



Report on Certification systems for origin of electricity from RES and CHP

Environment, Renewable and Energy Efficiency Working Group

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Table of Content

1.1. Objectives	5
1.2. Definitions	5
2. Guarantees of origin in European Countries	5
2.1. Croatia	6
2.1.1. Definition	6
2.1.2. Eligible producer	6
2.1.3. Guarantees of Origin Registry	7
2.1.4. Supervision:	7
2.1.4.1. Residual mix	7
2.1.4.2. Supplier supervision	7
2.2. Italy.....	8
2.2.1. Legislative Framework	8
2.2.2. AEEGSI provisions	8
2.2.3. GO System	9
2.2.4. GO volume exchanges: market and bilateral auctions	11
2.3. Spain.....	12
2.3.1. Guarantee of Origin (GO) and Disclosure of electricity Systems in Spain	12
2.3.2. CNMC role	12
2.3.3. Operations in the System	13
2.3.4. Issuing process	13
2.3.5. Deadlines	15
2.3.6. Transparency.....	16
2.3.7. Disclosure of electricity	17
2.3.8. Evolution of the system.....	18
2.4. Portugal.....	20
2.4.1. Note on guarantees of origin in Portugal.....	20
2.4.2. Electricity disclosure obligations in Portugal.....	20
2.4.3. What is disclosure and what is it for?	20
2.4.4. What information should be provided by suppliers to consumers and through which means?	21
2.4.5. What can the regulator do regarding disclosure?	24

3. Guarantees of Origin in North-African Countries	27
3.1. Algeria.....	27
3.1.1. Definition	27
3.1.2. The certification document	27
3.1.3. Conditions of granting	28
3.1.4. Metering	28
3.1.5. Data and potential.....	28
3.1.6. Granting process.....	28
3.1.7. Control and supervision	29
3.2. Egypt.....	29
3.2.1. Introduction	29
3.2.2. Objective	29
3.2.3. Legislative Framework	30
3.2.4. Regulatory Framework.....	30
3.2.5. Functioning	32
4. Recommendations	33
5. Final conclusions	34

1. Introduction

Among Mediterranean countries, few are those that do not at least make reference to the ideal of mass deployment of clean and renewable sources of energy. Some them see renewable energy as a path to a low-carbon future to avoid climate change. Others may worry about price volatility and dependence on imported fossil fuels. Yet others see renewables as a good option to save natural resources.

Regardless of the motivation or the incentivize mechanism chosen, the guarantee of origin is largely used for the traceability or to grant advantages in some cases. The use of guarantee of origin is examined in this benchmark through case studies of experiences from European, Balkan and North-African countries: Algeria, Croatia, Egypt, Italy, Portugal and Spain.

1.1. Objectives

This paper attempts to analyze guarantees of origin (GOs) in Mediterranean countries. It seeks to identify the common points and the fundamental differences between the practices in different Mediterranean countries focusing on the purpose of using GOs, the role of regulation, the means to supervise this labeling instrument.

1.2. Definitions

Guarantee of origin: as defined in the European directive 2009/28/EC, the guarantee of origin is issued to prove to a final customer that a given share or quantity of energy was produced from renewable sources.

Association of Issuing Bodies "AIB": The purpose of the AIB is to develop, use and promote a standardized system: the European Energy Certificate System - "EECS".

European Energy Certificate System "EECS": EECS is based on structures and procedures which ensure the reliable operation of international certificate schemes. These schemes satisfy the criteria of objectivity, non-discrimination, transparency and costs effectiveness, in order to facilitate the international exchange of certificates.

2. Guarantees of origin in European Countries

In recent years, throughout many countries customers have shown a growing interest in electricity generated from renewable energy sources (RES). In the light of this, the disclosure of information on electricity has become increasingly important.

It is crucial that electricity customers are provided with adequate, reliable and comprehensive information on electricity. By having access to such information, customers can be empowered to choose their electricity supplier and electricity contract not solely based on the price.

Many countries support the development of renewable energy through several mechanisms such as feed in tariff for producers and guarantee of origin for consumers.

In European countries, the guarantee of origin is the document referred to in Article 15 of Directive 2009/28/EC aiming to try to end customers the share or quantity of energy from renewable sources in the energy mix of energy supplier.

The guarantee of origin can be transferred, independently of the energy to which it relates (1MWh of electricity is the basic unit), from one holder to another. However, with a view to ensuring that a unit of electricity from renewable energy sources is disclosed to a customer only once, double counting and double disclosure of guarantees of origin must be avoided. Energy from renewable sources and the related guarantee of origin has been sold separately by the producer. The guarantee of origin 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.

For the purposes of proving to final customers the share or quantity of energy from renewable sources in an energy supplier's energy mix, Member States shall ensure that the origin of electricity produced from renewable energy sources can be guaranteed as such, in accordance with objective, transparent and non-discriminatory criteria.

To that end, Member States shall ensure that a guarantee of origin is issued in response to a request from a producer of electricity from renewable energy sources. 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.

2.1. Croatia

2.1.1. Definition

The guarantee of origin is an electronic document which serves to prove to the end consumer that a certain share or quantity of electricity was generated from a particular energy source. It contains data on the quantity of electricity (1 MWh of electricity is the basic unit), as well as:

- type of primary energy source,
- unique ID from the Guarantees of Origin Registry,
- data on the production plant (date of commission, installed capacity, technology used, plant ID, location),
- date of the beginning and the end of the electricity generation for which the guarantee of origin is issued,
- issuing body,
- date of issuance,
- Other data required for managing the Guarantees of Origin Registry.

Furthermore, in case of high efficiency cogeneration, the guarantee of origin contains additional data regarding utilisation of heat and overall efficiency.

2.1.2. Eligible producer

In Croatia, electricity producers can acquire a status of eligible producer of electricity for their power plants that use renewable energy source or high efficiency cogeneration. The ruling on the status of eligible producer of electricity is issued by Croatian Energy Regulatory Agency (HERA). HERA is also responsible for supervision of eligible producers.

Among other requirements, it is important for electricity producers to ensure metering of net production of electricity. Cogeneration power plants also have to ensure the metering of other values, which are used for calculating their efficiency.

Guarantees of origin can only be issued for electricity produced by eligible producers who are not in the feed-in system.

For the purpose of tracking the origin of electricity, renewable energy sources are classified as:

- solar
- wind
- water
- geothermal

- biomass
- other renewables

Fossil fuels are classified as:

- stone coal
- brown coal and lignite
- natural gas
- oil and oil derivatives
- other fossil fuels

2.1.3. Guarantees of Origin Registry

Guarantees of Origin Registry (Registry) is an electronic system which lists issued guarantees of origin and which enables its members (eligible producers, electricity traders and suppliers) to perform certain actions over them - transfer, import, export, cancellation.

The Registry is established and managed by the Croatian Energy Market Operator Ltd. (HROTE), which is also an issuing body for guarantees of origin.

HROTE is a member of the Association of Issuing Bodies (AIB) which is responsible for development and promotion of EECS. AIB also manages the international guarantees of origin registry.

2.1.4. Supervision:

2.1.4.1. Residual mix

Croatia used RE-DISS guidelines and CEER "Advice on Customer Information on Sources of Electricity" in implementing its system and so called "Issuance-based method" for determining the structure of electricity whose origin is not determined by guarantees of origin or other reliable tracking systems (residual mix).

The RE-DISS guidelines are a set of deliverables of the RE-DISS project, aiming for reliable disclosure systems across Europe in accordance to Directive 2009/28/EZ, Directive 2004/8/EC and Directive 2009/72/EZ (for more information please visit <http://www.reliable-disclosure.org/>).

To determine residual mix, HROTE uses data from transmission system operator, distribution system operator, electricity producers and other European bodies responsible for determining residual mix.

Residual mix, together with guarantees of origin and the feed-in system, is used in determining the structure of electricity sold to the end consumer.

2.1.4.2. Supplier supervision

Suppliers need to purchase and cancel guarantees of origin until March 31st of the current year for electricity sold to the end consumers in the previous year. If the electricity supply contract with the end consumer guarantees certain energy mix of the electricity sold to that consumer, the supplier has to prove that using cancelled guarantees of origin and other reliable tracking systems (electricity purchased from the feed-in system).

Suppliers are obliged to send an annual written report to every end consumer they supply which contains general data about the consumer, his tariff model and consumption as well as energy mix of the electricity sold to that consumer, supplier mix, domestic mix and other relevant data. The report is sent between July 1st and July 31st of the current year for electricity sold to the end consumer in the previous year.

By comparing the data sent to him by suppliers with the data from system operators and data from the Registry, HROTE is performing supervision over electricity suppliers. In case of irregularities, HROTE is required to notify HERA.

2.2. Italy

2.2.1. Legislative Framework

The Decree of the Italian Ministry for Economic Development "Criteria and procedures for the provision to end-users of the information on the composition of the energy mix used to generate the electricity supplied, as well as the environmental impact of production," July 31st, 2009 under article 2 foresees:

- The sales companies are required to make available to end-users the information under art. 1 of the Decree (information on the composition of the mix of primary energy sources used to produce electricity supplied and the environmental impact of the production of electricity, useful in order to save power).
- Information about the energy mix of electricity sold, with reference to each of the previous two years, must be indicated in the websites of the company's sales by 31 May of each year, starting from 2010, as well, with frequency at least quarterly, in the invoices sent to each customer;
- sales companies indicate to their end customers the information described under Article 3, paragraphs 1 and 3 of that decree (information on the environmental impact of the production of electricity and useful information for the promotion, by the end customers of actions aimed at saving energy, results of studies designed to assess the environmental impact of the production of electricity, which also takes into account the analysis of the life cycle and external costs), as well as any additional information sources and third independent information indicating the possible actions that these clients can implement in order to achieve savings in end-use energy.

Legislative Decree 28/11, transporting Directive 2009/28/EC, replacing Directive 2001/77/EC introduced some new provisions concerning Guarantees of Origin.

The new GO (art. 34 Legislative Decree 28/11) has the sole purpose to enabling electricity suppliers to disclose the share of renewable energy in their fuel mix to final customers. The new GO will be issued, transferred and cancelled electronically.

2.2.2. AEEGSI provisions

The Authority for electricity gas and water (AEEGSI) with decision ARG/elt/104/2011 has approved a set of rules to ensure that the electricity sold to individual customers is actually produced from renewable sources and not commercialized in the market several times, thus making GO the only certification system. Every single customer who accepts a "green offer" in the bill will receive an indication of the mix of energy sources used for its supply, along with information on the energy mix of the total electricity sold as already provided for in Article 2 of the Ministerial Decree of 31 July 2009.

The Authority also proposed that sale companies can still use other tools and certification marks on a voluntary nature or operated by parties other than the GSE ones, subject to contract for renewable energy sale.

It is also foreseen that the guarantees of origin can be traded on a virtual market managed by GME (Gestore dei Mercati Energetici) for the trading of guarantees of origin prepared, or may be the subject of negotiation or free allocation through competitive procedures referred to paragraph 4.2 of Ministerial Decree. In the latter two cases, the holders of bilateral contracts and the grantees are required to record the quantities and prices of trading on the platform of the GME.

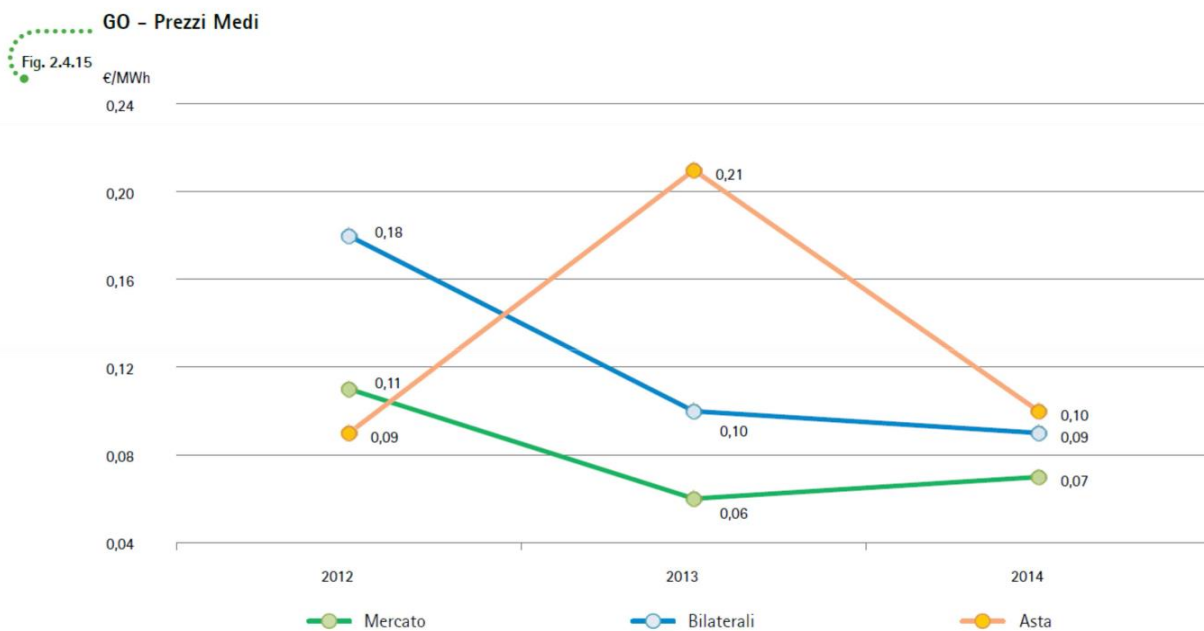
Different typologies of GO could be negotiated in particular with regard to the following renewable energy sources:

- hydropower;
- wind power;
- solar;
- geothermal;
- Other (such as biomass).

The market arranged by GME provides liquidity, transparency (the prices that are set on the market will be public and accessible to all) and safety, GME operates in the market as a Central Counterpart and guarantees the performance of the operation.

2.2.3. GO System

The GO system went actively into force in 2014 in compliance with art 31 paragraph 1 Ministerial Decree 6th July 2012. The average price for each GO in the market was 0,07 euro/MWh, with an increase of 0,01 from 2013. A bilateral Platform created with the intent to favour the GO exchange faced a reduction of – price reduction of 0,01 euro/MWh with a final value of 0,09 euro/MWh. The price of the GSE auction decreased (0,10 euro/MWh) as a consequence of the reduced price offered by GSE.



The analysis above demonstrates that in the market there are lower prices for titles produced in 2013.

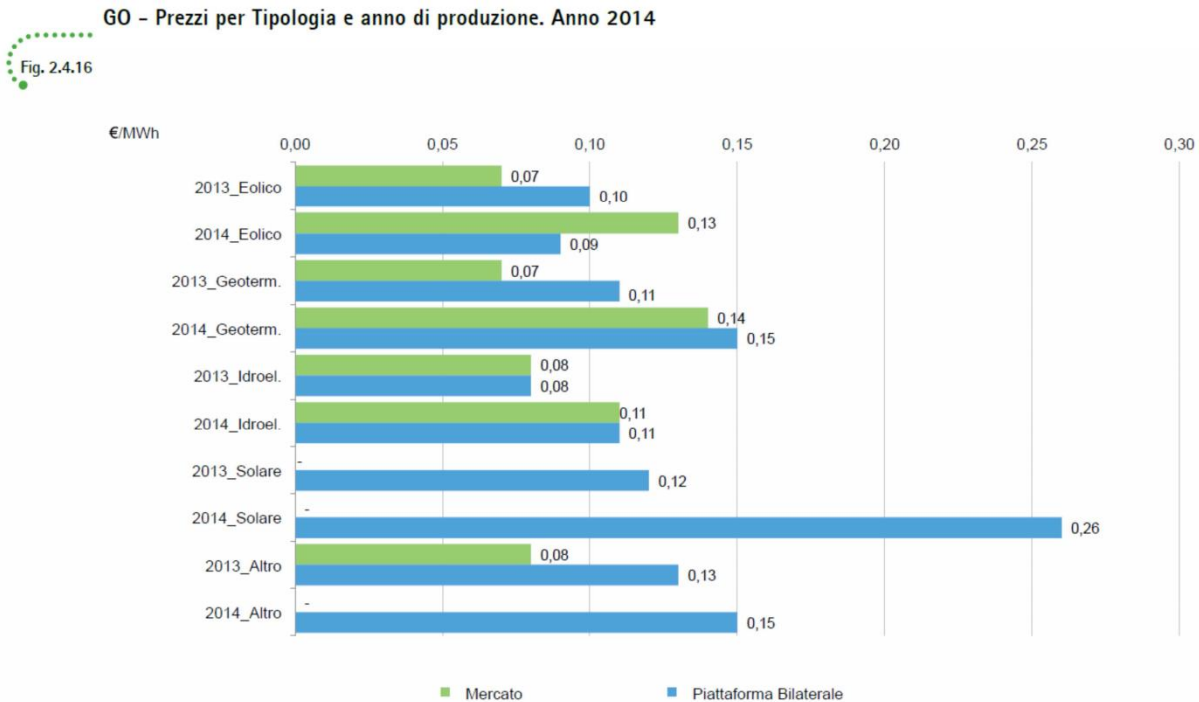
The GO can be traded between producers, traders and businesses for sale through the platform of bilateral contracts or on the GO market, both managed by the GME (the Energy Markets Operator).

The disclosure process is scheduled in the following phases:

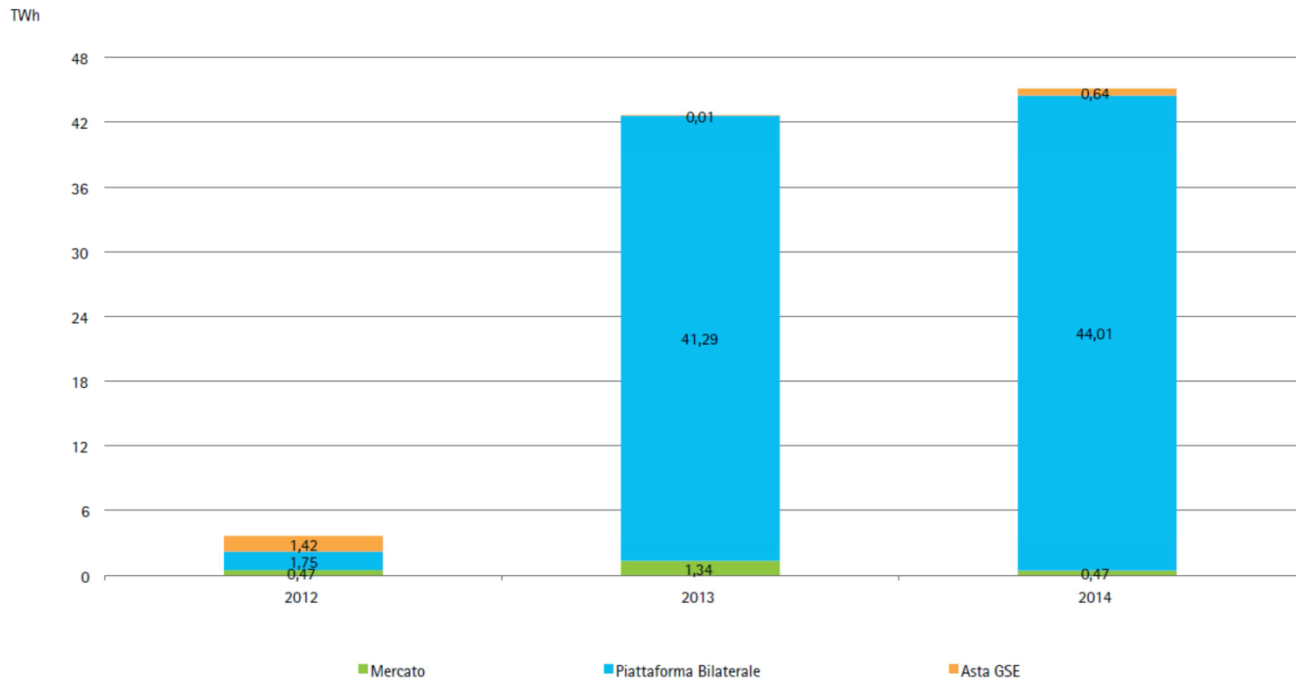
- By March 31 of each year, producers shall inform the GSE production data, together with the GO issued to have transferred to other operators, as verified by the GSE.
- By March 31 of each year, the sales companies communicate to the GSE their data on sales and imports.

- By April 30, the GSE calculates the complementary national mix.
- The GSE calculates the mix of sales companies using the data provided by them
- by May 31 of each year the sales companies are required to disclose their supply mix, along with the average national production mix, the billing documents made available to end users every four months, and on their websites.

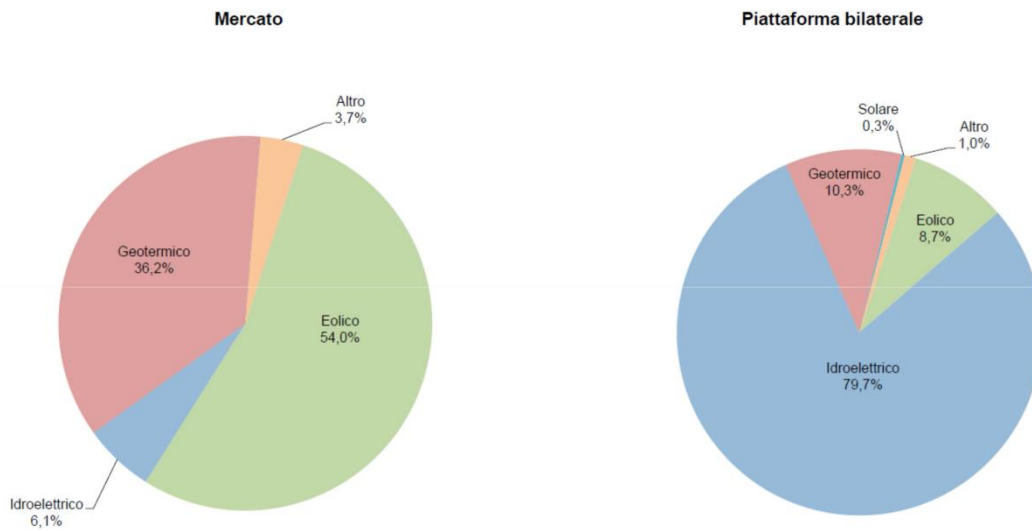
The calculation of a complementary mix takes into account the imported GO



In 2014, 0,47 TWh have been exchanged on the market, 65% less than 2013, while on the bilateral platform the exchanges grew up to 44 TWh (+6,6%). From these data it is clear that the GO system is focused on a bilateral exchange. During 2014, volumes assigned through auction have been around 640.000 MWh. The increase in volumes was caused by the growth of the quantities offered by GSE (from 4 TWh 2013 up to 30 TWh 2014). All the graphics in this case study come from the 2014 GME Annual Report.



2.2.4. GO volume exchanges: market and bilateral auctions



2.3. Spain

2.3.1. Guarantee of Origin (GO) and Disclosure of electricity Systems in Spain

In liberalized electricity markets, customers are able to choose not only their energy supplier, but also a particular energy product. As a result, they have the possibility to choose between different offers in terms of price, company profile, the sources of energy and the technologies used for electricity production. In order to make this information visible to customers, the European Union has introduced a requirement for electricity suppliers to disclose the origins of the energy they have delivered to their customers. The objective of this provision is to enable customers to make an informed choice about the energy they buy. This takes into account the type of electricity generation (fuel mix used, CO₂ emissions and radioactive waste production).

The GO System is a free and voluntary system where production plants owners can request a certain amount of GO to be granted, according to the generation of electricity produced by means of eligible technologies, which comprise all renewable energy sources (RES) technologies (Wind, Solar PV, Concentrated Solar Power, Biomass, etc.) and High-Efficiency Cogeneration (HEC).

A GO is a certification issued at the request of the owner which assures that a certain volume of MWh of electricity (each GO corresponding to one MWh) produced in a generation plant over a certain period of time has been generated using renewable energy sources or high-efficiency combined heat and power.

GO System is the only legal¹ instrument in Spain for tracking electricity generated from renewable sources and for the disclosure of this information to end-users, thus making the Disclosure of electricity System coherent, efficient and reliable. Therefore, only by means of their participation in the GO System electricity suppliers are allowed to make “green” electricity offers to their customers.

2.3.2. CNMC role

Since Spanish GO System's inception in 2007, CNMC has been legally appointed as sole Authorized Issuing Body (see Art. 5.1 in Order ITC/1522/2007 cited above); this role has been more recently enshrined in Art. 7.23 of Law 3/2013, of 4th of June, by which CNMC is established.

<http://www.boe.es/boe/dias/2013/06/05/pdfs/BOE-A-2013-5940.pdf>

CNMC is responsible for the following aspects pertaining to GOs:

- Official issuing body for the Guarantee of Origin System: may outsource administrative tasks to a Registry Operator, as it is actually the case, but CNMC retains full liability,
- Responsible for the national Disclosure of Electricity System,
- Responsible for audits and inspections of RES and HEC electric production facilities,

¹ As a preliminary remark about the legal system in Spain: “Circular” and “Orden” are parts of the legislative framework and the hierarchy is: -Ley>Real Decreto>Orden>Circular / (Law>Royal Decree>Order>Circular).

Main legislation related to GO system is: -Order ITC/1522/2007, of 24th of May.

Partially amended by Order ITC/2914/2011, (27th of October) and Order IET 931/2015, (20th of May). Final consolidated version after May 2015, is available on: <https://www.boe.es/buscar/act.php?id=BOE-A-2007-10868>

This Order has the purpose of regulating the GO System (Art. 1), setting: The scope of application (Art. 2), definitions (Art. 3), CNMC as issuing body (Art.5), issuing (Art. 9), transfers (Art. 10), imports and exports (Art. 11), redemption and expiration (Art.12), verification and inspection of power generation plants (Art. 13).

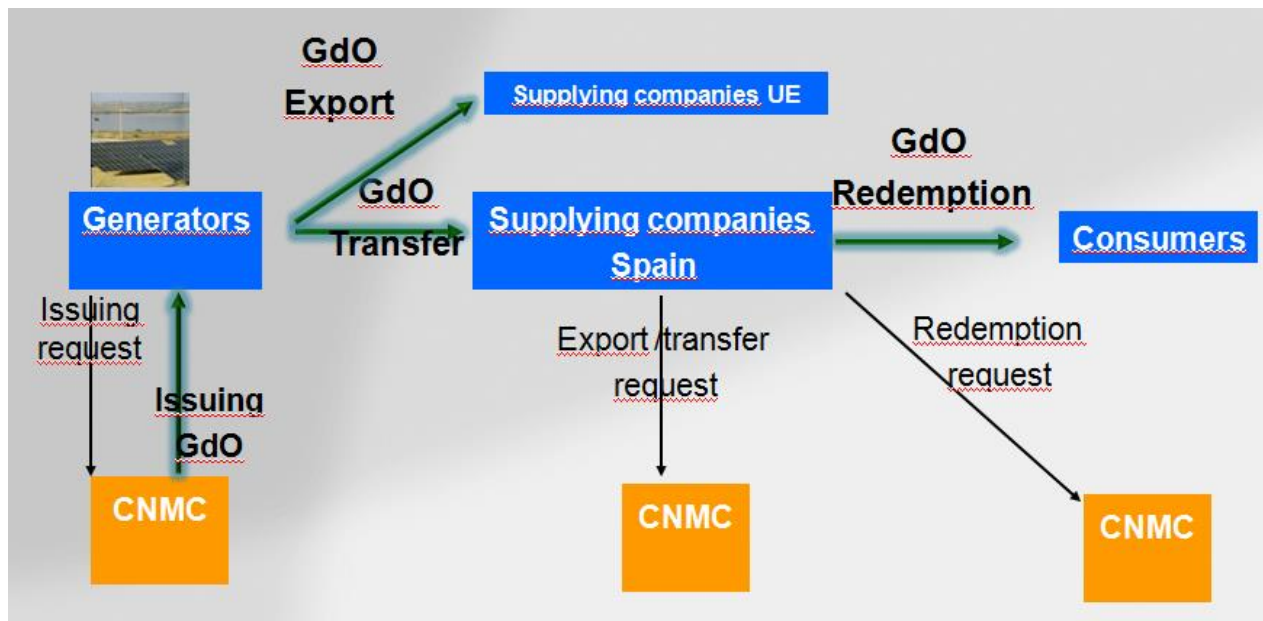
-Circular 6/2012, of 27th of September: <http://www.boe.es/buscar/doc.php?id=BOE-A-2012-13489>

This Circular regulates many details of the GO System, setting aspects as: Definitions (art. Segundo), issuing requests (art. Quinto.1), transfer requests (art. Quinto.3), imports and exports requests (art. Quinto.4), voluntary withdrawal (art. Quinto.7), deadlines for requests and operations (art. Sexto.3) correction of errors (art. Octavo).

-Responsible for RES support scheme settlement and payment system.

2.3.3. Operations in the System

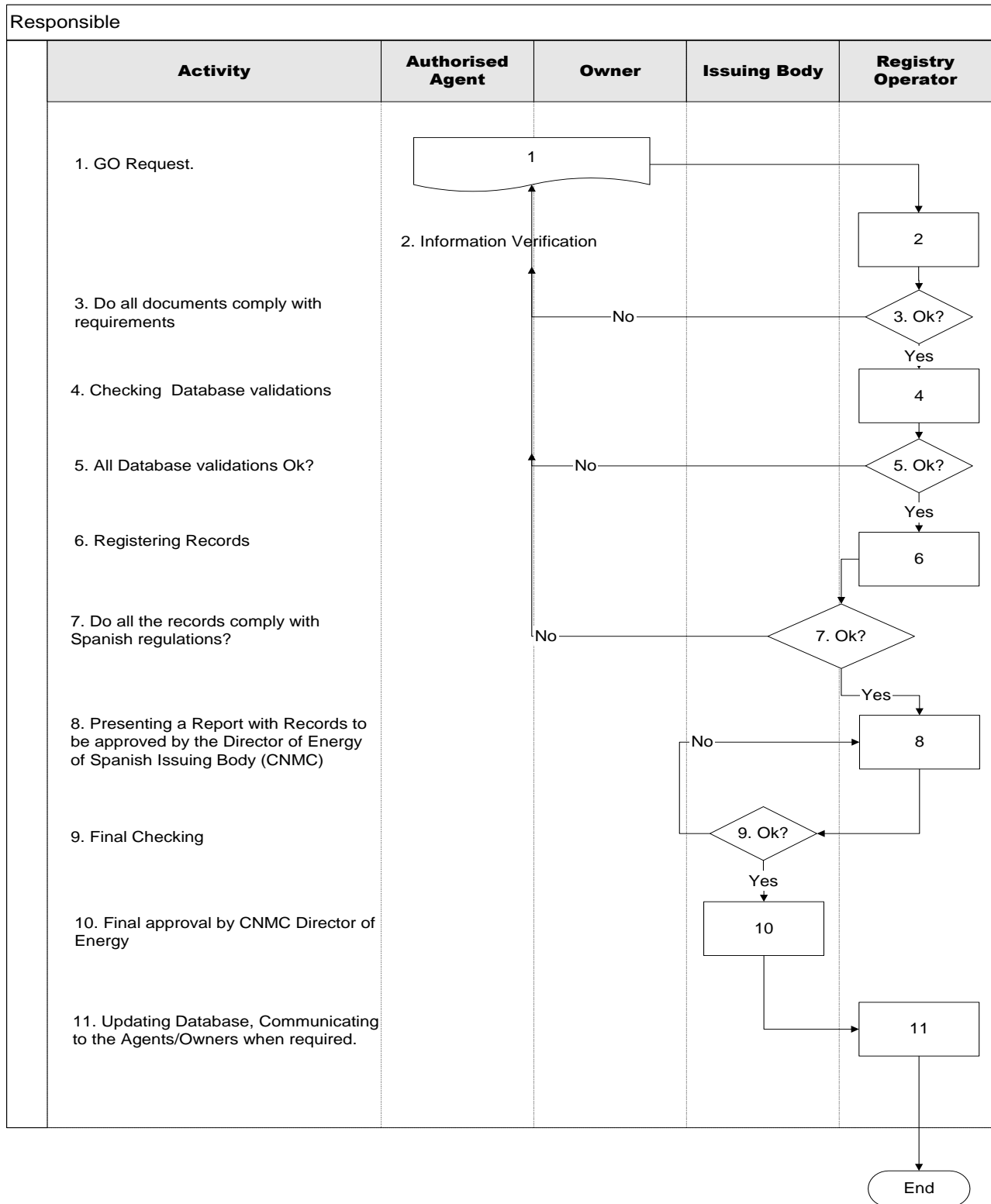
- Issuing Request: The owner of a generation plant may (i.e. voluntarily) apply to CNMC for the issuing of GO for the electricity generated from renewable energy sources or from high efficiency cogeneration in that plant during a certain period of time (necessarily shorter than one year; see section 'Deadlines' later on), on a monthly basis.
- Issuing: CNMC, after verifying the information provided in the request, issues the GO, which will be a new record in the book-entry system, linked to the account of the aforementioned generation plant.
- Transfer: Transfers of any GO shall be requested by the holder of the guarantee from its account to a Spanish supplier's account, who will become the new GO's holder.
- Export: Similar to Transfer, except that eventual holder will be a (European) non-Spanish supplier.
- Import: Imports of GOs shall be considered in the book-entry system as analogous to issuing requests (see above), provided they come from a body designated as issuer by another Member State.
- Redemption: It is the process followed to allocate a certain number of GO to a final consumer, identified by the CUPS (Unified Code of Supplying Point): before redemption, the holder is the supplier; after redemption, the holder is the final consumer. After redemption, no further operations are possible.



Source: CNMC

2.3.4. Issuing process

Flow diagram for issuing process (other processes as transfers, imports, exports, etc. follow a similar flow):



Notes: 1-7: Requests are automatically processed by the Registry Operator, but in case of any breach of the requirements or validations, errors are subject to manual handling and eventually corrected or rejected. Participants can check the “status” of their requests on the website throughout different steps.

4. Requests of GO issuance are cross-checked with system-wide metering data

Final operations approved by CNMC are published on the website.

2.3.5. Deadlines

In accordance with Art. “sexto.tres” of the Circular 6/2012, deadlines are as follows:

GO deadlines according Circular 6/2012. SPAIN																
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Responsible	Activity	JANUA	FEBRU	MARCH	APRIL	MAY	JUNE	JULY	AUGU	SEPTE	OCTOB	NOVEM	DECEM	JANUA	FEBRU	MARCH
	Generation															
Participant	Issuing / export request to CNMC														And further months	
CNMC	GOs issuing by CNMC															And further months
Participant	Other operations (Transferring, import, cancelation in final consumer) request from participant to CNMC															10th of March (*)
	Expiry															(*)
CNMC	FINAL DISCLOSURE															31st of March

(*)After 10th of March, there is no possibility to request any operation, and after 31st of March, there is no possibility to use any GO

The aforementioned provision sets that:

Requests for the issuance and export of GO corresponding to energy generated in the month “m” must be submitted before the last day of the month “m+8”, and in any case before 31 January of following year.

GO for the month of generation “m” must be issued before the last day of the month “m+10”, and in any case before 28 February of following year. GO issued for the month of generation “m” automatically expire on the first day of month “m+12”

The request for transfer, import or redemption to a final consumer of GO for the year “n”, must be submitted before 10 March of year “n+1”; no requests related to expired GO are allowed. (For these purposes, applications and communications’ date of entry in the electronic registry of CNMC are to be considered.

Example A: GO for energy dated February 2015 (m=2):

GO Deadlines according Circular 6/2012 Spain																
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Responsible	Activity	JANUA	FEBRU	MARCH	APRIL	MAY	JUNE	JULY	AUGU	SEPTE	OCTOB	NOVEM	DECEM	JANUA	FEBRU	MARCH
	Generation															
Generators	Issuing / export request to CNMC															
CNMC	GOs issuing by CNMC															
	Transferring, import, redemption request to CNMC															
	Expiration															
	FINAL DISCLOSURE															31st of March

1. Production facilities owners can request February 2015 GO up to 31 October 2015 (last day of month m+8).
 2. CNMC issues GO by 31 December 2015 (last day of month m+10). GO is recorded onto its holder's account.
 3. Current holder may request GO export or transfer to a national supplier until 31 January 2016. (expiration date; after that day, no further operations are allowed).
- Finally, on 31 March 2016, this GO will be included in the disclosure, and there is no possibility to use it anymore.

Example B: GO for energy dated June 2015(m=6):

Deadlines according Circular 6/2012		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Responsible	Activity	JANU	FEBRU	MARC	APRIL	MAY	JUNE	JULY	AUGU	SEPTEN	OCTOB	NOVEN	DECEM	JANUARY	FEBRUARY	MARCH
	Generation															
Generators	Issuing / export request to CNMC															
CNMC	GOs issuing by CNMC															
	Transferring, import, redemption request to CNMC															10th of March
	Expiration	(*)After 10th of March, there is no possibility to request any operation, and after 31st of March, there is no possibility to request any operation. (*)														
	FINAL DISCLOSURE															31st of March

- 1.-Production facilities owners can request June 2015 GO up to 31 January 2016 (last deadline for all 2015-originated issuing requests, irrespective of generation month)
 - 2.-CNMC issues GO by 28 February 2016 (last deadline for all 2015-originated issuances). GOs is recorded onto its holder's account.
 - 3.-Current holder may request GO export or transfer to a national supplier until 10 March 2016. (last deadline for all 2015-originated exports and transferring requests; after that date, no further operations are allowed).
- Finally, on 31 March 2016, this GO will be included in the disclosure, and there is no possibility to use it anymore.

2.3.6. Transparency

Operations:

There is a public registry for all operations (issuances, transfers, exports, imports, etc.) on the website:

<https://gdo.cnmc.es/CNE/mostrarpdfexpedicionesPorInstalacion.do>

- 1: "Año de las Garantías expedidas (AAAA):" (Year of issuing of GO) entering the year, (i.e. 2014)
- 2: Select "TODAS las instalaciones" (all production sites)
- 3: Choose "pdf" or "excel".
- 4: Press the arrow mark

Choose "listadoexpediciones_2014.COG.xls" for Cogeneration devices or "listadoexpediciones_2014.xls" for Renewable devices.

Reports:

Annual report with a summary of all operations is available on the website (entering the year)

https://gdo.cnmc.es/CNE/resumenGdo.do?informe=garantias_etiquetado_electricidad

2.3.7. Disclosure of electricity

Every year, CNMC calculates and publishes on the website the Disclosure of electricity for all electricity suppliers. It is mandatory to show this information to customers, displayed on every single bill. As mentioned, deadline for calculation is 31 March of year “n+1” for the disclosure of electricity generated throughout year “n”, detailing CO₂ emissions, radioactive waste and technology mix.

Relevant legislation is Circular 1/2008, from CNE, (of 7 February 2008)², which establishes the procedure CNMC uses to collect relevant data, calculate the fuel mix disclosure for all suppliers and define the formats used to disseminate the results.

The detailed formula to calculate energy mix for disclosure is described in Circular 1/2008, Annex 1 “*Método de Cálculo*”:

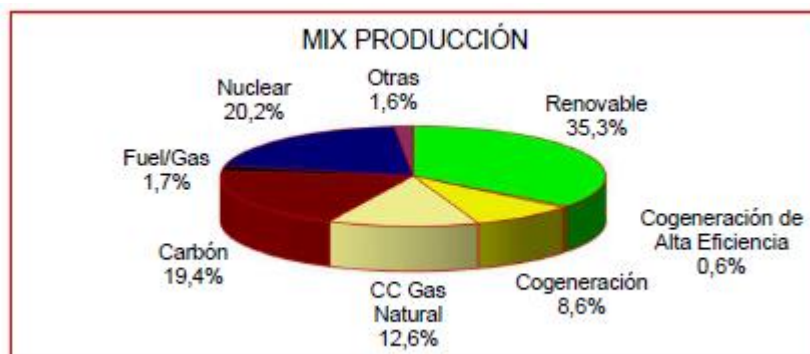
- In a first step, a first proxy of ‘National Production Mix’ is calculated, in accordance to exhaustive energy meterings received from SO, including also net electricity exports and imports.
- Then, ‘National Production Mix’ is amended (*rectified*) with imported and exported GO to obtain the ‘National Rectified Mix’.
- Finally, GO *domestically* redeemed (within Spain) are discounted from this latter ‘National Rectified Mix’, so as to calculate the ‘Domestic Residual Mix’ (that without GO and therefore poorer in renewable and high-efficiency cogeneration energy).

Final results of the Disclosure of electricity System are available on the website (entering the year):

https://gdo.cnmc.es/CNE/resumenGdo.do?informe=etiquetado_electricidad

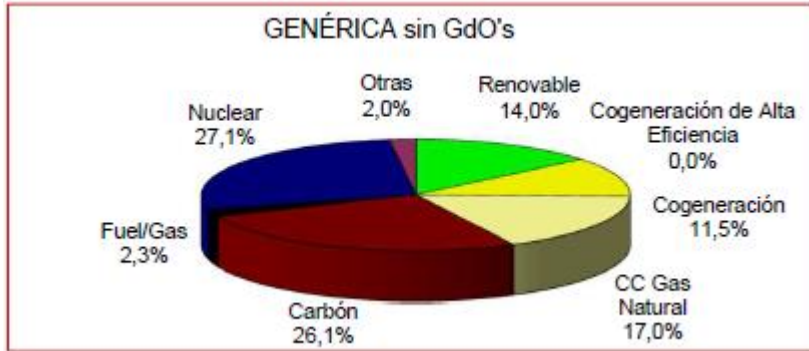
Here are some examples for year 2015:

Generation mix for electricity generation in Spain, regardless of the GO System:

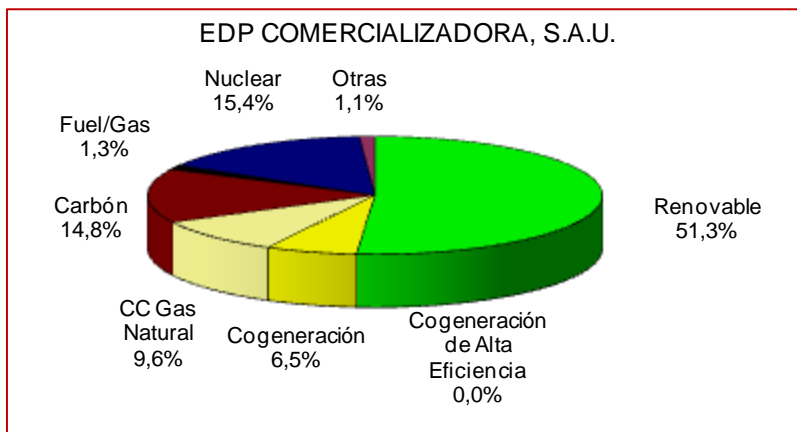


If the electricity supplier does not participate in the GO system, its mix is not so rich in renewable energy (‘Domestic Residual Mix’):

² <https://gdo.cnmc.es/CNE/abrirVentanaGeneral.do?fichero=Circular%201-2008%20Origen%20de%20la%20Electricidad.pdf&directorio=circulares>



On the other hand, for suppliers participating in the GO system, their specific mix calculated by CNMC is higher in renewable or HEC energy:

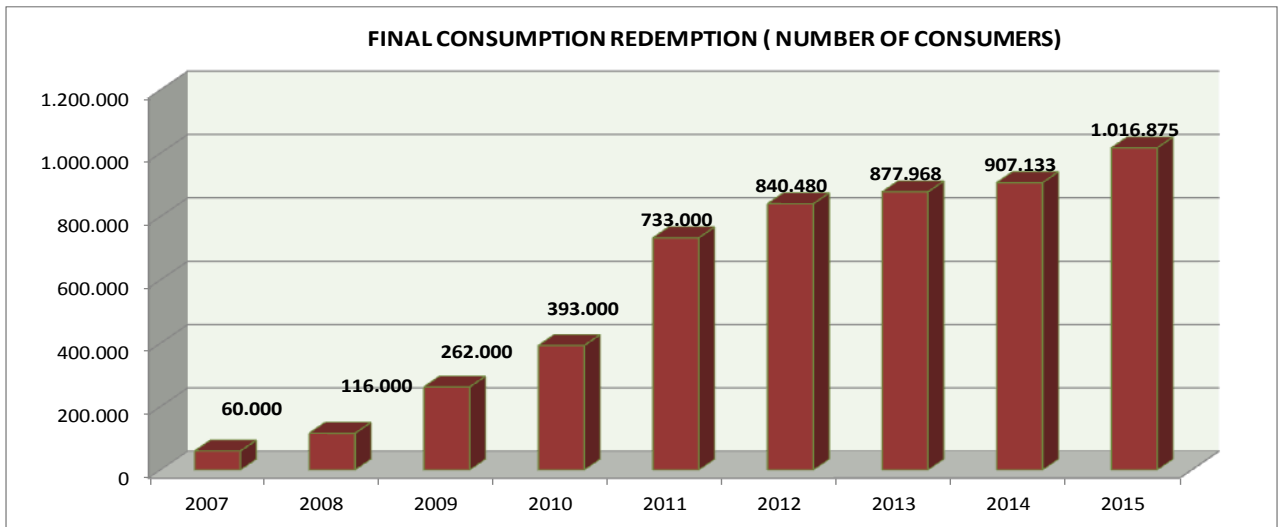
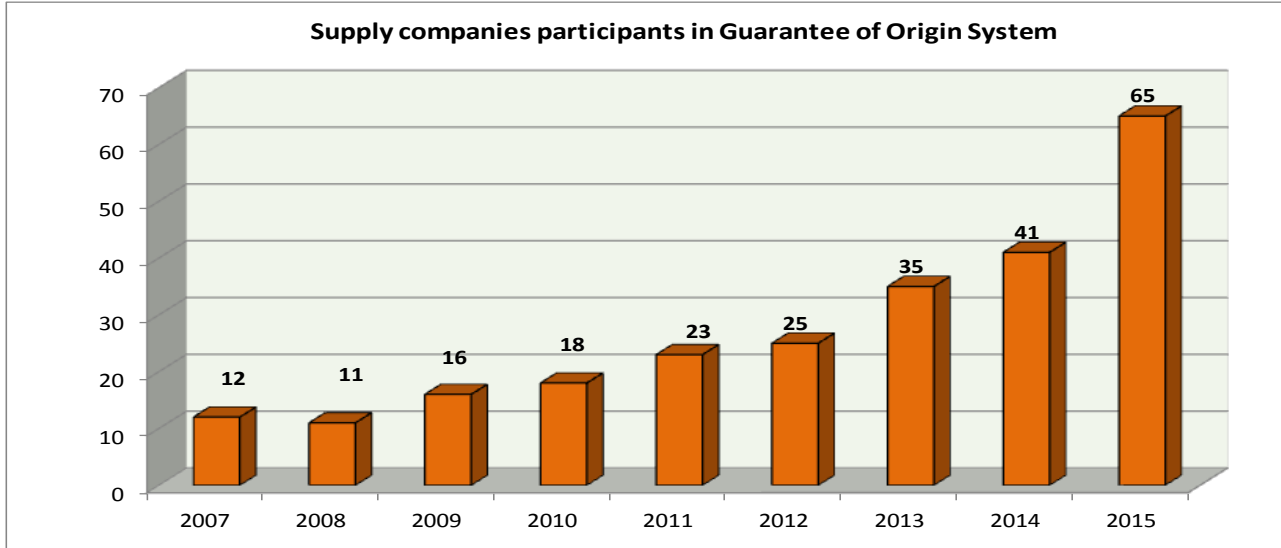
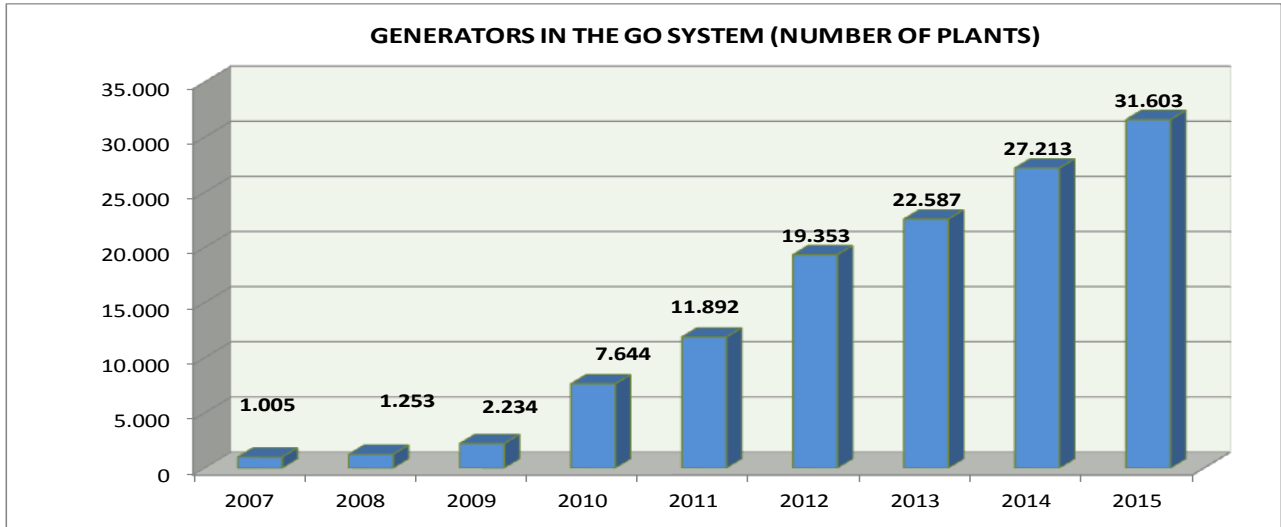


Or even completely renewable, which is a strong selling point for many companies as a base of their marketing strategy:



2.3.8. Evolution of the system

Since the commissioning of the system, the number of participants involved has increased year by year, not only from the generation side but also from the demand side:



Finally, although Spanish GO System was the first of its kind developed in the EU, recently other Member States have developed such other systems using a common platform for GO interexchange managed by the "Association of Issuing Bodies - AIB".

In order to ease any administrative barriers that may hinder international GO trade among countries, recently CNMC decided to apply for membership to this Association.

CNMC is member of AIB since 4th of March 2016.

2.4. Portugal

In Portugal, the responsibility to act as the issuing body for guarantees of origin lays outside of the energy regulator's competences. Nonetheless, ERSE has developed best practices on disclosure, i.e. on how suppliers should inform their customers about the origins of the electricity they consume. As such, the case study on Portugal, apart a brief note on guarantees of origin, is dedicated to disclosure.

2.4.1. Note on guarantees of origin in Portugal

In Portugal, the responsibility to act as the issuing body for guarantees of origin lays outside of the energy regulator's competences.

In 2010 two entities were established to act as issuing body for guarantees of origin (EEGO³): REN—Rede Eléctrica Nacional, the electricity TSO (transmission system operator), for combined heat and power (CHP), and LNEG—Laboratório Nacional de Energia e Geologia, the National Laboratory for Energy and Geology, for renewable energy sources (RES)⁴. While the EEGO for CHP entered into operation, the same didn't happen for RES. The competence for RES was later reassigned to REN⁵.

In April 2015, the responsibility to act as issuing body, both for RES and CHP, was transferred to DGEG – Direção-Geral de Energia e Geologia, the Directorate-General for Energy and Geology⁶. As of today, this situation is still in a transition period. It is expected that in 2016 the EEGO will be fully operational.

2.4.2. Electricity disclosure obligations in Portugal

Although ERSE has no competences in establishing or maintaining certification systems regarding the origins of electricity, the regulator has developed best practices on disclosure, i.e. on how suppliers should inform their customers about the origins of the electricity they consume.

The first discussions on best practices occurred in 2007 at ERSE's initiative. At the time, only a few suppliers had started disclosure – as required by the Directive 2003/54/EC⁷, and the Commercial Relations Code⁸. A need to guarantee a minimum level of quality and harmonization was also identified. The following year, ERSE published its Recommendation on principles and best practices on disclosure for electricity⁹. In 2011, a revision ensued and Recommendation no. 2/2011 is in force since then¹⁰.

2.4.3. What is disclosure and what is it for?

Disclosure can be defined as the information given to consumers on the sources and environmental impacts of the electricity they consumed.

³ *Entidade emissora de garantias de origem*, in Portuguese.

⁴ Decree-Law no. 23/2010, 25th March, and Decree-Law no. 141/2010, 31st December, respectively.

⁵ Decree-Law no. 39/2013, 18th March.

⁶ Decree-Law no. 68-A/2015, 30th April.

⁷ Directive 2003/54/EC, 26th June.

⁸ *Regulamento das Relações Comerciais*, published by ERSE.

⁹ Recommendation no. 1/2008 (version 2, January 2009), in Portuguese.

¹⁰ [Recommendation no. 2/2011](#) (December 2011), in Portuguese.

This can be derived from Directive 2003/54/EC, in its article 3 (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 CO₂ and the radioactive waste resulting from the electricity produced by the overall fuel mix of the supplier over the preceding year is publicly available.

With respect to electricity obtained via an electricity exchange or imported from an undertaking situated outside the Community, aggregate figures provided by the exchange or the undertaking in question over the preceding year may be used.

Member States shall take the necessary steps to ensure that the information provided by suppliers to their customers pursuant to this Article is reliable.”

Also, disclosure should be addressed in the **perspective of the consumer**:

- **Supplier/product differentiation**
 - Disclosure as an additional criterion of choice (apart from price)
 - Greater competition in retail (e.g. new products based on disclosure).
- **Consumer empowerment**
 - More informed consumption choices (knowledge of environmental impacts)
 - Commitment of consumers regarding their consumption choices.

2.4.4. What information should be provided by suppliers to consumers and through which means?

As stated above, disclosure information includes the contribution of energy sources to the electricity consumed and information on environmental impacts. In Portugal, this translates to:

- Energy mix (percentage of each energy source)
- Specific carbon dioxide emissions and radioactive waste production
- Total carbon dioxide emissions associated to the consumption of each bill
- Other information on environmental impacts.

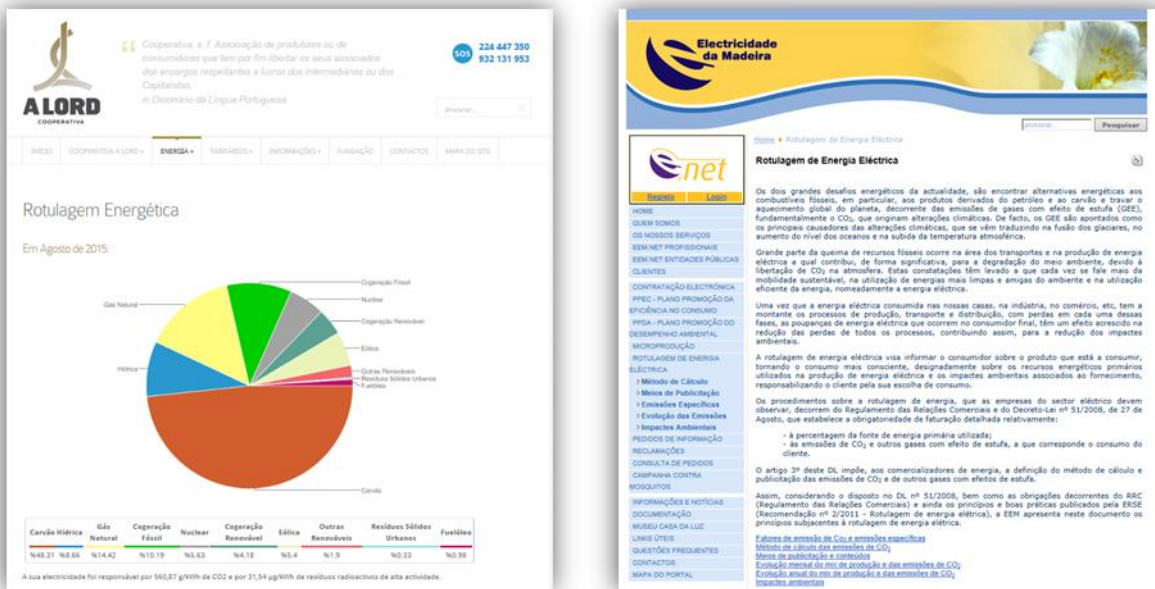
When providing information to consumers a balance between needed information and excess information must be evaluated. In Portugal, the weighting of these trade-offs resulted in different levels and detail of information and the means by which the information is provided according to the specific audience (see Figure 1).

Figure 1. Means of disclosure and target audience



Internet is seen as the favoured means for providing easily accessible and detailed information to an interested audience (see Figure 2).

Figure 2. Example of internet pages with disclosure data (left: monthly values; right: description of environmental impacts)



Leaflets serve as an intermediate means, being of mass dissemination, and are available from suppliers (sent yearly to consumers and delivered with pre-contractual information) (see Figure 3).

Figure 3. Example of leaflet on disclosure

Poluentes Secundários:
Aqueles que resultam de reacções químicas que ocorrem na atmosfera e entre poluentes primários, como o ozono troposférico (O₃) e que resulta de reacções fotoquímicas que se estabelecem entre os óxidos de azoto (NO_x). Compostos Orgânicos Voláteis (COV):

- CO₂: gás responsável pela absorção da radiação terrestre que produz o efeito de estufa da atmosfera.
- SO₂: gás tóxico que pode contribuir para a ocorrência de chuvas ácidas.
- NO_x: principal gás responsável pelo problema de acidificação que, em contacto com a água, origina as chuvas ácidas.
- Resíduos radioactivos:** correspondem a todos os materiais que se encontrem contaminados por radionucleídeos sem fim próprio de utilização, os quais em contacto com o meio ambiente interferem com os tecidos vivos e provocam alterações genéticas e cancro.

Da combustão dos combustíveis fósseis ou de qualquer outro tipo resulta a emissão de partículas em suspensão, as quais provocam a diminuição significativa da troca gasosa em espécies vegetais, e tal como a maioria dos poluentes atmosféricos, danifica o nosso sistema respiratório.

A Gas Natural Fenosa preocupada com a sustentabilidade do meio ambiente e com o cumprimento da legislação aplicável ao sector em que opera procede à **monitorização rigorosa das emissões de poluentes** nas várias centrais de produção de energia que detém, bem como na implementação progressiva de tecnologias mais limpas e eficientes.

Para mais informações consulte a página www.gasnaturalfenosa.pt ou para mais esclarecimentos sobre as fontes de energia consulte a página da Entidade Reguladora dos Serviços Energéticos em www.erse.pt

Apoio comercial
Contratação, facturação, alterações contratuais, novas instalações, contadores, 800 303 132
Horários de ATC de Segunda-Feira a Sábado entre 8h00 - 20h00.

Avarias eléctricas
Falhas de energia, avarias e iluminação pública. 800 506 506
24 Horas

Leituras do contador
Comunicação de leituras. 800 507 507
Chamada grátis

gasNatural fenosa
www.gasnaturalfenosa.pt

A energia
A energia é um dos pilares fundamentais para o desenvolvimento da sociedade. Está presente na nossa actividade diária: cada vez que premimos um interruptor, quando utilizamos o carro, ao ligar o aquecimento. Desta forma, para que todos nós, e as futuras gerações, possamos continuar a utilizar a energia, devemos dar-lhe valor e comprometemo-nos com um consumo melhor e mais racionalizado.

Só se tomarmos consciência do problema energético poderemos fazer parte da solução. É necessário preservar o meio ambiente, para tal devemos escolher dois caminhos: o da eficiência energética, consumindo apenas a energia que necessitamos, e o caminho das energias renováveis, diminuindo a utilização de energias fósseis e nucleares.

Tipos e fontes de energia
A rotulagem de energia eléctrica pretende dar a conhecer as fontes de produção da electricidade consumida em Portugal, bem como os impactos ambientais que lhe estão associados. A energia pode ser classificada de diferentes formas de acordo com a sua origem e transformação:

Energia primária:
Entende-se por energia primária aquela que se obtém directamente da natureza. Ou seja, sem passar por qualquer tipo de transformação. Por exemplo, o carvão ou o petróleo.

Energia final:
É aquela que resulta das transformações da energia primária e que chega ao consumidor preparada para utilização. Por exemplo, utilizamos carvão para produzir electricidade ou tratamos o petróleo para produzir gasolina. Das que se obtém energia, classificam-se em dois tipos:

- Fontes de energia renováveis:
São inesgotáveis e a sua exploração não acarreta emissões de gases de efeito de estufa, têm um impacto no meio ambiente praticamente nulo e são uma solução viável para minimizar o problema energético actual: Solar, eólica, da biomassa, hidráulica, do mar ou das ondas e ainda geotérmica.
- Fontes de energia não renováveis:
Encontram-se na natureza em quantidade limitada. De origem fóssil: Petróleo, carvão e gás natural. De origem mineral: O urânio.

Em Portugal, a electricidade que chega aos consumidores finais provém maioritariamente das centrais instaladas no nosso país (termoeléctricas a carvão, gás natural, fuelóleo e biomassa e centrais renováveis - sobretudo hidroeléctricas e eólicas). Sendo a restante energia importada de Espanha.

Rotulagem de energia eléctrica
A rotulagem de energia eléctrica visa dar a conhecer as fontes de energia primárias utilizadas na produção de energia eléctrica. A Gas Natural Fenosa é um operador ibérico do sector energético que comercializa electricidade em Portugal.

A figura abaixo representa o mix de energia comercializada pela Gas Natural Fenosa e a sua repartição por tecnologia utilizada:

Sabe qual é a origem da electricidade que consome e os impactos ambientais inerentes?
A electricidade consumida e constante nesta factura representa o mix de energia comercializada com origem nas seguintes fontes de energia (valores 2012):

Gas Natural Fenosa



Emissões específicas e resíduos radioactivos produzidos

CO ₂	426,1 g/kWh	RAA	56,0 µg/kWh
-----------------	-------------	-----	-------------

Estas fontes são responsáveis por emissões totais de dióxido de carbono de 426,1 g/kWh CO₂ (valores 2012).

Para mais informações contacte-nos, e para mais esclarecimentos sobre as fontes de energia consulte o site da Entidade Reguladora dos Serviços Energéticos em www.erse.pt e www.gasnaturalfenosa.pt

Impactes Ambientais
Inerente à actividade de comercialização de energia eléctrica são originadas **emissões específicas de poluentes atmosféricos**, tais como CO₂ (dióxido de carbono), SO₂ (dióxido de enxofre), NO_x (monóxido de azoto) e resíduos radioactivos (apenas da energia nuclear).

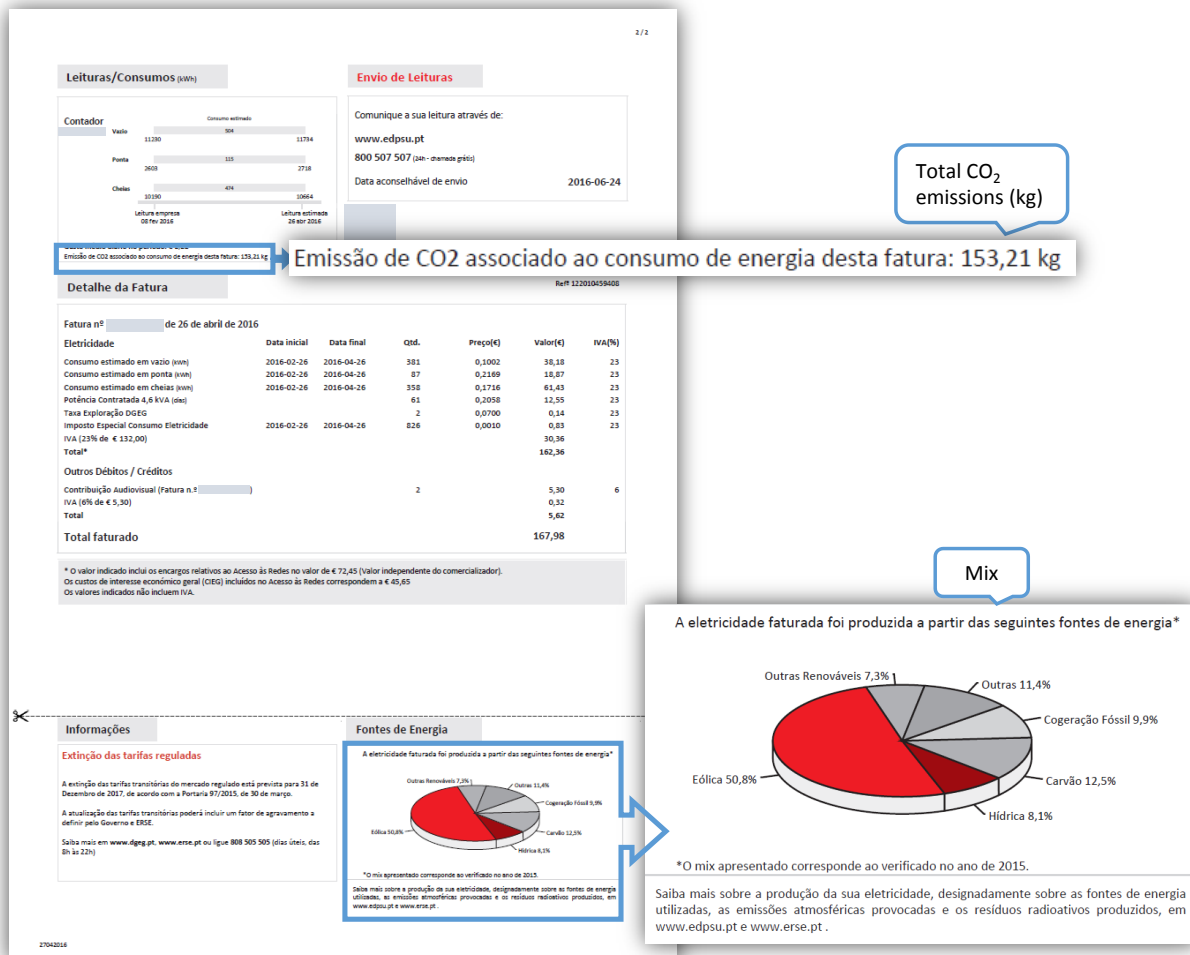
Os principais poluentes que podem dar origem aos maiores impactes ambientais são o CO₂, o SO₂, e o NO_x, produzidos em centrais com queima de combustíveis fósseis como o carvão, gás natural ou fuelóleo e os resíduos radioactivos produzidos nas centrais nucleares. Em contrapartida, **as fontes de energia renováveis** na sua maioria não originam gases poluentes, representando, por isso, uma aposta na **sustentabilidade ambiental**.

Atendendo à sua origem, os poluentes atmosféricos podem ser caracterizados como:

- Poluentes Primários:**
Aqueles que são emitidos directamente pelas fontes para a atmosfera, como as centrais termoeléctricas.

As for **bills**, while it is a privileged means for providing disclosure information for each and every consumer, one also has to bear in mind the need for bills that are simple to understand (see Figure 4).

Figure 4. Example of bill with disclosure data (energy mix and total CO2 emissions)



2.4.5. What can the regulator do regarding disclosure?

ERSE publishes information on disclosure that is reported by suppliers. This information is useful namely for comparison purposes.

Disclosure simulator: Consumers can access ERSE's website and simulate their energy bills in what regards the energy mix and emissions for a given supplier (see Figure 5). The resulting emissions are compared with those from travelling by car and airplane to allow for a better understanding of the magnitude of the values.

Figure 5. Electricity disclosure simulator provided by ERSE (<http://simuladores.erse.pt/rotulagem>)



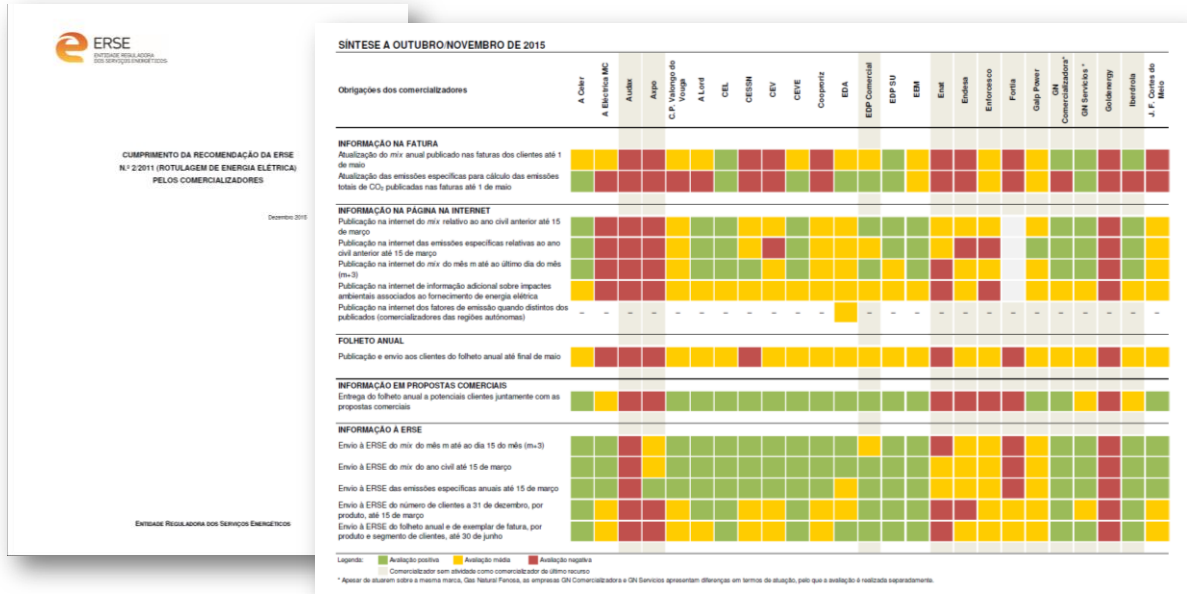
Disclosure comparison tool: Consumers can access ERSE's website and compare the disclosure information of different suppliers regarding the energy mix and emissions (see Figure 6).

Figure 6. Electricity disclosure comparison tool provided by ERSE (<http://www.erse.pt/pt/desempenhoambiental/rotulagemenergetica/comparacaoentrecomercializadores/>)



State of disclosure report: A yearly report on the state of disclosure provision by suppliers is published by ERSE in its website (see Figure 5).

Figure 7. Report on the state of disclosure published by ERSE
<http://www.erse.pt/pt/desempenhoambiental/rotulagemenergetica>



3. Guarantees of Origin in North-African Countries

In Egypt, this type of certificates acts as a tracking mechanism for electricity production, it acts as a proof that the certificate holder (end consumer) has consumed the amount of electricity mentioned in the certificate from the origin (resource) defined in the certificate which in Egyptian case renewable energy resources.

In Algeria, the guarantee of origin was introduced on the 18th February 2015 with the publication of the Executive Decree No. 15-69 laying down the Certification of the origin of the renewable energy terms and the use of these certificates.

The main purpose of this certification is to guarantee that the source of the energy injected in the network actually comes from RES, Producers that want to access supporting measures to produce RES must obtain a certificate that guarantees the origin of the energy produced. Such certificate is not delivered based on produced MWh but rather for the installed production.

3.1. Algeria

3.1.1. Definition

The certificate of origin is a mechanism which aims to demonstrate that the energy is generated from a source of renewable energy or cogeneration system. This results in the issuance of a document guaranteeing this origin.

The decree that explains the modalities for the certification of origin was published on 18th February 2015: "Executive Decree No. 15-69 of 21 Rabie Ethani 1436 corresponding to 11 February 2015 laying down the Certification terms of the origin of the Renewable energy and the use of these certificates". This decree can be found in the CREG website following this link:

<http://www.joradp.dz/FTP/JO-FRANCAIS/2015/F2015009.pdf>

3.1.2. The certification document

The renewable energy producers, who wish to get access to the benefit of feed in tariff (FIT), must introduce an application to the electricity and gas regulatory commission.

This application shall fulfil the following requisites:

- General pattern of plant design with the location of measuring instruments and metering devices;
- Primary energy scheme;
- Process design;
- List of functional equipment;
- The site survey of the energy potential/power plant and the references of the project office that made it.

The certification documents shall include :

- Name and address of the applicant,
- Identification of the power plant and the location,
- The installed Electrical power,
- The origin of the sources used to produce electricity,
- The part of electrical energy produced from renewable energy when it is a hybrid power plant,
- Primary energy savings calculated in accordance with the formula set out in regulations, when electricity is produced from cogeneration systems.

If during the preliminary examination CREG notices that the application isn't conform the requirements, the applicant will be notified to update his application.

3.1.7. Control and supervision

The control and supervision of the certification will be performed by an independent expert or an authorized inspection body under the supervision of the CREG and will include:

- control of the installation after the realisation of the power plant.
- After the commissioning, a control will be performed during the lifetime of the equipment, following the below timeline:
 - a. six months for each installation whose power is greater than or equal to 100 kilowatts,
 - b. Every five (5) years and sample turn for installations whose power is less than 100 kilowatts.

Ad-hoc controls may be done on demand by the CREG.

The guarantee of origin certificate of renewable energy can be withdrawn based in the following cases:

- If the facility does not meet the conditions for granting the original guarantee certificate of renewable energy because of the changes occurred;
- If the producer does not fulfil its obligation to provide the required information to the CREG;
- If the producer launches its installation before the completion of the compliance check.

3.2. Egypt

3.2.1. Introduction

The importance of renewable energies for the power production has risen significantly over the last years. Especially in Egypt the usage, for instance, of wind, solar or biomass has increased and stepped to the forefront of investment projects for renewable energies. The Egypt government and in particular the energy regulator EgyptERA would like to support this trend by using different incentive mechanism or subsidies like the feed-in tariff as an incentive mechanism for producing Electricity from Renewable Energy resources and Certificate of Origin as an inventive mechanism for consuming Electricity produced by Renewable Energy resources. Fig1 shows some examples of both supply and demand incentives.

Fig.1 RE Incentive Mechanisms (Egypt)

Supply Side

- *Feed- in systems*
- *Tendering systems*

Demand Side

- *Quota obligations*

3.2.2. Objective

Certificate of origin provides a useful way to decouple the physical flow of electricity from the commercial flow of the certificate itself. These decoupling will enable end consumers to benefit from such certificates

(e.g. Consumers acting under quota system) even if the end consumers did not physically consume the electricity produced by Renewable Energy Resource, as illustrated in Fig2.

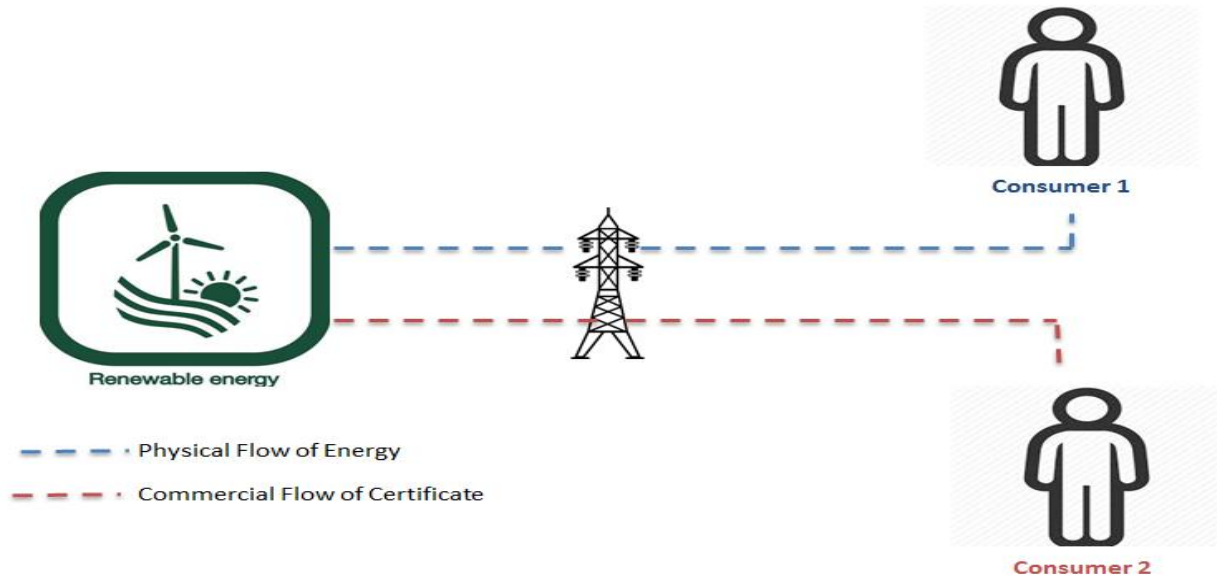


Fig.2 Decoupling Concept

3.2.3. Legislative Framework

- In 2012; EgyptERA's Board of Directors has issued a memo that approves the Certificate of Origin as one possible mechanism to support the Development of Using Renewable Energy Resources in Electricity production and it also proposes a General Headlines of the regulatory framework
- In 2014; Law No. 203, Article No. 8 States that: the cabinet shall issue , based on the proposal from relevant ministry, the Regulatory frame work for the Certificate of Origin
- In 2015, Electricity Law, Article No. 4 states that: EgyptERA is the responsible party for issuing Certificates of origin according to regulatory framework set by the Cabinet.

3.2.4. Regulatory Framework

EgyptEra has proposed to the government a regulatory framework , which has not yet been approved by the Cabinet. This means that these regulations can't be considered as final , but they nonetheless provide a clear understanding on how EgyptERA conceive this scheme from the regulatory point of view.

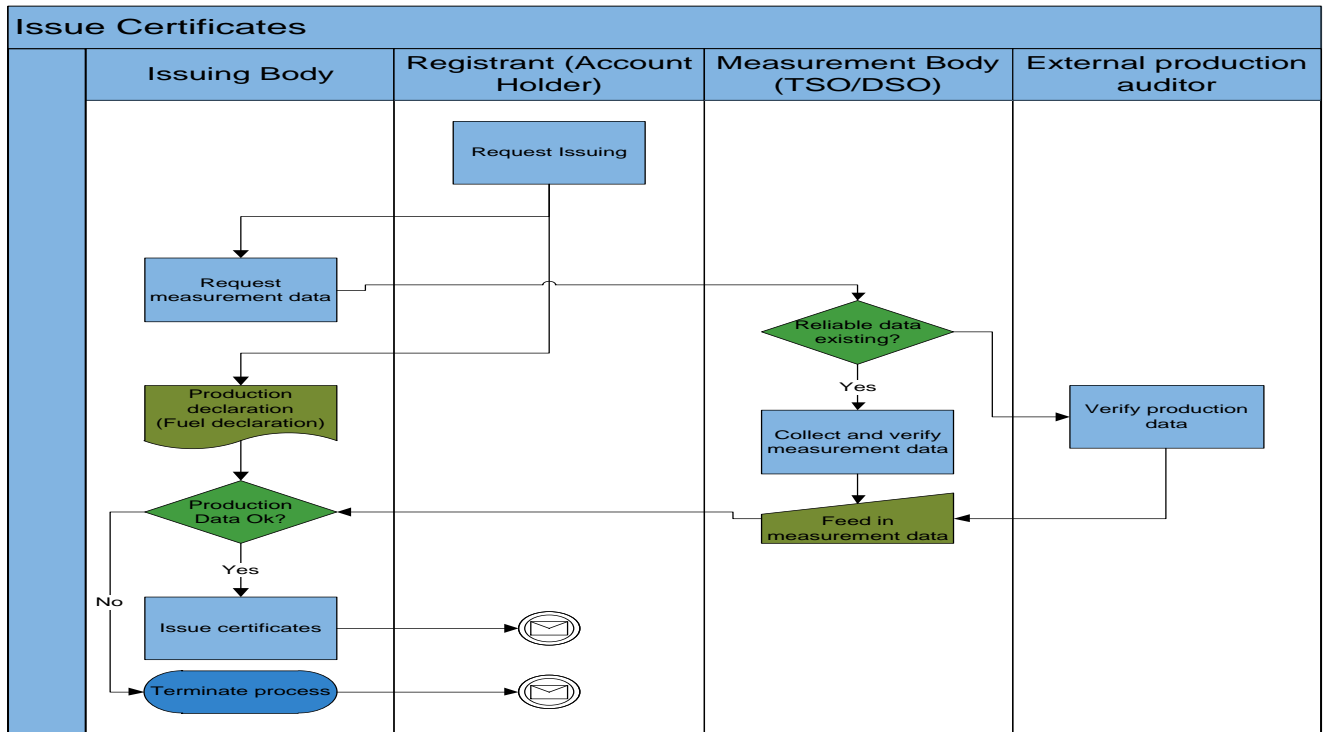
Major Players in the scheme:

Entity	Role
EgyptERA	Issuing Body
Generation Companies (As being the entities that own the power plant and hence can register their power plant on the electronic system)	Account Holder
Generation Companies (As being the entity that produces electricity)	Production device
1. Egyptian electricity transmission Company EETC 2. Distribution companies	Measurement Body

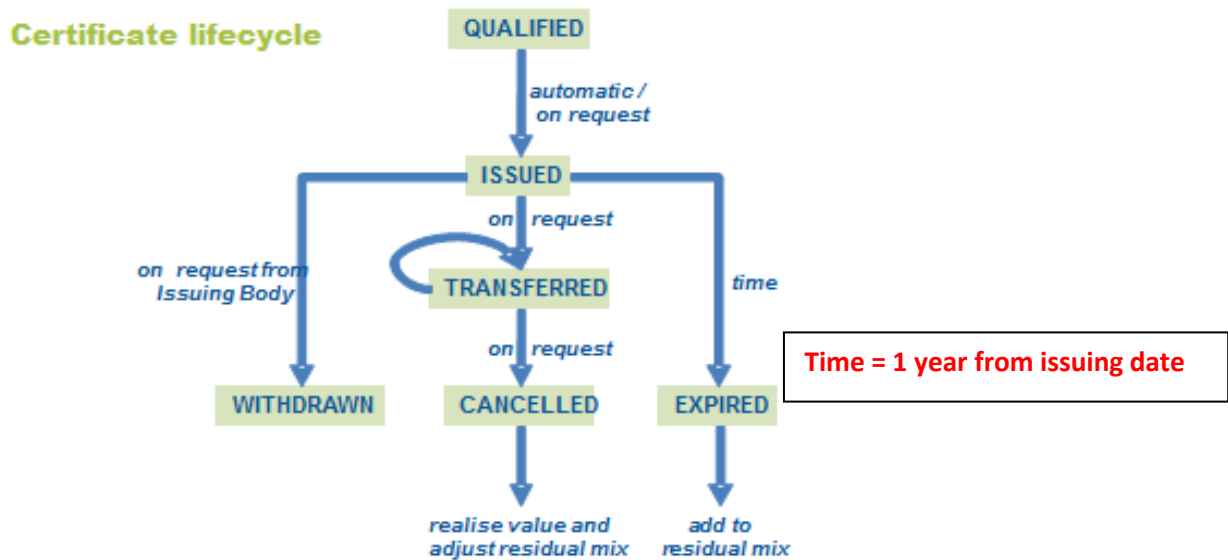
Generation Technologies targeted with this scheme:

1. Wind Power Plants
2. PV Power Plants
3. CSP Power Plant
4. Hydro Power plants (Micro-scale)
5. Biogas and Biomass Power plants (Under Progress)

Procedures of Issuing the Certificates:



Certificate Life cycle:



3.2.5. Functioning

The measure of how far a certain scheme is applicable can be done through two different methodologies;

First: assessing and analyzing the scheme independently from any other interrelated schemes,

Second: thinking in a more generic way looking at the system as a whole to check its workability & applicability. Then a more detailed analysis can be made as scheme by scheme in a way to measure how far each individual scheme helps the whole system to work efficiently and reliably.

For the GoO the second methodology is the most effective as the certificate of origin, by itself, is not an incentive scheme for the Renewable Energy market but rather it represents an added value for already well established incentive schemes.

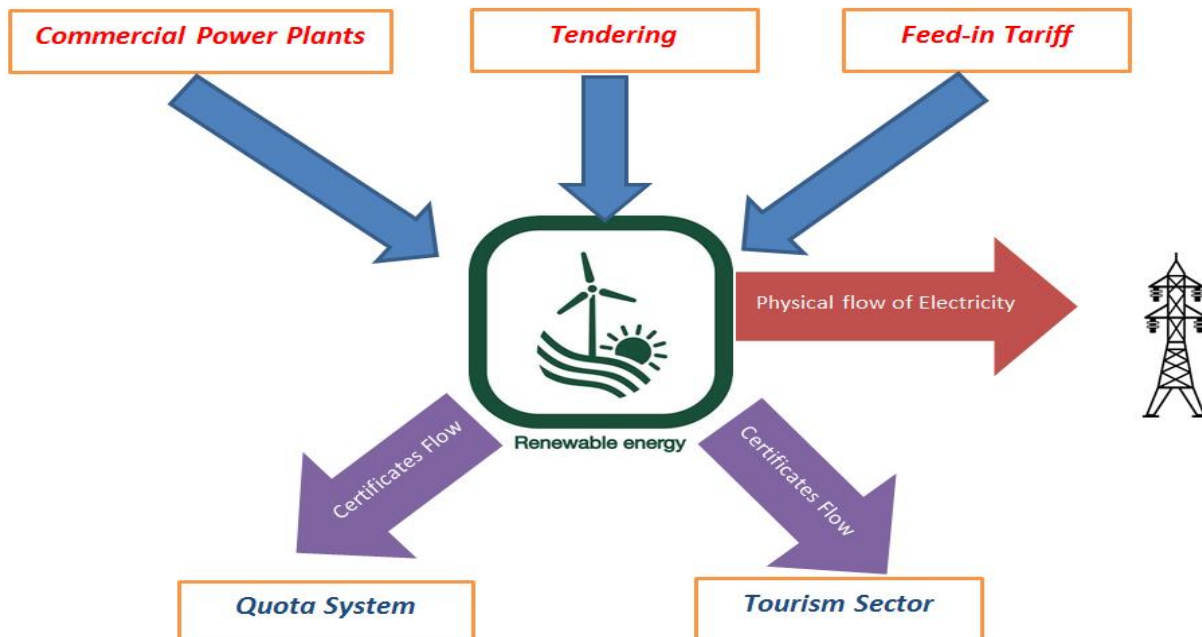
The Egyptian government started with three supply incentive alternative schemes for Renewable Energy Generation which are illustrated by the Renewable energy law ;

1. Feed-in tariff Scheme,
2. Tendering Scheme and
3. Commercial Power Plants (The generator can sell electricity via bilateral contracts to consumers who are connected the electricity grids).

GoO is to provide a demand incentive scheme to promote the consumption from Renewable Power Plants which in our case is the quota system; this scheme will push the consumers under quota system to provide a proof to the government that they have consumed their assigned quota from Renewable Resources which in this case is the Certificate of Origin.

It is also worthy to say here that there are certain consumers categories that can benefit from such certificates even if there is no demand incentive scheme. The most straightforward example is the touristic sector, as many hotels can increase their profits with GoO that label them as green hotels.

The Figure below clarifies this point:



4. Recommendations

It is clear that one of the approaches for using the guarantee of origin system -from a “generator” perspective- is to organize a tracking mechanism for electricity generation as a proof of renewable attributes to the generation plant.

In this case, the main purpose of the system is to guarantee that the generation plant is actually generating electricity from renewable/CHP sources and consequently, giving the plant the “eligible” condition, usually for the purpose of receiving any kind of support scheme.

Another common use of the system is from a “consumer” approach, giving reliable information to the final electricity consumer and linking the guarantee of origin system with the disclosure of electricity.

From this perspective, some recommendations for guarantee of origin systems could be as follows:

- Although disclosure might appear to consumers as an abstract and complicated topic, it is important that they can trust the system information on how the system works has to be made accessible for consumers demanding this information. Information should be made available explaining that by buying electricity based on renewables, it cannot be guaranteed that customers physically consume electricity produced by renewable sources. It only ensures that the same amount of electricity (which is consumed) has been generated by renewables somewhere in the electricity market.
- It is important to recognize the fact that electricity customers are not a homogenous group, but pursue their own interests and have different levels of knowledge on these topics. This raises the question of what is the appropriate level of detail which should be provided to customers. This can be solved by presenting information providing different levels with increasingly detailed information. First, the mandatory level would contain all the information that suppliers must provide to customers as required by the regulatory framework. This framework may oblige electricity suppliers to specify in their bill and in promotional materials the contribution of each energy source to the overall fuel mix of the supplier. In addition, they can be obliged to publish information on the environmental impact, at least in terms of CO₂ emissions and radioactive waste resulting from the electricity produced. This information must not interfere with the comprehensibility of the bill / annual statement.
- Bearing this in mind, a second, voluntary level, including information of a higher level of detail – which already exists inside the guarantee of origin system – could be made available to the customer. It would be useful for customers to not only receive information about whether or not the electricity they consume is generated by renewable sources. Empowered customers also show increased interest in knowing the geographic origin of electricity and the source from which it is produced. Hence, the availability of more detailed information on the geographic origin of the electricity and the technology could benefit those customers.
- Regulators must ensure that all electricity suppliers use the same methodology when providing information to their customers on the origin of their electricity. It is of great importance to display the information on the origin of electricity in a comprehensive and clear manner. Even though in many countries there are legal or regulatory imperatives regarding the content and/or the format of the bill, a sample bill developed by the regulator or another competent body could serve as guidance for suppliers on how to display information concerning the origin of electricity on the annual statement in a clear manner.
- National solutions can be reliable, but integration of non-harmonized national disclosure systems in the same market would be very costly. Therefore, from an efficiency and affordability perspective, a harmonized solution is preferable. The need for further integration of the different disclosure systems in Mediterranean countries should be promoted. As an example, European

Member States can opt not to issue GOs for electricity that benefits from RES subsidies. As a result, in some countries subsidized RES production receives GOs, but not in others. While RES support is a national policy decision, disclosure is an EU-wide requirement and should, therefore, be harmonized at international level. The recognition of all guarantee of origins, irrespective of whether this guarantee are from supported or non-supported electricity, for disclosure purposes would enhance harmonization as well as the reliability of disclosure systems across Europe. This approach clearly enhances the transparency of disclosure.

- The implementation of the guarantee of origin system has primarily had a national focus in most countries. Customers would benefit insofar as the costs of the traded guarantee of origin would be made transparent and guarantee of origin trading could be more cost-efficient. As one of the recommendations is to advance in a wide harmonization of the disclosure system based on guarantees of origin, it is also necessary a transparent, secure and non-discriminatory Mediterranean market for guarantees of origin. From a long-term perspective, it is worth considering whether further introduction of market platforms would make the trading of guarantees of origin more transparent. A good example of this supra-national approach is the development of Association of Issuing Bodies (AIB), which mission is to develop, use and promote a standardized system for guarantees of origin to ensure the reliable operation of international certificate schemes. These schemes satisfy the criteria of objectivity, non-discrimination, transparency and costs effectiveness, in order to facilitate the international exchange of certificates through an inter-registry telecommunications Hub.
- Currently, other tracking mechanisms which are similar to guarantee of origin are also being used but do not have the same reliability. There is a manifest risk that energy might be associated with generation attributes twice (double disclosure) by using overlapping tracking mechanisms. In order to avoid this problem and to advance in this harmonization, as guarantee of origins are the only tracking instrument with a clear legal basis at international level, guarantee of origin could be used as the only instrument for tracking electricity from renewable sources within disclosure systems.

5. Final conclusions

The consumption of electricity tracked by guarantee of origin has shown significant development in the last years. Despite this development, the level of awareness and knowledge among domestic customers is rather low regarding issues related to the disclosure of electricity sources and offers of electricity based on renewable sources.

Systems for tracking and disclosing the attributes of electricity generation and their disclosure are complex and often difficult to for customers to understand.

It is necessary to develop approaches to make the disclosure system more coherent and reliable and information on disclosure more transparent, so that the customer can make a decision based on reliable, trustworthy information.

Electricity disclosure and its main instrument – the guarantee of origin – can be essential if a voluntary, consumer-driven market for renewables is to be created. Guarantees of origin can be a fundamental tool for supporting consumer awareness and choice in a Mediterranean power market.

Finally, further integration of the different disclosure systems could involve a more efficient and reliable system at international level, so, from an efficiency and affordability perspective, a harmonized solution would be a good practice.