frequency shall be:</p> <ul style="list-style-type: none"> <li>(a) where the connection capacity of the Production Device is less than or equal to 3X80 A: twelve-monthly;</li> <li>(b) where the connection capacity of the Production Device is greater than 3!80 A: monthly.</li> </ul> <p>As of January 2020, Dutch electricity suppliers are obliged to prove the origin of all electricity they physically supply, so-called Full Disclosure. This goes a step further than sharing their production mix as this really concerns the specific volume supplied to a customer. The aim is to give consumers freedom of choice in the origin of the electricity they purchase. The transparency should stimulate companies to make choices that lead to less output of carbon emission, even within the grey category.</p> <p>However, as electricity is transported over a common network and the electricity is mixed with different sources, it is not physically possible to purchase the electricity from a specific source without having to install a separate electricity network. For this reason, parallel markets exist to indicate the source of your electricity consumed.</p> <p>As of January 2020, Dutch electricity suppliers will also need to cancel Certificates of Origin. These certificates will prove the source of their clients' grey electricity and will be traded in a bilateral market where energy suppliers will negotiate and buy certificates from traders or producers directly.</p>

Country	Relevant legal act(s) on GO	Procedures for issuing GO	Good practice
Poland	<p>THE RULES FOR THE CERTIFICATES OF ORIGIN REGISTER No 82/21/21 of 11 May 2021 effective as of 11 May 2021</p> <p>Guarantees of Origin are entered in the Register Account of the GOR Member.</p> <p>The agreements concerning Guarantees of Origin is being executed outside of the Exchange and solely between GOR Members.</p>	<p>These Rules for the Guarantees of Origin Register maintained by Polish Power Exchange (GOR Rules), set forth the principles applicable to the registration and record-keeping system for Guarantees of Origin, as well as the principles of over-the-counter trade in Guarantees of Origin.</p> <p>TGE keep the Guarantees of Origin Register in a manner that ensures the identification of: a) the generators for whom Guarantees of Origin were issued; b) the entities whose Guarantees of Origin issued in another EU member state, Swiss Confederation, or a member state of the European Free Trade Association (EFTA) which is a party to the European Economic Area Agreement, have been accepted by the President of the Energy Regulatory Office; c) the entities which have acquired Guarantees of Origin; and d) Guarantees of Origin held in the accounts of individual entities and the corresponding quantities of electricity.</p> <p>An entity shall obtain the status of a GOR Member upon the submission of an application for the status of a GOR Member to the Exchange, in accordance with the form set out in Attachment 2 to the Rules.</p> <p>In the GOR, the Exchange is recording all the agreements for sale of Guarantees of Origin and make quantitative settlements of such agreements with the aid of the GOR IT System.</p> <p>GOR Members are executing the agreements for sale of Guarantees of Origin exclusively through the IT System of the Guarantees of Origin Register.</p> <p>A submitted offer to sell a Guarantee of Origin shall not be valid longer than until the expiration of the Guarantee of Origin being the subject of such an offer. A GOR Member who placed such an offer may withdraw it until its acceptance or rejection by the GOR Member the offer is addressed to.</p> <p>Upon accepting the offer to sell referred to in clause 7 above by the buying GOR Member, the sale agreement is executed and the object of sale is transferred onto the buying GOR Member.</p> <p>GOR Members shall be required to secure all the necessary consents (including specifically the consents of their corporate authorities), as legally required for the sale agreements concerning Guarantees of Origin to be valid and effective.</p> <p>A Guarantee of Origin shall be blocked in the following circumstances:</p> <ol style="list-style-type: none"> <li>a. when it has expired as a result of the lapse of its validity term;</li> <li>b. upon being cancelled.</li> </ol> <p>The blocked Guarantees of Origin may not be subject to any operations in the Register.</p> <p>The notification of the Guarantee of Origin cancellation shall result in the blocking of such Guarantee of Origin.</p> <p>Once the Guarantee of Origin are cancelled, the GOR Member shall indicate the name of the final consumer in the application for the issuance of a confirmation document .</p> <p>TGE shall issue a document confirming that the cancelled Guarantees of Origin were held by the GOR Member at the time of the cancellation.</p> <p>Guarantees of Origin which expired, except for cancelled Guarantees of Origin, shall be extinguished and deleted from the GOR.</p>	

#### 4. Legal acts of the EU countries (including EER ones) and Serbia as a Contracting Party of the Energy Community to trade Guarantees of Origin (GOs) (including as financial instruments)

Directive 2018/2001 identified GOs as a promotion instrument of electricity production from renewable sources in Member States with a possibility to be sold on the market:

*Guarantees of origin issued for the purposes of this Directive have the sole function of showing to a final customer that a given share or quantity of energy was produced from renewable sources'*

*Energy from renewable sources in relation to which the accompanying guarantee of origin has been sold separately by the producer should not be disclosed or sold to the final customer as energy from renewable sources. It is important to distinguish between green certificates used for support schemes and guarantees of origin. (55)*

In a practice, GO has a monetary value determined by different technology and market elements with a possibility to be a subject of contract between different parties. This is reason (**but not in the legal field**) why GOs are seen as a financial instrument which gives additional source of income for the renewable project owner.

Many AIB member states allow the issuance of GOs for supported energy, thus increasing the risk of double counting. This occurs when the perception arises that an amount of „renewable” electricity has been certified or traded twice, and it can result in further distrust of the system. In countries that allow the issuance of GOs in addition to the reception of financial support for RES production, revenue generated from trading GOs is a highly welcomed source of income, provided that the registry fees (for issuing GOs) are sufficiently low.

Following table provides overview of selected European countries which are allowing issuance of GOs only for non-supported renewable energy.

Table 5 Overview of legal acts of the European countries on GOs as tradable financial instruments

Country	GO as financial instrument together with the support	National RES production 2020 (GWh)	EECS production 2020 (GWh)
Greece	No	17,588	planned to be issued from the end of 2021
Denmark	No	23,226	21,843
Germany	No	251,014	17,050
Serbia	No	11,016	6,621
Netherland	No	31,000	28,600
Poland	Not identified status within analysis	24,000	13,600

To understand the full purpose of GOs as promotional and financial instrument on the electricity market, following chapter will provide overview of:

- General elements of GOs market functioning,
- GOs trade on the national and EU market and
- Importance of GOs for “environmentally friendly” producers.

#### 4.1. Guarantees of origin as tradable financial instruments

Electricity consumers have four options for acquiring green electricity. Presented in the order of their increasing positive impact on green electricity production and additional organizational effort and costs, these are: *unbundled energy attribute certificates (EAC) in countries where this decoupling is approved by the electricity market rules, power purchase agreements (PPA), renewable energy offerings in countries where consumer is not able to buy the certificate include also GO, and direct investments for self-consumption (on-site and off-site).*

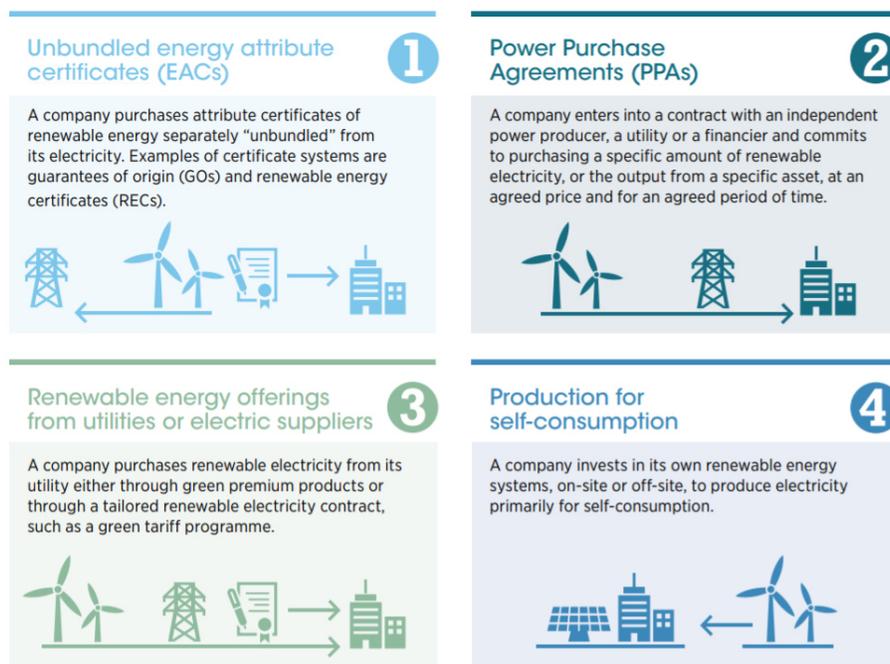


Figure 6 Models for corporate sourcing of renewable electricity<sup>7</sup>

Amongst commercial and industrial consumers, EACs have been the most frequently used method for green electricity acquisition. The most commonly used type of EACs in the EU are GOs.

To summarize aspects identified in previous chapters:

The theoretical design of the GO system will be explained in the following: For every MWh of green electricity that is fed into the grid by a producer, that producer may request the issuance of one GO in its respective national registry.

During its lifetime, this GO may be traded internationally amongst traders, utilities, and suppliers until it is cancelled upon request when the corresponding MWh of green electricity has been sold and must be disclosed to a consumer. If the GO is not cancelled after 12 months, it expires and is removed from the registry. The corresponding MWh of green electricity is still fed into the grid – the “greenness” of the electricity, however, has not been sold. This separation between the physical delivery of electricity and the trading of GoOs has resulted in the emergence of a fully independent but non-transparent market for GO trade. As this trade can also be conducted on an international basis in the European Energy Certificate System (EECS), an acknowledged independent institution is required to ensure the correct processing of GOs because of different systems diverging from one another in terms of regulations. This institution is the Association of Issuing Bodies (AIB), which is defining regulatory framework in compliance with EU law and the respective national laws.

As every market, GO market is determined by the relation between the two fundamental concepts of supply and demand. In an ideal situation, the supply and demand curves meet at the

<sup>7</sup> Source: <https://irena.org/publications/2018/may/corporate-sourcing-of-renewable-energy>

equilibrium price and quantity. The GO market, however, is characterized by an oversupply of GOs, as supply exceeds demand. This special situation is illustrated in the following figure.

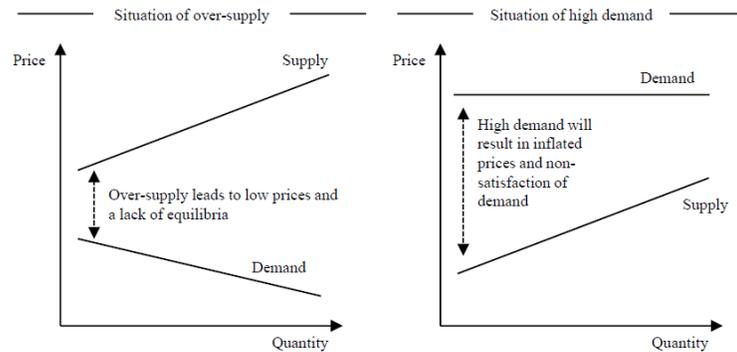


Figure 7 Impact of supply and demand imbalances on GO prices

In previous figure, supply and demand curves are shown to be linear. This, however, is not the case in the reality. The phenomenon that describes the price-dependent shift or the curvature of demand and supply curves is known as price elasticity. Following figure shows three different types of price elasticity for a theoretical supply curve, with the two extremes, i.e. perfectly inelastic and perfectly elastic supply. The case of a change in price elasticity beyond a certain boundary price is shown in **Figure 9**.

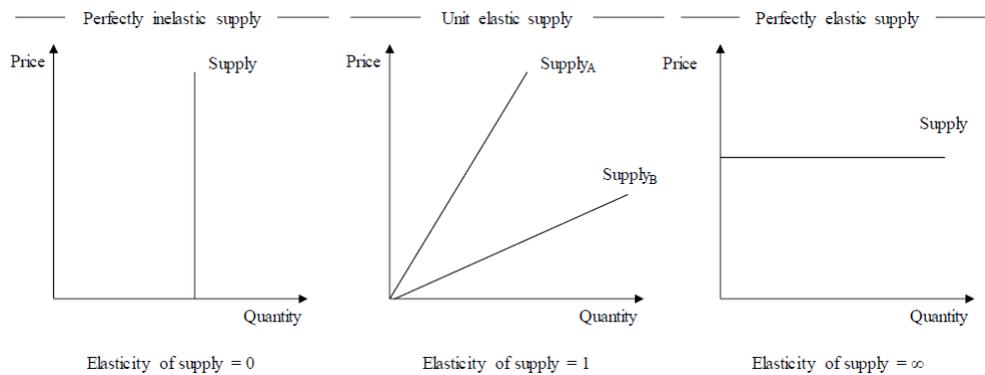


Figure 8 Price elasticity of GO supply

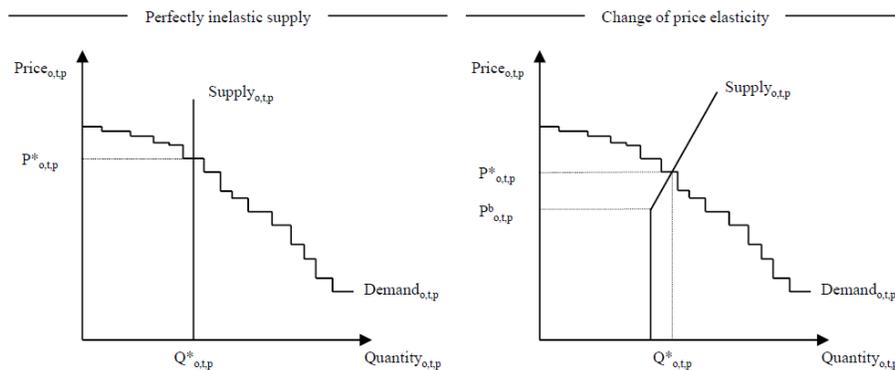


Figure 9 Price-setting equilibria of different elasticities

The price of GO on the market is formed mostly for following renewable energy technologies: wind, hydro, solar and biomass<sup>8</sup>. There are many factors that influence price development on the EU market, as follows:

- Surplus or deficit of the GO market;
- Since the most production of renewable electricity comes from Nordic countries, a wet year as strong hydro production means too many GOs on the market and therefore strong downward pressure on the price within all technologies;
- Changes in buying pattern - technology, seasonal, and up to production of every country;
- Price spreads between technologies closing in;
- Financial Crisis/Global Economic Recession and
- Psychological factors (speculations) - greed/fear.

Statistics in AIB shows annual transactions per every member/domain. Norway as the biggest exporter of GO influences the market prices very significant as it is aforementioned.

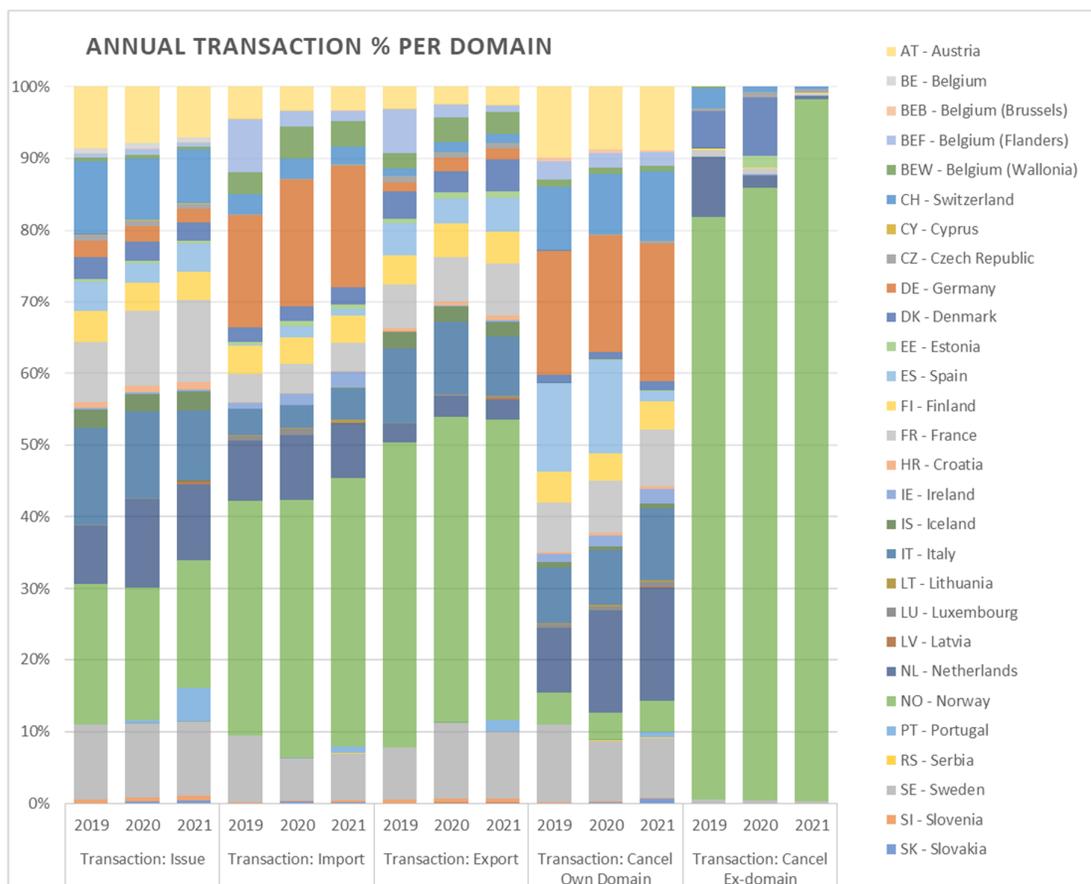


Figure 10 Annual GOs transaction (%) per domain, AIB statistics on November 2021

The GO price on the market is very much influenced by how old the production device is. GO produced from newer production device **without support** gains better price on the market. It is assumed that emission factor for those devices is greater than from the old. This is important to underline that old supported electricity barely can achieve good revenue.

<sup>8</sup> Directive 2012/27/EU provides for guarantees of origin for proving the origin of electricity produced from high efficiency cogeneration plants. In addition to this, Directive 2018/2001 identified possibility to extend the guarantees of origin system to energy from non-renewable sources – this should be an option for Contracting Parties and it would enable the creation not only guarantees of origin for renewable gas than for hydrogen.

The product-specific emission factor for unsupported generation should reflect the vintage of the production devices as follows:

- New plants = [0 – 6] years old; Use the plant specific emission factor.
- Medium-aged plants = [>6 – 12] years old; Use the mean value between the plant specific emissions and the standard system emission factor.
- Old plants = > [12] years old; Use the standard system emission factor.

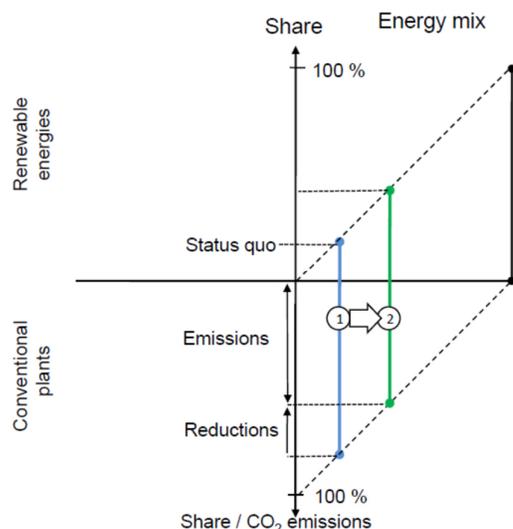


Figure 11 Impact of new renewables capacity on energy mix

In theory, once demand for GOs increases, prices will rise and therefore result in GOs becoming a potential tool for the promotion of renewable energy production. As interested consumers are willing to pay higher electricity prices in exchange for higher amounts of renewable energy in their supply mixes, and as corporate awareness is increasing as well as a more active approach being conducted in terms of energy acquisition, the necessary demand for GOs could be generated if European policy makers were to pave the way.

Whether GOs are seen as an additional revenue option – or even as an alternative to subsidies for new projects – is highly dependent on the decision makers involved. While project developers, wishing to maximize their profits, will value the possibility of GO issuance in their project planning, investors and especially lenders will not value such issuance as highly without the security of long-term contracts.

In conclusion, the current GO system design is able to fulfil its original purpose of electricity disclosure. However, due to low prices and a lack of harmonization amongst EECS member states, GOs can currently not be regarded as an effective instrument for the promotion of the production of renewable electricity. However, once prices exceed national support schemes and further harmonization eventually leads to the elimination of double-counting – and thus an increase of trust in the GO scheme – GOs might become a useful instrument for the EU-wide transitioning to a carbon-neutral economy by 2050.

#### 4.2. Trade of Guarantee of Origin: market trade and auctions

AIB members have two approaches is selling GOs on the market:

- Market trade via traders and brokers at the wholesale market and
- Auctions for GO issued for electricity produced in subsidized plants.

##### *Market trade via traders and brokers at the wholesale market*

AIB members do not have information on the prices of certificates - these are exchanged between market participants without the issuing bodies participating in or being aware of the detail of the trade (i.e. as the independent body should not know the market prices).

In the wholesale market, GOs are predominantly traded through brokerages such as Clean world and ICAP, who facilitate transactions between power producers and electricity suppliers. Other popular ways to trade are via portfolio management companies, trading houses and bilaterally between producers and retail power companies. Portfolio management companies, such as ECOHZ and Kinect, manage substantial volumes of GOs on behalf of small and medium-sized power producers. These companies act as counterparties to both sellers and buyers, aiming to create value by optimizing their client's renewable energy strategies. Trading houses such as Axpo and STX aim to create value by taking a speculative position in the GO market. All retail consumers and most businesses buy GOs from their retail power supplier, while some large businesses purchase GOs directly in the wholesale market or through Power Purchase Agreements (PPAs).

The PPAs are a long-term financial contract in which the seller (i.e. an energy producer) receives a fixed price (which may or may not be the same for each year of the contract) and pays the variable price of the market. In this way, the seller can manage the risk of the future market price. The volume of energy considered in the contract can be baseload (the same amount every hour of the year), monthly fixed profile, a fixed production profile (for example photovoltaic profile zone V in Spain) or a real photovoltaic production profile. Additionally, the contract may include the sale of Guarantees of Origin. Moreover, the price can be structured in such a way as to include additional features such as floors (ensure a minimum price in exchange of a premium), or a combination of floor and fixed price (participation swap).

While the registries keep the information about every issued GO (in the national domain and other domains) and all transactions in the national registry, it is not the platform for financial transactions. Electricity producers sell their GOs produced from their production devices, and suppliers buy on behalf of their customers. However, the trade of GOs is performed by the traders and the brokers through two ways: (i) bilateral contract or (ii) on the exchange platform (**more details in the Chapter 6**).

##### *Auctions for GO issued for electricity produced in subsidized plants*

Some of the AIB members have launched the auctions for selling GO issued from subsidized power plants. This approach has been implemented firstly by Italian domain and their Issuing Body-GSE Market Operator in order to gain income for subsidize scheme. Afterward the approach has been followed in some other domains: Croatia, Luxemburg, Portugal and Slovakia.

The approach is in line with the EU Guidelines on State aid for environmental protection and energy 2014-2020 (2014/C 200/01)<sup>9</sup> which are based on the assumption that all sources of revenue are taken into account when determining the level of the support:

##### *3.3.2.4. Aid granted by way of certificates*

*(135) Member States may grant support for renewable energy sources by using market mechanisms such as green certificates. These market mechanisms<sup>10</sup> allow all renewable energy producers to benefit indirectly from guaranteed demand for their*

---

<sup>9</sup> [https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52014XC0628\(01\)&from=EN](https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52014XC0628(01)&from=EN)

<sup>10</sup> Such mechanisms can for instance oblige electricity suppliers to source a given proportion of their supplies from renewable sources

*energy, at a price above the market price for conventional power. The price of these green certificates is not fixed in advance but depends on market supply and demand.*

*(136) The Commission will consider the aid referred to in paragraph (135) to be compatible with the internal market if Member States can provide sufficient evidence that such support (i) is essential to ensure the viability of the renewable energy sources concerned; (ii) does not, for the scheme in the aggregate, result in overcompensation over time and across technologies, or in overcompensation for individual less deployed technologies in so far as differentiated levels of certificates per unit of output are introduced; and (iii) does not dissuade renewable energy producers from becoming more competitive*

European Commission guidance for the design of renewables support schemes<sup>11</sup> explicitly recognizes income from the sale of GOs as such revenue source (*page 20*).

Auctioning brings wider benefits to the GO system and provides further transparency to European consumers: auctioning of GOs ensures disclosure of these supported renewable projects in the GO system, thereby ensuring that there is full transparency on all renewable energy sources.

In some EU Member States, national legislation prohibits the issuing of GOs for energy from support schemes altogether. This leads to a potential source of revenue being ignored. GOs must therefore be issued to generate this additional value, while avoiding double compensation. Using revenue from the auctioning of GOs to offset the cost of support is fully in line with Commission guidance on inherently building market-based features into support schemes in order to minimize the costs of the scheme. The alternative of administratively taking into account the market value of the GO by adjusting the level of financial support would lead to additional administrative burden on the authorities and would require the calculation of an average sale price. A number of Member States do not allow the issuance of GOs for supported energy. In these cases, the supported renewable energy is accounted for in the residual mix, rather than in the GO system, leading to incomplete disclosure.

Issuance of GOs for the energy produced from support schemes and auctioning them directly to the market fundamentally solves this problem and ensure there is no 'hole' in the disclosure process. The issuance of GOs for supported energy leads to more complete disclosure so that consumers receive clear, reliable and adequate evidence on the renewable origin. Beyond renewable energy, the mandatory issuance of certificates for all production sources, known as 'full disclosure' would significantly improve the transparency of the electricity market, allowing consumers full insight into the origin and enabling them to make reliable comparisons between suppliers. The Netherlands is the latest country to acknowledge these benefits and announce its move to full certification, meaning that all suppliers must substantiate the origin of all supplies of electricity, irrespective of the source.

Using revenue from the auctioning of GOs to offset the cost of the support scheme is the most transparent and reliable solution to ensure that the additional value, the 'greenness' of a GO accrues to those who ultimately pay for it - the consumers. Auctioning fully ensures the market value of the GO is appropriately taken into account, because the GO is issued and has the additional advantage that it does not withhold from the market GOs issued to supported energy.

---

<sup>11</sup> [https://ec.europa.eu/energy/sites/ener/files/com\\_2013\\_public\\_intervention\\_swd04\\_en.pdf](https://ec.europa.eu/energy/sites/ener/files/com_2013_public_intervention_swd04_en.pdf)

### 4.3. Prices of GOs in the EU countries

Following figures is providing overview of GO prices for Nordic hydro and European wind, solar and biomass in a period from 2020 and 2021, as well as predictions of future price increase until 2024. Over the last years, the European demand for renewable electricity has been lower than supply, and this has resulted in low GO prices.

European GO prices in 2020 for wind, solar and biomass were varying from 0.58 to 0.6 EUR/MWh. In 2021, bided GO price increased for 10% causing price ups from 0.6 to 0.65 EUR/MWh. It can be noticed that prices of GOs from hydro and wind in November and December 2021 were at almost the same level 0.6 EUR/MWh. They slightly recovered from a lower price which happened previously as the results of the French monthly auction for 2021.

	Guarantee of origin certificates												€/MWh
	Nordic hydro			European wind			European solar			European biomass			
	Bid	Ask	±	Bid	Ask	±	Bid	Ask	±	Bid	Ask	±	
2020	0.50	0.60	-0.060	0.50	0.60	-0.060	0.50	0.62	-0.055	0.50	0.58	-0.010	
2021	0.64	0.69	0.020	0.65	0.70	0.030	0.62	0.70	0.030	0.60	0.68	0.020	
2022	1.68	1.74	0.005	1.67	1.73	0.005	1.65	1.75	nc	1.62	1.71	-0.005	
2023	1.95	2.05	0.010	1.95	2.05	0.010	1.95	2.05	0.005	1.88	2.00	0.015	
2024	2.03	2.13	0.010	2.03	2.13	0.010	2.00	2.16	0.005	1.92	2.12	nc	

Figure 12 GO prices for hydro, wind, solar, biomass GO for different compliance period (Argus; 17th Dec 2021)

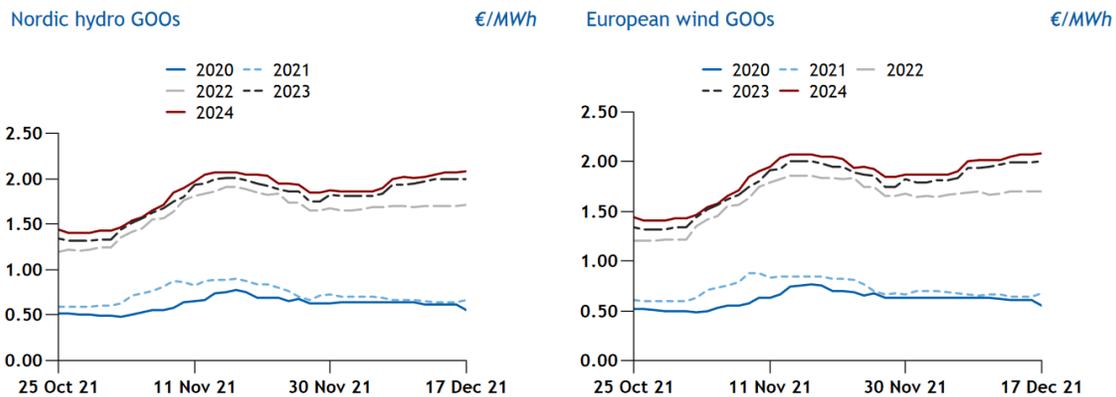


Figure 13 GO prices for hydro and wind for a different compliance period (Argus; 17th Dec 2021)

Beside the soaring all energy commodities prices, GOs have been increased a lot, that next Figure shows.

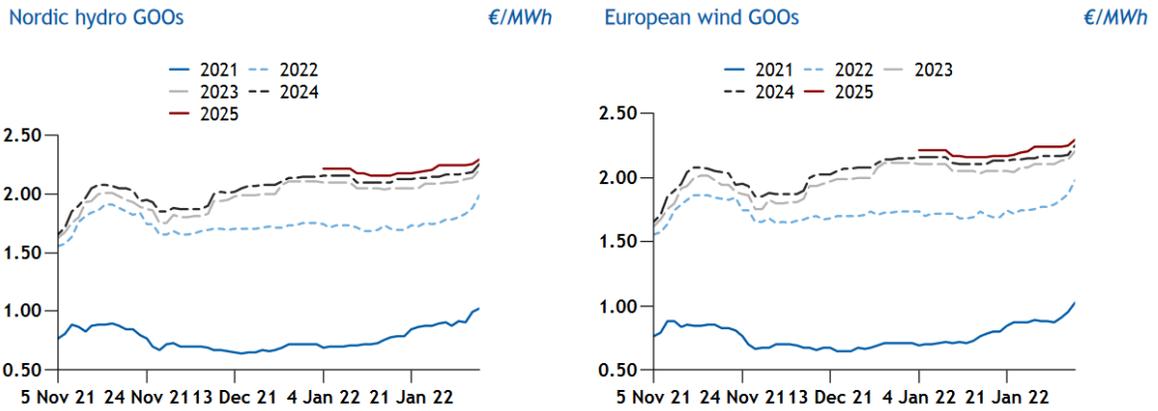
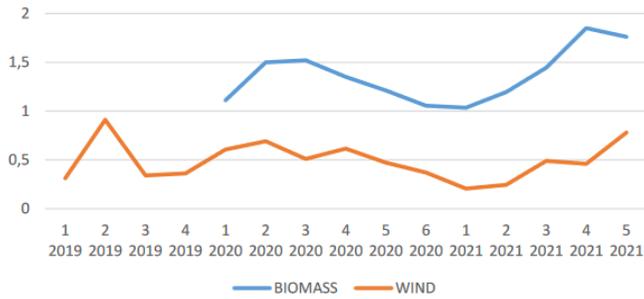


Figure 14 GO prices for hydro and wind for a different compliance period (Argus; 4<sup>th</sup> February 2022)

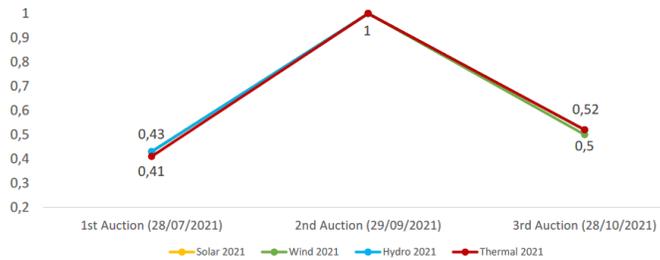
Analysed are prices of GOs upon conducted auctions for Croatia, Luxemburg, Portugal and Slovakia. The lowest GO prices were upon Slovakian auctions for solar and hydro. The reason could be that the Slovakian auctions were the last launched in the EU. Therefore, the seller-Slovakian Issuing Body wanted to sell all GOs on the market and have successful outcome, even though low prices of GOs. GO prices upon Croatian and Portugal auctions had similar price levels: for biomass – going from 1 to almost 2 EUR/MWh and for wind – going from 0.4 to almost 1 EUR/MWh.



GO prices in Croatia were getting the level almost 2 EUR/MWh for electricity from biomass and 1 EUR/MWh for electricity from wind. High prices were achieved due to the fact that most of GO buyers were from Great Britain where legislation is allowing less levy impact on suppliers who import electricity from biomass plants with installed capacity less than 5 MW.

GB suppliers must hold REGOs (national certificates), or EU GO that have been recognized by Ofgem (Regulator), relating to generation in the disclosure period. For EU GO, evidence must be provided that the electricity has been supplied in GB and that the GO has not been used outside GB as evidence for fuel mix disclosure.

Figure 15 GO prices in Croatia upon GO auctions conducted by IB HROTE (EUR/MWh)



GO auctions in Portugal were organized in three rounds in 2021 for electricity from solar, wind, and hydro, as well as for thermal energy. The highest GO prices were in the second round, while the lowest was in the first round.

Level of GOs price for electricity and thermal energy was the same, and going from 0.4 to 1 EUR/MWh.

Figure 16 GO prices in Portugal upon GO auctions conducted by IB REN, TSO (EUR/MWh)

Product	Date				
	05.11.2020	04.02.2021	06.05.2021	06.08.2021	04.11.2021
€/MWh					
Solar (0-3)	n/a	n/a	0,1	0,1	n/a
Solar (3-6)	0,12	0,2	0,15	0,17	n/a
Solar (6-9)	0,25	0,3	0,2	0,2	0,45
Hydro (0-3)	n/a	0,1	0,1	n/a	0,2
Hydro (3-6)	0,12	0,2	0,15	0,17	n/a
Hydro (6-9)	0,25	0,3	0,2	0,2	0,4

GO auctions in Slovakia were organized in four rounds in 2021 for electricity produced from solar and hydro. Prices were varying from 0.1 to 0.45 EUR/MWh.

	05.11.2020	04.02.2021	06.05.2021	06.08.2021	04.11.2021
Amount offered	708 421	720 755	741 675	665 636	497 677
Amount Sold	342 800	229 389	467 740	598 539	447 436
Minimum traded price	0,13	0,11	0,12	0,11	0,31
Maximum traded price	0,35	0,25	0,32	0,47	0,7
Average traded price	0,25	0,17	0,17	0,28	0,41
Number of participants	8	4	6	8	11

The highest price of GO was achieved for electricity from solar plant in the fourth round of auctions – 0.45 EUR/MWh.

Offered GO volumes for the first three rounds were not achieved. Only the last round of GO auctions resulted in 90% sold GOs.

Figure 17 GO prices in Slovakia upon GO auctions conducted by IB OKTE (EUR/MWh)



Luxembourg conducted three rounds of auctions for electricity from solar, solid biomass and wind. All allocated volumes were achieved upon tendering, where the highest price were for electricity from solar – 2.21 EUR/MWh and the lowest for electricity from solid biomass – 0.57 EUR/MWh.

Figure 18 GO prices in Luxembourg upon GO auctions conducted by IB ILR – The Regulatory Agency (EUR/MWh)

#### 4.4. What GO value means for the market of goods

From the aspect of industrial producers, GO is the certificate that gives additional value to every product on the market if it is produced by using the renewable electricity.

During 90' very few customers chose the product based on its environmental performance. From than to now, some industrial companies spent large investments and a radical change has occurred. Renewable energy has been used for within industrial facilities and customers started emphasizing the environmental performance of products.

Following figure listed some of the companies that sell “environmentally friendly” products.



Figure 19 Companies with “environmentally friendly” products

There are many other examples how companies use GO in order to advertise their products. Such is the Goodyear Slovenia, d.o.o. as one of the leading tire manufacturers in Southeast Europe and has been part of the international corporation Goodyear since 1998.

From September 2021 it began to use exclusively hydropower for electricity source. The company's global goal is to reduce carbon dioxide emissions by 25% by 2023. Goodyear emissions were reduced in one year in 2020/2019. by 19%. This change is part of Goodyear's plan, in which all its plants in Europe and Turkey will switch exclusively to renewable electricity, thus reducing its carbon footprint by up to 260,000 tons of CO<sub>2</sub> annually. Accordingly, Kranj's Goodyear switched to hydroelectric energy, one of the types of green energy, on September 1, 2021, and calculations show that this step will save 46,757 tons of carbon emissions in Slovenia in one year.

The decision was made as part of Goodyear's long-term climate strategy, which seeks to limit its own operational impact on the environment and reduce carbon emissions by 20 percent in 2023 compared to 2010. According to the latest Corporate Responsibility Report, emissions have already been reduced compared to last year. by 19 percent. The next step of this strategy envisages the transition to renewable energy sources in plants in Serbia, Great Britain, Africa and the Middle East. To achieve this important goal, Goodyear is increasing its use of various renewable energy sources, such as hydropower, wind energy, solar or geothermal energy, and biomass energy. Its plants in Slovenia, France, Germany, the Netherlands, Luxembourg, Poland and Turkey will enable it to operate in this way by purchasing 700,000 megawatt-hours of renewable electricity per year. Other Goodyear locations, such as Goodyear in South Africa and Cooper Tire facilities in Serbia and the UK, will be covered in the second phase.

However, to ensure that all electricity is truly produced from renewable sources, the company will always require the Guarantees of Origin. The transition to green energy is one of many measures by which the company plans to reduce its impact on the environment and work on its preservation.

## 5. Practices of the EU countries (including EER ones) and Serbia as a Contracting Party of the Energy Community on creation of registries for Guarantees of Origin (GOs)

The purpose of this Chapter is to provide an overview of practices on creation of the GO registries in the European countries selected for analysis.

GO registry is an electronic system on national level which lists issued guarantees of origin and which enables its members to perform certain actions over them - transfer, import, export, cancellation. Members of the registry<sup>12</sup> can be eligible producers, electricity traders and suppliers, depending on requirements of national legal framework. The Registry is usually being established and managed by the IB for GO or service providers, as in the case of some AIB members.

For a cross-border trade of GOs, national GO registry should be AIB compatible (obtain full membership) and connected with its hub for transfer of GOs from one to the other national domain. This would mean that relevant authorities should involve AIB through all stages of development of national registry so that they receive AIB support and market trust.

Start point is establishing national GO registry is to:

1. Identify all involved institutions and their tasks relevant to national GO system,
2. Update or finalize legal framework on GO system,
3. Develop national Domain protocol,
4. Develop national methodology for calculation of residual mix and
5. Establish IT system/software: digitalized GO registry.

### 5.1. Responsibility of institutions in nation GO register

To have full functioning of national GO system, it is needed to identify all involved institutions: Issuing Body (IB), Production Auditor, Production Registrar and Approved Measurement Body. There is a possibility that tasks of some institutions are assigned to a competent authority thru the concept of an agent which would be analyzing the roles of the various competent authorities.

**It can be noted that the Competent Body in the Figure refers to the Competent Authority according to AIB. The Competent Authority may or may-not necessarily be identical to the so-called Authorized Issuing Body and the GO Registry operator.**

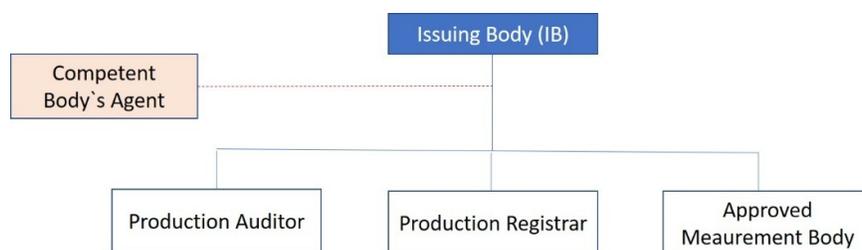


Figure 20 Authorities involved in GO system

<sup>12</sup> or Production Devices

Roles and obligations of competent institutions are:

*Competent Authority:* (a) Competent Authority in relation to the exercise or discharge of any legislative, governmental, regulatory or administrative function with respect to any Domain. (b) the body duly authorized under the laws and regulations of the state in which such Domain is situated to exercise or discharge that function and in relation to any GO.

*(Authorized) Issuing Body (IB):* A Member which the AIB has accepted meets the Authorization Criteria with respects to that EECS Product (located in the Domain and registered in the relevant database. The key responsibilities of the IB are:

- ✓ Establish and operate GO registry,
- ✓ Develop and maintain a domain protocol package
- ✓ Develop Standard Terms and Conditions (STC) as a contract between the IB and the Account Holder<sup>13</sup>,
- ✓ Attain and maintain the membership of the Association of Issuing Bodies (AIB),
- ✓ Run daily operations: registering of new account holders, registering production devices, registering of production (meter values), issue GOs according to verified meter readings, monitor the use of GOs (cancellation).

*Authorized Measurement Body:* The role of the measurement body is to deliver reliable metering data to the IB. The Measurement Body is responsible of ensuring the quality of the data.

The delivery of the data can be manual or automatic via messaging (XML) between systems. Metering values can be delivered on a continuous basis for selected production devices or they can be delivered a response to a request from the IB. Measurement Body can take reasonable fee from producers for delivering the values.

*Production registrar/auditor:* The purpose of the production registrar is to verify the details of registered production devices. If a device is already eligible, the verification can be deemed done if all details needed for issuing guarantees of Origin according to the EECS system can be verified from the register of eligible plants.

Production registrar needs to verify and sign the registration form of new devices. This is normally done by site visit.

Table 8 provides overview of institutions and their role in establishment and operation of GO registry for selected countries: Greece, Denmark, German, Serbia, Netherland and Poland. It can be concluded that:

- Competent Authority, IB and Registry operator were the same institutions; the exemption is Denmark, where these roles were given to three different institutions.
- Role of Authorized Measurement Body was given to different institutions: distribution system operators, electric power utility companies or power transmission operators.
- Production auditor was given to different institutions: power transmission operators, ministries of energy, distribution system operators.

---

<sup>13</sup> *Account Holder* - Any natural or legal person in respect of whom an account is maintained in the Registry. That means producer, trader, broker who signs the contract with the Issuing Body gets the account into the Registry and become the Account Holder.

## 5.2. Elements of national Domain protocol

The main objective of national Domain Protocol is to elaborate detailed procedures and conditions for issuing GOs and to ensure robustness and transparency in the facilitation of EECS Schemes for all EECS Participants. A Domain Protocol promotes quality and clarity, as it:

- Makes local regulations transparent;
- Provides clear information to all stakeholders (consumers, market parties, other members, government, the EU Commission etc.);
- Facilitates assessment of compliance and permissible variance from the EECS Rules;
- Facilitates audits; and
- Translates local regulations into a single format and language, supporting each of the objectives above.

All previous elements of Domain protocol are incorporated within its content:

- A. Introduction
- B. Background (with purpose, scope, roles and responsibilities within the Domain, other general information)
- C. Overview of national legal and regulatory framework (certification system, electricity source disclosure, public support schemes, deviations from EECS Rules)
- D. Registration of participant and production devices
- E. Certificate System Administration (for issuing EECS Certificates, Process, measurement, issuing certificates, transferring certificates, end of life of certificate, administration of corrections and errors)
- F. Audits of Production Devices
- G. Change controls (complaints, disputes, change requests)

Annexes (contact lists, procedure for account application for production device, production device registration forms, declarations,).

In the case of GO trade between AIB members, each national Domain Protocol must be approved by the General Meeting of the AIB before certificates can be issued, transferred or cancelled in the domain in question; and any changes must also be approved by the General Meeting in advance of implementation.

To achieve less errors and omissions, AIB has installed a quality assurance system where all AIB members are audited. Each AIB member is being audited every three years. The list of domain protocols and AIB audited countries can be found at: <https://www.aib-net.org/facts/aib-member-countries-regions/domain-protocols>.

### 5.3. Elements of national methodology for calculation of residual mix

Residual Mix is the energy source mix that is left over once the reliably tracked consumption is taken out from the generation mix. Residual Mix is used for the purpose that if end-user is sourcing electricity from unknown origin, the energy source mix of it shall be considered as Residual Mix. Residual Mix is an integral part of GO system for preventing double counting in energy source disclosure.

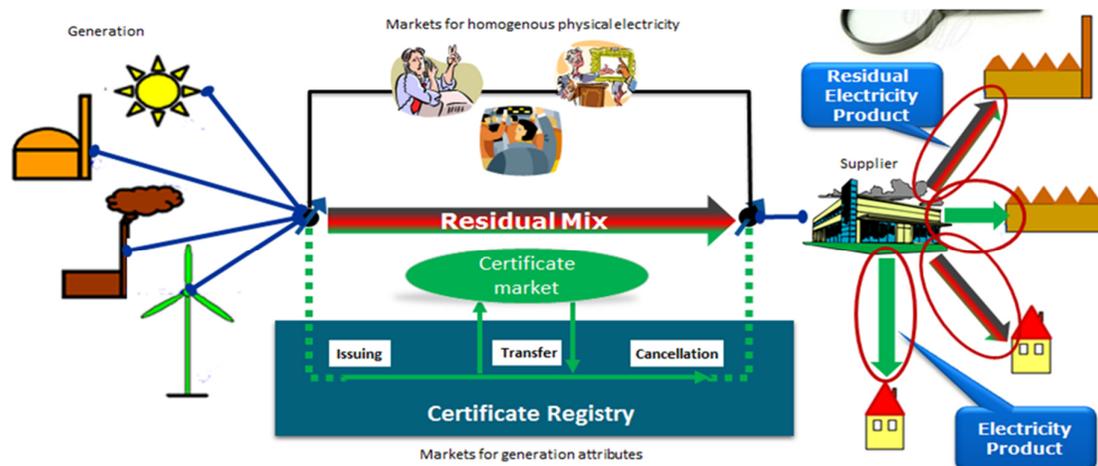


Figure 21 The overview of matching the Guarantees of Origin system and disclosure

A Residual Mix is needed when there is a disclosure requirement and when a nontrivial share of the consumption is explicitly tracked using GOs. Centralized calculation of the Residual Mix is needed if GO is internationally traded and recognized.

Centralized Residual Mixes have been calculated using similar methodology and theoretical framework since 2012, first by EU funded projects E-Track II, RE-DISS and RE-DISS II<sup>14</sup>. AIB took over the calculation in 2015 and renewed the calculation methodology in 2020. In EU wide regulation, the first explicit requirements to calculate and use Residual Mix were introduced the first time in RED II.

The E-Track and RE-DISS projects identified two ways to calculate the Residual Mix: Issuance Based Method (IBM) and Transaction Based Method (TB). Thorough review of these can be found in Revised residual mix calculation methodology: <https://www.aib-net.org/facts/european-residual-mix>.

Transaction Based Method has been the dominantly used method. There have always been arguments for Issuance Based Method but the most prominent problem there has been the lack of final data at the time of annual calculation. Even though the IBM processes and the data systems behind have improved to a level where many countries issue close-enough final figures within one month of the production, there are still many countries where that is not the case.

Differences between the previous Residual Mix Calculation method (TB) and the new method (IBM) can be listed as:

- With the methodology change to IBM, the formula for Domestic Residual Mix is changed from

$$\text{Corrected Generation} + \text{Imported Attributes} - \text{Exported Attributes} - \text{Cancelled Attributes} = \text{Domestic Residual Mix}$$

to  $\text{Corrected Generation} + \text{Expired Attributes} - \text{Issued Attributes} = \text{Domestic Residual Mix}$

<sup>14</sup> E-Track II: <https://ec.europa.eu/energy/intelligent/projects/en/projects/e-track-ii>  
RE-DISS I and II: <http://reliable-disclosure.org/>

- The only environmental indicators to be calculated are direct CO<sub>2</sub> emissions and radioactive waste.
- Consider new source for emission factors or use of common reference values.
- The change in Domestic Residual Mix formula is also reflected in the formula of domestic Environmental indicators where Imported, Exported and Cancelled Attributes are replaced by the Issued and Expired Attributes.

Nevertheless, both methods integrate all the concepts of Issuance, Cancellations, Imports, Exports and Expiries, although some implicitly.

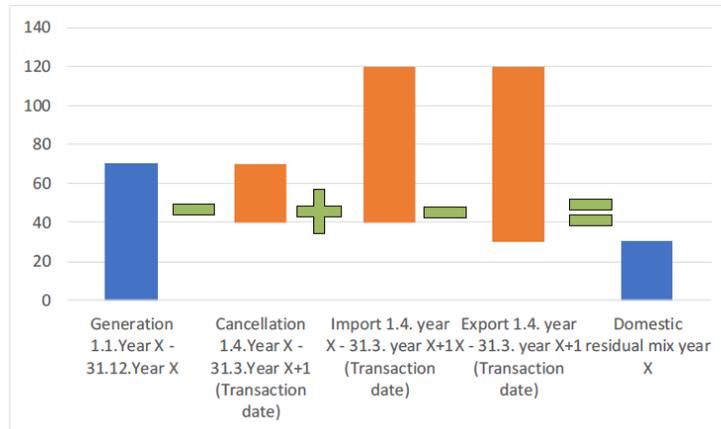


Figure 22 Transaction Based Method for Residual Mix Calculation in a specific country

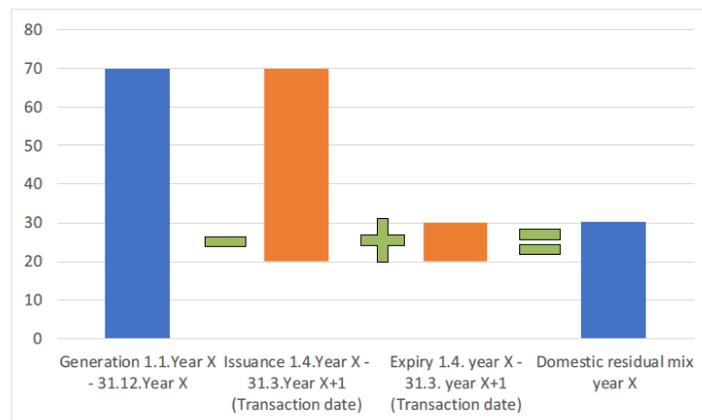


Figure 23 Issuance Based Method for Residual Mix Calculation in a specific country

#### 5.4. Implementation of national digitalized GO registry

IB is responsible for maintenance of a digitalized GO registry, which records registered production devices and holds details of certificate accounts, including details of each account-holder and the certificates they hold, and any transactions relating to this account. A list of registries per AIB country can be found on the following page: <https://www.aib-net.org/facts/eecs-registries/registries>.

The registry should include key business processes as following:

##### 1. New account holder registration

This process includes all main steps needed for new account holder to be registered. As part of the process the applicant (producer, trader, supplier, broker) signs the contract called Standard Terms and Conditions with the IB and in doing so commits to the domain protocol and relevant limitations of liability. The process also facilitates proper client identification, which is important to make the system fraud resistant. The process is the same for traders, electricity suppliers and producers. It was recommended that opening an account is possible for all legal and natural persons including non-domestic applicants.

##### 2. Production Device registration

Production devices can be registered by any account holder, not only owners. The process also enables the aggregation of production. This means that a properly authorized account holder can handle and register production devices owned by other persons regardless of whether they are account holders in the system or not. The legal effect or a by-product of the process is the Production Device becoming eligible for issuing of GO. The process takes place mainly electronically, but some manual steps are required.

##### 3. GO issuing

Once an account holder has active production device(s) registered, GO can be issued for those production devices. In this process verified production meter reading are converted into tradable EECS certificates. In case several certificate types (RES-GO, HE CHP-GO) are issued, they must be done at the same time. This means that meter readings are issued only once and only one certificate can exist for a specific produced MWh. As a result of the process, the registrant, owner or an aggregator becomes the owner of the production attributes related to relevant production period of the relevant production device.

##### 4. GO cancellation

GO cancellation is the process of using the GO for proving the sales or usage of renewable electricity. As an outcome, the GOs are taken out from circulation and the information on for what electricity they were cancelled is recorded in the database. A separate cancellation statement can be issued by the IB for account holder to prove the sales or usage of renewable electricity to e.g. external auditors.

##### 5. Certificates expiry

According to the RED II the GO can only be used for 12 months after the production of the related electricity. The final implementation of GO expiry should follow the EECS guidelines (the IB manually expires outdated certificates monthly from the system or it is done automatically).

The GO registry can be established and operated by a number of service providers. Some provide a central registry for a number of AIB members; while others provide single or multiple implementations of registry systems for individual members. For establishing GO registry, there is a list of service providers that already provide services to AIB members: <https://www.aib-net.org/facts/eecs-registries/service-providers>.

Table 6 List of service provider for AIB members

Service Provider	Country	Website
Atos	Austria	https://atos.net/de-at/austria
Engineering	Italy	http://eng.it
DXC	Belgium	http://www.dxc.technology/
Grexel	Finland	http://www.grexel.com
NSI	Belgium	http://www.nsi-sa.be
Powernext	France	http://www.powernext.com
Solita	Finland	http://www.solita.fi/en
XLAB	Slovenia	http://www.xlab.si
Unicorn Systems	Czech Republic	http://www.certigy.net
Sféra	Slovakia	http://www.sfera.sk

Table 7 The list of domains and their registries <sup>15</sup>

Domain	Registry
Austria	E-Control
Belgium - Federal	CREG
Belgium - Brussels	BRUGEL
Belgium - Flanders	VREG
Belgium - Wallonia	e-cwape
Croatia	CMO.Grexel; Identity: HROTE
Cyprus	TSO Cyprus
Czech Republic	OTE
Denmark	CMO.Denmark; Identity: Energinet
Estonia	Elering
Finland	Finextra
France	Powernext
Germany	HKNR; Identity: UBA
Italy	GSE
Iceland	CMO.grexel; Identity: Landsnet
Ireland	CMO.grexel; Identity: SEMO
Lithuania	CMO.grexel; Identity: Litgrid AB
Luxembourg	CMO.grexel; Identity: ILR
Netherlands	CERTIQ; Identity: TenneT
Norway	NECS; Identity: Statnett
Portugal	EEGO; Identity: REN
Serbia	CMO.grexel; Identity: JSC Elektromreža Srbije
Slovakia	OKTE
Slovenia	Borzen; Identity: Energy Agency
Spain	CNMC
Sweden	Energimyndigheten
Switzerland	Pronovo AG
Latvia AST	Identity: AST

### 5.5. Connection of national digitalized GO registry with AIB Hub

If any country decides to join AIB it is needed to meet the requirements of the EECS and the terms for connection to the AIB Hub. The AIB Hub enables member registries to inter-communicate, in order to transfer certificates.

<sup>15</sup> Note: Grexel is provider for several registries. Also, it is possible that registry is in-house IT solution by the Issuing Body-IB

Terms of connection are the list of protocols given by AIB to the provider of the software that should be incorporated into the software. It is not given in advance, but when the software is being designed.

The national GO registry should enable next featuring:

- National IB complete control over own domain including Account Holders, Production Devices, Users, Transactions, etc.,
- To be able to registry Account Holders, users (apart of Account Holders, there could be external users as the Measurement Body or Regulatory Agency) and production devices,
- Issuing, transferring, exporting, importing, cancelling, withdrawing, and expiring certificates,
- Managing accounts and scheduling transactions,
- Activity log and public reporting of transactions,
- Managing GOs as defined by EECS including all relevant ICSs (Independent Criteria Schemes, ICS is voluntary label for the certificate used in some countries as such SÚV. E.g. if the plant is audited by the SUV auditor it gets ICS label and it should be stated on the GO),
- Public information site wit available public reports,
- Different security roles for different users,
- Unlimited number of users.

Table 8 Overview of relevant parties in GO system

Country	Competent authority	Issuing Body	Registry Operator	Authorized Measurement Body	Production Auditor
Greece	DAPEEP	DAPEEP	DAPEEP	IPTO S.A. ( <a href="http://www.admie.gr">www.admie.gr</a> ) HEDNO S.A. ( <a href="http://www.deddie.gr">www.deddie.gr</a> )	IPTO S.A. ( <a href="http://www.admie.gr">www.admie.gr</a> ) HEDNO S.A. ( <a href="http://www.deddie.gr">www.deddie.gr</a> ) Register of Certifying Bodies ( <a href="http://www.lagie.gr">http://www.lagie.gr</a> )
Denmark	Danish Energy Agency	Energinet	The Distribution System Operators (DSO)	The Distribution System Operators (DSO)	Energinet
Germany	Umweltbundesamt (German Environment Agency – UBA)	Umweltbundesamt (German Environment Agency – UBA)	Umweltbundesamt (German Environment Agency – UBA)	The respective grid operator of a plant; grid operators can be found via the BDEW (Codenummerndatenbank: <a href="http://codenummern.strom.de">http://codenummern.strom.de</a> )	Environmental auditors as stated in the data bank of the German inspection body DAU ( <a href="http://www.dau-bonn-gmbh.de/dauAdrList.htm?cid=209">http://www.dau-bonn-gmbh.de/dauAdrList.htm?cid=209</a> ) and registered in the HKNR.
Serbia	EMS JSC Belgrade	EMS JSC Belgrade	EMS JSC Belgrade	EMS JSC Belgrade EPS Distribucija Ltd. Belgrade	<a href="http://www.mre.gov.rs">www.mre.gov.rs</a>
Netherlands	CertiQ	CertiQ	CertiQ	<a href="http://www.netbeheernederland.nl/netbeheer-nederland/leden">www.netbeheernederland.nl/netbeheer-nederland/leden</a>	For accountants: <a href="http://www.nba.nl">www.nba.nl</a> For metering companies: <a href="http://www.tennet.eu/nl/elektriciteitsmarkt/nederlandse-markt/mv-register-elektriciteit">www.tennet.eu/nl/elektriciteitsmarkt/nederlandse-markt/mv-register-elektriciteit</a> For the Transmission System Operator and Distribution System Operators: <a href="http://www.netbeheernederland.nl/netbeheer-nederland/leden">www.netbeheernederland.nl/netbeheer-nederland/leden</a>
Poland	Polish Power Exchange	Polish Power Exchange	Not possible to determine during analysis	Not possible to determine during analysis	Not possible to determine during analysis

Table 9 Overview of procedures for GO registry functioning

Country	Legal framework/Managed by/Principles	Production Device registration process and eligibility criteria	Procedures for evaluation and verification of Production Device	Cross checks and error handling processes	Metering requirements
Greece	<p>Only electricity Producers owning a qualifying RES and/or HE-CHP Production Device and Electricity Suppliers, licensed to supply electricity in the Greek Market are eligible to register as Account Holders</p> <p>An eligible electricity Producer who is interested in obtaining EECS GOs for the electricity generated from its own power generation Facility shall submit an application in order to be registered in the EECS GO Registration Database run by DAPEEP.</p>	<p>To register a Production Device in the Facilities Register of the Registration Database of DAPEEP, the owner of the Production Device needs to submit:</p> <ul style="list-style-type: none"> <li>The Device Registration Form (Annex 2) signed by the legal representative of the company owning the Production Device. The Device Registration Form is compatible with the Facility Data Declaration of Annex 1 of Ministerial Decision 8786/2010 and includes:</li> <li>Applicant's Name or Corporate Name and address.</li> <li>Legal representative of the applicant: name and contact details.</li> <li>Location of the Production Device, municipality, prefecture, address (if available).</li> <li>Installed power capacity and in case of HE-CHP installed heat capacity.</li> <li>Every energy source that may be used as input to the Facility for the production of electricity.</li> <li>Technology applied for the production of electricity.</li> <li>Date of the Facility operational commencement.</li> <li>Grid connection number: the identification number of the Facility connection point to the electrical grid, assigned by the competent Network Administrator.</li> <li>Data of the electricity meters that are installed and maintained by the Authorised Measurement Body at the boundaries between the Facility and the electrical grid the Facility is connected to: manufacturer, model, serial number. The respective Authorised Measurement Body.</li> <li>Data of the metering devices that are installed by the Producer inside the Facility and whose measurements are taken into account in the calculation of the energy output (see section E.4)</li> <li>Certificate issued by a Certifying Body stating that the metering devices installed inside the Facility by the Producer and whose measurements are taken into account in the calculation of the energy output, meet the standards set by the Regulatory Authority's Decision No.1599/2011 as amended by the Regulatory Authority's Decision No.410/2016 (see section E.3). The respective Certifying Body.</li> <li>Support Scheme: capital subsidy and/or operational support.</li> </ul>	<p>Once the registration is complete, a Facility Unique Identification Code (MAE) and a Unique Identification Code for the EECS GO Account (MAMEP) shall be assigned to the Facility and the Facility will be considered as a Production Device for the purpose of issuing EECS GOs. By virtue of Article 4 of Ministerial Decision 8786/2010, the recognition of a Facility as a Production Device will be completed within 10 working days after the submission of the required documents.</p> <p>Owners of Production Devices, who so wish, may de-register their Production Devices by notifying DAPEEP in writing about their intent. The notification must be submitted by the legal representative of the owner. The effective date of deregistration must be no less than 10 days from the date of receipt of the said notification by DAPEEP. Auditing procedure</p> <p>The metering devices installed at the boundaries of each Production Device and the Transmission System or the Distribution Network, are periodically inspected for all Production Devices with installed capacity more than 100 kW. The inspection frequency depends on installed capacity of the Production Device and is at least once per 5 years. Detailed specifications for the inspection procedure and frequency are defined in the Transmission System Operator Code. Especially for the HE-CHP units with installed power capacity equal or higher than 1MWe, in addition to the above, the heat and power installation along with the metering devices installed by the Producer as in E.3, are audited annually by a Certifying Body chosen by the Producer from the list of Certifying Bodies Registered by DAPEEP in the relevant Register.</p> <p>Up until April 15 each year, DAPEEP collects all data required for the calculation of the energy mix at national and at supplier's level for the previous year. Up until April 30 each year, DAPEEP calculates and announces the preliminary national residual energy mix and informs AIB as the Competent Body for the calculation of the European Attribute Mix. DAPEEP receives the calculated European Attribute Mix until May 30th. Until June 10, DAPEEP calculates and publishes in its web site the National Residual Energy Mix. DAPEEP calculates and informs the suppliers on the results regarding their Energy Mix, which then publishes only after having received their consent.</p>	<p>When a transfer of EECS GOs fails and when an error is identified then:</p> <ul style="list-style-type: none"> <li>in the event of a failure of minor validation during transfer - DAPEEP will make reasonable effort to correct and make the transfer happen</li> <li>in the event of a complete failure of a transfer - DAPEEP shall reinstate the Certificates in the seller's account - Investigate how to facilitate another attempt</li> <li>where an obvious error has occurred and is agreed - DAPEEP will correct it, even if it was not the issuer, in a way that no one gains financially as the result of a correction</li> </ul> <p>DAPEEP can recover its reasonable costs of corrective action (unless it was responsible for the error)</p>	<p>Production Devices with installed power capacity of more than 100 kW are equipped with meters recording the electrical energy with a 15' time interval. Metering is performed remotely, by the Transmission System Operator and measurements are aggregated in a monthly basis. The procedure for validation of measurements is described in the Code for the Transmission System Operation, further elaborated in the Manual for Meters and Measurements. The Transmission System Operator sends to DAPEEP every month the validated metering data for electricity injected to the grid and electricity absorbed from the grid during the previous month, for each Production Device registered in the Facility Registration Database of DAPEEP. For Production Devices with power capacity less than 100kW, meter readings are collected every four months by the Distribution Network Operator (HEDNO) and sent to DAPEEP.</p>
Denmark	<p>Any legal person can be an EECS Market Participant. The EECS Market Participant must contract with Energinet under the Standard Terms and Conditions. The processing time of complete Account</p>	<p>If a PD is connected to the grid, it has to be registered by the DSO in the central database called Selvbetjening (Self Service), checked against the CVR (central register of companies). This information is mailed automatically to the Energinet Panda mailbox. Panda is the Energinet registry for production and plant data. Data are introduced in the Panda database manually (automated for small PDs). Every plant has a GSRN number for identification in all databases.</p>	<p>On successful completion of the registration process, Energinet will register the Production Device in to the EECS Registration Database and assign an already given unique identifier to each registered Production Device. The registration procedure is fulfilled within 1 working day.</p> <p>The Registrant must notify Energinet of intent to deregister his Production Device in writing. A written notification of deregistration of a Production Device must be sent to Energinet within the end of the month following the last issuing period. The remaining certificates on the account of such a Registrant, will be available for 12 months.</p>	<p>Where an error is introduced Energinet will correct the error in or with respect to that EECS Scheme Certificate, provided that such EECS Scheme Certificate(s) have not been transferred out of that Transferables Account. Energinet is informing the owner of the Production Device within 3 days and corrects the error as fast as</p>	<p>All energy production and consumption is measured. However, GOs are only issued for net production (injection) and calculated by the Energinet DataHub as an aggregated value. It is theoretically possible to disclose on-site consumption (GOs that are cancelled immediately), but in this case the owner has to pay for extra meters.</p>

Country	Legal framework/Managed by/Principles	Production Device registration process and eligibility criteria	Procedures for evaluation and verification of Production Device	Cross checks and error handling processes	Metering requirements
	<p>applications by Energinet is 10 working days. Applicants can be i) owners of production devices, ii) agents behaving on behalf of the owner or iii) traders. The same application procedure is used for all types of applicants. Energinet will issue each authorized user with a client certificate and password to enable users to access the registry and secure communications. It is the responsibility of the EECs Market Participant to keep such identification secret.</p>	<p>The plant is subsequently registered in the Grexel CMO on behalf of the account holder by Energinet. A copy of the contract between the account holder and the PD owner has to be submitted.</p>	<p>All electricity producing devices are subject to registration in Denmark due to the "Executive Order on Verification and Control of Payments to certain forms of Electricity" (regardless whether they receive payment or not). The registration is carried out by the DSO's under order from the Danish Energy Authority (DEA) and instruction from Energinet. The complete Central Registry is operated and kept by Energinet. Basic information for all Production Devices is made public on <a href="http://www.ens.dk">www.ens.dk</a> (website of DEA).</p> <p>By 1st July each year electricity trading companies need to provide disclosure information based on the previous calendar year. Companies can either use a general electricity label (default) or an individual electricity label (used for explicit tracking). Energinet prepares the general label. Companies can on voluntary basis market individual electricity products. RES-E and HE-CHP may only be disclosed to consumers if they are tracked by GO. The following rules apply when using GOs from renewable energy sources (RES-GO) for disclosure in Denmark: All RES-GO which are meant to be used for the disclosure period of year x should be cancelled within their 12 month lifetime and before deadline of 31 March year x+1. RES-GO which are not expired until this deadline can be used for the disclosure period of year x+1 instead.</p>	<p>possible considering the general provisions of the Administrative Procedures.</p>	<p>The regulation defines the roles of the DSO, metered data collector, metering point administrator and the concept of grid area. The regulation also defines which types of metered data are required in connection with electricity generation, grid flow between areas of responsibility and end consumption. The regulation describes how often the various metering points must be metered. Meter data must be submitted to Energinet and other legitimate recipients. The regulation describes the full requirements applied to the submission of data. Measurement body is responsible for the submission of production data, which represent net injection to the grid.</p>
Germany	<p>Any legal or natural – person or association of natural persons which is given legal capacity by the law is entitled to take part in the HKNR. UBA operates an electronic database (as regulated by law), called the Herkunftsnachweisregister, hereafter referred to as HKNR. The plant operator, electricity supplier, trader receive a GO account. The service providers, grid operators, environmental auditors only receive access to the GO system but not an own account. These last three (3) roles do not handle GOs. Combinations of roles are possible (exception: an environmental auditor is not allowed to be a plant operator as well). Service providers are persons or organisations offering account holders the service to manage their business with the HKNR; often plant operators make use of service providers to handle their administrative procedures for them. Traders, who are not a supplier, nor an electricity producer, are allowed to open an Account in the registry. Those traders can only trade including import and export. They are prevented from cancelling,</p>	<p>The owner of the production device or his service provider is entitled to register the plant. Before registration of a production device they have to register themselves and prove their power of attorney by sending to UBA a written certificate of authority and – in the case of an organisation – an up-to date copy out of the Commercial Registry. The production device</p> <ul style="list-style-type: none"> <li>– has to produce electricity from renewable energy sources,</li> <li>– has to be located in Germany, in the German Exclusive Economic Zone or at least on the border to another country (e.g. Austria, Switzerland, France, Luxembourg).</li> </ul> <p>As long as the owner does not fill in all of these data the installation cannot be registered. The data are cross-checked by UBA. The production device receives a unique registration number. In some cases, an environmental verifier has to validate the data the owner sends to UBA. That is especially the case with installations</p> <ul style="list-style-type: none"> <li>– that have not been supported under the RES support scheme within the last five years, that is by the feed-in-tariff, the market premium or the green electricity-privilege,</li> <li>– that have complicate electricity meters that need calculations,</li> <li>– that can use biological but also fossil fuels,</li> <li>– that use pumped water for electricity production and have a specific efficiency factor.</li> </ul>	<p>The timeline for the registration of a production device depends on the specific preconditions, especially the question whether an environmental verifier has to audit the plant. In other cases the registration may last at about two or three weeks.</p> <p>The registration of the installation has to be renewed every five years without any further inspection. UBA is allowed to command an expertise by an environmental auditor about a production device to cross check the statements of a plant operator.</p> <p>The period between inspections of a Production Device will not exceed 5 years. Some installations have to be inspected by an environmental verifier; these are installations</p> <ul style="list-style-type: none"> <li>– that have not been supported under the RES support scheme within the last five years, that is by the feed-in-tariff, the market premium or the green electricity-privilege,</li> <li>– that have complicate electricity meters that need calculations,</li> <li>– that can use biological but also fossil fuels,</li> <li>– that use pumped water for electricity production and have a specific efficiency factor.</li> </ul> <p>Suppliers have to provide their electricity fuel mix for year X by 1 November of year X+1 the latest at the annual invoice, advertising material and on their website</p> <p>Disclosed fuel mix contains the company's mix, a product mix (if any, in these cases also the residual company mix) and (for comparison) the German production mix.</p> <p>Disclosed information contains at least the shares of nuclear, coal, natural gas, other fossil, renewables as supported according to German Renewable Energy Sources Act (EEG), other renewables and the respective emissions of CO2 and nuclear waste.</p> <p>For shares of unknown origin, the German ENTSO-E mix published by the German Association of Energy and Water Industry (BDEW) has to be used, which shall be corrected "with reasonable effort" by BDEW and/or the suppliers in order to avoid double counting. Electricity from renewable energy sources, which is disclosed as "supported by the Renewable Energy Sources Act" or "other renewable energy sources with GOs", has to be subtracted beforehand. The adjusting "with reasonable effort" comprises everything to avoid double counting, including factoring in the number of imported, exported or expired GOs. BDEW calculates and publishes the adjusted ENTSO-E mix on a yearly basis for all electricity suppliers.</p> <p>(<a href="https://www.bdew.de/internet.nsf/id/DE_Datenplattform_Stromkennzeichnung">https://www.bdew.de/internet.nsf/id/DE_Datenplattform_Stromkennzeichnung</a>)</p> <p>In order to disclose a certain share of "other renewables"– besides the amount of "renewables supported by the Renewable Energy Sources Act" which is</p>	<p>If UBA detects mistakes in data it is entitled to correct them. Account holders are legally obliged to correct all mistakes in data. If they fail to correct data, UBA may impose an administrative penalty.</p>	<p>The nett measurement depends on the meter and how it can be read: In the case the meter can be read automatically via radio-communication or internet (so called RLM), the grid operator sends UBA the produced energy once a month for the month passed. UBA issues the GOs for the month passed. In the case the meter cannot be read automatically (so called SEP), the grid operator sends the data every time a staff member reads the meter. The grid operator has to submit the metered data at least once a year UBA issues GOs then for the metering period which is determined by the dates when the meter was read. The first day of the production period is the day after the last reading. The last day of the production period is the day of the recent reading. There is no breakdown of production per calendar month. Instead, on the GO the production period is expressed as the calendar month in which the production period ended. Line losses are not taken into account as such. GOs are issued based on measured grid injection. Electricity lost before injection is not measured and therefore not issued. Line losses after injection are also not measured and therefore not taken into account. There's currently no possibility in Germany to cancel GO's to green grid losses. Auxiliaries are measured by separate meters in the power plants. All types of PDs with auxiliaries (biomass plants, waste incineration plants and pumped hydro power plants) need their electricity production confirmed by an</p>

Country	Legal framework/Managed by/Principles	Production Device registration process and eligibility criteria	Procedures for evaluation and verification of Production Device	Cross checks and error handling processes	Metering requirements
	because the right to cancel is only conferred to suppliers (because only suppliers are obliged to provide an electricity disclosure statement to their final costumers).		EECS Domain Protocol calculated every year on legal basis as a reliable tracking system and paid for by every consumer –, suppliers are obliged to use RES GO as cancelled in the HKNR. This obligation does not apply for RES as share of the corrected ENTSO-E mix. All other shares of origin of electricity (nuclear, coal, gas, other fossil fuels, renewables supported by the Renewable Energy Sources Act) are disclosed in accordance with the BDEW guidelines.		environmental verifier before issuance. The environmental verifier confirms that auxiliaries are deducted from gross production based on the metered values.
Serbia	Only electricity producers from renewable sources registered at the Ministry, suppliers and wholesale suppliers with an active license issued by National Regulatory Authority (hereinafter: NRA) can be registered as Account Holders in Serbia. The registration process begins when the applicant completes and sends the Account application form to EMS JSC Belgrade, duly signed by an authorised representative. The Account application form shall be published on EMS JSC Belgrade website. The required attachments of the Account application form are following: i. Original or certified copy of excerpt from the court or company register (only for international participants) ii. A copy of; the first page of a passport or identification card or another form of legitimate identification, for each authorized representative who signs the Standard Terms and Conditions. Account application form and required attachments should be sent via e-mail. The Applicant should include the Energy Identification Code (EIC) issued by the local issuing office, authorised by ENTSO-E, in its Account application form.	EMS JSC Belgrade is responsible for Production Device registration. Account Holders, which aim to register a Production Device for EECS-GO, are referred to as Registrants. Only the Account Holder who is the owner of a Production Device may register a Production Device, which is located in Serbia, into the Registry. Production Devices can only be registered by Registrants if they meet the qualification criteria for EECS-GO. To be qualified, Production Devices must: • be situated in Serbia; • be registered in the registry of producers from renewable energy sources at the Ministry and • must not be in receipt of support for ongoing production of electricity. Following the registration, EMS JSC Belgrade will publish an updated list of Registered Production Devices per Account Holder on the EMS JSC Belgrade website.	EMS JSC Belgrade will register the Production Device in Registry no later than 20 working days from the date of receipt of the registration form by EMS JSC Belgrade.  The Account Holder must notify EMS JSC Belgrade of their intent to deregister the Production Device in written form. The effective date of deregistration must not be less than 10 working days from the date of receipt by EMS JSC Belgrade. EMS JSC Belgrade will deregister the Production Device in the Registry as of the effective date listed in the request or 10 working days from the date of receipt by EMS JSC Belgrade, whichever is later.  Inspections of Production Devices registered in the Registry are conducted under the rules of audit according to the law and the procedures of the Energy Inspectors delegated by the Ministry. The Registrant must permit Energy Inspectors to access the Production Device or the records associated with it, its energy output and sources of energy. EMS JSC Belgrade shall verify various points of information at least: • National Regulatory Authority – Licenses • Ministry – Statuses of Producers of renewable energy and relevant data on their Production Device An additional check may be completed with the Distribution System Operator and Operators of closed distribution systems, Guaranteed supplier and EMS JSC Belgrade internal data. The period between inspections of a Production Device will not exceed 5 years.	If EMS JSC Belgrade detect errors in Account Holder information, it will correct it immediately. The relevant Account Holder will be informed of such actions. In the event that EMS JSC Belgrade has issued too many EECS-GO in error, EMS JSC Belgrade will remove EECS-GO of the same type and same quantity from the relevant Account Holder to compensate for the discrepancy. In the event that EMS JSC Belgrade has issued too few EECS-GOs in error, it will issue additional EECS-GO for the relevant Fuel Type, Production Device and production period. In the event that the data within an EECS-GO(s) is inaccurate (whether or not through an act or omission of the Account Holder of the originating Production Device): a) EMS JSC Belgrade will (provided that such EECS-GO are, at the time of such Withdrawal, in the Account of that Account Holder) withdraw those EECS-GOs; and b) In the case when EECS-GO are no longer in the Domain of Serbia, EMS JSC Belgrade will cooperate with other Issuing Bodies to withdraw the erroneous EECS-GO. EMS JSC Belgrade may also alter an EECS-GO held in its EECS Registry so as to rectify an error which occurred prior to its transfer into the Account in which it is held at such time, provided: a) the Account Holder has agreed to such alteration; b) it is reasonably satisfied that any unjust enrichment of an EECS Scheme Participant as a consequence of such error has, to the extent reasonably practicable, been nullified; c) it is reasonably satisfied that the alteration itself does not give rise to undue enrichment of the Account Holder.	In its role as TSO, EMS JSC Belgrade has access to the metering data, therefore metering data is readily available and verified. The Distribution System Operator (DSO) is obliged by law to send verified metering data to EMS JSC Belgrade 14 days from the end of the month at latest. The Production Device owner is responsible for delivering the information regarding fuel used for production of energy output. Information ere provided to EMS JSC Belgrade in the Registry and via a Production Declaration Form. EMS JSC has right to request additional production data. Metering data are delivered to EMS JSC Belgrade on monthly level and shall enable the calculation of the Net Electricity Production from renewable sources of the Production Device for the corresponding Production Period. Data format for delivering metering data is determined independently by EMS JSC Belgrade. The Account Holder is responsible for making Production data available to the Measurement Bodies for every Production Device on their account.
Netherland	Any legal person who is not a member of the Association of Issuing Bodies or such member's affiliate or agent can apply	The owner of a Production Device, or a duly authorized representative on his behalf (collectively referred to as: Registrant), can file an application for registration of a Production Device situated in the Netherlands by filling out the web form on the website www.certiq.nl. As part of the	As part of the verification process, the Production Registrar may conduct an onsite review at his own discretion. Within four weeks after receipt of the application, the Production Registrar must inform the applicant on the outcome and either approve or reject (as appropriate) the application in myCertiQ.	In the event that CertiQ becomes aware of errors with respect to the information recorded on myCertiQ in relation to a Production Device, CertiQ will confer with the Production Registrar to determine	Measured volumes are collected by the Measurement Body and submitted to CertiQelectronically. All measurement data so submitted is automatically verified by myCertiQ

Country	Legal framework/Managed by/Principles	Production Device registration process and eligibility criteria	Procedures for evaluation and verification of Production Device	Cross checks and error handling processes	Metering requirements
	<p>for a transferable account or an end-user account. Each applicant must fill out an application form. The application form (which includes a Know-Your-Customer questionnaire) for a transferable account and the application form for an end-user account can be downloaded from the website <a href="http://www.certiq.nl">www.certiq.nl</a>. The application form must be sent to CertiQ. Application forms for transferables accounts must be accompanied by photocopies of the passports / identity cards of:</p> <ul style="list-style-type: none"> <li>(a) the person signing the application form;</li> <li>(b) the applicant's general manager;</li> <li>(c) the applicant's board members.</li> </ul> <p>Upon receipt of a complete application form, CertiQ will verify the application. Where such verification is completed successfully, CertiQ will send an applicant for a transferables account a copy of the Standard Terms and Conditions for them to sign and return to CertiQ. CertiQ will register the applicant in myCertiQ and send the applicant notification of the approval of its application. From then on, the (now) Account Holder can log on to myCertiQ using eRecognition. The application process can be completed within five working days.</p>	<p>application process, the Registrant must check a box to confirm that he agrees with the Standard Terms and Conditions, thereby establishing a contract.</p> <p>The Production Device shall be identified in the application using the unique number assigned to it by the Production Registrar in accordance with GS1 numbering.</p> <p>The Production Registrar can view the application in myCertiQ. Upon receipt of assigned application, the Production Registrar will verify:</p> <ul style="list-style-type: none"> <li>(a) if the information contained in the application is complete and accurate;</li> <li>(b) if the application satisfies the requirements of the applicable legislation;</li> <li>(c) if the Production Device satisfies the requirements of the applicable legislation; and</li> <li>(d) if the metering arrangements of the Production Device: <ul style="list-style-type: none"> <li>(i) are adequate for measuring the nett (and gross where applicable) production of electricity;</li> <li>(ii) conform to the Metering Code</li> </ul> </li> </ul>	<p>The Registrant must notify CertiQ of an intent to deregister his Production Device, either:</p> <ul style="list-style-type: none"> <li>(a) by specifying the effective date of closure in myCertiQ; or</li> <li>(b) by means of written notification, specifying the effective date of closure.</li> </ul> <p>The effective date of closure must be the first day of any calendar month after the month to which the most recent measured values (by date of production) received for that Production Device by CertiQ relate.</p> <p>The accuracy of standing data on a Production Device with a nominal capacity of 15 kW or more shall be verified at least every 5 years. As part of such verification, an onsite inspection may be required by the Production Registrar. Where a Production Device can be fuelled by more than one Source of Input, a Production Audit is carried out each year. An onsite inspection by the Production Auditor is often conducted as a part of the Production Audit.</p> <p>Any renewable electricity disclosed in a supplier's supply mix must be corroborated by the cancellation of guarantees of origin. These guarantees of origin can be EECS Certificates; and each guarantee of origin issued by CertiQ for electricity injected into the grid constitutes an EECS Certificate. Any fossil or nuclear electricity disclosed in a supplier's supply mix can be corroborated by the cancellation of EECS-Disclosure Certificates. For any part of a supplier's supply mix not corroborated by the cancellation of Certificates, that supplier can use the Residual Mix. The residual mix is determined annually by the Authority for Consumers &amp; Markets, taking into account:</p> <ul style="list-style-type: none"> <li>(a) the volumes and composition of electricity: <ul style="list-style-type: none"> <li>(i) produced in the Netherlands;</li> <li>(ii) exported from the Netherlands;</li> <li>(iii) imported into the Netherlands; and</li> </ul> </li> <li>(b) the issuance by CertiQ of any EECS-Disclosure Certificates.</li> </ul> <p>The residual mix is considered to contain no renewable electricity, and therefore by definition there can be no double-counting with EECS Certificates issued by CertiQ for renewable electricity. The attributes of any EECS-Disclosure Certificates issued by CertiQ for fossil and nuclear sources are explicitly deducted from the 'pool' of attributes available for the residual mix. The residual mix is then determined by subtracting from the pool of available attributes of electricity produced in the Netherlands the attributes of electricity exported from the Netherlands and adding the attributes of electricity imported from other countries, using the weighted average share of each energy source in its respective mix each time.</p>	<p>the appropriate course of action with regard to the registration of the Production Device; such action being the amendment of the record of that Production Device:</p> <ul style="list-style-type: none"> <li>(a) to more accurately reflect reality; and/or</li> <li>(b) to reflect that it has ceased to qualify for EECS Certificates.</li> </ul>	<p>against the registered capacities of the relevant Production Devices. In accordance with legislation, the Measurement Frequency shall be:</p> <ul style="list-style-type: none"> <li>(a) where the connection capacity of the Production Device is less than or equal to 3X80 A: twelve-monthly;</li> <li>(b) where the connection capacity of the Production Device is greater than 3X80 A: monthly.</li> </ul>
Poland	<p>Rules for the guarantees of origin register (05.03.2020.)/TGE</p> <p>registration and record-keeping system for Guarantees of Origin, as well as the principles of over-the-counter trade in Guarantees of Origin</p>	Not possible to determine during analysis	Not possible to determine during analysis	Not possible to determine during analysis	Not possible to determine during analysis

## 6. Analysis of practice on trading of the Guarantees of Origin (GOs) in the OTC and exchange markets (including clearing and settlement) in the EU countries (including EER ones)

---

As elaborated in previous chapters, GOs are a tracking instrument that allows to confirm the origin of electricity and to determine the quantity stemming from renewable production within the total of electricity that flows through the grid. This makes them an indispensable tool to promote the production and consumption of green electricity, by ensuring its traceability and to enable investments into renewables. Thanks to this mechanism, European consumers subscribing to a green electricity offer with their energy provider can be assured that the exact amount of electricity they consume has been injected from renewable sources into the grid. In the context of the energy transition, a well-functioning and exchange-based GO market brings transparency on the traded products and the technologies that are most demanded on the market.

For some AIB members, such as: Greece, Denmark, Germany, Serbia and Netherland, GOs are traded in the market through brokerages, who facilitate transactions between power producers and electricity suppliers. This means the payment is done based on the signed contracts, upon the GO transactions. Specific clearing and settlement on the power exchanges is not applicable since there is only one-to-one transactions.

For other AIB members, GOs are being issued for subsidized electricity and sold via auctions. Italy was the first country to introduce system where GOs are being auctioned. Ever since the possibility of auctions was explicitly included in Article 19 of the Renewables Directive 2001/2018, more countries have followed this example.

Following paragraphs will provide overview of general elements of clearing and settlement in countries where auctions are conducted for issued GOs and where clearing and settlement is being elaborated in the regulatory framework, including: Croatia, France, Portugal and Italy.

### **Croatia - HROTE-CROPEX**

From the beginning of 2019 and in accordance with the Law on Renewable Energy Sources and Highly Effective Cogeneration (Official Gazette 100/15, 111/18), HROTE, as a leader of the ECO Balance Group for the incentivised electricity production, started to sell a part of the energy produced on trading platforms of CROATIAN POWER EXCHANGE Ltd. (CROPEX).

By switching to the market-based sales of electricity, the possibility of establishing a system for the sales of Guarantees of Origin was opened, precisely for the electricity produced by the incentivized eligible producers and sold on the CROPEX markets by HROTE. Guarantees of Origin for the electricity produced in the power plants concerned are being issued within the Croatian Guarantees of Origin Registry and sold to the market participants on the market-based principles, i.e. through Guarantees of Origin Auctions.

According to the agreement between HROTE and CROPEX, Guarantees of Origin are sold on Guarantees of Origin Auctions that are organised by CROPEX, using specially developed IT auction trading platform. After the Auction is successfully completed, raised funds from the Auction are transferred to the incentivised system fund, while sold Guarantees of Origin are transferred from HROTE's account in the Guarantees of Origin Registry to the Auction participant's user accounts.

### **France – European Energy Exchange (EEX)**

EEX has started auctioning GOs in September 2019, on behalf the French Minister for an Ecological and Solidary Transition, auctioning GOs for electricity produced from renewable energy sources from production devices currently receiving support in France. To optimize the allocation of GOs, EEX has designed a specific algorithm, to enable GO buyers, to submit orders by specifying, a region, a technology and even indicate a production device as a preference. Moreover, the auction is cleared and secured by our clearing house, the European

Commodity Clearing (ECC). The auction revenues are dedicated to a special fund acting for energy transition.

Auctions take place monthly at the same time for all energy sources. The quantity of GOs to be auctioned each month is defined by the French State. Auction participants need to open an account in the French registry.

### **Portugal - REN**

In Portugal, the auctions of guarantees of origin (GOs) from power plants that benefit from price or investment support began in July 2021. As provided for in the legal framework established by DL No. 141/2010, as amended by DL No. 60/2020, the GOs concerning the generation of electricity from renewable sources that benefit from support must be delivered to the Directorate-General of Energy and Geology (DGEG), which transacts them through auctions. The net income of these auctions must be subsequently deducted from the overheads related to the acquisition of electricity from renewable energy sources, thus reverting to consumers.

Participation in the auctions is open to all entities, both domestic and foreign, requiring previous registration with OMIP, S.A., which is the entity responsible for the execution of the auction, and with REN-EEGO, which ensures the physical settlement of the process. The auctions are held periodically, typically on a monthly basis, on a dedicated platform made available by OMIP S.A., with the quantity of GOs to be auctioned in each auction being defined by DGEG.

### **Italy - Gestore dei Servizi Energetici (GSE)**

In Italy, GOs auctions were introduced for the first time in 2013, by the Energy Regulator Resolution. Auction revenues are used to reduce the cost sustained by electricity consumers to promote the renewable energy in Italy.

According to the National Legislation, GSE (Manager of Energy Services) calculates the number of GOs related to the electricity produced and injected into the grid in order to define the quantity of GOs to be offered during the auctions.

The electricity taken into account is the one produced by the RES power plants that benefit from the “dedicated withdrawal” by GSE and which grant feed in tariffs.

Every year, five auctions are organized by GSE. GOs are differentiated according to the type of plant and production period.

## **6.1. Exchange market and GO trading in Croatia**

*Rules for Auction of GO* in Croatia regulate manner and conditions of execution and sale of GO of electricity, referred to in Article 40 Paragraph 2 of Renewable Energy and High-efficiency Cogeneration Act of Croatia. Detailed elements of clearing and settlement are elaborated in the **Table 10**.

Auction /bidding process is starting with announcement of auction of CROPEX webpage. Interested Auction Participants have to conclude Participation Agreement with CROPEX, open account in GO registry, deliver collateral and pay trading fee to CROPEX. Bidding process is conducted via registry managed by CROPEX. Upon conducted bidding process, CROPEX is ranking offers and determining the lowest price, named as Marginal price, which is being used for issuing invoice to Auction Participant. Based on details provided in invoice, Auction Participant is providing settlement in three days from invoicing to CROPEX settlement account.

Table 10

## Clearing and settlement in Croatia

Procedure	Description
<b>General preconditions</b>	<p><i>The Auction Participant</i> shall fulfil the following preconditions for joining and participating at the Auction:</p> <ol style="list-style-type: none"> <li>1. concluded Participation Agreement in Guarantee of Origin Auction with CROPEX,</li> <li>2. delivery of <i>Collateral</i> to CROPEX pursuant to provisions of these <i>Rules</i>,</li> <li>3. opened user account in the Guarantee of Origin Register managed by HROTE or other registers of Guarantees of Origin connected to AIB system, and</li> <li>4. the <i>Participant</i> shall not have any outstanding debts towards CROPEX.</li> </ol>
<b>Conclusion of the Participation Agreement in Guarantee of Origin Auction</b>	<p>Prior to first participation at the <i>Auction</i>, the <i>Auction Participant</i> is obligated to conclude with CROPEX the Participation Agreement in Guarantee of Origin Auction (hereinafter: <b>Agreement</b>).</p> <p>For the purpose of concluding the Agreement, the Auction Participant shall deliver to CROPEX the Request for <i>Auction</i> Participation and three (3) signed and certified copies of the Agreement.</p> <p>After receiving the Request for <i>Auction</i> Participation, CROPEX and HROTE shall mutually determine if the Auction Participant has submitted all necessary documentation and has fulfilled all preconditions for concluding the Agreement, which are stated in the application form of the Request for <i>Auction</i> Participation.</p> <p>The Auction Participant is obligated to submit the following minimum data with the Request for the Auction Participation, along with the signed Participation Agreement in Guarantee of Origin Auction (Agreement) :</p> <ol style="list-style-type: none"> <li>a) name of a natural or legal person, address, PIN (personal identification number, "OIB number"),</li> <li>b) if the Auction Participant is a legal person, registration number, place of the registration, name and surname of the authorized representative,</li> <li>c) name of the business bank, account number (IBAN), SWIFT/BIC,</li> <li>d) name and surname of the authorized person for the settlement, contact data of that person,</li> <li>e) name and surname of the person responsible for trading at the Auction, contact data of that person,</li> <li>f) webmail addresses for delivery of invoice and other statements and information pursuant to these Rules and the Agreement.</li> </ol> <p>In case of incomplete documentation, CROPEX shall request for a correction or amendment of the request, i.e. supplement of the requested documentation. CROPEX is authorized to request from the <i>Auction Participant</i> any additional data or explanations of the submitted data for the <i>Auction</i> Participation, which CROPEX and/or HROTE consider necessary.</p>
<b>Expenses of the Auction Participation</b>	<p>All the expenses and risks of participating at the Auction shall be borne by the Auction Participant. The Auction Participant is obligated to pay the Trading Fee to CROPEX. The amount of Trading Fee is published on the Web page of CROPEX.</p>
<b>Issuing the invoice</b>	<p>CROPEX shall issue the invoice for each Auction based on the results of the Auction, i.e. concluded sale of Guarantees of Origin at the Auction, to the Auction Participant separately for (i) the price of Quantity of purchased GOs which is determined by multiplying the Marginal price<sup>16</sup> on the Auction with the Quantity of purchased GOs and then by adding VAT, if applicable and (ii) the amount of the calculated Trading Fee increased by VAT, if applicable.</p> <p>The Auction Participant that purchases Guarantees of Origin, shall settle the invoices referred above in the period of three (3) days from the Invoicing Day in a suitable currency to CROPEX's Settlement Account<sup>17</sup>.</p>

<sup>16</sup> Marginal price is the price at which Guarantees of Origin have been sold to Auction Participants at a certain Auction and which is the price of the last fully or partly accepted Bid from the Bids Order

<sup>17</sup> Settlement Account - a transaction account opened by CROPEX in the Settlement Bank for the purpose of settlement. Settlement Bank - the bank where CROPEX opened its Settlement Account and Deposit Account.

Procedure	Description
	<p>CROPEX shall deliver the invoices to the Auction Participant in a written form by webmail address stated in the Request for Auction Participation. By signing the Agreement, the Auction Participant confirms their consent for receiving the invoices in an electronic form.</p> <p>CROPEX shall issue the invoices to the Auction Participant at the latest within one (1) working day after the Auction for which the invoices are issued.</p> <p>In case the Auction Participant does not settle the amount stated in the invoice in due time, it will be liable to pay, in addition to the principal amount, the Statutory Default Interest for each day of delay.</p>
<p><b>Collaterals &amp; Settlement</b></p>	<p>Each Auction Participant shall, at their own expense, obtain and maintain Collaterals pursuant to the Rules and ensure that the value of Collaterals at any moment is in accordance with the terms set forth by CROPEX, otherwise they will not be allowed to participate in the Auction.</p> <p>CROPEX shall accept the Collateral in a form of cash security deposited on the Deposit Account<sup>18</sup>, pledged for CROPEX to secure CROPEX's claims toward the Auction Participant.</p> <p>The Collaterals delivered to CROPEX by Auction Participants shall be used as a payment security for all the Auction Participant's obligations toward CROPEX of any nature, that occur as a result of the Auction Participant's activities at the Auction, from the Agreement or as a result of the Agreement termination.</p> <p>CROPEX is authorized to use the Collateral for settlement of its claims toward the Auction Participant if the Auction Participant does not settle payment of any of their financial obligations (in full or partially) in due time under or related to the Agreement.</p> <p>CROPEX shall return Collateral to the Auction Participant after the termination of the Agreement, provided that the Auction Participant does not have any outstanding financial obligations toward CROPEX and/or provided that CROPEX does not have any disputed or uncertain claims toward the Auction Participant.</p> <p>The Auction Participant is entitled to authorize CROPEX with the Request for Auction Participation, to transfer funds from the Deposit Account to the Settlement Account, in order to complete the settlement on the due day, instead of a settlement payment by the Auction Participant. The settlement method of transfer of funds from the Deposit Account and the method of revoking the authorization for direct transfer of funds from the Deposit Account, are regulated by the provisions of the Agreement.</p> <p>CROPEX is authorized to use the cash security in form of cash deposits on the Deposit Account explicitly accepted by CROPEX and recognized by the Rules as the security for fulfillment of obligations of the Auction Participant toward CROPEX (Collateral) for settlement of its claims toward the Auction Participant if the Auction Participant does not settle payment of any of their financial obligations (in full or partially) in due time under or related to the Agreement.</p> <p>The settlement is performed solely based on the trade of Guarantees of Origin recorded in the Auction System of CROPEX and it is not influenced by the transfer of Guarantees of Origin in the register.</p> <p>CROPEX shall deliver to the Auction Participant the information regarding payment and Collaterals. The Marginal Price as the Auction result is expressed in Euro. The settlement is conducted in Euro for the non-resident Auction Participants, while for the resident Auction Participants it is conducted in Croatian Kuna equivalent value determined by conversion of applicable amount of Euro into Croatian Kuna, using the official middle exchange rate published on the day of the invoice.</p> <p>CROPEX shall notify HROTE regarding settlement of financial obligations as a consequence of purchase of Guarantees of Origin at the Auction by each Auction Participant within one (1) business day from the day of settlement of the financial obligation.</p>
<p><b>Marginal Price</b></p>	<p>Bids are accepted in the order of their ranking in the Bids Order, starting with the Bid with the highest Bid Price at the top of the Bids Order and continuing to the Bid with the lowest Bid Price at the bottom of the Bids Order.</p> <p>The Algorithm of the Auction System determines the Marginal Price in a way that the Marginal Price is equal to the lowest Bid Price from the last Bid from the Bids Order, which has been fully or partially accepted.</p>

<sup>18</sup> Deposit Account - cash account opened by Croatian Power Exchange Ltd. (CROPEX) in the Settlement Bank in its name and account, namely cash account opened in specific bank; for keeping cash deposits of all Auction Participants as their Collateral.

Procedure	Description
	<p>If the submitted Bids for Guarantees of Origin at the Auction are lower or equal to the GOs Auction Quantity, all Bids shall be accepted at the Marginal Price.</p> <p>If the submitted Bids for Guarantees of Origin at the Auction are higher from the GOs Auction Quantity, the following rules shall be applied:</p> <ul style="list-style-type: none"> <li>- Bids are accepted at the Marginal Price according to the order defined by the Bids Order, i.e. from the higher-ranking Bids towards lower-ranking Bids, until the complete Guarantee of Origin Quantity is sold at the Auction. If the Bid Quantity of the last Bid from the accepted Bid Order is higher than the remaining Guarantees of origin Quantity at the Auction, then that Bid is accepted only in part regarding the remaining Guarantees of origin Quantity at the Auction which is available for allocation, after the acceptance of the higher-ranking Bids in the Bid Order in relation to that Bid.</li> <li>- if two (2) or more Auction Participants submitted valid Bids with the same Bid Price, which cannot be accepted entirely for the total amount of the requested Guarantees of origin Quantity from the Bids, the Auction System determines the winning Bids and executed Bid Quantities for the Auction Participants as follows: <ul style="list-style-type: none"> <li>a) the remaining Guarantees of origin Quantity at the Auction left on disposal, after the acceptance of the higher-ranking Bids in the Bid Order in relation to those Bids, shall be allocated in the same amount between the Auction Participants who submitted the respective Bids, at the Marginal Price,</li> <li>b) if the requested Guarantees of origin Quantity by the Auction Participant, based on the Bids which determine the Marginal Price is lower or equal to the amount calculated in accordance with Item a), the Bid of this Auction Participant shall be accepted entirely,</li> <li>c) if the requested Guarantees of origin Quantity by the Auction Participant, based on the Bids which determine the Marginal Price is higher than the amount calculated in accordance with Item a), the request of this Auction Participant shall be accepted up to the amount calculated according to Item a),</li> <li>d) all remaining Guarantees of Origin after the allocation in accordance with Items b) and c) shall be allocated to the number of Auction Participants whose Bids have not been accepted entirely and shall be additionally divided between those Auction Participants by repeated procedures described in Items a), b) and c),</li> <li>e) all remaining Guarantees of Origin after the allocation in accordance with Item d) shall be allocated pursuant to the criterion of chronological Bid submission.</li> </ul> </li> </ul>

## 6.2. Exchange market and GO trading in France

French Guarantees of Origin Auction General Terms and Conditions are defining rules for general organization of GO auctions. Detailed elements of clearing and settlement are elaborated in the Table 11.

European Energy Exchange (EEX) provides registry services for issuing GOs, as well as for GO auctions, on behalf of the French State. European Commodity Clearing (ECC) is a central clearing house which specialises in energy and commodity products. ECC assumes the counterparty risk and guarantees the physical and financial settlement of transactions, providing security and cross-margining benefits for its customers. As part of EEX Group, ECC provides clearing services for EEX, EEX Asia and EPEX SPOT and for the partner exchanges HUPX, HUDEX, NOREXECO, SEEPEX and SEMOpX.

Before the auction is held, EEX publishes the list of the GOs issued by the State and available for purchase via the auction on the dedicated platform. Participants have a period of 7 days to submit their orders and adjust their trading limits. Defined are criteria which participants of auctions must meet prior GO auctions: (i) Be an account holder on the registry of GO operated by EEX, (ii) Accept the GO Auction General Terms and Conditions and adhere to the corresponding Access/Trading Agreement, (iii) Be a member of ECC and sign a clearing contract and (iv) Pay the annual auction registration fee. At the latest 2 days after the auction, the results are published by EEX and the payment and delivery of the GOs are made. All participants are receiving electronic trade confirmation containing details of the transaction the price and total quantity determined by the Auction algorithm. EEX is sending details of the

transaction to EEC on a product level with data on: Price, Quantity, Product, side, counterparties, Delivery Period, date and time. Payments are made the day upon auctioning. After confirmation of payments by ECC, EEX delivers GOs to the accounts of the Members via a transfer on the National Registry for Guarantees of Origin, in a period from one to two days upon auctioning.

The European Power Exchange (EPEX SPOT), European Energy Exchange (EEX) and European Commodity Clearing (ECC) plan to jointly launch a pan-European market for Guarantees of Origin (GO) as part of EEX Group’s ongoing efforts to support the energy transition with market-based instruments.

The planned GO spot auctions will be held once a month and operated by EPEX SPOT, Europe’s leading power spot exchange, under the exchange’s membership and market rules. Clearing and settlement will be conducted by the clearing house ECC and EEX will ensure delivery through its French GO registry. The launch of the new trading products is envisaged within the second quarter 2022, subject to successful testing and market readiness.

This will be the first exchange-based pan-European market for GO trading, bringing the well-known EPEX SPOT expertise to this new segment.

The market design of this new pan-European spot auction foresees a monthly multilateral auction for GO from renewable production in selected countries that are part of the European Energy Certificate System (EECS), as set by the Association of Issuing Bodies (AIB). Buyers and sellers will be able to access both specific and generic GO within one pay-as-clear auction, optimising market liquidity. Several levels of specificity within three dimensions will be made available: country, technology, and subsidy regime. Indices will be published following each auction. Market participants will join a strong and diverse European trading community of more than 300 members backed by reliable membership and market rules.

Table 11 Clearing and settlement in France

Procedure	Description
<b>Trading Agreement</b>	<p>Relations between EEX and Members<sup>19</sup> shall be governed by contract. By signing the Trading Agreement, Members undertake to comply with General Terms and Conditions and all other documents relevant to them.</p> <p>Applicants seeking access to trading must provide the following documents in order to be admitted on EEX French Guarantees of Origin Auction:</p> <ul style="list-style-type: none"> <li>• the Know Your Customer (KYC) form, including direct and indirect shareholders and a description of the technical and human resources to be allocated to trading on EEX French Guarantees of Origin Auction,</li> <li>• evidence on their admission onto the National Registry for Guarantees of Origin kept by EEX,</li> <li>• the G01 admission application,</li> <li>• the signed Trading Agreement,</li> <li>• One of the following agreements: <ul style="list-style-type: none"> <li>&gt; a “Clearing License” signed directly with ECC if they become Clearing Members,</li> <li>&gt; or a “Non-Clearing Member/Clearing Member Agreement” if they become not Clearing Members and use the services of an ECC Clearing Member,</li> <li>&gt; Or an agreement with ECC if they subscribe to the DCP (Direct Clearing Participant) model.</li> </ul> </li> </ul> <p>EEX shall also be entitled to ask for the list of the Member's counterparties in given auction and to require Applicants to provide any additional information that may reasonably be deemed necessary to assess its specific characteristics.</p>

<sup>19</sup> Members refers to auction participants.

Procedure	Description
	<p>Such documents shall be provided to EEX in English or French. Applicants shall guarantee the authenticity of the provided documents and the validity of the information communicated to EEX.</p> <p>It is up to the Member to update the information and documents as necessary and communicate them to EEX.</p> <p>EEX shall make decisions concerning Members in accordance with requirements defined in General Terms and Conditions. EEX shall decide to admit a Member once the Applicant has sent EEX all the necessary information and satisfied all the membership requirements. Admission to the EEX French Guarantees of Origin Auction shall take effect on the date the Trading Agreement is signed.</p>
<b>Fees and other expenses</b>	<p>The Member shall be liable for payment to EEX of fixed and variable fees and expenses. The methods for calculating and collecting fees and expenses are set out in General Terms and Conditions and based on the Designation Decree<sup>20</sup>.</p>
<b>Transmission of trade confirmations</b>	<p>Once auctions are conducted and GO price is determined, Members receive an electronic trade confirmation containing the details of the Transaction: the price and total quantity determined by the Auction algorithm for each Contract.</p> <p>Once the result has been transmitted, Members agree to be bound by the terms of the Transactions they have accepted in the Contracts.</p>
<b>Transmission of Transactions to the Clearing House</b>	<p>As Orders are matched, EEX shall transmit the details about the Transactions for each Member on a per Product level to ECC. The information transmitted for each Transaction shall include the Price, Quantity, Product, side, counterparties, Delivery Period, date and time.</p> <p>As soon as a Transaction is concluded between a sell-side Member and a buy-side Member, ECC or, as the case may be, the concerned ECC Clearing Member, stand between the counterparties to the Transaction and their contractual relationships are then governed by the ECC's clearing rules.</p>
<b>Notification of the Payment and/or Delivery Organisation</b>	<p>The Delivery Organisation on EEX French Guarantees of Origin Auction is EEX, manager of the National Registry for Guarantees of Origin. ECC shall transmit the information about Transactions directly to the Delivery Organisation, EEX.</p>
<b>Payment/Delivery procedure</b>	<p><u>Payment</u></p> <p>Payments are generally made the day after the Auction Phase from the Members' accounts to the ECC account. Payments are generally made one day after from the ECC account to the account of the French Ministry for the Ecological and inclusive Transition and in any case before thirty (30) days after the Auction Phase, as stated in article R-314-69-11 of the energy Code.</p> <p><u>Physical delivery</u></p> <p>After confirmation of payments by ECC, EEX delivers the Guarantees of Origin to the accounts of the Members via a transfer on the National Registry for Guarantees of Origin, the day after the Auction Phase or two (2) days after the Auction phase.</p> <p>Members are not authorized to reject the transfer of Guarantees of Origin to their account if such transfer results from the execution of an Order.</p>

<sup>20</sup> Decree of 12 December 2019 modifying the decree of 24 August 2018 designating the body responsible for the National Registry for Guarantees of Origin of electricity produced from renewable energy sources or high-efficient cogeneration and the auctioning of Guarantees of Origin – in short “Designation Decree”.

### 6.3. Exchange market and GO trading in Portugal

GO Auctions in Portugal are being conducted in accordance with Order No. 6560-B/2021. The entities involved in the auction process are:

- SU ELETRICIDADE, S.A., as the SLR or CUR, which is the company responsible for the financial settlement and invoicing of the auction revenues;
- OMIP - Pólo Português, S.G.M.R. (OMIP), as the entity responsible for managing participation in the auctions and for operating them;
- OMIP, S.A. (OMIP SA), as the company responsible for managing the financial guarantees required for qualification to take part in the auctions; and
- REN - Rede Elétrica Nacional, S.A., as the EEGO, assuming the role of company responsible for the physical settlement of the guarantees of origin traded in the GO Auctions.

The auction is operated by OMIP, which will deal with the admission of the participants. Prior registration with the Guarantees of Origin Issuing Body (REN) is compulsory. Among other things, Order no. 6560-B/2021 defined the qualification rules for participants. These include the provision of a financial guarantee by 12 noon of the 2nd (second) business day before the auction. Legal entities registered in the EEGO system that sign an agreement accepting the auction rules up to 5 (five) days before the auction can participate in the auction. Details on clearing and settlement procedure are elaborated in the following table.

Table 12 Clearing and settlement in Portugal

Procedure	Description
<b>Trading Agreement</b>	The relationships between the participants in the GO Auctions and OMIP are of a contractual nature. By signing the GO Auction Rules Adherence Agreement, Participants undertake to comply with these Rules and any legal or regulation, instructions or document applicable to GO Auctions.
<b>Preconditions</b>	<p>The date and terms of the Auction, namely the quantity, typology and period of production of the Guarantees of Origin, are set by the DGEG<sup>21</sup> by means of a Notice, published until 20 days before the auction takes place. The Call will also include information on prices of reserve and any restrictions on participation in the GO Auctions, as well as the increase factor K to apply to the Financial Guarantee. OMIP will publish auction information on its website, in accordance with the terms set by the DGEG.</p> <p>Each auction may correspond to Guarantees of Origin of the same Technological Group or be grouped into different Technological Groups and may correspond to one or several Periods of different production. Several auctions can take place in parallel. The definition of the products to be auctioned is established in the Call. OMIP may publish an indicative list of auctions and respective products on its website.</p> <p>The documents that constitute the admission process as an Enrolled Participant must be delivered to OMIP in Portuguese. The documents required by OMIP for the purposes configuration of IT systems and trading platform must be delivered to OMIP in Portuguese. Documents in Spanish or English may be accepted after application approved by OMIP.</p> <p>The admission process as an Enrolled Participant must be instructed with the following elements:</p> <ol style="list-style-type: none"> <li>a) Application for admission.</li> <li>b) Copy of the articles of association or permanent certificate.</li> <li>c) Indication of the holders of shares that hold, directly or indirectly, in the company's capital of more than 10%.</li> <li>d) General contacts: telephone and e-mail.</li> <li>e) Identification and contact details of the Authorized Representative.</li> <li>f) Identification and contact details of the Auction Operator.</li> </ol>

<sup>21</sup> Directorate-General for Energy and Geology (DGEG)

Procedure	Description
	<p>g) Operational information necessary for the purposes of managing financial guarantees, settlement financial, invoicing and physical settlement.</p> <p>h) Declaration of consent to the recording of telephone calls and transmission of information.</p> <p>To access the auctions, Registered Participants must meet the following requirements:</p> <p>a) Have the status of an active Registered Participant up to 5 working days before the date of an auction.</p> <p>b) Have the status of Qualified Participant up to 2 working days before the date of an auction, in accordance with the provisions of the following point.</p> <p>Qualified Participant status is granted to Registered Participants when they are the following conditions are verified:</p> <p>a) Have deposited an amount in cash (in Euros) corresponding to the economic volume of the OMIP, S.A. Financial Guarantee Account by 12:00 on the 2nd working day before the auction of its initial offer, calculated by multiplying the Bid Quantity by the Reserve Price, plus a K-factor, as described in these Rules in point 8.1 Calculation of the Financial Guarantee. This amount constitutes the Financial Guarantee;</p> <p>b) No debts or other outstanding obligations related to GO-PT Auctions;</p> <p>c) Qualify as an Active Participant in the EEGO system up to 2 business days before the auction.</p>
<p><b>Fees and other expenses</b></p>	<p>Within 2 working days prior to the auction date, OMIP, S.A. sends to OMIP information on the amount of Financial Guarantee that Qualified Participants have deposited in the Financial Guarantee account.</p> <p>Until 12:00 on the 2nd working day prior to the auction, Registered Participants who wish to qualify must deposit, in a bank account explicitly indicated by OMIP, S.A. (Account Financial Guarantee), an amount in cash (Euros), decided by them, and which constitutes the respective Financial Guarantee.</p> <p>The Financial Guarantee must be sufficient to cover the economic value, in Euros, that corresponds to your initial bid, calculated by multiplying the Initial Bid Quantity by the Price of Reserve, plus a K factor of increase that reflects the greater or lesser distance between the reservation price and the expected market price, plus VAT (if applicable), plus the relative tariff the transfer of the Guarantees of Origin in the EEGO system and the tariff related to the remuneration of the auction operation and management of financial guarantees, plus VAT (if applicable).</p> <p>The Financial Guarantee delivered to OMIP by the Qualified Participants will be used as guarantee of payment of its financial obligations arising from the activity in the GO Auctions. In the event that the Financial Guarantee is not sufficient to cover all financial obligations, due to the final result of the auction, OMIP, S.A. will communicate this information to the Participant, within 24 hours after the final Information Phase, for the latter to deposit the amount in missing within 48 hours.</p>
<p><b>Transmission of trade confirmations and transactions to the Clearing House</b></p>	<p>OMIP, after the auction, makes the following information available to all Qualified Participants, on the Auction Platform, in the part that concerns them:</p> <p>a) Auction Price;</p> <p>b) Total number of Guarantees of Origin attributed.</p> <p>The CUR is the entity responsible for the financial settlement and invoicing of the transactions resulting from the GO-PT Auctions.</p> <p>Up to the 1st working day after the auction, OMIP sends the final results to CUR and OMIP, S.A., based on the quantities and prices awarded to each participant. The CUR sends to the OMIP, S. A., information about the bank account to which the amounts must be transferred resulting from the sale of Guarantees of Origin at auction.</p> <p>Up to the 2nd working day after the auction, OMIP, S.A., transfers from the Financial Guarantee account to a CUR bank account the amount corresponding to the economic value of the Guarantees of Origin purchased by each participant, plus VAT (if applicable), plus the fee relating to the transfer of Guarantees of Origin in the EEGO system. In case the Financial Guarantee is not sufficient to cover all financial obligations, by virtue of the final result of the auction, OMIP, S.A., communicate this information to the Participant within 24 hours after the Information Phase final payment, for the latter to deposit the missing amount within 48 hours.</p>

Procedure	Description
	<p>In the event that the Participant does not deposit within the stipulated period, in the Financial Guarantee account, an amount sufficient to cover all its obligations arising from the result auction final — purchase of Guarantees of Origin at the auction price, taxes and fees — no any quantity will be awarded.</p> <p>The Participant, through the Agreement of Adherence to the Rules, authorizes OMIP, S.A. to transfer to the CUR's bank account funds that you have deposited in the Financial Guarantee Account in order to proceed with the payment of the Guarantees of Origin acquired at the Auction and to comply with other obligations, namely tariffs related to the transfer of Guarantees of Origin in the from EEGO. Up to the 2nd working day after the auction, OMIP, S.A. returns to the Participants, if applicable, via bank transfer, the amount of Financial Guarantee that they have deposited in the Financial Guarantee Account, which was not used to cover financial liabilities arising from their participation in the auction, after deduction of the fee related to management activities and operationalization of the auction and management of financial guarantees.</p> <p>Up to the 3rd working day following the auction, the CUR sends to OMIP, S.A. the confirmation of receipt in its bank account of the value of the Guarantees of Origin, plus VAT (if applicable), plus the EEGO tariff.</p> <p>Up to the 8th working day after the auction, the CUR issues and sends by e-mail to each Buyer Participant an invoice, detailing the economic value in Euros of the Grants of Origin awarded, multiplying the price by the number of Guarantees of Origin awarded, plus VAT (if applicable), plus the fee related to the transfer of Guarantees of Origin in the EEGO system, plus the fee related to the auction management and operation and collateral management activities financial.</p> <p>Up to the 15th working day after the auction, the CUR transfers to the EEGO the amounts related to the tariffs transfer of Guarantees of Origin in the EEGO system, paid by the successful tenderers.</p> <p>The deadlines referred to in this paragraph may be extended by 72 hours in cases where the Financial Guarantee of any Participant is not sufficient to cover all of its obligations financial institutions and they have to post the missing guarantee.</p> <p>The execution of an Offer in the GO Auction will result in the transfer of Origin, in the EEGO System, from the DGEG account to the buyer's account. The execution of a Offer in the Auction of Guarantees of Origin implies the irrevocable commitment:</p> <p>a) For the buyer, to receive the amount of Guarantees of Origin and pay the agreed Price, under the terms of the applicable Financial Settlement and Physical Settlement procedures,</p> <p>b) For DGEG, to deliver the amount of Guarantees of Origin and receive payment of the agreed Price, according to the Financial Settlement and Physical Settlement procedures applicable.</p> <p>By the 3rd working day after the auction, OMIP sends the final auction results to EEGO, that will serve for the physical settlement of the Guarantees of Origin, through transfers in the System from EEGO, from the DGEG account to the buyers account. In cases where the Financial Guarantee is not sufficient to cover all financial obligations, due to the final result of the auction, the subsequent deadlines are extended by 72 hours, so that OMIP, S.A. informs the Participant the need to deposit the missing collateral and for it to execute the deposit.</p> <p>The entity through which the physical settlement in the auction is carried out is EEGO, operator of the EEGO system. OMIP transmits directly to the EEGO, with the knowledge of the DGEG, information on the transactions resulting from the auction.</p>
<p><b>Payment/Delivery procedure</b></p>	<p>In the period between 12:00 pm on the 2nd business day before the auction and the 2nd business day after the auction, the Participants cannot dispose of the amount they deposited in the Financial Guarantee Account of the OMIP, S. A. From the 2nd working day after the auction, OMIP, S. A. returns to the Participants the amount of Financial Guarantee that they have deposited in the Financial Guarantee Account, and that has not been used to cover the financial liabilities arising from its participation in the auction.</p> <p>The period referred to for the return of the Remaining Financial Guarantee may be extended by 72 hours in cases where the Financial Guarantee of any Participant is not sufficient to cover all their financial obligations and they have to post the missing guarantee.</p> <p>From the revenue obtained from the sale of Guarantees of Origin in the GO-PT Auctions, the costs related to the management and operation of the auctions, incurred by OMIP,</p>

Procedure	Description
	<p>must be deducted, as well as those relating to the management of financial guarantees incurred by OMIP, S. A.</p> <p>The remuneration for these two activities is determined according to the total volume in MWh awarded in each auction, with a total value of €0.02/MWh, corresponding to €0.01 for the CUR and €0.01 to the successful bidders.</p> <p>The remuneration provided for in the previous number for each auction cannot exceed the value of 20% of the recipes. If this occurs, the difference between the application of tariffs to the volume awarded and the 20% limit will be considered as auction revenue.</p>

#### 6.4. Exchange market and GO trading in Italy

Art. 3, para. 32.2 of Decision of 28 Jul. 2011 ARG/elt 104/11 – provides that guarantees of origin may be traded in the appropriate venue organised by GME, i.e. freely traded or awarded under GSE's auctioning procedures. The PB-GO is an electronic platform where bilateral transactions of purchase/sale of guarantees of origin are registered in accordance with the applicable Rules.

Holders of Participation Agreements are required to register on the PB-GO the volumes and the prices at which the guarantees of origin have been traded. Conversely, bilateral transactions resulting from auctioning procedures will be registered on the PB-GO by GSE.

Sessions usually take place on a monthly basis, under the continuous trading mechanism. Approximately five days before auction session, GSE publishes on its website: the amount of GOs to be auctioned and the initial auction-bidding price determined by GSE based on GOs market price in Italy. In this way, market operators can start sending purchasing-bid. At the end of the auction session, GSE publishes, in aggregated form, the number of certificates sold (split by source and production period), minimum and maximum price and the average price weighted by the registered volumes. Participation at GO auctions include payment of several types of fees, as well as security deposit to GSE. The prices declared by participants, the prices specified in trading orders and the price of execution of transactions do not include VAT. Details on clearing and settlement procedure are elaborated in the following table.

Table 13 Clearing and settlement in Italy

Procedure	Description
<b>General preconditions and Participation Agreement</b>	<p>Participation in the PB-GO is open to all parties. To be admitted to the PB-GO, the applicant must submit:</p> <ol style="list-style-type: none"> <li>1. the Participation Application (in the format of Annex A to the Rules governing the operation of the regulated market and of the platform for registration of bilateral of guarantees of origin), accompanied by a copy of a personal identity document of the signer of the application and, if the application is submitted on behalf of an organization, by documents certifying the powers of representation of the signer;</li> <li>2. the Participation Agreement (in the format of Annex B to the Rules governing the operation of the regulated market and of the platform for registration of bilateral of guarantees of origin). Each page of the agreement must be initialed by the legal representative. In the agreement, the contracting party must declare that he/she/it is aware of and accepts the Rules governing the operation of the regulated market and of the platform for registration of bilaterals of guarantees of origin without any condition or reservation.</li> </ol> <p>The notification of admission to the PB-GO qualifies the applicant as Participant. Participants are entered into a "List of PB-GO Participants", which is posted on the website of and managed by GME in compliance with personal data privacy legislation.</p> <p>Participants are required to pay an access fee, a yearly fixed fee (every 12 months, beginning on the date of admission) and a variable fee.</p> <p>The following are the fees for 2022:</p> <ul style="list-style-type: none"> <li>• access fee: € 0.00;</li> <li>• yearly fixed fee: € 0.00;</li> <li>• fee per GO traded/registered in the market and/or bilaterally: € 0.003.</li> </ul>

Procedure	Description
	<p>The fees due for all the transactions ended in the M-GO are to be paid - by the end of the last working day of the month in which the related invoice has been issued - into GME's account</p> <p>The fees are determined on a yearly basis by GME, approved by ARERA<sup>22</sup> and posted on GME's website. They will take effect on 1 January of the following year. The obligation to pay the fees will cease only if the Participant submits a formal request of exclusion from the PB-GO to GME.</p> <p>The Participation Application and all the documents to be enclosed thereto should be submitted only in the Italian language.</p>
<p><b>Expenses of the Auction Participation</b></p>	<p><u>Before the market session</u></p> <p>To operate in the GO Market (M-GO), participants must have at least one access profile (ownership account) in GSE's GO Registry.</p> <p>In the M-GO, selling participants are required to make a single payment to GME as a security deposit fully covering their purchases (including VAT, where applicable). The trading system will accept buy orders only if they are fully covered by the available deposit.</p> <p><u>During the market session</u></p> <p>The prices to be specified in buy and sell orders must be NET OF VAT.</p> <p>The system will automatically calculate the value of the transaction inclusive of VAT (where applicable), both for updating the available deposit during the session and for confirming the transactions made and for other administrative-accounting tasks.</p> <p><u>After the market session</u></p> <p>a) sellers will issue a single invoice to the buyer GME;</p> <p>b) buyers will receive a single invoice from GME.</p> <p>The Technical Rules set out the technical procedures for participating in the GO Market, the calendar and timetable of the trading sessions, as well as the procedures for notifying the amount of the security deposit made. Detailed Technical Rules are available on the web page of GME.</p> <p><u>Sessions</u></p> <p>Dates of annual sessions are announced on the web page of GME. The dates of the next sessions will be set after completing the transition from the system of Renewable-Energy Certificates of Origin (GOs) to the system of Guarantees of Origin (GOs).</p> <p>The prices declared by participants, the prices specified in trading orders and the price of execution of transactions DO NOT include VAT.</p> <p>The security deposit must be made into to the appropriate bank account of Gestore dei Mercati Energetici S.p.A, no. 000008540X08, with the bank in charge of GME's treasury services - Banca Popolare di Sondrio, Società Cooperativa per Azioni, Viale Cesare Pavese, 336 - 00144 Roma, ABI 05696, CAB 03211, IBAN IT81M0569603211000008540X08, SWIFT CODE POSOIT22 - within 12:00 of the working day before the opening of the trading session.</p> <p>On the deposits on this account, GME will pay market participants an interest rate equal to the one that GME receives on the funds held in its treasury accounts, i.e. the three-month Euribor rate (act/360) calculated as the average of the quotes of the rate for each day of the reference month, only if that rate is positive.</p>
<p><b>Issuing the invoice</b></p>	<p>The invoicing period for transactions concluded on the M-GO will be each market session.</p> <p>For each invoicing period, by the end of the working day following the closing of the reference session, GME will provide, on the SetService Platform, each Participant that is in credit towards GME with a notification of the amounts of the sale transactions concluded by the same Participant on the M-GO.</p> <p>After receiving the notification, the Italian Participant will issue the invoice to GME by the end of the second working day following the closing of the reference session.</p> <p>After receiving the notification, the foreign Participant will shall issue the invoice to GME by the end of the second working day following the closing of the reference session. However, if such day coincides with the last working day of the month or with the first working day of the</p>

<sup>22</sup> The Italian Regulatory Authority for Energy, Networks and Environment (ARERA) carries out regulatory and supervisory activities in the sectors of electricity, natural gas, water services, waste cycle and district heating.

Procedure	Description
	<p>following month, the same Participant will issue the invoice on the first working day of the month following the one in which the session has been held.</p> <p>For each invoicing period, GME issues to each Participant and its debtor the invoice containing the amounts of transactions concluded in the purchase by the Participant on the M-GO, by the second working day following the closing of the reference session; if the latter coincides with the first day or the second day of the following month, GME proceeds to issue the invoice in the month in which the reference session ended. Moreover, by the end of the eighth working day of the month following each calendar quarter - thus in January, April, July and October - GME will issue to each Participant an invoice with the sum of the fees owed for all transactions concluded on the P-GO in the previous quarter.</p> <p>GME also issues to each Participant the invoice for:</p> <ul style="list-style-type: none"> <li>• the yearly fixed fee for the first twelve months by the end of the third working day of the month following his/her/its admission and, subsequently, every twelve months, increased by the VAT (where chargeable);</li> <li>• the access fee, increased by VAT (where chargeable), within five days of admission of the applicant to the market.</li> </ul>
<b>Taxation</b>	<p>Purchases and sales on the M-GO shall mean supply of services and the chargeability of VAT thereon shall depend on the place where the purchasing party has established his/her/its business, as per article 44 of Directive 2006/112/EC.</p> <p>Transactions with counterparties established in Italy will be invoiced by GME to Market Participants, or by the latter to GME, without applying VAT. The reverse-charge mechanism will be applied by the purchasing party under article 17, para. 6 d-ter) of Decree of the President of the Italian Republic (“DPR”) 633/72.</p> <p>No VAT will be applied on sales to EU Market Participants who/which are taxable persons in their own countries. In this case, the reverse charge will be applied by the customer.</p> <p>No VAT will be applied on sales to non-EU Market Participants as per articles 44 and 59, para. 1 a), Directive 2006/112/EC.</p> <p>For purchases from both EU and non-EU Market Participants, GME will receive an invoice without VAT and then apply the Italian VAT under the reverse charge mechanism. as per article 17 of DPR 633/72.</p>
<b>GME’s fees</b>	<p>The services supplied by GME SpA shall mean supply of services and the chargeability of VAT on the related fees shall depend on the place where the customer (M-GO Participant) has established his/her/its business, as per article 44 of Directive 2006/112/EC.</p> <p>Therefore, GME will issue an invoice with VAT at the standard rate, if the customer has established his/her/its business in Italy and without VAT, if the customer qualifies as “esportatore abituale” (Italian exporter on a permanent basis) under article 8, para. 1, lett. c) of the Decree of the President of the Italian Republic No. 633/72. Conversely, GME will issue an invoice without VAT to EU customers who/which are taxable persons in their own countries. In this case, the reverse charge will be applied by the customer.</p> <p>GME shall issue an invoice without VAT to non-EU customers who/which are taxable persons in their own countries.</p>
<b>Settlement</b>	<p>For settlement of payments, GME determines the net position (debit or credit) of each selling and buying Participant towards GME on the basis of the amounts (including VAT) of the invoices issued and received by GME in respect of the same invoicing period (single market session) whereas the following requirements are met:</p> <ul style="list-style-type: none"> <li>• the invoice of the operator is received by GME within the time limit set by the Technical Rules;</li> <li>• the invoice of GME is received by the PA and non-PA operator within the time limit set by the Technical Rules.</li> </ul> <p>If this is not the case, GME defers compensation amounts including VAT, where chargeable, at the time of receipt of the GME’s invoice by the participant and of the participant’s invoice by GME.</p> <p>After the end of the reference session and within the time limit provided in the Technical Rules, GME will:</p> <ul style="list-style-type: none"> <li>• settle receivables from debtor Market Participants by utilising their available deposit to the extent necessary;</li> </ul>

Procedure	Description
	<ul style="list-style-type: none"> <li>• refund the amounts posted as a guarantee and exceeding the purchases made in the session;</li> <li>• pay payables to selling Participants, provided that GME has received the related invoice.</li> </ul> <p>The payment to the PA Market Participant net creditor will be made within the working day following the determination of the net position.</p> <p>The payments will be made by SEPA Credit Transfer<sup>23</sup> with Priority or equivalent procedures.</p>

---

<sup>23</sup> A credit transfer is an electronic payment from one bank account to another:  
<https://www.europeanpaymentscouncil.eu/what-we-do/sepa-credit-transfer>.

## 7. Best practices and lessons learned of the EU countries (including EER ones) and Serbia as a Contracting Party of the Energy Community on establishment of national registries for GO

### 7.1. Establishment of national GO registries

The main objective of the assignment is to provide support in developing GOs as an instrument for facilitation of private investment in renewables in Ukraine.

To achieve previous objective, developed is overview of best practices and lessons learned from analysis of legal acts of European countries on establishment of GO registries.

Table 14 Best practice and lessons learned: establishment of national registries

Country	Best practice and lesson learned
Greece	<ul style="list-style-type: none"> <li>- GOs for electricity from RES and energy produced from high efficiency cogeneration</li> <li>- IB: RES&amp;GO Operator (DAPEEP)</li> <li>- GO is 1 MWh</li> <li>- Register: (i) data kept for 10 years, (ii) operation, maintenance and upgrading by DAPEEP SA, (iii) CHP producer must submit a report/certificate issued by a certified body (auditor), (iv) time-to-time inspection without notice (5 yrs period between inspections)</li> </ul>
Denmark	<ul style="list-style-type: none"> <li>- GOs for electricity from RES</li> <li>- IB: Energinet.dk – independent public enterprise responsible for electricity and gas sector</li> <li>- GO is 1 MWh</li> <li>- Register: (i) operated by Grexel System, (ii) account code at the registry, (iii) two calculation methods for waste incineration plants</li> </ul>
Germany	<ul style="list-style-type: none"> <li>- GOs for electricity from RES + waste/sewage treatment</li> <li>- IB: UBA – Federal Environmental Agency</li> <li>- GO is 1 MWh</li> <li>- Register: (i) operation under UBA, (ii) grid operator is sending measurement data on produced energy in standardized format, (iii) production auditors, (iv) coloured copy of ID or passport as a proof of identity for non-German residents</li> </ul>
Serbia	<ul style="list-style-type: none"> <li>- GOs for electricity from RES</li> <li>- IB: EMS JSC – Transmission System Operator (Elektromreža Srbije)</li> <li>- GO is 1 MWh</li> <li>- Register: (i) software provision by Grexel System, (ii) if Producer wants GO → exit from support scheme (no re-entering)</li> </ul>
Netherland	<ul style="list-style-type: none"> <li>- GOs for electricity from RES, fossil electricity and renewable heat</li> <li>- IB: CertiQ – company responsible for issuing GOs</li> <li>- GO is 1 MWh</li> <li>- Register: (i) Transmission System Operator and DISTRIBUTION System Operators as production auditors, (ii) from January 2020 electricity suppliers are obliged to prove origin of all electricity they supply – Full closure</li> </ul>
Poland	<ul style="list-style-type: none"> <li>- GOs for electricity from RES + high-efficiency cogeneration: as an instrument to reduce carbon footprint of products and services</li> <li>- IB: President of the Energy Regulatory Authority is issuing GOs and uploading to TGE (Polish Power Exchange) IT system</li> <li>- GO is 1 MWh</li> <li>- Register: (i) GOs are issued for individual months, periods of several months or for the whole calendar year, (ii) GOs from RES are valid for 12 months from the electricity generation end date, while the guarantees of origin from CHP are valid for 12 months from the date of issuance by the Energy Regulatory Authority.</li> </ul>

## 7.2. GOs as tradable financial instruments (in the meaning defined in the part 4)

Detailed analysis of Directive 2018/2001 identified GOs as a promotion instrument of electricity production from renewable sources in Member States with a possibility to be sold on the market. From the aspect of industrial producers, GO is the certificate that gives additional value to every product on the market if it is produced by using the renewable electricity.

In practice, GOs have no impact on the increase of renewable energy production and are, therefore, an instrument that is used solely for electricity disclosure and marketing purposes.

Directive 2018/2001 didn't define rights of Contracting Parties of the Energy Community when it comes to GOs. That was the reason why Serbia, although became the AIB member, was not allowed to export GOs from Serbia's Registry to other domains. On 30 November 2021, the Ministerial Council Decision 2021/14/MC-EnC was published on incorporating Directive (EU) 2018/2001 in the Energy Community acquis communautaire and amending Article 20 and Annex I of the Treaty. By this concluded is that Member States should ensure, as early as possible, that that Guarantees of Origins issued by Contracting Parties of the Energy Community shall be recognized either through the Energy Community Treaty or a separate agreement. The above-mentioned legislation from 30 November 2021 also applies to Ukraine.

The price of GO on the market is formed mostly for following renewable energy technologies: wind, hydro, solar and biomass. Directive 2012/27/EU provides GOs possibility for electricity produced from high efficiency cogeneration plants, as well as possibility to extend the GO system to energy from non-renewable sources such as hydrogen. In addition to this, Directive 2018/2001 identified possibility to extend the guarantees of origin system to energy from non-renewable sources – this should be an option for Contracting Parties and it would enable the creation not only guarantees of origin for renewable gas than for hydrogen.

GO system is increasingly being applied for tracking non-renewable electricity production – both fossil and nuclear based. This is already happening in countries like Switzerland and Austria. This concept is called Full Production Disclosure (FPD), and simply means that it is mandatory to track and document every MWh produced with a GO – irrespective of the technology. This provides a complete and detailed description of these countries' power production.

Full Disclosure only really makes an impact when the demand side in the market also is covered by the same principle. This entails that a Guarantee of Origin must be purchased along with every MWh of physical power consumed, enabling consumers to choose renewable power if this is their preference. Full Consumption Disclosure (FCD) "forces" all consumers to make an active choice as the alternative to renewable will not just be "power with a rest-mix" but will instead be based on nuclear or fossil fuels; also documented with GOs.

AIB members have two approaches is selling GOs on the market:

### 1. Market trade via traders and brokers at the wholesale market:

For some AIB members, such as: Greece, Denmark, Germany, Serbia and Netherland, GOs are traded in the market through brokerages, who facilitate transactions between power producers and electricity suppliers. Other popular ways to trade are via portfolio management companies, trading houses and bilaterally between producers and retail power companies. In general, the trade of GOs is performed through two ways: (i) bilateral contract or (ii) on the exchange platform.

While the GO registries keeps the information about every issued GO (in the national domain and other domains) and all transactions in the national registry, it is not the platform for financial transactions. This is reason why AIB members do not have information on the prices of GOs - these are exchanged between market participants without the issuing bodies participating in or being aware of the detail of the trade.

### 2. Auctions for GO issued for electricity produced in subsidized plants:

Some of the AIB members have launched the auctions for selling GO issued from subsidized power plants in order to increase the income for the support scheme (i.e. the income of selling GOs goes into the support fund, not to the producers).

Many AIB member states (Italy, Croatia, Portugal, Slovakia, Luxembourg) allow the issuance of GOs for supported energy, thus increasing the risk of double counting. This occurs when the perception arises that an amount of „renewable” electricity has been certified or traded twice, and it can result in further distrust of the system. Perceived issue of double counting is usually tackled by introducing mandatory cancelation of supported GOs. Other option is that issued GOs for the energy produced from support schemes goes directly to auctioning in accordance to the electricity sold on the market; this approach fundamentally solves “double counting” problem and ensure there is no ‘hole’ in the disclosure process. The issuance of GOs for supported energy leads to more complete disclosure so that consumers receive clear, reliable and adequate evidence on the renewable origin.

There are many factors that influence price development on the EU market, surplus or deficit of the GO market, seasonal changes in electricity production from different technologies, financial crisis or global recessions, etc. In 2021 market prices of GOs varied depending of technology type and season of selling with an average bided price around 0.6 EUR/MWh. On the other side, auction GO prices had its ups and falls and went from 0.4 up to 2 EUR/MWh.

Table 15 Overview of lessons learned and recommendations for Ukraine

EU legal framework on GOs <sup>24</sup>	Recommendation for Ukraine
<p>Article 19, paragraph 1:  <i>For the purposes of demonstrating to final customers the share or quantity of energy from renewable sources in an energy supplier’s energy mix and in the energy supplied to consumers under contracts marketed with reference to the consumption of energy from renewable sources, <b>Contracting Parties</b> shall ensure that the origin of energy from renewable sources can be guaranteed as such within the meaning of this Directive, in accordance with objective, transparent and non-discriminatory criteria.</i></p>	<p>Definition of the purpose of GOs should incorporate elements relevant to promotion of additional green electricity production and electricity disclosure.</p> <p>Perceived issue of double counting could be tackled by introducing mandatory cancelation of issued GOs or thru going directly to the GOs auctions.</p>

<sup>24</sup> Relevant to Incorporated and adapted Directive 2018/2001 by the Ministerial Council Decision 2021/14/MC-EnC of 30 November 2021 on incorporating Directive (EU) 2018/2001 in the Energy Community acquis communautaire and amending Article 20 and Annex I of the Treaty

EU legal framework on GOs <sup>24</sup>	Recommendation for Ukraine
<p>Article 19, paragraphs 1. and 2.):</p> <p>2. To that end, <b>Contracting Parties</b> shall ensure that a guarantee of origin is issued in response to a request from a producer of energy from renewable sources, unless <b>Contracting Parties</b> decide, for the purposes of accounting for the market value of the guarantee of origin, not to issue such a guarantee of origin to a producer that receives financial support from a support scheme.</p> <p><b>Contracting Parties</b> shall ensure that when a producer receives financial support from a support scheme, the market value of the guarantee of origin for the same production is taken into account appropriately in the relevant support scheme.</p> <p>It shall be presumed that the market value of the guarantee of origin has been taken into account appropriately in any of the following cases: (a) where the financial support is granted by way of a tendering procedure or a tradable green certificate system; (b) where the market value of the guarantees of origin is administratively taken into account in the level of financial support; or (c) where the guarantees of origin are not issued directly to the producer but to a supplier or consumer who buys the energy from renewable sources either in a competitive setting or in a long-term renewables power purchase agreement.</p> <p>In order to take into account, the market value of the guarantee of origin, <b>Contracting Parties</b> may, inter alia, <b>decide to issue a guarantee of origin to the producer and immediately cancel it.</b></p>	

### 7.3. Creation of GO registry

Analysis of the best practice of EU and EEA countries on establishment of GO registries resulted in the conclusions provided in Table 14.

Table 16 Best practice and lessons learned: establishment and operation of national GO registry

Country	Best practice and lesson learned
Greece	<ul style="list-style-type: none"> <li>- Defined detailed list of documents to be submitted with the request for GO Registry registration of Production Device, upon which applicant receive unique identification code.</li> <li>- Defined error handling process in GO transfer.</li> <li>- Transmission System Operator is responsible for metering of produced electricity for facilities &lt;100 kW; Distribution System Operator is responsible for metering of produced electricity for facilities &gt;100 kW – periodity 1 mnth.</li> </ul>
Denmark	<ul style="list-style-type: none"> <li>- Automatized registration process upon which applicant receive unique identifier.</li> <li>- Defined error handling process in GO transfer.</li> <li>- Distribution System Operators are responsible for metering of net injected electricity to the grid.</li> </ul>
Germany	<ul style="list-style-type: none"> <li>- Elaborated list of needed documents for registration process. The registration of the installation has to be renewed every five years.</li> <li>- Elaborated basic elements of error handling process.</li> <li>- Grid operators are responsible for metering of net electricity – periodity 1 mnth.</li> </ul>
Serbia	<ul style="list-style-type: none"> <li>- Defined registration criteria: only for owners of Production Devices located in Serbia.</li> <li>- Defined detailed error handling process.</li> <li>- TSO responsible for metering of net data – periodity 1 mnth.</li> </ul>

Country	Best practice and lesson learned
Netherlands	<ul style="list-style-type: none"> <li>- Defined registration criteria: only for owners of Production Devices located in Netherlands.</li> <li>- Elaborated basic elements of error handling process.</li> <li>- Measurement Body responsible for electrical measurements in 12 months or 1 month period.</li> </ul>
Poland	<ul style="list-style-type: none"> <li>- Not possible to determine during analysis</li> </ul>

Recommendations on following steps for Ukraine are based on identified best practice for analysed European countries and it includes following steps:

1. Develop a road-map for a staged implementation of activities which are leading to establishment and full functioning of national GO Registry and access to AIB Hub. The scope of this approach is to:
  - Identify all involved institutions and their tasks relevant to operation and management of national GO system: Competent Authority, Issuing Body (IB), Production Auditor, Production Registrar and Approved Measurement Body.
  - Elaborate detailed, clear and transparent procedures and conditions for issuing national GOs taking into consideration EECS Rules. Developed procedures will be used as a basis for elaboration of national Domain protocol.
  - Development of transparent Domain protocol harmonized with EECS Rules.
  - Define timing of disclosure and elaborate methodology for calculation of national residual mix in accordance with the best EU practice and recommendations (see Table 17).
  - Decide on service provider or internal IT solution and start developing elements of national GO registry.
  - Request the full membership in AIB to have access to EU GO transfer system.
  - Update legal framework on national GO system, based on changes identified in previous bullets.
2. Ensure overall involvement and constant open communication of all relevant stakeholders from the beginning of the process.

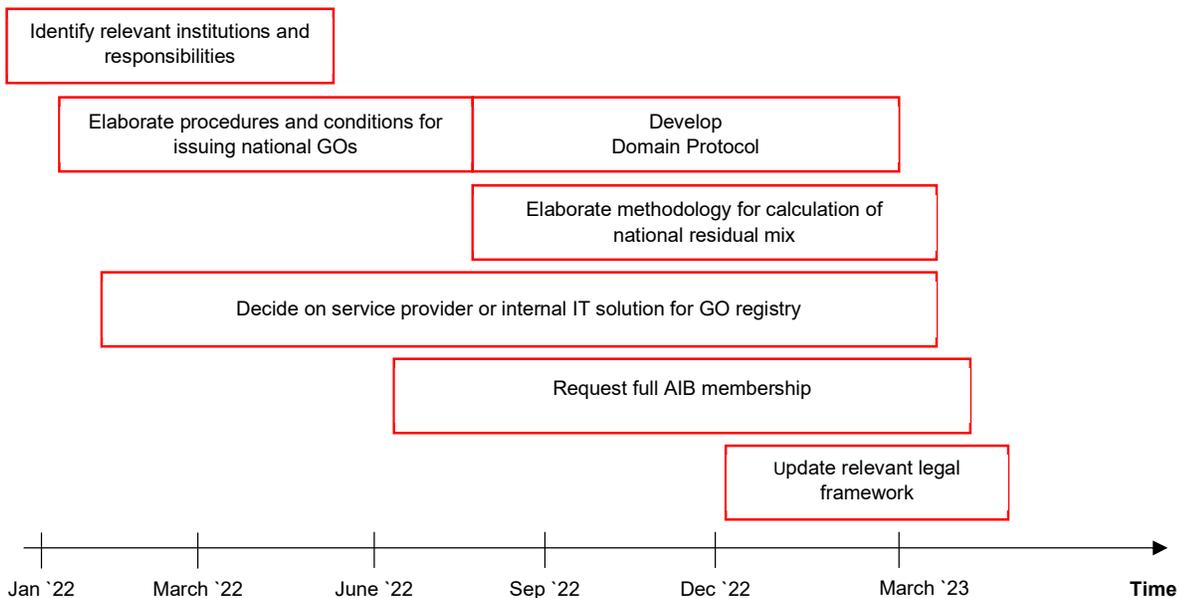


Figure 24 Overview of needed steps to be conducted in order to establish national GO registry and connect it with AIB Hub

In 2015, as a result of project “A European Tracking System for Electricity (ETRACK)” and RE-DISS project, document “Best Practice Recommendations For the implementation of Guarantees of Origin and other tracking systems for disclosure in the electricity sector in Europe Version 2.4” was developed. The main goal of this document was to provide guidance to IBs and legislators which are implementing and managing systems of Guarantees of Origin (GO) for electricity and other tracking systems for purposes of electricity disclosure in Europe. All recommendations were developed and discussed in nine workshops which involved representatives of IBs from 19 European countries. The members of the project team recommend that IBs and legislators in Europe follow the proposals as specified in this document when implementing the details of GOs and disclosure systems in their countries. This will facilitate an advanced implementation of these instruments, which satisfies the requirements for GOs to be accurate, reliable and fraud-resistant (as set out in Directives 2009/28/EC and 2004/8/EC4) and for disclosure information to be reliable (as set out in Directive 2009/72/EC). Most of the Best Practice Recommendations are for immediate application. However, in some cases, when the project ambition was too far away from the current GO and Disclosure frameworks observed in most countries, the RE-DISS team felt it necessary to sketch what the long-term goal was and to provide for intermediary steps that could lead to the ideal vision. Typical examples are BPR [11b] and [11c]. The Best Practice Recommendations cannot be binding for any party, but it serves as a point for orientation for many countries and that it supports a truly reliable implementation of GOs and disclosure across Europe.

Overview of developed recommendations is provided in following table.

Table 17 Best practice recommendations

Elements	Recommendations
<p>“12 months lifetime rule” for GOs</p>	<p>[1] <i>The metered production periods for purposes of issuing GOs should not be longer than a calendar month and where possible should not run across the start and end dates of the disclosure periods (see item [33]). If metered production periods are longer, then the allocation of GOs to production periods should be done according to what the EECS rules recommend (C.3.4.1.c).</i>  <i>Longer intervals up to one year are acceptable for very small plants, for example.</i></p> <p>[2]</p> <p>a) <i>If possible, the issuing of GOs should be done without delay after the end of each production period.</i>  b) <i>Wherever possible, the issuing of GOs for energy produced in year X should be done at the latest by 31st March X+1.</i></p> <p>[3]</p> <p>a) <i>The lifetime of GOs should be limited to a maximum of 12 months after the end of the production period.</i>  b) <i>GOs which have reached this lifetime should be considered as being “expired” and be collected into the Residual Mix.</i></p> <p>[4] <i>An extension to this lifetime can be granted if a GO could not be issued for more than six months after the end of the production period for reasons which were not fully under the control of the plant operator. In this case, the lifetime of the GO might be extended to six months after issuing of the GO.</i></p> <p>[5]</p> <p>a) <i>Cancellations of GOs which take place until a given deadline in year X+1 should be counted in disclosure for year X. Later cancellations should be counted in disclosure for year X+1. (If disclosure periods differ from the calendar year (see item [33]), the deadline should be defined accordingly.)</i>  b) <i>Deadline is set on 31st March X+1.</i></p> <p>[6] <i>The disclosure information from expired GOs (see item 3) can be allocated either to the production year of the corresponding energy unit or to the year when the GOs have expired, depending on the methodology used for Residual Mix calculation in the respective domain.</i></p>
<p>EECS System</p>	<p>[7]</p> <p>a) <i>The implementation of GOs in all countries in Europe should be based on the European Energy Certificate System (EECS) operated by the Association of Issuing Bodies (AIB).</i>  b) <i>If national GO systems are established outside of EECS, then EECS should at least be used for transfers between registries.</i></p>

Elements	Recommendations
	<p>[8] If not all European countries are members of the AIB, appropriate connections between the EECS system and non-AIB members as well as in between different non-AIB members will need to be established. These include inter alia procedures for assessing the reliability and accuracy of the GOs issued in a certain country and interfaces for the electronic transfer of GOs. To support this, the AIB has developed fallback procedures for allowing non-members to connect their GO registries to the EECS Hub. This option should be used by all countries which have decided not to become members of the AIB.</p> <p>[9]</p> <p>a) Market participants of the respective domain should be provided the possibility to export their GOs and thus participate in the European internal market for electricity.</p> <p>b) So-called ex-domain cancellations of GOs, where a GO is cancelled in one registry and a proof of cancellation is then transferred to another country in order to be used there for disclosure purposes, should only be used if a secure electronic transfer is not possible and if there is an agreement on such ex-domain cancellations between the competent bodies involved. Statistical information on all ex-domain cancellations relating to a disclosure year should be made available differentiated by energy source<sup>7</sup> in order to support Residual Mix calculations.</p>
GO Issuing	<p>[10]</p> <p>1) GOs should generally be issued only for the net generation of a power plant, i.e. gross generation minus the consumption of all auxiliaries related to the process of power production. For hydro power plants involving pumped storage this means that GOs should be issued only for the net generation which can be attributed to natural inflow into the reservoir. This should be consistent with the EECS Rules which for the time being means: net generation may include losses associated with pumping, where the efficiency of the pump is known and can be verified.</p> <p><math display="block">\text{Issuing} = \text{Generation} - \text{AuxiliaryConsumption} - \text{Pumping} * \text{PumpingEfficiency}</math></p> <p>If Pumping Efficiency is unknown, 100% must be assumed.</p> <p>2) Verification mechanisms should be implemented for ongoing control of registered data (e.g. reaudits, random checks, etc.).</p> <p>3) Correct accounting of RES share of combustion plants should be assured by adequate measures such as those recommended by the EECS Rules (cf part N6.3.2 and N6.4.1).</p> <p>4) The competent body can correct errors in GOs it has issued before they are exported and is the only one with this competence.</p> <p>European Directives require the establishment of GOs for electricity from renewable energy sources and from high-efficiency cogeneration. However, in order to support differentiation also between other forms of electricity generation it is recommended to extend the system of GOs to other forms of electricity generation. Moreover, in order to diminish the share of Residual Mix in the different domains, it is recommended to encourage use of GOs by issuing them automatically for all generation.</p> <p>[11]</p> <p>a) The GO system should be extended beyond RES &amp; cogeneration to all types of electricity generation.</p> <p>b) GOs should be issued for all electricity production, unless an RTS applies for that production, e.g. for the disclosure of supported electricity.</p> <p>c) Competent bodies should consider to make the use of GOs mandatory for all electricity supplied to final consumers.</p> <p>[12]</p> <p>1) All types of GOs should be handled in one comprehensive electronic registry system per country, which is automated and auditable (For an exception from this recommendation see the coexistence of national GO systems and EECS in item [7]).</p> <p>2) Technical changes to plants need to be registered as soon as is reasonably practicable.</p> <p>[13]</p> <p>1) GOs shall have no function in terms of target compliance and should not be used as support instrument. The only purpose of GOs should be disclosure.</p> <p>2) A GO should be considered as having been used only once it has been electronically cancelled.</p> <p>3) After cancellation, no further cancellation, transfer or export of the given GO should be possible.</p> <p>4) After expiry, no further cancellation, transfer or export of the given GO should be possible.</p> <p>5) An exported GO should be marked as removed from the exporting registry.</p> <p>6) Processes in the registry should exclude duplication of GOs.</p> <p>7) Registries should be audited on a regular basis.</p> <p>[14]</p>

Elements	Recommendations
	<p>a) There should be no issuing of more than one GO for the same unit of electricity.</p> <p>b) If multiple certificates are to be issued, for example, a GO for disclosure and a support certificate for management of a support system, then these should be legally separated.</p> <p>[15]</p> <p>a) This also applies to cogeneration plants which are using RES as the energy source: only one GO should be issued per unit of electricity.</p> <p>b) This GO should combine the functionalities of a RES-GO and a High Efficiency cogeneration GO.</p> <p>Note that linking cogeneration GOs to disclosure means that there should be a use of the information content of cogeneration GOs in disclosure statements. For example, suppliers might be encouraged or even required to disclose the share of electricity from high-efficiency cogeneration in their company or product mix. In some domains, GOs may not only be used by suppliers of final consumers, but also by (typically large) consumers or service providers who purchase energy and GOs separately and cancel the GOs for their own purpose. In this case, the related energy might be associated with generation attributes two times (once by the supplier of the energy and once by the consumer itself through the cancellation of GOs).</p> <p>[16] GOs should be the only “tracking certificate” used. Any other tracking systems of a similar purpose and function as GOs should be converted to GOs.</p> <p>[17] Besides GOs, only Reliable Tracking Systems (which may include contract-based tracking) and the Residual Mix should be available for usage for disclosure. No other tracking mechanisms should be accepted.</p> <p>[18] Green power quality labels should use GOs as the unique tracking mechanism.</p> <p>[19] European countries should clarify whether and under which conditions the use of GOs by end consumers is allowed independently from the disclosure provided by their electricity suppliers. Such use of GOs should not be based on ex-domain cancellations performed in other countries. If consumers are allowed to use GOs independently, a correction should be implemented in the disclosure scheme which compensates for any “double disclosure” of energy consumed.</p> <p>[20]</p> <p>a) European countries should choose one of the two followings options and apply it consistently for all foreign GOs:</p> <ul style="list-style-type: none"> <li>- Rejection of GOs only relates to the cancellation of GOs and subsequent use for disclosure purposes in the respective countries and should not restrict the transfers of GOs between the registry of the considered country and the registries of their countries. This means that the decision about the recognition of a GO by a country should not hinder its import into the considered country.</li> <li>- Rejection of GOs implies blocking their import to the national registry.</li> </ul> <p>b) The choice of one or the other option should be transparent for all market parties and clearly communicated.</p> <p>[21] Within the rules set by the respective Directives, European countries should consider their criteria for the acceptance of imported GOs for purposes of disclosure.</p> <ul style="list-style-type: none"> <li>- These criteria should address imports at least from all EU member states, other members of the European Economic Area (EEA) and Switzerland. The parties to the Energy Community Treaty should be considered as well, as soon as GO imports from these countries become relevant.</li> <li>- The criteria should specify the electronic interfaces, specifying data format and contents of GOs to be imported, which the respective country accepts for imports of GOs (such as the EECS Hub and any other interfaces accepted).</li> <li>- Conditions for the recognition of GOs from other countries should be that they were issued based on Art. 15 of Directive 2009/28/EC or compatible national legislation, and that they meet the explicit requirements set in Art. 15, for example, regarding the information content of the GOs.</li> <li>- The recognition of GOs from other countries should be rejected if these countries have not implemented an electricity disclosure system.</li> <li>- The recognition of GOs from other countries should be rejected if the country which has issued the GOs or the country which is exporting the GOs have not implemented appropriate measures which effectively avoid double counting of the attributes represented by the GOs. Such appropriate measures should ensure the exclusivity of the GOs for representing the attributes of the underlying electricity generation, implement clear rules for disclosure, establish a proper Residual Mix (see “Calculation of residual mixes”) or equivalent measures, and ensure their actual use. Furthermore, the appropriate measures should ensure that attributes of exported GOs are subtracted from the Residual Mix of the exporting country and cannot be used for disclosure at any time in</li> </ul>

Elements	Recommendations
	<p><i>the issuing or the exporting country by explicit mechanisms, unless the GOs are re-imported and cancelled there.</i></p>
Disclosure Schemes	<p>[22] Full disclosure schemes should be implemented, including the disclosure of CO<sub>2</sub> emissions and radioactive waste.  [23] (Other) Reliable Tracking Systems (RTS) should be defined where appropriate based on criteria of added value, reliability and transparency.  [24] RTS can comprise, where applicable:  - Homogenous disclosure mixes for non-competitive market segments where no choice of supplier or different products exists,  - Support systems whose interaction with disclosure requires a certain allocation of the attributes of supported generation (for example, a pro-rata allocation to all consumers in a country in which RES electricity is supported by a feed-in tariff),  - Contract-based tracking</p>
Calculation of residual mixes	<p>[25] All countries should provide a Residual Mix as a default set of data for disclosure of energy volumes for which no attributes are available based on cancelled GOs or based on other Reliable Tracking Systems (RTS, see item [23]). The use of uncorrected generation statistics (for example on national or ENTSO-E, Nordel etc. levels) should not be possible.  [26]  a) The calculation of the Residual Mix should follow the methodology developed in the RE-DISS project.  b) As part of this methodology, competent bodies should ensure that double counting between GOs they have issued, other Reliable Tracking Systems in use in their country and the Residual Mix is excluded.  [27] Competent bodies from all countries in Europe should cooperate in order to adjust their Residual Mixes in reflection of cross border transfers of physical energy, GOs and RTS. For this purpose, competent bodies should use data provided by the AIB. They should also support the collection of input data for the related calculations by the AIB.  [28] As a default, the Residual Mix should be calculated on a national level.<sup>13</sup> However, if the electricity markets of several countries are closely integrated (for example in the Nordic region), a regional approach to the Residual Mix may be taken. This should only be done after an agreement has been concluded between all countries in this region which ensures a coordinated usage of the regional Residual Mix.</p>
Contract-based tracking	<p>[29] If contract-based tracking is allowed in a country, it should be regulated clearly.  [30] Such regulations should ensure that  - The rules of the tracking system are transparent and comprehensive and are clearly understood by all participants in the system.  - Double counting of attributes and loss of disclosure information is minimised within the contract-based tracking scheme and also in the interaction of the contract-based tracking scheme to GOs and other RTS (if applicable). As a precondition for this, the contract-based tracking scheme should be able to provide comprehensive statistics about the volumes and types of electricity attributes which are tracked through it.  - The relevant information for disclosure purposes should be available in time to meet the timing requirements set out in "Timing of Disclosure".  [31] If suppliers of electricity intend to use contract-based tracking in order to fulfil claims made towards consumers regarding the origin of a certain electricity product (for example a "green" energy product), GOs should be used in addition to the contract (see also item [38]).  [32] If a country implements a system in which generation attributes are allocated to suppliers and consumers of electricity "ex post" based on the contracts concluded in the electricity market, then such a system should fulfil the requirements mentioned above in order to qualify as a Reliable Tracking System (see item [23]). This includes the need to produce reliable statistics about the attributes allocated by this system.</p>
Timing Disclosure	<p>of  [33] Electricity disclosure should be based on calendar years.  [34] The deadline for cancelling GOs for purposes of disclosure in a given year X should be 31 March of year X+1 (see item [5]).  [35] The timing of the calculation of the Residual Mix should be coordinated across Europe:  - By 30 April X+1 all countries should determine their preliminary domestic Residual Mix and whether they have a surplus or deficit of attributes.  - By 15 May X+1, the European Attribute Mix should be determined.  - By 31 May X+1, the final national Residual Mixes should be published.  - As of 1 July X+1 the disclosure figures relating to year X can be published by suppliers.  It must be noted here that some countries are using diverging disclosure periods: Austria, the United Kingdom and Estonia are using financial years which are different from calendar years. In Portugal suppliers are disclosing based on rolling 12 month invoicing periods<sup>15</sup> and therefore disclosure figures are determined on a monthly basis. In order to</p>

Elements	Recommendations
	<p>avoid market distortions and possibilities for arbitrage deals between countries with different deadlines and in order to support the cooperation of competent bodies regarding the calculation of their Residual Mixes, these countries should move to a calendar year disclosure period whenever possible.</p>
Other	<p>[36] All countries should clarify the relation between their support schemes for RES &amp; cogeneration on the one side and GOs and disclosure schemes on the other side. Where necessary, the support schemes should be defined as RTS (see item [23]).</p> <p>[37] If support schemes in a country are using transferable certificates, then these certificates should be separated from GOs and should not be used for disclosure (see also item [14]).</p> <p>[38] All electricity products offered by suppliers with claims regarding the origin of the energy (for example “green” or low-carbon power) should be based exclusively on cancelled GOs. No other tracking systems should be allowed, with the exception of mechanisms required by law, e.g. a pro-rata allocation of generation attributes to all consumers which is related to a support scheme (see item [24]).</p> <p>[39]</p> <p>a) As required by Art. 3 (9) of the IEM Directive 2009/72/EC annual disclosure of the supplier mix on or with the bill should be mandatory. This should also include information on environmental impacts.</p> <p>b) Additionally, suppliers offering two or more products which differ in terms of the origin of the energy should be required to give product-related disclosure information, including environmental impacts, to all their customers including those who are buying the default “remaining” product of the supplier.</p> <p>[40] There should be clear rules for the claims which suppliers of, for example, “green” power can make towards their consumers. There should be rules how the “additionality” of such products can be measured (the effect which the product has on actually reducing the environmental impact of power generation), and suppliers should be required to provide to consumers the rating of each product based on these rules.</p> <p>[41] Claims made by suppliers and consumers of “green” or other low-carbon energy relating to carbon emissions or carbon reductions should also be regulated clearly. These regulations should avoid double counting of low-carbon energy in such claims. A decision needs to be taken whether such claims should adequately reflect whether the energy purchased was “additional” or not.</p> <p>[42] If suppliers are serving final consumers in several countries rules must be developed and consistently implemented in the countries involved on whether the company disclosure mix of these suppliers should relate to all consumers or only to those in a single country.</p> <p>[43] The following recommendations should be followed with respect to the relation of disclosure to the cooperation mechanisms (Art. 6 – 11 of Directive 2009/28/EC):</p> <ul style="list-style-type: none"> <li>- If EU member states or member states and other countries agree on Joint Projects, such agreements should also clarify the allocation of attributes (via GOs, RTS or Residual Mix) issued from the respective power plants.</li> <li>- If EU member states agree on Joint Support Schemes, such agreements should also clarify the allocation of attributes (via GOs, RTS or Residual Mix) issued from the power plants supported under these schemes.</li> </ul>
Steps for determining the disclosure figures of a supplier	<p>[44] Suppliers should apply the following steps in order to determine their disclosure figures:</p> <ul style="list-style-type: none"> <li>- During the disclosure period, suppliers which aim at a certain disclosure mix should use the “explicit” tracking mechanisms which are available in the respective countries in order to acquire the desired generation attributes. In all countries this comprises GOs, but contract based tracking and certain other Reliable Tracking Systems might also be available.</li> <li>- If suppliers are offering electricity products with claims regarding the origin of the energy (for example “green” or low-carbon power) then they should acquire the related generation attributes during the disclosure period exclusively based on GOs. Besides such products, GOs can also be used for shaping the overall disclosure mix of a supplier.</li> <li>- All GOs which are meant to be used for the disclosure period of calendar year X should be cancelled before the deadline of 31 March X+1.</li> <li>- After this deadline, the total volume of electricity sold to final consumers and all generation attributes which have been acquired based on cancelled GOs and other Reliable Tracking Systems including contract-based tracking (if applicable) should be accounted for. This may include a pro-rata allocation of attributes of electricity supported, for example, under a feed-in tariff to all suppliers, which might have been implemented in the respective country as a Reliable Tracking System.</li> <li>- Any use of contract-based tracking should strictly follow the regulations issued for the respective country. Any attributes assumed for or notified by the contractual counterpart in the electricity market may only be used if explicitly allowed by such regulations.</li> </ul>

Elements	Recommendations
	<p><i>National generation statistics and other data which is not corrected by the different tracking systems in use should not be used at all. Instead, the Residual Mix should be used (see below).</i></p> <ul style="list-style-type: none"> <li><i>- Suppliers should respond in time to requests by the Competent Body on statistical reporting of volumes of electricity sold to final consumers and of any “explicit” tracking mechanisms used.</i></li> <li><i>- Typically, the volume of electricity sold to final consumers is larger than that of the generation attributes acquired through “explicit” tracking mechanisms. In this case the missing generation attributes should be “filled up” from the Residual Mix for the respective country, which will be determined and published by the Competent Body according to the schedule set out in “Timing of Disclosure”.</i></li> <li><i>- The overall supplier disclosure mix consists of the attributes of all electricity sold to final consumers, including all products which might be differentiated.</i></li> <li><i>- If electricity products which differ in terms of the origin of the energy have been offered to part of the consumers then these consumers will receive product-related disclosure information based on the GOs cancelled for this purpose. However, in this case such product-related disclosure information should also be given to those consumers who have not purchased a specific product. This means that a “remaining” product should be defined which consists of the disclosure mix of the supplier minus the attributes of all separated products. This information should be disclosed as product-specific disclosure data to the consumers who are receiving the “remaining” product.</i></li> <li><i>- CO<sub>2</sub> emissions and radioactive waste should be disclosed on the supplier and product levels in direct relation to the fuel mix which is being disclosed.</i></li> </ul>

#### 7.4. Trading of the GOs

##### **General elements of GO trading in accordance with the EU Directive 2018/2001**

In the framework of GO auctions, it is important to identify relevant institutions involved into auctioning, as well as their roles. Article 19 (5) of EU Directive 2018/2001 identified that IB shall be independent from trade of GOs:

*Contracting Parties or designated competent bodies shall supervise the issuance, transfer and cancellation of guarantees of origin. **The designated competent bodies shall not have overlapping geographical responsibilities, and shall be independent of production, trade and supply activities.***

This implies that beside IB's role in operation of the registry, countries are obliged to identify clearing and settlement institution(s). From the aspect of clearing and settlement terminology, following definitions are important:

**Clearing.** *Generally, clearing refers to the process of comparing trades before settlement date or the determination of the net obligations of the participants (for both assets subject to sale and purchase (GOs are in this case), and cash).*

**Settlement.** *The settlement process refers to the exchange of cash and GOs on the contractual settlement date. The settlement date can be agreed upon at trade execution or can be prescribed by local trading conventions or exchange/Clearing house rules and/or legislation. Settlement may be processed on a provisional (full or partial) and/or final basis.*

##### **Best practice and lessons learned**

To identify good practice and recommendations, GO auctioning, clearing and settlement process was analysed for the following countries: Croatia, France, Portugal and Italy.

The GO auction process starts with the official announcement of the auctions on the web page of institution responsible for auctioning. Announcement usually contains data on auction volume, reserve price, auction procedure and timing for process conduction. In the most cases, preconditions for participation on the GO auctions are registration in the auction online platform, signed contract between auction participant and institution responsible for auctioning, payment of fee for participation in the auction and financial guarantees or collaterals. At the end of auctioning, institution responsible for auctioning and/or IB are publishing results of auctions on its websites with information on: the number of certificates sold (split by source and production period), minimum and maximum price and the average price weighted by the volumes, etc.

There is different practice in jurisdiction of IBs, clearing and settlement institutions. In addition to this, procedures for clearing and settlement for analysed countries are different.

In the case of Croatia, IB - HROTE is totally separated from auction process, while CROPEX is titled for conducting auctions, clearing and settlement processes. At the end of the clearing and settlement processes, CROPEX is informing HROTE on settlement of financial obligations of auction participants, upon which HROTE is transferring GOs from the registry to the auction participant user account.

In France, IB – EEX is responsible for the GO registry as well as for GO auctioning. European Commodity Clearing (ECC) is identified as a central clearing house. Upon successful auctioning, all participants are receiving electronic trade confirmation containing details of the transaction the price and total quantity of GOs. EEX is sending details of the transaction to ECC on a product level with data on: Price, Quantity, Product, side, counterparties, Delivery Period, date and time. Payments are made the day upon auctioning. After confirmation of payments by ECC, EEX delivers GOs to the accounts of the auction participant via a transfer on the national Registry for Guarantees of Origin, in a period from one to two days upon auctioning.

The GO auctions in Portugal is operated by OMIP. Prior registration is compulsory with the Guarantees of Origin Issuing Body (REN). Among other things, Order no. 6560-B/2021 defined the qualification rules for participants. Legal entities registered in the EEGO system that sign an agreement accepting the auction rules up to 5 (five) days before the auction can participate in the auction. OMIP, after the auction, makes the following information available to all Qualified Participants, on the Auction Platform, in the part that concerns them: a) Auction Price and b) Total number of Guarantees of Origin attributed. The CUR is the entity responsible for the financial settlement and invoicing of the transactions resulting from the GO auctions. Up to the 1st working day after the auction, OMIP sends the final results to CUR and OMIP, S.A., based on the quantities and prices awarded to each participant. The CUR sends to the OMIP, S. A., information about the bank account to which the amounts must be transferred resulting from the sale of Guarantees of Origin at auction. Up to the 2nd working day after the auction, OMIP, S.A., transfers from the Financial Guarantee account to a CUR bank account the amount corresponding to the economic value of the Guarantees of Origin purchased by each participant, plus VAT (if applicable), plus the fee relating to the transfer of Guarantees of Origin in the EEGO system. In case the Financial Guarantee is not sufficient to cover all financial obligations, by virtue of the final result of the auction, OMIP, S.A., communicate this information to the Participant within 24 hours after the Information Phase final payment, for the latter to deposit the missing amount within 48 hours.

In Italy, IB – GSE is responsible for auctioning of GOs, as well as for clearing and settlement activities. For each invoicing period, GME issues to each Participant and its debtor the invoice containing the amounts of transactions concluded in the purchase by the Participant on the auctions, by the second working day following the closing of the reference session; if the latter coincides with the first day or the second day of the following month, GME proceeds to issue the invoice in the month in which the reference session ended. Moreover, by the end of the eighth working day of the month following each calendar quarter - thus in January, April, July and October - GME will issue to each Participant an invoice with the sum of the fees owed for all transactions concluded on the P-GO in the previous quarter. For settlement of payments, GME determines the net position (debit or credit) of each selling and buying Participant towards GME on the basis of the amounts (including VAT) of the invoices issued and received by GME in respect of the same invoicing period (single market session) whereas the following requirements are met:

- the invoice of the operator is received by GME within the time limit set by the Italian Technical Rules (available at GSE web page);
- the invoice of GME is received by the PA and non-PA operator within the time limit set by the Italian Technical Rules.

The analysis of practice doesn't identify common and basic roles and responsibilities of clearing and settlement institutions. The main element which is identified is that in some cases clearing process is including settlement and mainly it is relevant to the following sub-steps: trade confirmation, clearing activities, cash flow distribution, trade settlement, reporting, transfer of GOs. In addition to this, trading currency is common and that is EUR, as well as the currency for cash deposit and other relevant expenses.

In accordance with identified elements from the analysis, following elements can be stressed as important in establishment of GO trading via auctions:

- Identify clear responsibilities of IB and make decision whether Clearing and Settlement institution will be the same or separated.
- Elaborate in detail: (i) auction procedure and sub-steps relevant to: fulfilment of preconditions (registration on the auctioning platform, getting approval for participation on the auctions, ...), auctioning, clearing, settlement activities, transfer of GOs, reporting (if needed), (ii) time-frame and deadlines for conducting of every sub-step, (iii) jurisdiction of IB, Clearing and Settlement institution.
- Establish fully transparent and digitalized GO auctioning system.

## 8. Study findings and conclusions

---

Legal framework of Ukraine provides definition of GO with limitation to the purpose of a GO on electricity produced from renewable energy sources. In addition to this, the basic conditions for issuing a GO are elaborated without details on elements of national GO registry and its elements.

To set the basic ground for national GO registry, it is needed to lay down the main elements of the GO system and disclosure rules in accordance with Directive 2018/2001/EC, Directive 2009/72/EC and the best EU practice:

- ✓ Identify all involved institutions and their tasks relevant to operation and management of national GO system: Competent Authority, Issuing Body (IB), Production Auditor, Production Registrar and Approved Measurement Body

In accordance with Article 19(5) of the Directive 2018/2001/EC, IB shall be independent from production, trade<sup>25</sup> and supply activities.

- ✓ Elaborate detailed, clear and transparent procedures and conditions for issuing national GOs taking into consideration relevant EU Directives and EECs Rules. Developed procedures will be used as a basis for: (i) elaboration of new or update of existing Decree on GOs and (ii) development of national Domain protocol.

As part of this activity, it is needed to make decision:

- On the approach in selling GOs on the market, whether it will be market trade via traders and brokers at the wholesale market and/or auctions for GO issued for electricity produced in subsidized plants.

**Note: One option is not excluding the other option!!**

- That the revenues from GOs trade will be used for the support system.

If it is decided that GOs will be traded via auctions, it is needed to:

- Elaborate in detail: (i) auction procedure and sub-steps relevant to: fulfilment of preconditions (registration on the auctioning platform, getting approval for participation on the auctions, ...), auctioning, clearing, settlement activities, transfer of GOs, reporting (if needed), (ii) time-frame and deadlines for conducting of every sub-step, (iii) jurisdiction of IB, Clearing and Settlement institution.
- Establish fully transparent and digitalized GO auctioning system.
- ✓ Develop new or update existing legislation on GOs with the following elements:
  - Definition of the purpose of GOs should incorporate elements relevant to promotion of additional green electricity production and electricity disclosure (Directive 2018/2001/EC, Article 19(1))
  - Define standard size of GO and connect it with each unit of produced energy. In addition to this, it is needed to identify a provision that the same unit of energy from renewable sources is taken into account only once (Directive 2018/2001/EC, Article 19(2)).
  - Perceived issue of double counting could be tackled by introducing mandatory cancelation of issued GOs or thru going directly to the GOs auctions ((Directive 2018/2001/EC, Article 19 (2))
  - Identify provision on cancellation of GO at the latest 18 months after the production of the energy unit (Directive 2018/2001/EC, Article 19(3)(4)).

---

<sup>25</sup> In practice, this means that, when conducting trade of GOs via auctions, clearing and settlement institutions should be separated from the IB.

- To achieve fraud-resistance, institution responsible for the inspection of all plants, that wish to participate in GO system of Ukraine, should be identified (Directive 2018/2001/EC, Article 19(5)(6)).
- Simplified content of GOs for installations less than 50 kW could be provided (Directive 2018/2001/EC, Article 19(7)).
- Identified conditions under which application for GO from other countries can be refused.
- ✓ Prepare and adopt Domain protocol with overview of transparent rules and clear information's for issuing GOs in accordance with EECS rules. (Directive 2018/2001/EC, Article 19(1)).
- ✓ Elaborate and adopt Methodology for calculation of residual mix in accordance with the Directive 2009/72/EC, Article 3(9) and the best EU practice and recommendations (see Table 17).
- ✓ Decide on service provider or internal IT solution for national GO registry. Based on this decision, start developing elements of national GO registry.
- ✓ Request the full membership in AIB to have access to EU GO transfer system.
- ✓ Develop a road-map for a staged implementation of previous activities.
- ✓ Ensure overall involvement and constant open communication of all relevant stakeholders from the beginning of the process.

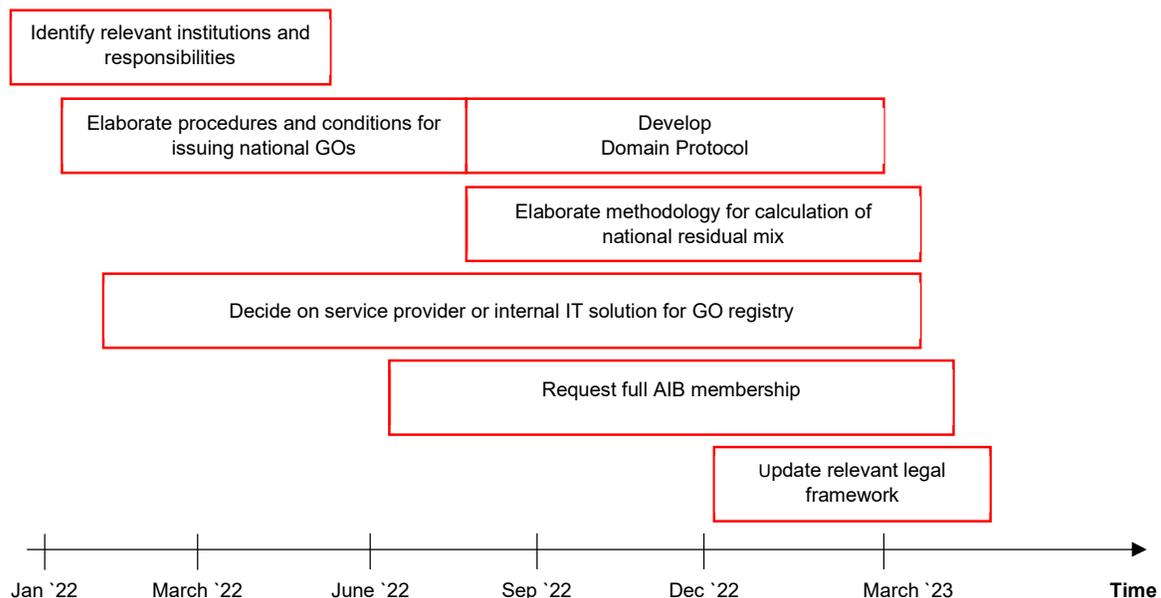


Figure 25 Overview of needed steps to be conducted in order to establish national GO registry and connect it with AIB Hub

In practice, there is no common point from the aspect of time needed for setting the basic ground and preconditions for GO registry and trade on GOs on the market. It depends of market developments, time needed to prepare new or update existing GO legislation, willingness of decision makers to conduct efficient adoption of GO legislation, etc. Some countries, such as Croatia, needed 5 years, while Serbia needed only 18 months for the establishment of relevant legal framework for GO registry and GO auctioning.

Based on the status of existing legal framework of Ukraine, it is estimated that it will be needed more than 12 months for establishment of fully transparent and fraud resistant GO system.

Figure **25** provides overview of estimated time needed for realization of different sets of activities in Ukraine.