

# **CHP-GO implementation and their integration with other policies, including policy recommendations (WP4 Report)**

**D5 of WP 4 from the E-TRACK II project**

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## Introduction

### The E-TRACK II project

Phase I of the E TRACK project has investigated the feasibility of a harmonised standard for tracking of electricity generation attributes in Europe. Such tracking is required by electricity disclosure (also called labelling) and can also be used for support schemes and for accounting for the 2010 targets of Member States for electricity from renewable energy sources (RES-E). Phase II of the project continues the process of harmonisation of tracking systems across Europe, including the new Guarantees of Origin for high-efficient cogeneration (HE-CHP-E). It also focuses on the specific situation of New Member States in the implementation of tracking systems and supports consumers and their organisations to define their requirements on tracking systems and the related policies. Based on intensive discussions with stakeholders across the EU, Norway and Switzerland, the project is giving recommendations for the design of tracking schemes and for measures to be taken at European and national levels.

### Acknowledgements

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### This report

This report aims at giving a general overview of the current status of cogeneration (CHP) Guarantees of Origin (GO) in the European countries covered by the E-TRACK II project. The report covers both the status of the implementation of Guarantees of Origin for cogeneration (CHP-GO) and the integration of CHP-GO with other electricity policies. The general trends throughout Europe are pointed out. The status of the regulations for CHP-GO in all Member states is compared to the EU Directive 2004/8/EC on the promotion of cogeneration based on a useful heat demand in the internal energy market. We also evaluate, interpret and discuss the interaction between different aspects of CHP-GO. This report includes three case studies covering Member States with respectively far, intermediate and slow advance in the implementation of CHP-GO. The report is concluded with a set of policy recommendations.



## Executive Summary

Based on the information on cogeneration Guarantees of Origin (CHP-GO) collected by the E-TRACK II project team, we can sketch an overall view of the status of CHP-GO in Europe.

### Implementation of CHP-GO in Europe

Within the EU-27, Norway and Switzerland out of 31 countries and regions 25 have now passed their primary legislation on CHP-GO and in 17 secondary legislation is prepared and available. In one third of the cases, regulation on HE-CHP has passed. As not all Member States (MS) have advanced their CHP-GO system to the same level, there is a high risk that the system is compromised at the European level. Apart from Cyprus, Finland, Greece, Ireland, Norway and Slovakia, all countries have appointed an Issuing Body (IB) to take care of the implementation of the legislation. In 11 cases, the IB is a regulator, in four a government and in Italy it is an independent accrediting body. These IBs can be considered independent from generation and distribution activities proper, as demanded by Article 5 par. 2 of the CHP-Directive<sup>1</sup>. In eight cases, the IB is a TSO. In six cases the IB has not been appointed yet and for Luxembourg the status of the IB is unknown. Where the IB activity is not defined as a mandatory public service but is conducted as a commercial activity, it can be questioned whether it is compatible with the aforementioned article. This issue would seem to be even more serious in cases where designated IBs are private-sector parties.

In most cases, CHP-GOs are filed in a registry, which is maintained by the IB. Nine registries are internet-based and five are not. There is strong differentiation between MS on the aspect to whom the information contained in the registry is available. The information can be publicly available, or just to (a selection of) stakeholders.

Most EU countries comply with the rules set by the CHP-Directive concerning the information provided on the CHP-GO. However, major disagreement exists on the rules set by the CHP-Directive and the implementation by the MSs regarding the indication of CO<sub>2</sub> information<sup>2</sup>. Apart from the Netherlands and Wallonia, no country indicates

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<sup>1</sup> Directive 2004/8/EC

<sup>2</sup> This stems from the fact that the CHP Directive offers an indirect methodology to calculate avoided CO<sub>2</sub> emissions based on the primary energy savings calculated under Annex III but does not enshrine this methodology to calculate CO<sub>2</sub> savings in the Directive itself. Member States can be tempted to use national fuel mixes or even European electricity CO<sub>2</sub>-intensity factors to calculate the CO<sub>2</sub> savings associated with CHP.

this information. The time and date of production are not as precisely defined as demanded by the Directive; usually only the production period is indicated. Most countries investigated claim that their CHP-GO system is not EECS based. However, EECS demands a high level of detail and much of the information requirements for CHP-GO is already aligned. Among the MS there is only strong deviation from the EECS Guidelines on the indication of public support and CO<sub>2</sub> information.

The calculation method for determining CHP electricity and to what extent a plant is high efficient or not, is still not harmonised. Just about one third of the analysed MSs accept the outcome of the Comitology process. To that effect, the late issuance of the final Guidelines is also a case in point. These Guidelines were only made available in the second half of 2008.

Transfers of CHP-GO are allowed by nine countries. Still, five MSs do not allow transfers of CHP-GO. Imports are allowed, in 12 MSs. However, so far, no exports of CHP-GO have taken place. The reason for this possibly lies in the design of each MS's policy on the use of CHP-GO, whether transfer of CHP attributes is necessary (for example to put the support where it is needed), protection measures of the MS's support scheme, existence of (domestic) targets and the existence of a market for CHP attributes.

### **Integration of CHP-GO with other electricity policies**

CHP-GO are most commonly used for disclosure although they are also used for support. In eight MSs, the officially specified role for CHP-GO is to serve as proof for disclosure of electricity; in three for proving eligibility for support benefits. If the CHP-GO is used for disclosure, the amount of support a generator is entitled to is based on other sources like green certificates, amounts of avoided CO<sub>2</sub>, etc. In most cases, disclosure attributes can be claimed by the owner of the CHP-GO. There is little agreement among the mechanisms chosen by each MS to support CHP electricity. In those cases where CHP-GOs play a role in the support scheme, the scheme is based on feed-in tariffs or premiums.

Directive 2009/29/EC states that GO (i.e. RE-GO in the context of this Directive) are solely meant to facilitate electricity disclosure with inclusion of green power marketing. In line with RE-GO we recommend to use CHP-GO as well for electricity disclosure and to make this purpose explicit in national legislation of the respective MS. For administration of CHP support, it is advised to introduce separate CHP support certificates. It is not recommended to use CHP-GO to determine the amount of support to a CHP generator. In the case where the investment in new CHP generation capacity is supported, for example in the form of grants, CHP-GO are at any rate a less obvious tool to hand out support. Currently, a separate support system for CHP-heat is only in place in Spain.

In the UK, generation of HE-CHP electricity is eligible for support with LEC (climate-change levy exemption certificates), worth on the order of £<sub>GB</sub> 4.5 / MWh. Yet, Ofgem, the competent authority for granting LEC, does not require CHP plant operators to prove generation of electricity from HE-CHP plants by CHP-GO.

In principle, no interaction between CHP-GO and ETS takes place. CHP-GO can not be used for carbon accounting; CHP-GO and EU ETS allowances cannot be traded against each other. When the efficiency benefits of CHP installations compared to separate production of electricity and heat, expressed as savings on carbon allowances, do not compensate the additional costs of CHP plants, a CHP-GO may be used to distribute production support (feed-in), and not just for statistical or disclosure purposes.

We identified several ways by which multiple counting with CHP-GO may still take place. First, CHP-GO may be used to apply for disclosure and/or support more than one time. Second, there are MS where more than one tracking system for CHP-GO exists. Third, multiple types of GO may be issued for the same quantity of electricity (RES-E and CHP-E). When a CHP generator uses biomass as a primary fuel, this generator is in principle eligible for issuance of both RE-GO and CHP-GO for a certain quantity of electricity produced in a HE CHP mode unless prevailing legislation pre-empts this. Finally, when cross-border trade in CHP-GO will develop, other multiple counting issues might arise if the E-TRACK standard is not adhered to. At present CHP-GO have not been exported yet, but this may change in the future.

## Policy recommendations

Based on our analysis we come to the following policy recommendations concerning CHP-GO:

- All MS have to implement CHP-GO systems to at least a minimum level (requirements CHP-Directive).
- MS have to state in their legislation for which purpose(s) the CHP-GO system is implemented.
  - These should include at least facilitation of disclosure and product differentiation.
- If CHP-GO have to facilitate support to (HE) CHP as well, introduction of a detachable support attribute is recommended.
- Delivery of a differentiated CHP product shall be proven mandatorily by CHP-GO.
- MS supporting HE-CHP and RES-E should define for which type(s) of support biomass-based HE-CHP is eligible.

- 
- Fully integrate CHP-GO system in RE-GO system to prevent double counting (one label covering both RES-E and CHP-E); in case of parallel GO systems, at least double issuing has to be prevented by use of a joint registry or mutual checks of registered plants within separate registries.
  - MS have to set up an electronic registry, solely for GO, maintained by an independent (issuing) body, in which all processes are tracked (issuing, imports, exports, transfers, redemption, etc.) and, with due regard for the protection of any confidential information, should be as transparent as possible.
  - Mandatory cancellation of CHP-GO after use for disclosure (and support, if appropriate).
  - A clear definition of HE-CHP is required.
    - Evolution towards a harmonized definition among MS is highly desirable.
  - Legal exclusion of disclosure of CO<sub>2</sub> emissions avoided by HE-CHP to end-users should be seriously considered.
    - Proper disclosure of CO<sub>2</sub> emission intensities is recommended instead.

## 1 Scope of the analysis

This report presents and discusses different aspects related to the implementation of CHP-GO in Europe. In the first chapter we assess the current state of implementation of CHP-GO in the EU27 plus Norway and Switzerland. The integration of CHP-GO with other policies is discussed in Chapter 3. The findings from these two chapters lead us to the formulation of policy recommendations which are presented in Chapter 4. We conclude with three case studies in Chapter 5 illustrating far, intermediate and slow advance in the implementation of a CHP-GO system.

Guarantees of Origin are a national responsibility for all Member States (MS), apart from Belgium, where the responsibility is taken by three regions: Brussels Capital Region (BCR), Flanders and Wallonia. The analysis is based on standard questionnaires which have been sent out to national experts, covering all 31 competent authorities. Where necessary, further assistance by E-TRACK II project partners has been provided. Out of 31 standard questionnaires, 23 were returned and for the other countries we based our information on private communications (for further reference see Annex I – Country Monitoring Reports of D1 of E-TRACK II project WP2.). Cyprus, Greece and Ireland have no cogeneration Guarantees of Origin (CHP-GO) system in place and will not be further mentioned in the analysis. By this, from here on, we only focus on ‘participating’ countries, i.e. countries with at least some trace of an (emerging) CHP-GO system being implemented.

Data assessment took place between January and November 2008. All information given in this report refers to the status of implementation in that period.

## 2 Monitoring of the implementation of CHP-GO in Europe

### 2.1 Introduction

The Directive on the promotion of cogeneration based on a useful heat demand in the internal energy market (2004/8/EC, from hereon called CHP-Directive) (EC, 2004) came into effect on April 21, 2004 and had to be implemented by EU MS no later than February 21, 2006. In the following sections, we analyze to what extent the MSs, Norway and Switzerland have adopted the requirements of the CHP-Directive with respect to CHP-GO.

### 2.2 Primary legislation and regulations

#### Primary legislation

Article 5 par. 1 of the CHP-Directive demands for a system by which electricity generated from CHP installations can be distinguished.

*“1. On the basis of the harmonised efficiency reference values referred to in Article 4(1), Member States shall, not later than six months after adoption of these values, ensure that the origin of electricity produced from high-efficiency cogeneration can be guaranteed according to objective, transparent and nondiscriminatory criteria laid down by each Member State. They shall ensure that this guarantee of origin of the electricity enable producers to demonstrate that the electricity they sell is produced from high efficiency cogeneration and is issued to this effect in response to a request from the producer.”*

In order to fulfil these requirements, primary legislation and regulations should be in place which define CHP-GO that enable producers to demonstrate by objective, transparent and non-discriminatory criteria that their electricity originates from high efficiency cogeneration. Our analysis shows that 25 governments have passed their primary legislation on CHP-GO. Switzerland has no legislation proposed and the legislation of Slovakia and Portugal is still being prepared. A list of the relevant legislative documents is shown in Annex 1. More details on these legislative documents can be found on the E-TRACK II website (E-TRACK II, 2009).

#### Regulations/Secondary legislation

The CHP-Directive demands for regulations in Article 5 par. 3.

*“3. Member States or the competent bodies shall put in place appropriate mechanisms to ensure that the guarantee of origin are both accurate and reliable and they shall outline in the report referred to in Article 10(1) the measures taken to ensure the reliability of the guarantee system.”*

Fulfilment of these requirements depends on the details of CHP-GO schemes, including administrative procedures and calculation methods. Such specifications on a more de-

tailed level are usually not implemented by primary legislation, but by further regulation. Such detailed regulations are prepared and available in 17 countries and regions. In the BCR and Slovakia, regulations are still in preparation; Estonia, Finland, Germany, Lithuania, Luxembourg, Malta, Portugal, Romania and Switzerland have no such regulation in place. A list of the regulations is provided in Annex 2 for 15 countries and regions where secondary legislation is prepared and available. More details are available on the E-TRACK II website (E-TRACK II, 2009).

Regulations on high efficient (HE) CHP-GO are passed in 10 countries and regions. In the BCR and the Czech Republic, HE CHP-GO regulations are proposed. In Finland, France, Hungary and Slovakia the regulations on HE CHP are still under development; in Denmark regulations only consist of guidelines from the issuing body. The main reason for the delay of these MS is the lack of a proper definition of HE CHP from the European Commission. Bulgaria, Estonia, Germany, Latvia, Luxembourg, Malta, Norway, Portugal, Romania and Switzerland have no regulation on HE CHP-GO.

### **Actual implementation of the CHP-GO system**

The implementation of the CHP-GO system has been severely delayed because the original time schedule for publishing reference values and the calculation Guidelines were not met. Harmonized efficiency reference values were delayed for a year and only became available in February 2007. In August 2007, not later than 6 months after adoption of the reference values all MS should have a GO-system in place. This deadline has not been met. The CHP-GO system is fully operational in 10 countries and regions. In the BCR and Sweden the system is being tested, preparations are going on in Finland, France, Hungary and Slovakia. Actual implementation in Austria, Bulgaria, Estonia, Germany, Latvia, Luxembourg, Malta, Portugal and Romania has not started yet. Norway and Switzerland are not bound by EU Directives to implement a CHP-GO. In Norway, although primary legislation is in place no actual implementation is anticipated due to the low relevance of CHP in the generation mix. Switzerland has no legislation in place. The Guidelines for the implementation of Annex II of the CHP-Directive were only decided on November 19, 2008.

The purpose of the CHP-Directive is stated in Article 1:

*“The purpose of this Directive is to increase energy efficiency and improve security of supply by creating a framework for promotion and development of high efficiency co-generation of heat and power based on useful heat demand and primary energy savings in the internal energy market, taking into account the specific national circumstances especially concerning climatic and economic conditions.”*

The character of the CHP-GO system should be in line with Article 1. Given that it has a proper implementation and is well-coordinated with relating policies, the CHP-GO system can support the achievement of the EU’s objective of increasing energy efficiency by 20% (EC, 2006a). In 10 cases, the contributing national experts consider the CHP-GO system playing a supportive role for target counting regarding a MS’s targets

with respect to CHP. In the Czech Republic and France there is no specific role anticipated by the contributing national experts for CHP-GO.

Table 1 shows an overview of the status of implementation of different countries. There are differences in the level of advancement of CHP-GO legislation among the MS. So far, this has not posed a major problem as trade in CHP-GO does not take place. However when the CHP-GO business takes off the integrity of the EU-wide system is at risk as MSs staying behind create voids which compromise the CHP-GO systems of more advanced MSs.

### 2.3 The issuing bodies and registries

Article 5 par. 2 enables MSs to appoint their own issuing body for CHP-GO which is independent of generation and distribution activities.

*“2. Member States may designate one or more competent bodies, independent of generation and distribution activities, to supervise the issue of the guarantee of origin referred to in paragraph 1.”*

Apart from Finland, Luxembourg, Norway and Slovakia, all other 22 reporting countries with a GO system have appointed their issuing body (IB), although in Finland the TSO will likely be chosen to perform the accreditation and verification of CHP plants. In 11 cases the IB is a regulator, in four cases a government; in Italy the IB is a company of which the Ministry of Economic Affairs is its only shareholder. The advantage of governments and regulators as IB is that they have no obvious commercial interest in the production, distribution and trade in electricity or GOs and fulfil the independency requirement stated in article 5 par. 2 of the CHP-Directive. The downside of this independence is that collecting data is more difficult. Governments and regulators may have to rely on other parties or collect data parallel with TSOs and DSOs, which increases the costs of the tracking system. In Denmark, Estonia, France, Lithuania, The Netherlands, Portugal, Sweden and Switzerland, the IB is the TSO. Although TSOs are not the commercial parties operating on the net, they are still involved in the distribution of electricity. Therefore, one may question whether TSOs fulfil the independence requirement stated in Article 5 par. 2 of the CHP-Directive. Still, there are also good reasons for a TSO being the competent body, as this actor plays a central role in providing easy access to the information a competent body needs to gather related to electricity production and feed into the grid.

One element of the appropriate mechanism ensuring the accuracy and reliability of CHP-GO demanded in Article 5 par. 3 is the setting up of a registry. Via our questionnaires there are 15 registries reported. Only in the United Kingdom there is no registry (the certificate is kept by the producer). For Germany and Malta, no information about the existence of the registry was provided. For Germany it is only clear that CHP-GO will not be issued electronically. As a CHP-GO system is practically absent in Bulgaria, Estonia, Finland, Latvia, Lithuania, Luxembourg, Norway, Romania, Slovakia, Sweden and Switzerland the necessity for a registry is automatically countered there.

Country/region	Primary legislation	Regulation	HE-CHP regulation	CHP-GO system	Role CHP-GO-system
EU-15					
Austria					
Belgium, BCR					
Belgium, Flanders					
Belgium, Wallonia					
Denmark					
Finland					
France					
Germany					
Italy					
Luxembourg					
The Netherlands					
Portugal					
Spain					
Sweden					
United Kingdom					
EU-12					
Bulgaria					
Czech Republic					
Estonia					
Hungary					
Latvia					
Lithuania					
Malta					
Poland					
Romania					
Slovakia					
Slovenia					
Non-members					
Norway					
Switzerland					
Legend					
	Passed	Prepared and available	Passed	Fully operational	Supportive for targets
	Proposed	Proposed	Proposed	Tested	Satisfy directive
	Under development	Under development	Under development	Under preparation	No role
No information	No regulation	No regulation	No regulation	Not started	

Table 1. Status of the implementation of primary legislation and regulations for each MS. The status of to what extent the CHP-GO system is operational and its role in achieving targets is shown in the two right-hand side columns.

To our knowledge, twelve of these registries are maintained by the IBs, in Austria and in the future probably also in Luxembourg, the regulator maintains the registry. In Portugal, apparently it has not been decided who maintains the registry. Nine registries are internet based and five are not. The registry is publicly available in the Czech Republic, France, Portugal (only non-confidential information) and Spain available to stakeholders in Austria, Flanders, Wallonia and Slovenia. In the Netherlands, the registry is only available to the agency that hands out support to CHP plant operators. For the remaining 6 registries no information is available on to whom they are available.

The requirements concerning the IBs and the registries defined in Article 5 par. 2 and 3 are summarized in Table 2.

In some MS the IB also provides other services than issuing GO and maintaining the registry. The services provided by the IBs are shown in Table 3.

## 2.4 Information specified on the CHP-GO

### Requirements from the CHP-Directive

In Article 5 par. 5 of the CHP-Directive the minimum requirements for the information on the CHP-GO are defined.

*“5. A guarantee of origin shall:*

*— specify the lower calorific value of the fuel source from which the electricity was produced, specify the use of the heat generated together with the electricity and finally specify the dates and places of production,*

*— specify the quantity of electricity from high efficiency cogeneration in accordance with Annex II that the guarantee represents,*

*— specify the primary energy savings calculated in accordance with Annex III based on harmonised efficiency reference values established by the Commission as referred to in Article 4(1).*

*Member States may include additional information on the guarantee of origin.”*

In our questionnaires we have inquired about which information is included with the CHP-GO. We asked about all the information mentioned in Article 5 par. 5 of the CHP Directive apart from the technology of the production device, the indication of the IB and the quantity of electricity from high efficiency cogeneration. The value of this information is also relatively low as the difference in definition of installations generating CHP electricity in Annex II and the installations that are high efficiency in Annex III gives rise to different interpretations of which electricity may be allocated to high efficiency CHP installations (see for further discussion of this subject section 2.5).

<i>Country/region</i>	<i>Issuing body</i>	<i>Role IB</i>	<i>Registry</i>	<i>Maintaining body</i>
EU-15				
Austria				
Belgium, BCR				
Belgium, Flanders				
Belgium, Wallonia				
Denmark				
Finland				
France				
Germany				
Italy				
Luxembourg				
The Netherlands				
Portugal				
Spain				
Sweden				
United Kingdom				
EU-12				
Bulgaria				
Czech Republic				
Estonia				
Hungary				
Latvia				
Lithuania				
Malta				
Poland				
Romania				
Slovakia				
Slovenia				
Non-members				
Norway				
Switzerland				
Legend				
	Appointed	Government Regulator	present	Appointed
	Not appointed	Indep. Accred- iting body	Not present	Appointed to TSO
No information		TSO		Not appointed

*Table 2. Status of issuing bodies and registries for CHP-GO. The results shown only concern the presence of an IB/registry and the issue of independence from electricity generation and distribution activities.*

<i>Country/region</i>	<i>Accreditation Plant</i>	<i>Issuing GO</i>	<i>Transferring GO</i>	<i>Redeeming GO</i>	<i>Maintaining registry</i>	<i>Other</i>
EU-15						
Austria	N	Y	N	N	N	N
Belgium, BCR	Y	Y	Y	Y	Y	N
Belgium, Flanders	Y	Y	Y	Y	Y	N
Belgium, Wallonia	Y	Y	Y	Y	Y	N
Denmark	Y	Y	N	N	Y	N
Finland	n/a	n/a	n/a	n/a	n/a	n/a
France	N	Y	N	N	Y	N
Germany	Y	Y	N	N	N	N
Italy	Y	Y	Y	N	Y	N
Luxembourg	n/i	n/i	n/i	n/i	n/i	n/i
The Netherlands <sup>3</sup>	Y	Y	N	Y	Y	N
Portugal	N	Y	Y	Y	Y	N
Spain	N	Y	Y	Y	Y	Y <sup>4</sup>
Sweden	Y	Y	N	N	N	N
United Kingdom	Y	N	N	N	N	N
EU-12						
Bulgaria	N	N	N	N	N	N
Czech Republic	Y	Y	Y	Y	Y	N
Estonia	n/i	n/i	n/i	n/i	n/i	n/i
Hungary	N	Y	N	Y	Y	N
Latvia	n/i	n/i	n/i	n/i	n/i	n/i
Lithuania	n/i	n/i	n/i	n/i	n/i	n/i
Malta	n/a	n/a	n/a	n/a	n/a	Y <sup>5</sup>
Poland	Y	Y	Y	Y	Y	N
Romania	n/i	n/i	n/i	n/i	n/i	n/i
Slovakia	n/a	n/a	n/a	n/a	n/a	n/a
Slovenia	Y	Y	Y	Y	Y	N
Non-members						
Norway	n/a	n/a	n/a	n/a	n/a	n/a
Switzerland	n/i	n/i	n/i	n/i	n/i	n/i

*Table 3. Services provided by IBs in different MS related to CHP-GO (Y); not provided (N); no information (n/i); not applicable (n/a).*

<sup>3</sup> Transferring CHP-GO is not allowed by law in the Netherlands

<sup>4</sup> Calculation of disclosure mix for each supplier

<sup>5</sup> The Authority shall have in place mechanisms that ensure that GO is both accurate and reliable

### **European Energy Certificate System (EECS)**

The Association of Issuing Bodies (AIB) has implemented a system for HE CHP-GO. This system has been developed in close cooperation with the European Commission and is fully compatible with the requirements of the CHP Directive (AIB 2009a). In order to assure a system of consistent and internationally tradable GO, this also includes further specifications and an Excel Tool which shall assure compliance with the Calculation Guidelines ((EC, 2006b) and (EC, 2008)) as defined by the Commission. The requirements for the EECS CHP GO (and all other types of EECS Certificates) are defined within the PRO, the Principles and Rules of Operation (AIB 2009b). The information content of an EECS CHP GO includes the following information:

1. the EECS Scheme(s) in respect of which it has been Issued; and
2. the unique number assigned to it by the Originating Member in accordance with the Subsidiary Document “EECS Registration Databases”;
3. the first day on which the energy output to which the EECS Certificate relates was generated;
4. the last day on which the energy output to which the EECS Certificate relates was generated;
5. the nature of the Originating Production Device;
6. identify the Originating Production Device;
7. the Nominal Capacity of the Originating Production Device;
8. its Face Value in accordance with the provisions of the relevant Domain Scheme;
9. the identity of the Originating Member;
10. the date on which it was Issued;
11. an indication, as appropriate, as to whether:
  - a. the relevant EECS Registration Database records that no Public Support has been, is being or will be given in respect of the Originating Production Device;
  - b. the relevant EECS Registration Database records that Public Support has been given in relation to an investment in the Originating Production Device or its owner;
  - c. the relevant EECS Registration Database records that Public Support is being or will be given with respect to the energy output of that Originating Production Device;
  - d. the relevant EECS Registration Database records that both:

- i. Public Support has been given to an investor in the Originating Production Device in relation to its investment therein or in the body which owns that Production Device; and
    - ii. Public Support is being, or will be, given in respect of the energy output of that Originating Production Device; or
  - e. the relevant EECS Registration Database does not record whether or not Public Support has been, or is being, given in respect of the Originating Production Device<sup>6</sup>.
12. Use of heat, being the value identified in the PRO Fact Sheet “CHP Codes” under “Use of Heat” which represents the predominant use of the relevant heat;
13. Lower calorific value in megajoules per kilogramme of fuel;
14. Primary Energy Savings, including:
- a. the primary energy saved expressed as a percentage according to Annex III of the Directive; and
  - b. the actual amount of primary energy saved expressed in megajoules per MWh; and
15. Information relating to CO<sub>2</sub> emissions, comprising:
- a. the CO<sub>2</sub> emissions produced per unit of CHP electricity in kilograms per MWh, calculated by subtracting the fuel for CHP heat based on Harmonised Efficiency Reference Values for separate production of heat from the total CHP fuel; and
  - b. absolute CO<sub>2</sub> emissions saved per MWh compared with the best available and economically justifiable technology for separate production of heat and electricity using the same fuels; and which was on the market in the year of construction of the CHP unit, as defined in Annex III(f) and in particular Annex III(f)(2) of the CHP Directive.

Part of this information has to be provided due to the fact that EECS covers more certificate types than only CHP GO. In order to allow for a meaningful comparison of the key information content of an EECS CHP GO with the requirements of the Directive, these information items are for this assessment abstracted as follows:

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<sup>6</sup> Points d(i) and e seem to contradict, however in principle only one of the points under 11 should be included on the certificate. If information on support is available, d(i) applies, if not than one can use e.

1. Unique identification number
2. Generation period
3. Technology of the production device, including fuels
4. Identity (incl. location) of the production device
5. Capacity of the production device
6. Amount of energy (e.g. 1 MWh)
7. Issuing Body
8. Issuing date
9. Type of support
10. Predominant use of heat
11. Primary energy savings (relative and absolute values)
12. CO<sub>2</sub> emissions per CHP electricity
13. CO<sub>2</sub> emissions avoided

Only the three Belgium regions claim to have their CHP-GO system based on EECS. In any case, this only means that the CHP GO system has been designed in order to comply with the EECS system to a large extent. So far, no EECS CHP GO Chapter has been approved yet by AIB. Austria will only base their CHP-GO system on EECS if this is requested and Portugal will try to base their system on EECS if the authorities agree. The Czech Republic, Denmark, France, Germany, Hungary, Italy, Malta, The Netherlands, Poland, Slovenia, Spain and the United Kingdom have not based their CHP-GO on EECS. In Bulgaria, Estonia, Finland, Latvia, Lithuania, Luxembourg, Norway, Romania, Slovakia, Sweden and Switzerland a CHP-GO system is practically absent, which implies that for these countries the system does not comply with EECS.

The majority of the responding countries have systems in place that do not accord with the EECS. This is quite natural as EECS specifications go in much more detail than the CHP Directive and are therefore only to meet if a government explicitly decides to implement an EECS CHP GO scheme on the national level.

The information provided on the CHP-GO is shown for each MS in Table 4. The information shown there is based on the returned questionnaires. For clarity, countries that have not defined the requirements for the information on a CHP-GO have been excluded from Table 4. This concerns Finland, Latvia, Luxembourg, Romania and Sweden. For the same reason, Norway, Slovakia and Switzerland are also not included as in these countries there is no CHP-GO system presenting place. As Table 4 shows, there is much overlap between the information provided on the CHP-GO of these MSs and the requirements for EECS. There we also show whether the information is required by the

CHP-Directive, EECS or both. The indication of the issuing date has not been included in the investigation.

Indication on CHP-GO of	Identification number	Generation period	Technology of production de-vice	Fuels	Lower calorific value of fuel	ID of plant	Location of plant	Plant capacity	Amount of energy	Issuing body	Type of support	Predominant heat use	Primary energy savings	HE CHP-E amount	CO <sub>2</sub> emissions per CHP-E	CO <sub>2</sub> emissions avoided
CHP-Directive																
EECS																
EU-15																
Austria																
Belgium, BCR																
Belgium, Flanders																
Belgium, Wallonia																
Denmark																
France																
Germany																
Italy																
The Netherlands																
Portugal																
Spain																
United Kingdom																
EU-12																
Bulgaria																
Czech Republic																
Estonia																
Hungary																
Lithuania																
Malta																
Poland																
Slovenia																
Legend																
Indicated																
Not indicated																
No information																

Table 4. Status of the information provided on CHP-GO.

## 2.5 Calculation method

The main elements of the national systems allowing for the issuance of CHP-GO are described in Article 5 of the CHP-Directive. A major role however, is reserved for Annex II and Annex III of the same directive where respectively the amount of electricity from a CHP plant and the calculation for the primary energy savings are described. Article 12 of the CHP-Directive describes in what situation alternative calculations are allowed. The Guidelines for the implementation and application of Annex II were not established in the CHP-Directive 2004/8/EC (EC, 2004), but according to point (e) of Annex II postponed to a later date. The diverging interpretations of a key aspect of this directive could result in differentiated treatment of similar plants in different MSs. These Guidelines became available November 19, 2008 and are described in the Commission Decision 2008/952/EC (EC, 2008). As a consequence, several MSs have delayed the adoption of national regulations implementing fully the CHP Directive, and in several cases those required for the full implementation of CHP-GO (as has also been pointed out in section 2.2).

The data source for the calculations in Annex II and III are the operational data from the CHP plant. The system boundaries of the CHP plant are set within its property's limits, but exclude heat-only boilers that may possibly be installed at the plant site. The Guidelines leave the possibility open that the CHP installation does not run in CHP-mode - producing electricity and *useful* heat - over the entire reporting period, but also in a mode where it only produces electricity (and non-useful heat). The CHP electricity output should be measured at the generator terminals and includes consumption for the operation of the cogeneration unit (i.e. gross output).

The first step in the calculation procedure is to determine the overall efficiency of the of the cogeneration unit based on the actual operational data taken from real/registered values of the specific cogeneration unit (excluding heat-only boiler) collected during the reporting period. If the overall efficiency exceeds the efficiency threshold defined in Annex II, all measured electrical energy qualifies as "cogenerated electricity" and can receive a guarantee of origin. If the threshold of Annex II is not met, the amount of electricity generated in CHP-mode has to be calculated using the power-to-heat ratio between the measured actual electrical energy and the measured actual useful heat ( $C_{\text{actual}}$ ). If these values are not available, for example in the case of a new installation, one may fall back on design or default values. The fuel spent in non-CHP-mode can also be calculated with  $C_{\text{actual}}$ <sup>7</sup>. The last step in the calculation procedure is to determine the pri-

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<sup>7</sup> To avoid extra administrative costs for operators, the AIB deviates from this CHP-model. AIB assumes a maximum heat loss of 15% (85% overall efficiency) and calculates the power-to-heat ratio based on that.

primary energy savings (PES) as described in Annex III. The conditions set in Annex III(a) determine whether an installation can be considered as high efficient (HE) CHP (>10% PES for large units, >0% PES for small units) (EC, 2008).

The following example is meant to illustrate that there is still room for improvement of the Commission Guidelines. Although the example does not describe a common practice in the operation of CHP-installations, it still shows a realistic case where a plant becomes eligible for CHP-GO where it actually loses energy compared to separate production of electricity and heat. Following the Guidelines and Annex II and III of the CHP-Directive, we can calculate the primary energy savings of an imaginary CHP unit (Harmsen, 2009).

Our case concerns a combined cycle gas turbine with heat recovery having an electric efficiency of 35% and a heat efficiency of 53% in full CHP-mode. We assume a reporting period of 1 year in which 100 MWh of electricity and 100 MWh of heat was produced with an amount of fuel which has an energy content of 303 MWh (lower heating value). The annual average of the electric efficiency (i.e. regardless of whether the installation was run in CHP mode or not) is 33% and the corresponding thermal efficiency is 30%. Although these low efficiencies are not exemplary for most CHP-units we think this example is still realistic<sup>8</sup>. The overall efficiency (power plus heat) during the reporting period was 63% which means that this installation does not meet the Annex II threshold of 80%. According to the Commission Guideline the amount of CHP electricity should therefore be calculated via the method laid out in the CHP-Directive Annex III. Following step 3 of the Commission Guideline, the amount of CHP electricity is 66 MWh. This amount is determined by multiplying the power to heat ratio  $C_{\text{actual}}$  between the electric and heat efficiencies in full CHP mode (respectively 35% and 53%) with the reported (useful) heat production of 100 MWh. It follows that of the 100 MWh of electricity produced 34 MWh was generated in non-CHP-mode. The amount of non-CHP electricity divided by the average electrical efficiency over the reporting period of 33% gives the non-CHP fuel spending which is 102.9 MWh. The electric efficiency in CHP mode is 33%. This has been calculated by dividing the amount of electricity produced in

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<sup>8</sup> Performing the same calculation with an annual average thermal efficiency of 40%, i.e. a better utilization of the useful CHP-heat produced, results in positive primary energy savings of 6.8%. The Commission Guidelines seem to be based on the assumption that a CHP-plant operator both uses the power and heat capacity of its plant as effective as possible. From an economic point of view this seems a reasonable assumption, and it will work in most cases. Our example shows that the amount (and sign) of primary energy savings from a CHP-unit strongly depends on the simultaneous demand for power and heat. The Commission Guidelines does not anticipate a simultaneous demand for these two products that differs so much that using the CHP-plant results in an energy loss compared to separate production of power and heat.

CHP-mode by the total energy consumed in CHP-mode which is 200.1 MWh (see Annex III(b)). Similarly, using the amount of useful heat produced in CHP mode in stead of the associated amount of electricity produced we can determine the thermal efficiency in CHP-mode at 50%. According to the formula in Annex III(b) the primary energy savings in CHP-mode are 15.5%. This means that the installation qualifies as a HE CHP-plant. Still, the efficiency for the unit as a whole, i.e. based on the annual average efficiencies of 33% (electric) and 30% (heat) and using the same formula in Annex III(b) is -4%.

Although according to the Directive the installation is high efficient, as a result of the negative effect of power-only operation on overall efficiency over the course of one year the plant uses more primary energy instead of saving it. This is a major concern and a source of confusion. The current method to determine whether an installation is HE or not fails to assess to what extent the efficient attributes of a CHP plant are actually used and makes installations eligible for CHP-GO that do not meet the annual efficiency thresholds, as the Directive allows Member States to test the compliance with the 10% PES over periods of time shorter than one year. Moreover, the information on primary energy savings indicated on the CHP-GO do not necessarily reflect the energy savings that are actually achieved with a particular plant over the entire year, but rather those over the specific period on CHP-mode operation during which the installation operates in high efficiency mode.

Another source for misunderstanding is that the CHP-Directive does not give a clear definition of what constitutes a CHP plant, but only distinguishes between high efficient installations and other installations. The basic idea is that only CHP that is produced by HE CHP plants can qualify for a CHP GO. However, it is possible to apply Annex II to installations that only achieve the 10% primary energy saving test over a fraction of a year, and not over an entire year.

Denmark, Hungary and Italy do not follow the Comitology procedure for the calculation methods for CHP electricity and HE CHP. Estonia, Finland, Germany, Luxembourg, Malta, Norway, Portugal, Romania, Slovakia and Switzerland have no regulations in place, so the calculation issues do not apply to these MSs. The information on whether the Comitology process is followed or not from the BCR, Bulgaria, the Czech Republic, Germany, Latvia, Lithuania, Poland, Sweden and the United Kingdom was not available to us. Table 6 shows which countries and regions are following the Comitology procedure and which ones are not.

<i>Country/region</i>	<i>Status</i>
EU-15	
Austria	
Belgium, BCR	
Belgium, Flanders	
Belgium, Wallonia	
Denmark	
Finland	
France	
Germany	
Italy	
Luxembourg	
The Netherlands	
Portugal	
Spain	
Sweden	
United Kingdom	
EU-12	
Bulgaria	
Czech Republic	
Estonia	
Hungary	
Latvia	
Lithuania	
Malta	
Poland	
Romania	
Slovakia	
Slovenia	
Non-members	
Norway	
Switzerland	
Following Comitology	
Not following, but Guidelines based on Comitology	
Not following	
No regulation	
No information	

*Table 5. Status of the acceptance of the Comitology process for each country or region.*

## 2.6 Imports, exports and transferability

In principle, when used for disclosure purposes and specialty products there should be no difference in transferability between RE-GO and CHP-GO. These GO represent an additional value of the renewable and the efficiency attribute respectively. Like in the case of RE-GO, the attributes of CHP-GO may be tradable if legislation allows for the transfer of CHP-GO from one owner to the other and arranges the mutual recognition of CHP-GO among all MS. In practice, the need for transfers is determined by the design of each MS's policies and further characteristics of the electricity market with respect to CHP electricity and heat and may depend on the following (non-exhaustive) list of issues:

- does legislation specify what CHP-GO can be used for in each MS (disclosure, support),
- whether it is desirable that the CHP (or efficiency) attribute is transferable from the plant operator to other parties (which is the case when CHP-GO are used for disclosure),
- the need to protect the CHP support scheme from 'leaking' tax payers' money to other MS,
- whether there are (efficiency) targets that have to be met,
- whether there is a market for the CHP (or efficiency) attribute like in the case of RE-GO where there is a green power market. This market might develop after the right conditions for trading are created.

It is essential that in legislation the purpose(s) of CHP-GO is (are) stated. If both for facilitating disclosure (and product differentiation), then transferability for disclosure purposes can still be accommodated by introducing a (detachable) support attribute.

### Imports and exports

The CHP-Directive requires MSs to recognize each others CHP-GO as is described in Article 5 par. 6.

*"6. Such guarantees of origin, issued according to paragraph 1, should be mutually recognised by the Member States, exclusively as proof of the elements referred in paragraph 5. Any refusal to recognise a guarantee of origin as such proof, in particular for reasons relating to the prevention of fraud, must be based on objective, transparent and non-discriminatory criteria.*

*In the event of refusal to recognise a guarantee of origin, the Commission may compel the refusing party to recognise it, particularly with regard to objective, transparent and nondiscriminatory criteria on which such recognition are based."*

The mutual recognition implies that imports and exports are recognized between the MS. According to the information provided to us, imports of CHP-GO are eligible in

Austria, all three Belgium regions, Denmark, France, Lithuania, Slovenia and Spain. In Italy and the United Kingdom imports are only recognized for disclosure. In the Czech Republic, Hungary, the Netherlands, Norway, Poland and Switzerland, imports of CHP-GO are not eligible. Information on the allowance of imports was not available from Bulgaria, Estonia, Finland, Germany, Latvia, Luxembourg, Malta, Portugal, Romania and Sweden. The explanation for this lack of information is that for many of these countries secondary legislation, which deals with these issues, is not present yet. In spite of the rather widespread recognition for imports of CHP-GO, no CHP-GO has been exported yet although for seven countries we do not have information. This leads to the observation that although international trade is recognized between some MSs of the EU, nobody is making use of this opportunity (yet).

Two possible reasons for the absence of import and export activities may exist. Although in most MSs use of CHP-GO for disclosure is envisaged (see Table 8), demand for CHP-based electricity might be negligible. Moreover, the absence of CHP targets to which MSs have to comply may be a case in point. Therefore, between MS there is no incentive to exchange CHP-GO, although in those MS where the support scheme is based on quota obligations, importing GO may be used by individual producers (if no further conditions apply) to fulfil their obligation. It should be noticed that meeting national targets is independent from voluntary trade. Unless mutual agreements between countries regulate otherwise, the imported CHP-GO still count to the national target of the country of electricity production.

Another reason to transfer CHP-GO cross border may be a high demand for power products with the CHP attribute. This would then be similar to the green power market in for example the Netherlands, where the amount of green power sold exceeds the domestic production of renewable energy. Such high voluntary demand from consumers does not exist within the EU-27 for CHP so far and is therefore a further explanation for the absence of imports and exports.

For MS in which CHP-GO play a role in the support scheme (see Table 8), there is no general trend observable in the eligibility of imports and exports. Portugal, Spain and Slovenia recognize imports, only Hungary does not. We may speculate that for Hungary this is a means to protect its support scheme against leaking, although this has not been explicitly mentioned to us.

### **Transferability**

In Austria, all three Belgium regions, Finland, Italy, Poland, Slovenia, Spain and the United Kingdom, CHP-GO are transferable. In Bulgaria, the Czech Republic, Denmark, France and the Netherlands they are not. For the other countries a CHP-GO system is not present or information on transferability was unavailable. Although CHP-GO are in most cases only used for disclosure or support (see section 3.3) both for which transferability is not an absolute necessity, the exchange of CHP-GO is still widely allowed. Transferability is probably implemented to fulfil the recognition requirement stated in Article 5 par. 6 of the CHP-Directive. Mutual recognition of CHP-GO between MS

takes shape via the eligibility of imports and exports for which transferability is an absolute condition. It should be noted that in Denmark and France imports are allowed, whereas issued CHP-GO are reported to be non-transferable. This poses the question whether the answers stated in the questionnaires are internally consistent. Otherwise, the policy design would be inconsistent. Table 6 schematically shows the information on which this section is based.

<i>Country/region</i>	<i>Exports</i>	<i>Imports</i>	<i>Transferability</i>
EU-15			
Austria			
Belgium, BCR			
Belgium, Flanders			
Belgium, Wallonia			
Denmark			
Finland			
France			
Germany			
Italy			
Luxembourg			
The Netherlands			
Portugal			
Spain			
Sweden			
United Kingdom			
EU-12			
Bulgaria			
Czech Republic			
Estonia			
Hungary			
Latvia			
Lithuania			
Malta			
Poland			
Romania			
Slovakia	n/a	n/a	n/a
Slovenia			
Non-members			
Norway			n/a
Switzerland			n/a
Legend			
	Took place	Recognized Recognized for disclosure only	Allowed
No information	Did not take place	Not recognized	Not Allowed

Table 6. Status on the national and cross-border transferability of CHP-GO among MSs.

## 3 Integration of CHP-GO with other electricity policies

### 3.1 Stapling of attributes

When a MS has two separate systems for RE-GO and CHP-GO, there are situations in which a generator may apply for both GO. This is the case when a CHP installation (partly) runs on bio-based fuels. The possibility of applying for two or more different GO for the same amount of electricity is called “stapling of attributes”.

This is a relevant issue as it causes a form of double counting when no appropriate measures are taken. The electricity produced with a CHP plant running on biofuels ends up *both* in the RE-GO registry and in the CHP-GO registry. If GO are used for disclosure, this implies that this amount of electricity ends up twice in the disclosure statement. We can define two undesired effects: the amount of actually produced electricity does not balance the amount of electricity for which the attributes are disclosed. In the case where GO are used for support, the generator can apply for support for RES-E as well as CHP-E. The generator may therefore, depending on MS legislation, receive more subsidies than justified.

Neither the CHP-Directive nor the RES-Directive adopted by the European Parliament on 17 December 2008 (P6\_TA(2008)0609) deals with this issue. In the recitals of the latter document it says:

*(42) Directive 2004/8/EC of the European Parliament and of the Council of 11 February 2004 on the promotion of cogeneration based on a useful heat demand in the internal energy market and amending Directive 92/42/EEC creates guarantees of origin for proving the high efficiency of cogeneration plants; such guarantees of origin cannot be used in disclosing the use of renewable energy in accordance with Article 3(6) of Directive 2003/54/EC as this would not exclude the risk of double counting and double disclosure.*

CHP-GO should not be used for the disclosure of RES-E towards consumers, however it does not explicitly forbid the stapling of attributes as defined above, nor the use of CHP-GO for other/multiple purposes like support benefits. A unit of electricity from renewable sources can only be disclosed once to a consumer using the RE-GO but there still exists an unredeemed CHP-GO for the same quantity of electricity which may be used for other purposes. If a MS has two separate systems for RE-GO and CHP-GO without the provision that a generator has to choose between one of the two systems, there is a high risk that the same unit of electricity generated by a CHP-plant running on renewable sources still ends up twice in the MS's statistics.

In Austria, the BCR, Wallonia and France, there is one GO that covers both renewable electricity (RES-E) and CHP. In these systems, stapling of attributes is not possible. Flanders, Hungary, the Netherlands, Slovenia and the United Kingdom use separate GO systems for RES-E and CHP. For these latter countries (and Flanders) it means that, depending on the regulation, a CHP-generator that uses biomass as a fuel could apply

for both RE-GO and CHP-GO. This could lead to double counting as well as windfall profits. The latter problem occurs in case the stapling of attributes makes plant operators eligible for two different support schemes while these are not designed to deal with the combined attributes (RES and CHP). A precaution measure to prevent these kinds of problems can be found in Flanders, the Netherlands and Slovenia. There a generator has to choose whether it applies for RE-GO or CHP-GO. In these three countries stapling of labels is not allowed. Norway only has a RE-GO system in place, so label stapling is not an issue there. Other countries do not have a CHP-GO system in place or did not provide us with information regarding the possibility of stapling of labels.

### 3.2 Multiple counting

One of the major pitfalls that undermines the reliability of a GO system is so-called multiple counting. The basic principle behind multiple counting is that the attributes of the same quantity of electricity can be claimed multiple times. For renewable energy GO (RE-GO) multiple counting problems have been extensively described in the Phase 3 report of the RE-GO project (Uyterlinde et al., 2004). There are four causes that bring on multiple counting:

- Multiple issue of GO for the same unique quantity of electricity
- Multiple use of a GO
- Parallel use of GO and other forms of proof (such as e.g. other tradable green certificates) for the same unique quantity of electricity
- Unintentional or fraudulent errors

The undesirable effects associated with multiple counting can be identified using the following criteria:

- **Additionality of claims:** this is not the case when the environmental attributes of the electricity underlying a CHP-GO are used several times.
- **Legality of the claims:** this is not the case when the claims in line contravene the national legislation of a MS or the CHP Directive.
- **Consistency of the claims:** this is not the case when the information on the production and use of electricity in a certain region and in a certain year is not consistent between the different purposes disclosure, support and target accounting.<sup>9</sup>

Many of the multiple counting problems associated with the use of RE-GO may also apply to CHP-GO. Below a number of possibilities of double counting applying for pri-

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<sup>9</sup> Although this might lead to confusion amongst consumers, the new RES Directive 2009/28/EC has introduced it in order to grant MS control of their respective national RES support system.

vate sector entities are discussed based on the four causes for multiple counting defined above. Additionally possible occurrences of multiple counting at a government level are also described.

Multiple counting may occur when more than one GO is issued for the same amount of electricity. In principle, a CHP-installation running on a renewable source like biomass can apply for both RE-GO and CHP-GO. In that case the same quantity of electricity ends up in both the RE-GO and the CHP-GO system and is thus counted twice. This can be prevented by good design of the CHP-GO tracking system and proper implementation. The best way of preventing multiple issuing of GO is by setting up a system which uses only one type of GO that covers both RES-E and CHP-E instead of setting up two separate GO systems. Apart from Austria, the three Belgium regions and France, the CHP-GO systems are separated from the RE-GO systems. In the Netherlands and Slovenia the multiple issuing problems are solved by the obligation of an operator to choose whether it applies for CHP-GO or for RE-GO. Applying for both is forbidden there. In all other MS no provisions are made to prevent double counting in the two registries for CHP-GO and RE-GO.

Another measure that prevents multiple issuing is by setting up one national registry<sup>10</sup> for GO. Apart from Luxembourg, Slovakia and Norway, all MS and Switzerland have appointed an IB, although in Finland and Portugal are not as far and have only proposed an IB. Apart from Austria, where the net operators are IB in their respective control area and Belgium with three regional IBs, all MS have appointed only one IB. For Lithuania this claim is still provisional as to our knowledge an IB has been appointed but no further details were provided to us. A registry is present in all MS apart from Germany, Norway, Slovenia, Switzerland and the United Kingdom.

Regulations should be in place to inhibit market participants to use CHP-GO more than once for obtaining direct market support for production or consumption (feed-in tariffs, feed-in premiums and quota obligations) and/or for other commercial purposes such as “green” electricity disclosure, reporting, advertising, etc. A major step in preventing this multiple use of CHP-GO would be made when national legislation explicitly states the purpose(s) of CHP-GO and makes redemption of CHP-GO after use for one of these purposes mandatory. This also prevents other unwanted effects similar to various types of ‘green washing’ (Uyterlinde et al., 2004). Most MS have officially specified only one role for CHP-GO (see also Table 7) Only in Spain CHP-GO can be used both for disclosure and for support. So far inter alia Bulgaria, the Czech republic, Finland, France, Germany and Italy have not specified an official use at all. Only the three Belgium regions, Denmark, Finland, the Netherlands, Portugal, Slovenia and Spain have a

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<sup>10</sup> This may be a joint registry or registries for which a mutual check of registered plants and issued GO is performed.

redemption procedure in place. In the other 18 MS (Austria, Bulgaria, the Czech Republic, Estonia, France, Germany, Hungary, Italy, Latvia, Lithuania, Luxembourg, Malta, Norway, Poland, Romania, Slovakia, Sweden, Switzerland and the United Kingdom) CHP-GO cannot be redeemed. The latter situation is at odds with the prevention of double counting of CHP electricity by multiple use of the same GO.

In Germany and Portugal, the CHP-GO system is used alongside other systems for tracking CHP electricity. This is a form of parallel use of GO and other forms of proof of the attributes of the same quantity of electricity which increases the risk of multiple counting in these two countries. In Germany contract-based tracking is applied along with BDEW<sup>11</sup> ex-post allocation, TÜV (for RES-E) and other labelling schemes. In Portugal CHP-GO are the basis of a support scheme and disclosure is not based on GO. In Austria and Flanders, the CHP-GO system does not exist alongside other tracking systems, but this may change when there is demand for such a different system. Bulgaria, Estonia, Finland, Latvia, Lithuania, Luxembourg, Norway, Romania, Slovakia and Sweden are excluded from this part of the analysis as there the CHP-GO system is not present or in a too early phase of development. From the Czech Republic, Malta and Switzerland there is no information available. In the other 11 cases, the CHP-GO system will not exist alongside other systems of electricity disclosure, green electricity, etc. (the BCR, Wallonia, Denmark, France, Hungary, Italy, the Netherlands, Poland, Slovenia, Spain and the United Kingdom).

On the government level, multiple counting may take place when statistical instruments are not harmonized or via creative cross border transfers when the validity period is not the same for each MS. A MS may collect CHP electricity production data via its own statistical instruments. The exported CHP-GO should be subtracted from the consumption statistics of the exporting country and added to the consumption statistics of the importing country.

Still, in the case of export of CHP-GO multiple counting may occur when the exporting country reduces its claimed amount of CHP electricity, but uses other sources than GO to correct its statistics. Another multiple counting possibility lies in the multiple use of GO that are transferred over MS borders when the validity periods, compliance period or the accounting date of the GO are not harmonized between the MS. The introduction of proper redemption and earmarking procedures will solve these sorts of multiple counting problems.

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<sup>11</sup> Bundesverband der Energie- und Wasserwirtschaft.

### 3.3 Application of CHP-GO

The current use of CHP-GO and its officially specified application is shown for each MS in the second and third column of Table 7. In most cases CHP-GO are used for disclosure although these certificates are also used for support. The application of CHP-GO is officially specified in 12 countries and regions. In four countries, the application of CHP-GO is not officially specified (and of 12 we do not have information). The CHP-GO system in Estonia, Latvia, Lithuania Luxembourg, Norway, Romania, Sweden and Switzerland is in such a premature state that this part of the analysis cannot be applied to these eight countries. The same goes for Slovakia, however, the results shown there are likely to be directions of thought.

The fourth column of Table 7 shows that disclosure information for CHP can be proven by different market participants, partly on the basis of CHP-GO. This also depends on whether CHP-GOs are transferable or not. In the end it is important that no two parties can use the disclosure information for one MWh of CHP electricity in parallel. In ten cases, disclosure is claimed by the owner of the CHP-GO, in five cases by the plant operator, in four cases by the electricity supply company and in three cases no one can claim disclosure. In the BCR, Wallonia, Germany and Spain different market participants are generally eligible to disclose CHP as a source of electricity in their electricity mix. In the two Belgium regions the CHP-plant owner is only allowed to disclose for his own consumption. For Bulgaria, Estonia, Latvia, Lithuania, Malta, Romania and Sweden it was not specified in the reply to our questionnaire who can disclose electricity from CHP plants.

As in many other MS, in Flanders CHP-GO are used for disclosure. An example of a disclosure statement as provided in Dutch by Electrabel for 2008 is shown on pages 36 and 37 (Electrabel, 2009). To keep the example as genuine as possible we have not translated the statement to English. In stead we explain here which information it contains and where it can be found. The share of CHP (Warmtekracht) in the generation plants is visualized in the first two pie diagrams respectively as the production capacity (ontwikkelaar vermogen per type eenheid) and the amount of electricity produced (productie per type eenheid). The third pie diagram indicates the fuels used to produce the electricity. The table shows the share of renewable (% hernieuwbaar), CHP (% warmtekracht), fossil fuel (% fossiel), nuclear fuel (% nucleair) and unknown (% onbekend) for the total fuel mix of Electrabel as well as for their grey (Fuel Mix Grijs) and green electricity product (Fuel Mix Groen).

Country/region	Use of CHP-GO	Officially specified role of CHP-GO	Disclosure claimed by
EU-15			
Austria			
Belgium, BCR			
Belgium, Flanders			
Belgium, Wallonia			
Denmark			
Finland			
France			
Germany			
Italy			
Luxembourg			
The Netherlands			
Portugal			
Spain			
Sweden			
United Kingdom			
EU-12			
Bulgaria			
Czech Republic			
Estonia			
Hungary			
Latvia			
Lithuania			
Malta			
Poland			
Romania			
Slovakia	n/a		
Slovenia			
Non-members			
Norway	n/a	n/a	n/a
Switzerland	n/a	n/a	n/a
Legend			
	Disclosure	Disclosure	Owner of GO
			CHP-Plant operator
	Support	Support	E-supply company
		Disclosure & support	Final consumer
		Specified but undefined	No one
No information	Unclear	No official role	Not defined clearly

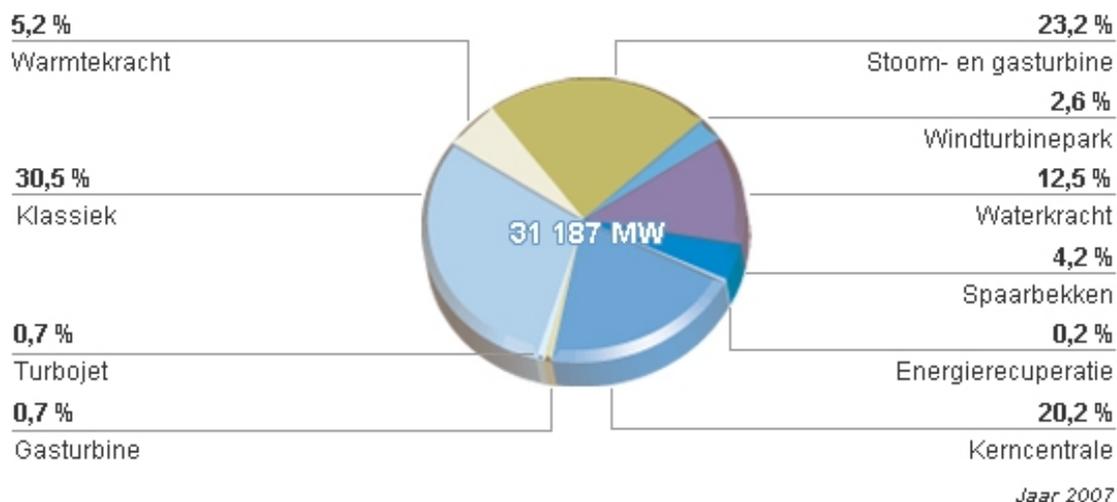
Table 7. Use and official role of CHP-GO and who can claim disclosure.

# Productie

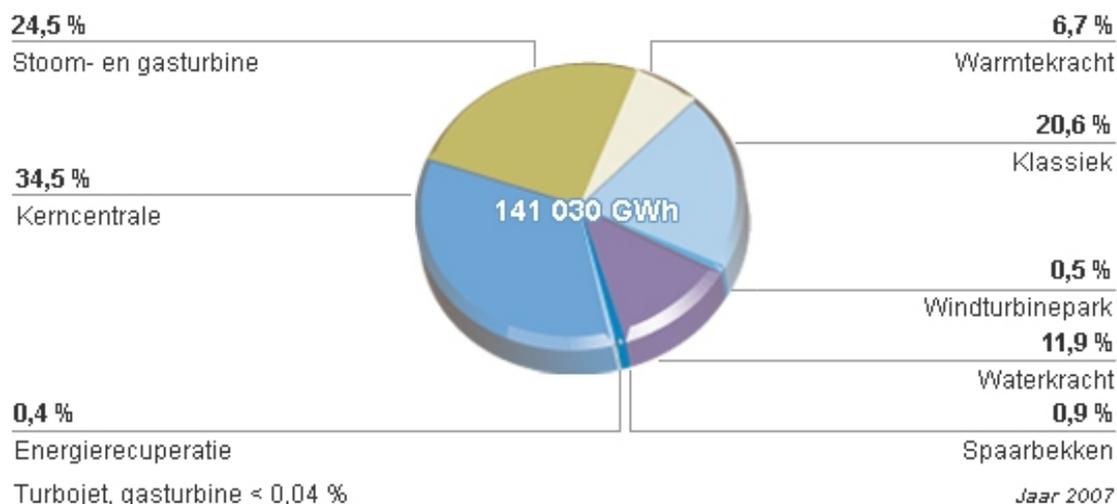
## Productiecijfers

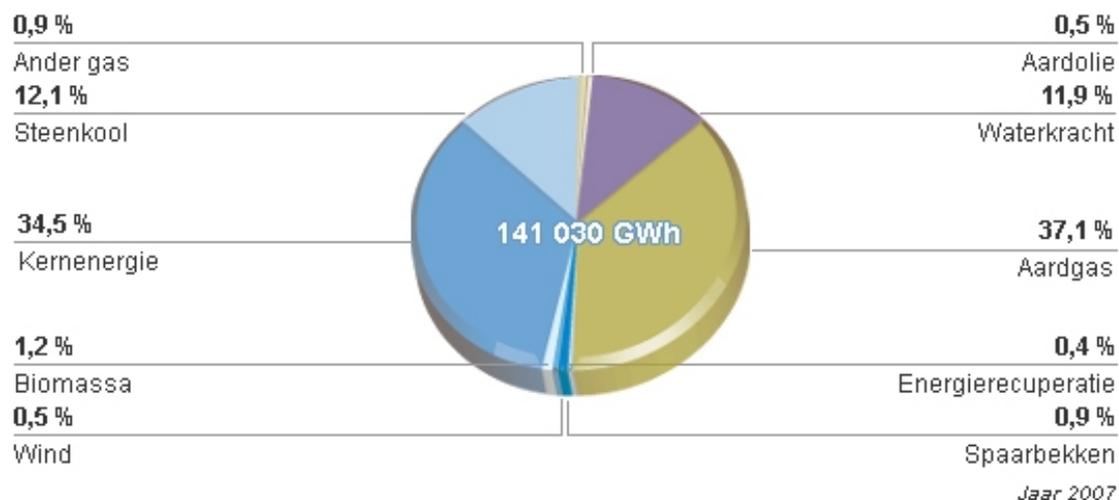
Het aandeel van aardgasgestookte centrales, kernenergie en waterkracht in haar productiemiddelen, alsook het groeiende aandeel van andere hernieuwbare energiebronnen, maken het mogelijk dat de onderneming een hoog rendement koppelt aan de naleving van ambitieuze milieudoelstellingen. De helft van de productie is CO2-emmissievrij.

### Ontwikkelbaar vermogen per type eenheid



### Productie per type eenheid in netto



**Productie per type brandstof - in netto****Oorsprong van elektriciteit**

De oorsprong van de door Electrabel geleverde elektriciteit in België, berekend volgens de methode gehanteerd door de regulator, is als volgt:

	% hernieuwbare	% warmtekracht	% fossiel	% nucleair	% onbekend
Fuel Mix Totaal	1,69	7,66	30,33	58,43	1,89
			aardgas: 16,32		
			ander: 14,01		
Fuel Mix Grijs	1,60	7,67	30,36	58,49	1,88
			aardgas: 16,33		
			ander: 14,03		
Fuel Mix Groen	100,00	0,00	0,00	0,00	0,00
			aardgas: 0,00		
			ander: 0,00		

In Europa beschikt Electrabel over 5 200 MW productiecapaciteit met hernieuwbare energiebronnen (wind, water, biomassa). Die installaties produceerden in 2007 evenveel elektriciteit dan 5,5 miljoen gezinnen jaarlijks verbruiken. In 2009 wil de onderneming de capaciteit uitbreiden tot 6 300 MW of 18 % van het totaal.

### 3.4 Support mechanisms for CHP

Although the CHP-Directive aims to create a framework for the promotion and development of CHP, it leaves the decision to establish a CHP support system to the MSs. Article 5 par. 4 states:

*“4. Schemes for the guarantee of origin do not by themselves imply a right to benefit from national support mechanisms.”*

Apart from Finland and the Netherlands, all 22 MSs that provided us with information regarding their support mechanism for CHP, have a support mechanism in place.<sup>12</sup> The most commonly used support scheme for CHP is a feed-in tariff which is used by eight countries. Because of the diversity of the other support mechanisms, we show the support mechanism for each MS in Table 8.

There is much difference in the role of CHP-GO that MS have chosen for their support systems. In all three Belgium regions, CHP-GO play no role in the allocation of support. The support scheme is based on quota obligations that are supported by certificates different from GO<sup>13</sup>. The way this works in for example Flanders is that CHP-GO can only be used for disclosure. As the CHP-GO and CHP-certificate are linked to each other, rules are established with regard to the use of the CHP-GO: When the CHP-GO is redeemed, the according CHP-certificate remains valid to be used for quota compliance. Alternatively, once the CHP-certificate is redeemed (for the quota) the CHP-GO is automatically redeemed as well, i.e. the CHP-GO can only be used before the CHP-certificate is redeemed. When the CHP-GO is exported, the according CHP-certificate can no longer be used in Flanders for target accounting or support.

Another example where CHP-GO do not play a role in support is the case of the Netherlands where redeemed CHP-GO are counted towards disclosure. CHP-GOs do not entitle the holder to any kind of support. There is currently no support scheme in the Netherlands.

In the cases where CHP-GOs do play an official role in the support scheme, this scheme is based on feed-in premiums or tariffs. Although this has not been explicitly stated in the returned questionnaires, it seems logical that the CHP-GOs are used to prove the

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<sup>12</sup> It can be assumed that often no information on support has been provided at all when no relevant support scheme was in place, because this information has been considered irrelevant by the national experts.

<sup>13</sup> In Flanders these certificates are called ‘Warmtekrachtcertificaten’ (CHP-certificates) or ‘WKC’ which only cover CHP. They are linked to, but not the same as GO. In Flanders there is a separate certificate system for renewable electricity which uses ‘Groenestroomcertificaten’ (green power certificates) or ‘GSC’. In Wallonia RES-E and CHP-E are both covered by one certificate system ‘certificats verts’ (green certificates). Like in Flanders these ‘certificats verts’ are linked to, but not the same as GO.

amount of CHP electricity produced. If the CHP-GO has a double role and is not redeemed when applying for support, as is the case in Spain, the producer can use the CHP-GO a second time for other means, for example, by exporting it. If a Spanish GO is exported for after receiving feed-in tariff support, then the producer has to renounce to the premium for the corresponding units of electricity. A Spanish CHP-GO is redeemed at disclosure.

Apart from support schemes based on feed-in premiums or tariffs, CHP-GO can play the role of accounting the amount of electricity in any other support scheme that is based on the amount of electricity produced like, quota systems, bonuses, tax exemptions. For investment support (grants), fixed annual subsidies, bank loans with tax incentives, or other support schemes that support the construction of CHP-plants, in stead of the electricity they produce, in our view, CHP-GO are not the obvious tool by which subsidies can be handed out.

Only Spain has a separate support scheme for CHP-heat. All other countries do not, although information from the Czech Republic, Denmark, Italy, Luxembourg, Norway and Switzerland is missing.

### 3.5 CHP-GO in relation to the Emission Trading Scheme

The Emission trading scheme (ETS) is in principle based on the opposite information of what CHP-GO are based on. The former is based on the CO<sub>2</sub> emitted, the latter on the primary energy saving from which the declared avoided CO<sub>2</sub> emissions are directly derived using an emission factor for the fuel saved (e.g. natural gas). This raises the question whether the fuel saved is the proper baseline fuel, used in the case of separate generation of power and heat. For example, in Norway virtually 100% of power generation is hydropower-based. Moreover, any extra GHG emission allowances saved by one installation of an EU ETS obligated party will be used elsewhere in the EU ETS system, assuming that commercial parties will not hold back emission rights to let them expire unused. Hence the merits of disclosing GHG emissions avoided by HE-CHP can be seriously questioned; at most specific GHG emissions per technology or plant can be claimed provided regulations exist which prescribe in detail an adequate approach to do so<sup>14</sup>. In general, the beneficial characteristics of HE-CHP is the contribution to meeting CO<sub>2</sub> targets and thus also to allowing for setting stricter emission caps in the next allocation period.

By producing electricity and heat with a CHP installation, in principle one *might* not only save primary energy but at the same time one *might* also avoid CO<sub>2</sub> emissions compared to producing the electricity and the heat separately. This implies that for the

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<sup>14</sup> The development of such an approach is beyond the scope of E-TRACK II.

same amount of electricity and heat, the operator of a CHP installation needs to buy less ETS allowances than the operator of the two separate electricity and heat plants. If the savings on the allowances and fuel costs for the CHP plant are such that they compensate the additional costs of CHP-E there is no need to support the CHP plant. If, however the price of allowances or the market price of electricity is too low, then a case could be made to introduce a support mechanism that could bring the unit cost of electricity from HE-CHP plants at a par with the average baseload wholesale price of electricity. This support can be provided, based on cancellation of CHP-GO.

In short:

- In principle, a CHP-plant is more efficient than producing electricity and heat separately
  - Savings on fuel
  - Savings on CO<sub>2</sub> allowances
- CO<sub>2</sub> emissions avoided by HE-CHP at micro level *is not avoided at EU level*; this only applies if the contribution of HE-CHP is properly taken into account for the next allocation period
- Moreover the proper reference primary fuel is not necessarily the same as the fuel saved at a HE-CHP installation (e.g. Norway: CHP plant may save gas at plant level; yet at national level the CHP plant as such means more gas instead of 100% electricity mix)

Country/region	Major CHP support mechanism	Restricted to HE-CHP?	Role CHP-GO
EU-15			
Austria	tariffs and investment funds for HE-CHP production devices	Yes	?
Belgium, BCR	Quota system with certificates	Yes	Disclosure
Belgium, Flanders	Quota obligation (supported by certificates)	Yes	Disclosure
Belgium, Wallonia	Quota system with tradable certificates	Yes	Disclosure
Denmark	Fixed yearly subsidy	n/a	Disclosure
Finland	No support	n/a	No official role
France	Contract-based feed-in tariff	No	No official role
Germany	Bonus (i.e. feed-in premium)	Partly <sup>15</sup>	No official role
Italy	Reduced energy tax	No	No Official role
Luxembourg	n/a	n/a	n/a
The Netherlands	No support	No	Disclosure
Portugal	Feed-in premiums	No	Support
Spain	Feed-in tariff or bonus on market price, depending on the choice of the producer	No	Disclosure & support
Sweden			
United Kingdom	Tax exemption	n/a	Disclosure
EU-12			
Bulgaria	Feed-in tariff with purchase obligation	No	No official role
Czech Republic	contribution on market price	n/a	No official role
Estonia	n/a	n/a	n/a
Hungary	feed-in, bonus on market price	No	Support
Latvia	n/a	n/a	n/a
Lithuania	n/a	n/a	n/a
Malta	The Authority may promote the use of cogeneration through the implementation of such measures as it may consider expedient and which are not contrary to the provisions of the Act or of these regulations	n/a	No official role
Poland	Quota obligation (supported by certificates)	Yes	Disclosure
Romania	n/a	n/a	n/a
Slovakia	fixed price for electricity from RES-E, priority rights to be connected to the distribution network	Yes	?
Slovenia	Feed-in	Yes	Support
Non-members			
Norway	n/a	n/a	n/a
Switzerland	n/a	n/a	n/a

Table 8. Major support mechanisms for CHP.

<sup>15</sup> New plants must be high-efficient in order to receive support. There is also support for some older plants which do not have to be high efficient.

## 4 Policy recommendations

Based on our findings of the previous sections, we here formulate policy recommendations on the further development of CHP-GO in the EU-27.

- All MS have to implement CHP-GO systems to at least a minimum level (requirements CHP-Directive).
- MS have to state in their legislation for which purpose(s) the CHP-GO system is implemented.
  - These should include at least facilitation of disclosure and product differentiation.
- If CHP-GO have to facilitate support to (HE) CHP as well, introduction of a detachable support attribute is recommended.
- Delivery of a differentiated CHP product shall be proven mandatorily by CHP-GO.
- MS supporting HE-CHP and RES-E should define for which type(s) of support biomass-based HE-CHP is eligible.
- Fully integrate CHP-GO system in RE-GO system to prevent double counting (one label covering both RES-E and CHP-E); in case of parallel GO systems, at least double issuing has to be prevented by use of a joint registry or mutual checks of registered plants within separate registries.
- MS have to set up an electronic registry, solely for GO, maintained by an independent (issuing) body, in which all processes are tracked (issuing, imports, exports, transfers, redemption, etc.) and, with due regard for the protection of any confidential information, should be as transparent as possible.
- Mandatory cancellation of CHP-GO after use for disclosure (and support, if appropriate).
- A clear definition of HE-CHP is required.
  - Evolution towards a harmonized definition among MS is highly desirable.
- Legal exclusion of disclosure of CO<sub>2</sub> emissions avoided by HE-CHP to end-users should be seriously considered.
  - Proper disclosure of CO<sub>2</sub> emission intensities is recommended instead.

## 5 Case Studies

Below we have described three cases of respectively far, intermediate and slow advance we found in the implementation of CHP-GO. The case studies show a detailed description of the CHP-GO system in Wallonia, France and Slovakia, based on all information available from the questionnaires.

### 5.1 Belgium, Wallonia

Wallonia has defined a target of 12% of the total electricity consumption for the generation of electricity from renewable sources and CHP combined by 2012. CHP-GOs are expected to play a supportive role to achieve this target. The responsibility for CHP-GO in Belgium is addressed on a regional level and therefore there are three slightly different CHP-GO systems for the Brussels Capital Region, Flanders and Wallonia. The latter is the subject of this case study.

The legislation needed to comply with the CHP-Directive has been passed November 30, 2006 and rules and procedures for CHP-GO are available. The system for CHP-GO is fully operational since January 1, 2007 for issuing and since February 1, 2008 also for transferring. Wallonia does not make a formal distinction between RE-GO and CHP-GO, but covers both types of electricity generation under one GO. For the Wallonia case, we still use the terminology “CHP-GO” for this integrated GO.

CHP-GOs are being issued. The issuing body is CWaPe (Commision Wallonne pour l’Energie) which is the regulator for the Wallonia electricity and gas markets. The issuing body has a responsibility for accrediting, issuing, transferring, and redeeming GO and maintains the registry. As from 2008, the CHP-GO system is based on EECS although the restriction on exports of CHP-GO by the AiB is opposed by CWaPe. The minimum information required on the CHP-GO is:

- Registration number
- Sources of energy used
- Production period
- Place of production
- Capacity of the power plant
- CO<sub>2</sub> emission factor
- CO<sub>2</sub> reduction
- Type of use of the CHP heat
- Lower calorific value of the fuel sources
- Primary energy savings
- Support received (grants, obligations and targets are earmarked)

The following items are not included on the CHP-GO:

- Name of the generator or producer
- Name of the certificate owner
- Issuing date

For each MWh of electricity, one CHP-GO is issued. The basis is the gross electricity production, including the consumption of the generation facilities. The CHP-GOs issued for the latter consumption are automatically redeemed. Issuing takes place every quarter and each month CHP-GOs may be reallocated. CHP-GOs are used for disclosure of CHP electricity only and they expire December 31<sup>st</sup> of the year after the year the electricity was produced, i.e. a CHP-GO is valid for at least one year, but no longer than two years.

Regulations on the determination of high efficient CHP has been passed in March 2007. Wallonia has stuck to the calculation Guidelines for CHP electricity based on the Comitology process, however, based on the documents that were available at the time of implementation (January 2007).

There are no restrictions on which fuels are used for the CHP installations, because the GO system in Wallonia does not make a distinction between RES and CHP. Hybrid stations (i.e. a CHP plant running on a renewable fuel) are registered in the same system as any other CHP (or RES-E) installation. Together with the single use of CHP-GO, mandatory redemption and the presence of a redemption procedure (e.g. see section 3.4), this aids the Wallonia GO system's robustness against multiple counting.

The Wallonia registry is internet based and CHP-GO are issued electronically. The registry is available to renewable energy producers and other concerned parties. CHP-GOs are transferable and transactions are tracked. The transfer of CHP is separate from the electricity trade. Imports of CHP-GOs are accepted without any conditions or additional criteria although the criteria for disclosure have to be fulfilled. Like the CHP-GOs issued by CWaPe, imported CHP-GO can only be used for disclosure (and not e.g. for target counting or support). The registry allows for the registration of imported CHP-GOs, however, up to now no imports have taken place. An additional criteria (over and above the criteria usually required for issuing a CHP-GO) for the acceptance of imported CHP-GO from Wallonia is that they should not have a support certificate for the same MWh according to current ECS PRO. Although no exports of CHP-GO have taken place from Wallonia so far, exports will be registered. Redemption is mandatory for disclosure. CHP-GOs are redeemed by moving them to special redemption accounts within the registry. The disclosure attributes can be claimed by the CHP plant operator (for his own consumption), the electricity supply company (for selling green electricity) and the final consumer of green electricity.

CHP-GO claims are verified by an accreditation process. Plant accreditation is done by an official inspection body. It is based on a metering code which specifies the requirement and includes the annual audits by the inspection body. The process is repeated

every 5 years if the plant capacity is smaller than 20 kW and randomly if the plant capacity is below 10 kW. The sanctions for fraudulently obtaining CHP-GO are suspension of the production site and potentially regulatory fines. Double counting is prevented by the metering code and the annual audit of plants. Double selling is prevented by allowing only licensed electricity suppliers the right to redeem GO.

CHP-GOs are issued to the producer free of charge. The costs are covered by CWaPe via public funding. The annual plant accreditation is paid by the plant owner.

The use of CHP is mainly promoted via quota obligations with tradable certificates. Other CHP support is arranged with grants, a comparatively rather small share of fiscal measures and a feed-in premium in the form of a floor price of the certificate (i.e. a guaranteed premium).

In Wallonia there is an explicit legal distinction between Green Certificates which are used for support and Guarantees of Origin which are solely used for disclosure. No other system for e.g. electricity disclosure or green power exists alongside the GO system. A tracking system for support and target does exist alongside the GO system. Target fulfilment is tracked through statistics. Support is allocated based on Green Certificates used to compensate the electricity producer for its additional costs. In principle the support scheme is restricted to HE-CHP<sup>16</sup>. Final consumers never receive the support benefits unless they are an auto producer or they purchase a green electricity product from a supplier. The support is only restricted to electricity, there is no support scheme for CHP-heat.

Small generators can participate in the CHP-GO system. There is no higher or lower limit for the amount of CHP-E produced in order to obtain a CHP-GO, nor is it required to be connected to the public grid. For generators with a net electricity capacity below 10 kW a simplified accreditation and verification procedure exists.

The Wallonia system of CHP-GO is entirely compliant to the CHP-Directive and mostly compliant to the EECS labelling as proposed by the AiB. To become compliant to the latter, only the name of the generator has to be included on the CHP-GO. There is a set of measures against double counting and double selling. The setup of the CHP-GO system in Wallonia is the most advanced compared to the other MS.

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<sup>16</sup> It could be argued support is not linked to HE CHP since support is granted to "quality HP" which are CHP installations which realise energy savings better than a set of reference values defined by CWaPe. However it can be shown a quality CHP will almost always have the same characteristics as a HE CHP plant. Indeed, the set of reference values used in Wallonia for these calculations are set at nearly the same level as the reference values under the CHP Directive.

## 5.2 France

The target for CHP-E in France is set at 5 TW for 2015. This target has already been met as it did not reflect any political ambition to develop CHP further in the country. CHP-GOs have not played a role in achieving this target, nor is any role defined for in relation to future targets. The responsibility for CHP-GO is addressed on a national level.

National legislation for implementing CHP-GO has passed on July 13, 2005. The documents on rules and procedures are available since September 5, 2006. However, the system of CHP-GO is still under preparation. Up to February 2008 no CHP-GOs have been issued and consequently no statistics on CHP-GO are available. The issuing body is RTE (Gestionnaire du Réseau de Transport d'Electricité) which has been appointed by law. RTE is a TSO and DSO and has the responsibility for maintaining the registry and the issuance of GO for the installations connected to the grid. It is not yet clear whether the CHP-GO system in France will be based on EECS.

The minimum information required on the CHP-GO is:

- Registration number
- Sources of energy used
- Production period
- Place of production
- Name of the certificate owner
- Capacity of the power plant
- Type of use of the CHP heat
- Lower calorific value of the fuel sources
- Primary energy savings
- Global efficiency of the plant
- Heat quantity produced in the period in which CHP-GO are asked for
- Commissioning date of the plant

The following items are not included on the CHP-GO:

- Name of the generator or producer
- CO<sub>2</sub> emission factor
- CO<sub>2</sub> reduction
- Support received
- Issuing date

The basis for CHP-GO is the gross electricity production. One CHP-GO is issued for each MWh of electricity. There is no pre-defined data or period for issuing CHP-GO. They are issued when they are asked for. The beginning and end dates have to correspond to metering periods, however, the period over which CHP-GO are issued can be several months at a time. The use of CHP-GO is not explicitly defined although they can be used for disclosure. CHP-GOs do not expire.

There are no restrictions on the fuel used in CHP installations. The system in France uses only one type of GO that covers both RES-E and CHP-E. Hybrid stations automatically fit into this system, without the necessity for them to choose for which type of GO they wish to apply. This setup of the GO system aids the prevention of double counting.

Detailed regulations on the determination of high efficient CHP consist of a copy of the annexes of the CHP-Directive. The results of the Comitology process should be included in the directive. As these results are not yet available, the regulations on high efficient CHP can be considered as under preparation.

The French registry is internet based, publicly available and the CHP-GO consists of a pdf-file with the information stated above. CHP-GOs are not transferable and consequently transfers are not tracked. Still, imports are allowed and no restrictions or specified additional criteria have to be met. Imports are not recorded in the registry. Imported CHP-GO can only be used for disclosure, not for target counting or support. French CHP-GOs are recognized by other countries without any restrictions or additional specifications. So far, no CHP-GO has been exported though the registry does not record exports. Redemption is optional and takes place by mentioning the utilization date. Who may claim the disclosure attributes is not clearly defined. The operators who pay the feed-in tariff get the right to ask for the GO, but if they do and they use it for disclosure, then they have to reimburse the compensation they get from the CSPE (contribution au service public de l'électricité). If they don't, then disclosure is not clearly attributed.

CHP-GO claims are verified by an accreditation process. The TSO and the distributors, who are responsible for the issuing of CHP-GO, meter the production of CHP-E. The validity of CHP-GO is verified by on-site sample verification. Inspectors will go to certain production devices and verify the operator's past request for GOs. At maximum the three preceding years of production are investigated. When CHP-GO are fraudulently obtained, the issuing of CHP-GOs is postponed until there has been an audit establishing that the new request for CHP-GOs is correct. The additional expenses have to be paid by the organisation requesting the CHP-GO. No measures are established to prevent double selling.

The issuing of CHP-GO is not free of charge. Each request for a CHP-GO is charged with a fixed cost of € 1000 plus € 0,005 per MWh.

The major support scheme for CHP is a feed-in tariff. Other support is arranged via grants, fiscal measures, the emission trading scheme, TÜV quality labelling of green power for voluntary demand, electricity disclosure and tradable white certificates.

The role of CHP-GO is not officially specified. They can be used for disclosure although this is not mandatory. On the other hand, different uses are not treated in the legal texts. No other system for electricity disclosure, green power etc. exists alongside the GO system. The target objective is counted by determining the amount of electricity produced. The support system is not restricted to HE-CHP. The domestic implementation of support is linked to the GO. If a plant benefits from the feed-in tariff, then the right to ask for a GO is transferred to the operator supporting the feed-in payment. There is no regulation on how, in terms of disclosure, the supported electricity is allocated to the consumer. The allocation is determined by the electricity supplier. There is no separate support scheme for CHP-heat.

The French GO system does not exclude small generators. There is no limitation for the amount of CHP-E produced in order to obtain a CHP-GO, both in upper and in lower direction. A connection to the public grid is also not required (Note: RTE is only responsible for CHP-GO of installations connected to the grid). The application and accreditation procedure for obtaining CHP-GO for small-scale project owners proceeds as follows. Documents that are already in the hands of small producers have to be submitted to the distribution network. Examples of these documents are licenses to operate the plant, feed-in tariff contract, contract for connection to the grid, other administrative information and information on production.

Although the French CHP-GO system seems to comply to most of the requirements from the Directive in a literal sense like, legislation and regulations in place, the designation of a competent body, separation from the support mechanism, specifications on the GO, allowances for imports and exports. There is still a major flaw concerning the accuracy and reliability of the CHP-GO system (Article 5 par. 5 of the Directive). The first problem is that the use of CHP-GO is not explicitly defined. CHP-GOs do not expire and redemption is optional. This implies that no measures are established to prevent multiple counting of CHP-GO and the CHP-GO from being used many times. The second related problem is that transfers, imports and exports of CHP-GO are not tracked. As transfers are prohibited, this does not seem to be a problem, however in order to be compliant to article 5 par. 6 of the Directive, imports and exports should be allowed. The system is therefore not closed. The measure taken to prevent multiple counting is using of one GO covering both RES-E and CHP-E which is not enough. The third problem concerns the specification of the quantity of electricity from high efficiency cogeneration as required by article 5 par. 5 of the Directive. The French regulations on the calculation of HE CHP-GO are copies of the Annexes in the Directive; however, as these calculations seem to be insufficient this part of the legislation is still under preparation. Again in this case, in a literal sense French legislation is compliant to the Directive; however, the specification of HE CHP on the GOs is not accurate. In order to catch up on the Directive, the above shortcomings should be resolved. The specifications included on the French CHP-GOs are not compliant to the EECS as they do not include the name of the generator or producer, the CO<sub>2</sub> emission factor, the CO<sub>2</sub> reduction and whether support was received.

### 5.3 Slovakia

The CHP-GO system in Slovakia is being prepared. As the preparations are still in an early phase, limited information is available although some contours of the future system are already visible.

There is no target with respect to CHP. The responsibility for the CHP-GO system is addressed on a national level. A general framework is set in the Act on Energy. A decree on HE CHP is being prepared. An issuing body has not been identified yet. Obviously, no CHP-GOs have been issued so far and no statistics are available. A registry is not present, nor are there any plans on its structure. Once CHP-GOs are being issued, the disclosure attribute can only be claimed by the owner of the CHP plant. Still, it is unclear which uses are going to be connected to the CHP-GO. An accreditation process for CHP generators is in place.

The specifications on the CHP-GO are unknown, apart from the indication of support which will be included.

The major support scheme connected to CHP is a fixed price for electricity from RES-E in combination with priority rights to be connected to the distribution network. The support scheme is restricted to HE CHP. Other measures to promote CHP are grants, fiscal measures and a feed-in tariff. There is no support scheme for CHP heat. The role of CHP-GO has been officially specified, although it is not known to us what that role is.

With respect to the CHP-GO system, Slovakia does not comply with any of the subsections of article 5 of the CHP-Directive. Although Slovakia is one of the new MSs (EU-12) and may thus postpone its transposition, it is also behind on the implementation compared to the other EU-12 states.

The exercise to state specific recommendations on each of the deficiencies of the Slovakian legislation is rather futile. This may seem a rather disappointing outcome; however, we still think this is an interesting case as its mere existence contains an important message. In order to reach a completely harmonized system of CHP-GO within the EU-27 in which robust measures are present to prevent multiple use of GO, double counting and double selling, it is critical that countries that are behind on the implementation catch up. Countries with a deviating or incomplete system of CHP-GO act as system leaks which potentially compromise the *entire* system over the whole of Europe (i.e. the CHP-GO system of all participating countries together). Unfortunately, many deficiencies still exist in most of the MS although in some the legislation is better developed than in others. To our knowledge, the Belgium systems present in Flanders and Wallonia are the only ones which are entirely compliant to the CHP Directive. To our opinion, more effort should be put in bringing the CHP-GO systems of the other MS to the same level.

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## Annex 1: Primary legislation on CHP-GO

Member State	Name Primary Legislation
Austria	§§ 42b of the Electricity Act - Elektrizitätswirtschafts- und -organisationsgesetz (EIWOG): BGBl. I Nr. 85/2007 (the last amendment for disclosure was in 2006)
Belgium, BCR	14 DECEMBER 2006. — Ordonnantie tot wijziging van de ordonnanties van 19 juli 2001 en van 1 april 2004 betreffende de organisatie van de elektriciteitsmarkt en de gasmarkt in het Brussels Hoofdstedelijk Gewest en tot opheffing van de ordonnantie van 11 juli 1991 met betrekking tot het recht op een minimumlevering van elektriciteit en de ordonnantie van 11 maart 1999 tot vaststelling van de maatregelen ter voorkoming van de schorsingen van de gaslevering voor huishoudelijk gebruik (1)
Belgium, Flanders	Besluit van de Vlaamse Regering ter bevordering van de elektriciteitsopwekking in kwalitatieve warmtekrachtinstallaties (dd. 07 July 2006)
Belgium, Wallonia	DRW/20010412/AA 12 avril 2001. – 12 AVRIL 2001. – Décret relatif à l'organisation du marché régional de l'électricité (M.B. du 01/05/2001, p. 14118) Ce décret a été modifié par: – le décret du 19 décembre 2002; – le décret du 18 décembre 2003; – le décret du 3 février 2005; – le décret du 4 octobre 2007.
Bulgaria	Bulgarian Law on Energy
Czech Republic	Energy Act No. 458/2000 Coll. ( <a href="http://www.mpo.cz/dokument11747.html">http://www.mpo.cz/dokument11747.html</a> ) and public notice No.439/2005 Coll. (kterou se stanoví podrobnosti způsobu určení množství elektřiny z kombinované výroby elektřiny a tepla a určení množství elektřiny z druhotných energetických zdrojů)
Denmark	Bekendtgørelse om oprindelsesgaranti for elektricitet fra højeffektiv kraftvarmeproduktion (nr. 146 af 16. februar 2007)
Estonia	Amendment of the Electricity Market Act
Finland	?
France	LOI n° 2005-781 du 13 juillet 2005 de programme fixant les orientations de la politique énergétique + Décret n° 2006-1118 du 5 septembre 2006 relatif aux garanties d'origine de l'électricité produite à partir de sources d'énergies renouvelables ou par cogé-

	nération
Germany	not published yet
Hungary	Villamos energiáról szóló 2007 évi LXXXVI törv. 12§ (1)
Italy	DECRETO LEGISLATIVO 8 febbraio 2007, n.20 Attuazione della direttiva 2004/8/CE sulla promozione della cogenerazione basata su una domanda di calore utile nel mercato interno dell'energia, nonché modifica alla direttiva 92/42/CEE. Gazzetta Ufficiale N. 54 del 6 Marzo 2007
Latvia	Law on Electricity Market
Lithuania	?
Luxembourg	(Loi du 1er août 2007 Art 18)
Malta	Cogeneration Regulations (2007). Act number 423 of 2007. Malta Resources Authority Act 2007
The Netherlands	Wet van 2 juli 1998, houdende regels met betrekking tot de productie, het transport en de levering van electriciteit (Electriciteitswet 1998), article 77ca-ce
Norway	?
Poland	Ustawa z dnia 12 stycznia 2007 r. o zmianie ustawy – Prawo energetyczne, ustawy – Prawo ochrony środowiska oraz ustawy o systemie oceny zgodności (Dz. U. z 2007 r. Nr 21, poz. 124), zwanej dalej „ustawą zmieniającą z dnia 12 stycznia 2007 r.”. - Act of 12th January 2007 amending the Energy Law act and the Act of Environment Protection. Information in brackets refers to the official journal where this act was published.
Portugal	Projecto de Decreto Lei n° /2008
Romania	?
Slovakia	Primary legislation proposed
Slovenia	Uredba o pogojih za pridobitev statusa kvalificiranega proizvajalca električne energije (Ordinance relating to the conditions for obtaining the status of qualified producer of electricity), Official Gazette of the Republic of Slovenia, No. 71/07 ; Uredba o izdaji potrdil o izvoru električne energije (Ordinance regarding the issuing of guarantees of the origin of electricity), Official Gazette of the Republic of Slovenia, No. 121/05
Spain	Orden ITC/1522/2007 de 24 de mayo, por la que se establece la regulación de la garantía del origen de la electricidad procedente de fuentes de energía renovables y de cogeneration de alta

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	eficiencia
Sweden	Lag om ursprungsgarantier för högeffektiv kraftvärmeel och förnybar el (SFS 2003:329)
Switzerland	No legislation proposed
United Kingdom	Statutory Instruments 2007 No. 292 Energy conservation The Guarantees of Origin of Electricity Produced from High-efficiency Cogeneration Regulations 2007

## Annex 2: Regulations/Secondary legislation on CHP-GO

Member State	Name Regulation/Secondary Legislation
Austria	§§ 42b and annex of the Electricity Act - Elektrizitätswirtschafts- und -organisationsgesetz (ElWOG): BGBl. I Nr. 85/2007 (the last amendment for disclosure was in 2006)
Belgium, BCR	n/a
Belgium, Flanders	Rapport 2007-4 met betrekking tot de oorsprong van de in 2006 geleverde elektriciteit in Vlaanderen (12 juni 2007)
Belgium, Wallonia	Specific yearly report 2006: the evolution of the green certificate market - Sep07
Bulgaria	Bulgarian Law on Energy
Czech Republic	public notice No.439/2005 Coll. (kterou se stanoví podrobnosti způsobu určení množství elektřiny z kombinované výroby elektřiny a tepla a určení množství elektřiny z druhotných energetických zdrojů)
Denmark	Retningslinjer for udstedelse af oprindelsesgarantier for elektricitet fra højeffektiv kraftvarmeproduktion
Estonia	n/a
Finland	n/a
France	Décret n° 2006-1118 du 5 septembre 2006 relatif aux garanties d'origine de l'électricité produite à partir de sources d'énergies renouvelables ou par cogénération
Germany	n/a
Hungary	389/2007(XII.23) Korm rend. A megújuló energiaforrásból vagy hulladékból nyert energiával termelt villamos energia valamint a kapcsoltan termelt villamos energia kötelező átvételéről és átvételi áráról
Italy	Procedura per il rilascio della garanzia d'origine all'energia elettrica prodotta da impianti di cogenerazione ad alto rendimento
Latvia	Regulation No. 921 on Regulations Regarding Electricity Production in Cogeneration
Lithuania	n/a
Luxembourg	n/a
Malta	n/a

The Netherlands	Regeling certificaten warmtekrachtkoppeling Elektriciteitswet 1998, including 1 "bijlage" (appendices) and 3 "wijzigingen" (amendments)
Norway	?
Poland	Obwieszczenie Ministra Gospodarki z dnia 12 grudnia 2007 r. w sprawie raportu oceniającego postęp osiągnięty w zwiększaniu udziału energii elektrycznej wytwarzanej w wysokosprawnej kogeneracji w całkowitej krajowej produkcji energii elektrycznej (Monitor Polski Nr 1 , Poz. 11 i 12) - Notice of the Minister of Economy from 12th of December 2007 regarding evaluation report on progress of increasing the share of production of electricity from high-efficiency cogeneration in total electricity production. Information in brackets refers to the official journal where this information was published.
Portugal	n/a
Romania	n/a
Slovakia	n/a
Slovenia	Uredba o pogojih za pridobitev statusa kvalificiranega proizvajalca električne energije (Ordinance relating to the conditions for obtaining the status of qualified producer of electricity), Official Gazette of the Republic of Slovenia, No. 71/07 ; Uredba o izdaji potrdil o izvoru električne energije (Ordinance regarding the issuing of guarantees of the origin of electricity), Official Gazette of the Republic of Slovenia, No. 121/05
Spain	circular 2/2007 de 29 noviembre de la CNE que regula la puesta en marcha y gestion del sistema de garantia de origen de la electricidad procedente de fuentes de energia renovables y de cogeneracion de alta eficiencia
Sweden	?
Switzerland	n/a
United Kingdom	CHP Guarantee of Origin (CHPGO) Certificates - ISSUE OF CERTIFICATES BRIEFING NOTE, Aug 07