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GUARANTEES OF ORIGIN AS A TOOL FOR RENEWABLE ENERGY POLICY FORMULATION

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Acknowledgement/Preface

The study presented in this report covers Phase II of the Renewable Energy-Guarantees of Origin (RE-GO) project carried in the framework of the EU Altener Programme. The report was prepared jointly by ECN Policy Studies, The Netherlands, Öko-Institut e.V., Germany, IT Power, United Kingdom and IDAE, Spain. The report is registered under ECN project number 7.7537 and can be downloaded from the RE-GO project website (www.re-go.info), or the ECN website (www.ecn.nl).

Abstract

The EU Directive on the promotion of electricity produced from renewable energy sources in the internal electricity market (Directive 2001/77/EC) asks Member States, among others, to issue guarantees of origin for renewable electricity on request. Member States are obliged to appoint one or more independent bodies to certify that green electricity comes from renewable energy sources. These bodies will supervise the issue of the guarantees of origin (GO). The Directive stipulates that these bodies should be in place no later than 27 October 2003.

The RE-GO project has been conducted in the framework of the EU Altener programme and aims to:

1. review the implementation and use of GO in the EU,
2. analyse the GO as a tool for renewable energy policy formulation,
3. analyse the GO as a tracking method and the problem of multiple counting.

The present report covers the second objective. The analysis presented in the report involves an identification of the potential interactions between GO and various renewable energy support policies which are currently implemented in the Member States, and an evaluation of the potential role GO can play in facilitating these policies. The analysis covers the interactions between GO and indicative targets, Tradable Renewable Electricity Certificate (TREC) systems, feed-in-tariffs, fiscal incentives, electricity labels, electricity disclosure, the Renewable Energy Certificate System (RECS) and the EU Emission Trading Scheme.

The GO implementation design varies considerably among the Member States. Some countries have implemented a GO system that does not go beyond the minimum requirements of the Directive, whilst other countries have included additional information to enable GO to facilitate national renewable energy policy mechanisms.

The report concludes that GO systems based on the minimum requirements of the EU Directive 2001/77/EC on the promotion of electricity produced from renewable energy sources, cannot be linked to national renewable energy support mechanisms, and, therefore, can easily lead to inefficiencies, in transparencies and also to multiple counting of the environmental benefits. It is recommended, therefore, to implement a GO system that goes beyond the minimum requirements so that it can be fully integrated into the national support mechanisms. In this way GO can become a key component of the national renewable energy policy. In the longer term, a fully harmonised GO system across the European Union would be advisable to avoid duplication of verification and monitoring efforts, and to effectively prevent multiple counting of environmental benefits.

CONTENTS

ACRONYMS

4CE	The Altener project *Consumer Choice and Carbon Consciousness: Electricity Disclosure in Europe.* (see www.electricitylabels.com)
AIB	Association for Issuing Bodies
CDM	Clean Development Mechanism under the Kyoto Protocol
CHP Directive	Directive 2004/8/EC, 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
CHP-GO	GO for CHP as defined in the CHP Directive
Commission	The European Commission
DSO	Distribution System Operator
EC	European Commission
EECS	European Energy Certificate System; voluntary system based on RECS which supports GO transfers
Electricity Directive	Directive 2003/54/EC, 26 June 2003, concerning common rules for the internal market in electricity and repealing Directive 96/92/EC
Electricity Disclosure	Disclosure of electricity attributes for the purpose of the Electricity Directive
Emissions Trading Directive	Directive 2003/87/EC, 13 October 2003, establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC
ETS	Emissions Trading Scheme
EU	European Union
EU ETS	The European Union Emissions Trading Scheme as defined in the Emissions Trading Directive
EU-15	The pre-May 2004 15 Member States of the EU
EUGENE	European Green Electricity Network
GHG	GreenHouse Gas
GO	Guarantees of Origin for the purpose of the Renewables Directive
Green electricity product	Electricity product based on a green electricity quality label
Green electricity quality labelling	Voluntary labelling of electricity from environmentally benign sources
IB	Issuing Body
Indicative targets	Country targets specified in the Renewables Directive (and accession treaties for the 10 new MS)
JI	Joint Implementation, Article 6 of the Kyoto Protocol
LEC	Levy Exemption Criteria
Linking Directive	Proposed directive amending the Directive establishing a scheme for greenhouse gas emission allowance trading within the Community, in respect of the Kyoto Protocol's project mechanisms. Commission proposal COM (2003) 403, 23 July 2003; European Parliament adoption 20 April 2004
MS	Member State
MS	Member State
Quality label	Green electricity quality label
Quality product	Green electricity product
RECS	Renewable Energy Certificate System (see www.recs.org)
RE-GO	The Renewable Energy Guarantee of Origin part of the Altener co-funded project SETREC|GO (see www.re-go.info)

Renewables Directive	Directive 2001/77/EC, 27 September 2001, on the promotion of electricity produced from renewable energy sources in the internal electricity market
RES	Renewable Energy Sources
RES-E	Electricity produced from Renewable Energy Sources in the internal electricity market
RES-E GO	GO for the purpose of the Renewable Directive, as opposed to CHP-GO and 'brown' GO
RPS	Renewable Portfolio Standard
tCO_2e	Tonne of CO_2 equivalent
TREC	Tradable Renewable Energy Certificate, used as a general term covering such certificates in all countries
TSO	Transmission System Operator
UCTE	Union for the Co-ordination of Transmission of Electricity
VAT	Value Added Tax

1. INTRODUCTION

In 2001, the EU Directive on the promotion of electricity produced from renewable energy sources in the internal electricity market (Directive 2001/77/EC, hereafter referred to as Renewables Directive) introduced the concept of Guarantees of Origin (GO) for renewable energy. As of 27th October 2003, EU Member States are required to have legislation in place to establish a system that will enable renewable energy generators to obtain GO for the electricity produced from their plants in response to a request. Whilst Member States are required to recognise GO from other EU countries, it is not necessary for the GO systems that are established to be identical.

The RE-GO (Renewable Energy-Guarantee of Origin) project, partially funded by the European Commission through the ALTENER Programme, aims to:

- assess the interaction between GO and energy policies in the EU-15 Member States,
- make recommendations on how to avoid fraud and multiple counting,
- assess the use of GO as a tracking tool,
- help share experience and information on approaches used in Member States.

This report results from Phase II of the RE-GO project, and provides a detailed discussion of the interactions between GO and the various support schemes and policy instruments currently in place in different EU Member States for promoting renewable energy as well as policies for enhancing electricity market transparency. The analysis presented in this report deals with the interactions between GO and:

- National indicative targets (Chapter 2)
- National renewable energy support mechanisms (Chapter 3)
- Electricity labels (Chapter 4)
- Electricity disclosure schemes (Chapter 5)
- The Renewable Energy Certificate System - RECS (Chapter 6)
- The EU Emissions Trading Scheme (Chapter 7).

Conclusions and recommendations are provided in Chapter 8. The remainder of the current chapter sets the stage for the analysis, by defining what GO are, what attributes they may contain, and what different types of interactions between GO and renewable energy policy instruments may occur.

1.1 What are Guarantees of Origin (GO)?

Article 5 of the Renewables Directive requires the provision of Renewable Energy Guarantees of Origin to electricity producers (i.e. generators) in respect of electricity generated from renewable sources. The legislation means that generators will be able to request GO as evidence that they have generated a certain amount of electricity from eligible renewable sources.

The definition of eligible renewable energy sources is set out in Article 2 of the Directive, which states that renewables are: ‘renewable non-fossil energy sources (wind, solar, geothermal, wave, tidal, hydropower, biomass, landfill gas, sewage treatment plant gas and biogases)’.

The Renewables Directive requires all Member States to put the necessary legislation and organisational infrastructure in place so that one (or more) independent body can certify that the electricity is produced from renewable sources, if a generator requests this information. Member States are required to have a GO system in place by 27th October 2003.

Article 5 of the Directive requires that Member States ensure that GO are issued on a request in respect of electricity generated from eligible renewable energy sources, as defined by the Directive. The system is purely voluntary for the generators, with individual generators being left to decide if they wish to make such a request. The main provisions of Article 5 state that guarantees of origin:

- specify the energy sources from which the electricity was generated, the dates and place of production, and in the case of hydropower, the capacity of the plant,
- serve to enable producers of electricity from renewables to demonstrate that the electricity they sell is produced from renewable sources as defined by the Directive,
- shall be accurate and reliable, and Member States are responsible to implement appropriate mechanisms to ensure this,
- should be mutually recognised by Member States, and any refusal to recognise GO should be based on objective, transparent and non-discriminatory criteria.

Other details on the information content of GO are left to the discretion of Member States.

Specifically, Article 5.1 requires that GO will be issued according to objective, transparent and non-discriminatory criteria. Each Member State is responsible for issuing of GO to generators within its own jurisdiction.

Article 5.2 enables Member States to designate competent bodies, which are independent of generation and distribution companies, to supervise the issue of GO.

Article 5.3 specifies the minimum information, which a guarantee of origin should contain:

- the energy source from which the electricity was produced,
- the dates and place of production,
- in the case of electricity generated from hydropower, the GO should also indicate the capacity of the generating station.

Article 5.3 states that GO 'serve to enable producers of electricity from renewable energy sources to demonstrate that the electricity they sell is produced from renewable energy sources within the meaning of this Directive.' This wording has given rise to discussion on whether GO should be traded together with the underlying electricity. Two views exist:

- Contract-based trade, where GO are traded together with the electricity.
- Certificate-based trade, unbundling the sale of electricity of a renewable electricity producer from the sale of the GO referring to the production concerned.

Article 5.4 requires that GO shall be mutually recognised by the Member States. Any refusal to recognise GO from another Member State must be based on objective, transparent and non-discriminatory criteria (such as insufficient prevention of fraud). In the event of a Member State refusing to recognise GO, the Commission may compel the Member State to recognise GO. In this context, 'recognising' GO means accepting that the electricity for which the GO were issued was generated from renewable sources as defined by the Directive. However, it is not clear which further meaning such recognition by Member States will have (see the discussion on Recital 10 below).

Article 5.5 requires that Member States, or the competent bodies appointed by them, put in place mechanisms to ensure that GO are accurate and reliable (i.e. that the electricity concerned is produced from eligible renewable sources and any information provided is accurate). Member States were also required to have reported to the Commission by 27 October 2003 on the measures taken to ensure the reliability of the system.

Article 5.6 is a provision for the Commission that enables them to consider the forms and methods used by the Member States to guarantee the origin of renewable energy. If necessary, the

Commission may propose common rules, but these would need to be agreed upon by the Council of Ministers and the European Parliament.

The Renewables Directive contains two recitals directly related to GO:

- Recital 10 states that 'the Directive does not require Member States to recognise the purchase of a guarantee of origin from other Member States or the corresponding purchase of electricity as a contribution to the fulfilment of a national quota obligation. However, to facilitate trade in electricity produced from renewable energy sources and to increase transparency for the consumer's choice between electricity produced from non-renewable and electricity produced from renewable energy sources, the guarantee of origin of such electricity is necessary. Schemes for the guarantee of origin do not by themselves imply a right to benefit from national support mechanisms established in different Member States. It is important that all forms of electricity produced from renewable energy sources are covered by such guarantees of origin.'
- Recital 11 states that 'it is important to distinguish guarantees of origin clearly from exchangeable green certificates.' This recital has been discussed at a seminar organised in the framework of the RE-GO project, where representatives of EU DG TREN, provided clarification. The objective of the recital is to point out that, although tradable green certificates are often *perceived* to be linked to a quota mechanism, GO are by no means necessarily linked to quota mechanisms, rather they could as well be used for e.g. verifying the validity of claims to eligibility for certain feed-in tariffs, where applicable. Recital 14 explicitly categorises green certificates as a support mechanism.

1.2 What is represented by GO?

Renewable electricity generation can result in benefits such as:

- increased energy security and diversity,
- reduced price volatility in energy markets,
- economic development and job creation,
- environmental benefits from reduced land and water impacts,
- improved air quality,
- avoided greenhouse gas emissions.

Some of these benefits(attributes of RES-E generation) are more concrete than others, and there will be a market for at least one of them, establishing a market price for these benefits: the EU greenhouse gas emissions trading scheme. When analysing the interaction of GO with renewable energy policy instruments, the question must be considered whether the owner of GO owns all or part of these (and other) attributes. This boils down to the question whether the 'value' of GO equals the value of (some of) the attributes of the underlying commodity.

Different Member States may use different interpretations, and for the sake of transparency, four main options are distinguished in this report. It should be stressed, however, that it is up to national governments to specify exactly, in legislation, which benefits are represented in GO

a. GO are proof of all attributes from generation from renewables.
b. GO are proof of all attributes, except those that are presently or are likely in the future to be traded separately (e.g. the carbon benefits).
c. GO are the exclusive proof of generation of a volume of electricity from a renewable energy source, but do not contain the attributes of RES-E generation. The buyer receives nothing in return except a proof that he has purchased a certain volume of generation from renewables.
d. Any other rules on which attributes are covered by the GO as proof of benefits from generation from renewables, as determined by the legislator of the jurisdiction concerned.

The various Member States' national implementation may be using any of these interpretations, and, unless action is taken to harmonise them, these interpretations are likely to be diverse. We will describe our view on the interpretation of GO in detail and make recommendations to Member States with regard to this interpretation when we draw conclusions in our final report at the end of the project. However, in our view Option a) would be inappropriate given the existence of the EU Emission Trading Scheme, as this would necessarily lead to multiple counting.

1.3 Types of interactions between GO and renewable energy policies

In principle two types of interaction between a GO system and a renewable energy policy instrument can be distinguished:

- *Facilitative interactions*: interaction in the facilitation of the monitoring and verification of the origin of electricity produced from renewable sources.
- *Market interactions*: interactions between the market for GO and the market that will be established by the EU emission trading system.

1.4 GO Implementation models

A review of how GO systems currently implemented in the various Member States have been designed has been conducted in Phase I of the RE-GO project and reveals that the following GO implementation models can be distinguished:

I. *Minimum compliance model*: In this implementation model the information content of the GO are limited to the minimum requirements stipulated in the Renewables Directive (see Section 1.1).
II. *Advanced implementation model*: Member States, which have implemented this model, have included additional information in GO in order to enable GO to play a larger role in facilitating the implementation of their national renewable energy policy.
III. *Policy integration model*: This model builds on Implementation Model II and includes even more information in GO to bring about a full integration of GO with national support schemes.
IV. *Harmonisation model*: This model reflects the situation where the GO system and the electricity disclosure are fully integrated and harmonised across the EU Member States.

Table 1.1 below presents an overview of the status of the GO implementation in the Member States as of June 2004.

Table 1.1 *GO implementation status EU-15 MS, Switzerland and Norway as of June 2004*

GO system not implemented	Minimum Compliance Model	Advanced Implementation Model	Policy Integration Model
France	Germany	Belgium (Brussels)	Netherlands
Spain	Ireland[2]	Denmark[3]	Belgium (Wallonia)
Greece		Italy[3]	Belgium (Flanders)
Portugal		United Kingdom	Austria
Switzerland[1]		Luxembourg[3]	
		Finland[3]	
		Norway[1,3]	
		Sweden[3]	

Notes:
1. Switzerland and Norway are not EU Member States and have not formally adopted the Renewables Directive
2. Ireland has implemented a GO system, which falls under minimum compliance but which is based on a full integration of GO and green electricity tariffs.
3. These countries are planning or have implemented a system with a registry, although many other aspects of advanced implementation have not been implemented.

2. GO AND NATIONAL INDICATIVE TARGETS

2.1 Introduction to national indicative targets

2.1.1 EU target

In 1997 an indicative target for renewable energy in the European Community was published in the Energy White Paper[1]. This indicative target was for a 12% contribution by renewable energy sources to the European Union's gross inland energy consumption by 2010. The related target for electricity produced from renewable energy sources ('RES-E') was originally 22.1% for the EU-15, but this was adjusted to 21.0% for the EU-25 following the negotiation of indicative targets in the Accession Treaty for the new Member States.

2.1.2 EU-15 Member State targets

The Renewables Directive requires Member States (MS) to put in place appropriate measures to encourage greater consumption of electricity produced from renewable energy sources in line with national indicative targets. The indicative targets for each MS are contained in the Annex to the Renewables Directive and are reproduced in Table 2.1.

Table 2.1 *Reference values for Member States' national indicative targets for the contribution of electricity produced from renewable energy sources to gross electricity consumption by 2010*

	RES-E, 1997 [TWh]	RES-E, 1997 [%]	RES-E, 2010 [%]
Austria	39.05	70.0	78.1
Belgium	0.86	1.1	6.0
Denmark	3.21	8.7	29.0
Finland	19.03	24.7	31.5
France	66.00	15.0	21.0
Germany	24.91	4.5	12.5
Greece	3.94	8.6	20.1
Ireland	0.84	3.6	13.2
Italy	46.46	16.0	25.0
Luxembourg	0.14	2.1	5.7
Netherlands	3.45	3.5	9.0
Portugal	14.30	38.5	39.0
Spain	37.15	19.9	29.4
Sweden	72.03	49.1	60.0
United Kingdom	7.04	1.7	10.0
EU-15	338.41	13.9	22

2.1.3 Accession Country targets

Negotiations on indicative targets for Accession Countries were completed prior to their joining the European Union in May 2004 and their indicative targets are shown in Table 2.2.

[1] European Commission, 1997. *Energy for the future: renewable sources of energy*. White Paper for a Community Strategy and Action Plan. COM (97)599.

Table 2.2 *Reference values for Accession Countries' national indicative targets for the contribution of electricity produced from renewable energy sources to gross electricity consumption by 2010*[2]

	RES-E, 1999/2000 [TWh]	RES-E, 1999/2000 [%]	RES-E, 2010 [%]
Cyprus	0.00	0.05	6
Czech Republic	2.34	3.8	8
Estonia	0.01	0.2	5.1
Hungary	0.22	0.7	3.6
Latvia	2.76	42.4	49.3
Lithuania	0.33	3.3	7
Malta	0.00	0	5
Poland	2.35	1.6	7.5
Slovak Republic	5.09	17.9	31
Slovenia	3.66	29.9	33.6
AC-10	16.8	5.6	11
TOTAL EU-25	355.2	13.0	21.0

2.1.4 Indicative targets as production or consumption targets

The wording of the Renewables Directive is not unambiguous with regard to the interpretation of the indicative targets as consumption targets or production targets.

The Directive states:

- Recital 5: 'To ensure increased market penetration of electricity produced from renewable energy sources in the medium term, all Member States should be required to set national indicative targets for the *consumption* of electricity produced from renewable sources'.
- Article 3, Paragraph 1: 'Member States shall take appropriate steps to encourage greater *consumption* of electricity produced from renewable energy sources in conformity with the national indicative targets referred to in Paragraph 2 …'.
- Article 3, Paragraph 2: '… Member States shall adopt and publish a report setting national indicative targets for future *consumption* of electricity produced from renewable energy sources in terms of a percentage of electricity consumption …'.
- Article 4, Paragraph 2: '… The report shall assess the success, including cost-effectiveness, of the support systems referred to in Paragraph 1 in promoting the *consumption* of electricity produced from renewable energy sources in conformity with the national indicative targets …'.

However, in the Annex to the Renewables Directive it is suggested that the indicative targets relate to the production of RES-E. The Annex states:

- Title 'Reference values for Member States' national indicative targets for the contribution of electricity *produced* from renewable energy sources to gross electricity consumption by 2010'.
- First paragraph 'This Annex gives reference values for the fixing of national indicative targets for the contribution of electricity *produced* from renewable energy sources …'.
- Footnote ** '[The RES-E, 1997 (TWh)] data refer to the national *production* of RES-E in 1997'.
- Footnote *** 'The percentage contributions of RES-E in 1997 and 2010 are based on the national *production* of RES-E divided by the gross national electricity consumption …'.

[2] European Union, *Treaty to Accession of the European Union in 2003*, pp 1802-1803, AA2003/ACT, Brussels, April 2003.

With some MS importing large quantities of renewable electricity from within and outside the EU, the role of imports and exports becomes an important issue with regard to accounting for the indicative target.[3]

In a communication from the European Commission to the Council and the European parliament on 'The share of renewable energy in the EU' (COM(2004)366 final) issued in May 2004, the Commission attempts to clarify the role of cross-border trade. It makes it clear that a MS cannot meet its targets with imports from outside the EU and that, for intra-EU trade: *'a Member State can only include a contribution from import from another Member State if the exporting state has accepted explicitly … that this electricity can be counted towards the importing Member State's target'.* [4]

It appears from this communication that the Commission's interpretation of the Renewables Directive is that indicative targets are defined as production targets corrected for intra-EU cross-border trade if there is agreement from the MS involved[5].

2.2 GO statistics and indicative targets

EU Member States have sufficient statistical instruments available to determine compliance with the indicative targets. The introduction of GO by the Renewables Directive was not intended to facilitate any statistical purposes. However, there are implicit as well as explicit linkages between GO and indicative targets, and GO can be used facilitate the accounting of compliance with these targets.

2.2.1 Linkages

The Renewables Directive requires that GO are issued to RES-E producers on request. The definitions of RES-E for GO and for the indicative targets are the same, both being defined by the Renewables Directive. GO, therefore, will be issued to RES-E which will be counted as contributing to the indicative targets. This implies that statistics on GO may, in principle, be able to contribute to the reporting process on compliance with indicative targets. However, it is likely that not all RES-E in a country will be issued with GO, because the Renewables Directive requires that GO are issued on *request*, rather than automatically for all RES-E produced. Solely using GO to report on compliance with the indicative targets would require GO to be issued for all RES-E. This goes well beyond the minimum compliance requirements of the Renewables Directive.

There is an explicit reference to EU internal trade and the indicative targets in the Renewables Directive. In a footnote the Annex to the Directive explains the formula for calculating the percentage contributions of RES-E as being the national production of RES-E divided by the gross national electricity consumption, and then states:

'In the case of internal trade of RES-E (with recognised certification or origin registered) the calculation of these percentages will influence 2010 figures by Member State but not the Community total.'[6]

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[3] The need for clarity on this issue was raised by the RE-GO project partners, in particular at the second RE-GO seminar in March 2004, see www.re-go.info.

[4] Commission of the European Communities, COM(2004) 366 final, 26 May, 2004.

[5] At the first SETREC|GO steering committee meeting, a number of MS representatives have indicated that they would not consider allowing exported RES-E to be counted towards another MS's indicative target, nor would they import RES-E to meet their own national target.

[6] Footnote *** of the Annex of the Renewables Directive.

While the text in brackets is ambiguous, as neither 'recognised certificate' nor 'origin registered' are terms that are used elsewhere in the Directive, the meaning of the text appears to be that GO ('recognised certification') can be used to enable RES-E imported from another MS to be counted towards a country's indicative target.

This interpretation has subsequently been confirmed in a Communication from the European Commission to the Council and the European Parliament on 'The share of renewable energy in the EU' (COM(2004)366 final) issued in May 2004. In this Communication the Commission attempts to clarify the role of the GO in the calculation of progress towards national targets. First, it makes clear that a MS cannot meet its targets with imports from outside the EU. Secondly, it states that the following principle will be used in assessing the extent to which national targets are met:

'A Member State can only include a contribution from import from another Member State if the exporting state has accepted explicitly, and stated on a guarantee of origin, that it will not use the specified amount of renewable electricity to meet its own target and thereby also accepted that this electricity can be counted towards the importing Member State's target.'[7]

It is clear from this Communication that the Commission's interpretation of the Renewables Directive is imports may be added and exports subtracted from the national production of RES-E for the purpose of calculating the 2010 indicative targets. However, any such explicit agreement 'stated on a guarantee of origin' goes beyond minimum compliance, as any such earmark is additional to the information specified in the Directive as being required to be included on the GO. If exported to a country with minimum compliance that is not able to track this specific information, the GO may be lost for accounting for the indicative targets in both exporting and importing Member States.

The Commission's Communication clarifies the procedure for the earmarking of GO as being between Member States. The Communication states that: 'Exporting Member States could include this agreement directly in guarantees of origin for renewable electricity produced on their territory. If they do not do so, importing Member States could ask for a supplementary approval with reference to the guarantee of origin in question.' However, this does not preclude the market players requesting the earmark from their government, as the value of the GO may be greatly affected by such inclusion. It is interesting to note that the earmarking can thus be done retrospectively, which may cause a number of problems in particular if GO have already been used or transferred.

It has been suggested[8] that when a Member State issues a GO it simultaneously creates what could be described as a 'Target Certificate' that can be used to meet a Member State's indicative target. In effect, the earmark on a GO as suggested by the European Commission will lead to this commodity being created. If the GO does not carry the earmark it can only be used for the indicative target in the country of issue. This could lead to two separate markets being created, with GO being traded between electricity market players, and 'Target Certificates' being transferred between Member States.

Given that GO would be traded between electricity market players, there is also the question over whether Member States will have control over GO needed to fulfil their indicative targets in 2010 if they have earmarked GO for exports. The result may be that they could need to purchase the indicative target component from the market in order to ensure that they meet their target.. Some MS may decide not to earmark any GO in order to avoid this issue.

[7] Commission of the European Communities, COM(2004)366 final, 26 May, 2004.
[8] Report by Campbell Carr, 'On Contributions to Indicative Targets', 19 July 2004.

2.2.2 Potential interactions

Harmonious accounting

The first issue of this document, drafted before the publication of the Communication from the Commission, discussed the problems arising from different interpretations of the indicative targets. In particular the scope for multiple counting when some MS would have adopted a production target and others a consumption target. The European Commission's explanation of its interpretation of the role of RES-E trade in meeting the indicative targets has clarified this issue.

GO and statistics

A number of problems may arise if GO are used to help calculate the indicative targets[9].

First, GO are not required to be of standard size. Statistics on the numbers of GO issued, or held, in-country are therefore not sufficient to indicate the quantity of RES-E generated.

Secondly, without the existence of a registry, accounting for the number of GO issued, or held, in country is prone to omissions and multiple counting. Under minimum compliance no registry is required.

Thirdly, and related to the existence of a registry, for accurate accounting tracking of GO transfers and in particular tracking of cross-border transfers is likely to be necessary. Without registry or tracking, GO accounting is likely to be inaccurate. Under minimum compliance neither registry nor tracking is required.

Fourthly, the dates and validity of GO are important. GO may be issued for a time period covering generation in more than one calendar year, e.g. a two-month period December and January, or indeed more than 12 months. The question arises in which year these GO could be used towards meeting the indicative targets. Related to this is the question of validity of the GO, in particular, can a GO generated in one year be used to meet the indicative target in subsequent years.

Finally, and most importantly, there is no comprehensive GO coverage, significantly reducing the usefulness of GO statistics for accounting for targets. Therefore, GO are likely to be issued only where they have monetary or beneficial non-monetary value:

- RES-E producers would have an incentive to request issue if a GO is required as proof of generation for national support schemes, or if required for the sale of RES-E to a buyer.
- A Member State may exclude GO which have been issued for RES-E production eligible to a national support scheme from being used for any other purpose, or even from being transferred (e.g. as in Germany). In such a circumstance there is no incentive for RES-E producers to request GO for the respective electricity volumes unless they are required as proof for the support scheme.
- RES-E producers may have an incentive to request issue of GO if they want to obtain accreditation for their green tariff under a voluntary labelling scheme or if they can be used as part of a mandatory disclosure scheme.
- The purpose of GO as given in Article 5.3 is to enable producers to demonstrate 'that the electricity they sell is produced from renewable energy sources'. One interpretation of this is that off-grid generation and autoproduction are not required to be issued with GO, as no electricity is sold to a customer. However, Recital 10 states that 'it is important that all forms of electricity produced from renewable energy sources are covered by such guarantees of origin'. Both off-grid generation and autoproduction are eligible for inclusion in figures for compliance with the indicative targets. The Phase 1 Country Reports show, for example, that the Netherlands do not issue GO to these sources, while the UK does.

[9] Some of these shortcomings may be solved by an implementation scenario that goes beyond minimum compliance.

Multiple counting and other problems
The Commission's recently published interpretation of the role of GO in cross-border trade of RES-E with regard to the indicative targets significantly reduces the potential for multiple counting. Multiple counting may still occur, but not due to the interaction between GO and indicative targets, as it is clear that GO cannot be counted towards the importer's target *unless* there is agreement from both parties to that effect.

However, problems remain. For example, the Netherlands' tradable green certificate system is currently based on GO and allows for imported GO to be used. It demands that the imported GO are earmarked so that they can be used to count towards the Dutch 9% indicative target for 2010. It is likely that the Netherlands will be able to show progress towards its target, given that approximately one quarter of the population subscribes to green power, which is backed-up by these GO, despite the fact that national production is very small. However, countries exporting GO to the Netherlands are likely to claim that they are progressing towards the target on the basis of national production. This scenario may leave the Netherlands dramatically short of its target in 2010, despite its earlier efforts, if exporters decide not to earmark any GO issued in 2010. Alternatively, it may leave the exporting countries short of their target despite having shown progress towards meeting it. While neither situation would be multiple counting, countries may be making inadequate preparations to meet their target due to their expectation that they will be able to use imported GO, whilst in fact these might not be available in 2010.

Other problems may occur if a bilateral agreement would retrospectively allow GO to be used towards the importing country's target. One country may decide at the end of a year that a certain number of issued GO will not be required for its own target, but can be used by another country. Such a situation could have a significant impact on the value of an individual GO, and it could be argued that this is state aid if earmarked GO are worth more than non-earmarked GO.

There is also the issue of ensuring that the indicative targets tally with information given to consumers in the form of electricity disclosure labels and green electricity quality labels. If, for example, all consumers in a MS subscribe to 100% renewable-based green electricity tariffs, consumers may expect that the disclosure labels should all say that 100% of the electricity supplied is from renewable sources and that 100% of electricity consumed in the country is from renewable sources. It would be possible, however, for everyone in a country to have a renewable-based green electricity tariff, but the target attributes in 2010 are allowed to be used by another country (thus wiping out any additionality which the consumers believed they were contributing towards) and only 10% is retained to meet its own target. This situation could arise, for example, when non-earmarked GO are imported to proof the green supply. Although this cannot strictly be considered multiple counting, the aim of GO being able to improve transparency and to meet consumers' expectations would be grossly undermined.

2.2.3 Implementation scenarios

The interaction between GO and the indicative targets under the implementation scenarios as described in Section 1.4 can be summarised as follows.

Minimum compliance
Under minimum compliance, GO are unlikely to facilitate effective use for any purpose other than rudimentary proof of RES-E. Under minimum compliance it is unlikely that issuance of GO would be close to comprehensive and thus GO statistics would not independently be able to facilitate the accounting for the indicative targets. Indeed, the earmark required for counting imported GO may not even be recognised as this would go beyond minimum compliance, and it is most likely that MS with minimum compliance view the indicative targets as pure production targets.

Advanced implementation
Advanced implementation covers a rather wide spectrum of implementation scenarios. One of the first elements of this scenario is likely to be the introduction of an electronic register which will help reduce the opportunities for multiple counting and support the opportunities for using GO in accounting for the indicative targets.

Policy integration
Under policy integration, MS would be able to use GO to effectively facilitate accounting for the indicative target. All RES-E would be issued with GO in an electronic registry. Reports on renewable energy quality labels, disclosure and indicative targets would provide information to final consumers in a transparent and coherent way. Automatically earmarking GO that are used for compliance with or are eligible for funding from a support scheme would also help avoid 'improper accounting'. Under policy integration, interaction between indicative targets and GO is thus likely to be full, effective and automatic.

Harmonisation
This scenario goes one step further than policy integration with a number of or all MS having harmonised their approaches to GO. All aspects of GO will be the same across the EU.

2.2.4 Recommendations

In order to improve the use of GO in accounting for the indicative target it would be beneficial to:
- issue GO to all generation from RES-E, including off-grid and autoproduction,
- issue GO automatically rather than on request.

General recommendations to reduce the risk of multiple counting include to:
- have only issuing body for a particular region - this would reduce the potential for multiple issuing of GO for the same kWh,
- have a standard size for GO, e.g. 1kWh,
- establish an electronic registry,
- develop effective interfaces between registries in different MS,
- require registries to perform full tracking of GO transfers, including imports and exports,
- establish one standard for all GO transferred across borders,
- establish a system for redemption of GO.

Further recommendations that will reduce the potential for 'improper accounting' include:
- requiring that any GO used for any purpose carries the earmark to indicate that use,
- issuing GO in vintages equivalent to calendar years,
- limiting the GO validity to the calendar year of RES-E generation only.

3. GO AND RENEWABLE ENERGY SUPPORT MECHANISMS

3.1 Interactions between GO and the quota obligation support mechanism origin

This section examines the interactions between GO and the renewable energy quota obligation support mechanism. At present, all existing EU Member State obligation schemes utilise a Tradable Renewable Energy Certificate (TREC) scheme to demonstrate compliance with the obligation. Therefore, the examination in this section will focus on the possible interactions between the GO and the TREC system used for administering an obligation support mechanism. TREC systems used for voluntary demand schemes are discussed in Chapter 6.

3.1.1 Introduction to the renewable energy quota obligation and the tradable renewable certificate system

A renewable energy quota obligation sets by law the minimum amount or proportion of electricity supply that must be produced from renewable energy sources. These obligations are sometimes referred to as Renewable Portfolio Standard (RPS). The government sets the framework within which the market has to produce, sell, or distribute a certain amount of electricity from renewable sources. The obligation is imposed on consumption (often through supply or distribution companies) or production. Governments may choose to establish 'technology bands' in order to protect technologies from strong competition by lower cost options. The implementation of a quota-based system usually involves a penalty for non-compliance with the obligation. Quota-based renewable energy support schemes have been implemented in the UK, Wallonia, Flanders, Italy and Sweden.

In order to keep the costs of meeting the quota obligation to a minimum, the obligation system is commonly administered by a system of Tradable Renewable Energy Certificates. The TREC provides proof that the associated electricity has been produced from renewable energy sources and allows sale of the 'greenness' of that electricity to be detached from the sale of the physical electricity. Each TREC system must define exactly what benefits the TREC contain (for example, TRECs produced in the EU can not contain the greenhouse gas benefits, because they are subject to a separate trading scheme[10]). TRECs can then be traded, banked or consumed like any other commodity. The quota obligation is met when the body that is subject to the obligation shows proof of redemption[11] of the required number of TRECs to the authority that oversees the obligation scheme. Trade in TRECs generates an additional revenue stream for renewable energy producers. The physical electricity can still be sold on the power market where the prices are determined based on short-term energy sales. However, the price determination at the green certificate market is based on political targets and associated non-compliance penalties.

Table 3.1 presents the main characteristics of the obligation schemes implemented in the EU Member States.

[10] See Chapter 7 for a description of the EU Emission Trading Scheme.

[11] Redemption is the final stage in the life cycle of a TREC or a GO. When the TREC or GO is used for a particular application it must be retired from circulation and this process is called redemption. In practice, it means that the issuing body transfers the TREC/GO to a redemption account and informs the owner in writing that the TREC/GO has been redeemed and can no longer be transferred or traded.

Table 3.1 *Main characteristics of the quota obligation schemes implemented in the EU Member States*

Country	Main characteristics of quota obligation schemes in the EU
UK	Mandatory obligation placed with electricity suppliers of 10% of electricity consumption in 2010. Compliance proved through TREC. No minimum TREC price and a penalty is set for non-compliance (~4.8 ct/kWh)
Wallonia	Mandatory obligation placed with electricity suppliers of 12% in 2010. Compliance proved through TREC. Minimum TREC price of Eurocent 6.5/kWh and a penalty is set for non-compliance. (10.0 ct/kWh)
Flanders	Mandatory obligation placed with electricity suppliers of 5% in 2010. Compliance proved through TREC. No minimum TREC price and a penalty is set for non-compliance. (10.0 ct/kWh)
Italy	Mandatory obligation placed with electricity producers of 2% of electricity production each year. Compliance proved through TREC.
Sweden	Mandatory obligation placed with electricity suppliers of 16.9% of electricity consumption in 2010. Compliance proved through TREC. Minimum TREC price ranging from ~.66 ct/kWh in 2003 to ~.22 ct/kWh in 2007 and a penalty is set for non-compliance of ~ 1.93 ct/kWh in 2003 and ~2.63 ct/kWh in 2004.

At the moment, none of these countries accepts imports for complying with their obligation, because they have set additional criteria that cannot be met in practice. Sweden and Norway intend to set up a joint market for trading TRECs. Furthermore, the Flanders and Brussels regions in Belgium will start a pilot for trade in 2005.

There is still little practical experience in the EU with quota-based TREC systems. In principle, they fit well into the liberalised electricity markets, and setting an obligation is seen as an assurance that the set target will be achieved[12]. Furthermore, an advantage of a TREC-based obligation is that competition between producers is stimulated, providing incentives for cost minimisation. Certificates are, in general, traded bilaterally or through brokers in an over the counter market (only a small fraction of trades occur via the spot market), and the number of market actors is small. Hence the liquidity of the market is low and there is little market transparency. Investors also face more uncertainty with regard to future revenues (due to fluctuations in TREC prices) compared to, for example, a feed-in tariff system.

Over the last few years, much research has been carried out on the harmonization of international trading rules for TRECs in Europe. In addition, an important initiative from the market is the Renewable Energy Certificate System (RECS), which is a non-governmental, self-financed group comprising more than 100 market players from the EU Member States. RECS's aim is to lead Europe towards a voluntary international trading system. RECS is described in more detail in Chapter 6.

3.1.2 Comparing TREC to GO

As explained above, the aim of a mandatory TREC system is twofold: 1) to show compliance with the obligation; and 2) to meet the obligation at the lowest possible cost through introducing market forces. This section aims to compare the TREC and the GO systems and to analyse the extent to which GO could facilitate (or even replace) the TREC system.

In Table 3.2 the minimum requirements for the GO as stipulated in the Renewables Directive are compared with the general characteristics of TREC systems implemented in Europe. The comparison is made for the three stages of the lifecycle of a certificate: issuing, transfer and redemption.

[12] Although in practice, the target may not be met because obliged actors can still buy out or pay the penalty.

Table 3.2 *Comparison of general characteristics of mandatory TREC systems and the GO as specified in the Renewables Directive 2001/77/EC*

	GO according to Renewables Directive	TREC general characteristics
Issuing	• Definition of eligible RES-E is as defined in the Directive	• Definition of eligible RES-E is as defined in national legislation for the associated quota obligation
	• Issuing body 'one or more competent bodies, independent of generation and distribution activities'	• Issuing body appointed by national government
	• Issued on request of the generator	• All countries use stringent accreditation and verification procedures before issuing TRECs. TRECs issued for all eligible production by accredited generator.
	• Purpose: demonstrate that the electricity a generator sells is produced from renewable energy sources	• Purpose: Obliged actors can prove that they have met the quota.
	• Information content: energy source, date and place of production, for hydropower the capacity of the plant.	• In addition: information required for trading purposes, such as a unique number
Transfer	• Directive implicitly accepts transfer of GO in Recital 10 where it states that GO are necessary 'to facilitate trade' in RES-E, however GO are 'clearly distinguished' from exchangeable certificates in Recital 11[13])	• National trade is by definition one of the functions of a TREC
	• Cross border transfers: Directive requires that MS should recognise GO from other MS	• Cross-border transfer depends on national provisions and bilateral agreements, with imported TRECs usually not eligible within national obligation schemes.
	• The Directive does not explicitly impose a linkage between physical electricity and GO[14]	• TRECs are in most cases allowed to be traded separately from the electricity
Redemption	• Not mentioned in Directive	• Redeemed when used for the purpose of compliance (to prevent multiple counting)

The GO and TREC systems have been merged in Wallonia and Flanders. In the UK, Italy and Sweden the two systems are operating separately. Note that in these countries, the definition of GO and TREC must be different to prevent multiple counting. For example, in Sweden, TREC are regarded as a financial support mechanism, not as a proof of origin for electricity.

Issuing of certificates

Issuing of the TREC involves accreditation of the renewable electricity generator, verification of the generation and issuing of the certificates. From the comparison shown in Table 3.2, it can be concluded that there are several similarities between the issuing procedures of GO and TRECs and this offers good possibilities for linking the two systems. Table 3.3 shows the extent to which the issuing procedures for GO and TRECs have been linked in the various countries.

[13] See Section 1.1 for a further interpretation of Recital 11.

[14] Article 5 (3): '… serve to enable producers of electricity from renewable energy sources to demonstrate that the electricity they sell is produced from renewable energy sources'. See for a further elaboration of this issue the discussion of Article 5 (3) in Section 1.1.

Table 3.3 *Interactions between issuing procedures for GO and TREC*

Country	Existing interactions between issuing procedures for GO and TREC
UK	Accreditation procedures already exist for the UK TREC scheme (RO) and this procedure will also be used for GO. Same issuing body for TREC (RO) and GO. However, there is no direct link between GO and ROCs at present.
Wallonia	Wallonia has a stringent accreditation process which will also be used for GO. Annual verification is conducted by a certified verification body or by CWaPE. GO are part of the TREC system. Same issuing body for TREC and GO.
Flanders	In Flanders, the GO are part of the TREC and accreditation procedures are the same. Same issuing body for GO and TREC.
Italy	The GO will operate alongside, but independent of, other support mechanisms and the procedures for accreditation and issuing are not linked. Same issuing body for GO and TREC.
Sweden	In Sweden, the existing stringent accreditation process for RE generators will also be used for claiming GO. Same issuing body for GO and TREC.

Transfer of certificates

Once a certificate has been registered, it can be transferred in the certificate market. The comparison in Table 3.2 shows the differences between the GO and the TREC related to trade. Table 3.4 presents an overview of the current position of Member States with regard to the tradability of GO.

Table 3.4 *Current position of EU Member States with regard to tradability of GO*

Country	Current position with regard to tradability of GO
UK	The GO registry is proposed to track transfer of GO. GO can be exported
Wallonia	GO are tradable in Wallonia and can also be exported provided there is a bilateral agreement.
Flanders	GO can be exported but then lose their eligibility for quota obligation.
Italy	Import of GO from other Member States is expected and will be recognised as long as the conditions of the Directive are met and free market and reciprocity rules are respected. Imported GO will however not be eligible for the quota.
Sweden	Sweden currently has no plans to recognise the purchase/sale of GO from/to other Member States.

Redeeming the certificates

TRECs can also be redeemed. This means that the certificates are withdrawn from the market as if they were destroyed. Redemption is required to show that the certificates have been used to fulfil an obligation (or for some other purpose). Redemption of GO is not among the minimum requirements mentioned in the Renewables Directive. At present, GO are redeemed only in the two Belgian regions where GO and TREC systems have been merged.

3.1.3 Case studies: Wallonia and Great Britain

To illustrate the use of GO and possible interactions between the GO and TREC system, this section presents two case studies. First, the situation in Great Britain is explained in detail as an example of a country where the GO and the TREC systems operate independently of each other. Next, the situation in Wallonia is presented as an example of how the GO and TREC systems can be merged.

Case study: the Renewables Obligation in Great Britain

The Renewables Obligation is a key policy tool to boost the generation of renewable electricity. This obligation was implemented on 1st of April 2002 and requires electricity supply companies to buy an increasing proportion of their electricity from renewable sources. The obligation is intended to run for 25 years and will gradually rise to a level of 10.4% of total electricity production in the year ending March 2011. The obligation level beyond 2011 has recently been changed to increase to 15.4% by 2015 although legislation for this has yet to be enacted.

Eligible renewable electricity produced within Great Britain is being issued with Renewable Obligation Certificates (ROC). ROCs are used by suppliers as a proof of compliance with the Obligation. If a supplier cannot meet the quota obligation, he can pay the buy-out of 30 GBP/MWh for 2002 (approximately 4.8 ct/kWh). The buy-out price is index-linked and will therefore increase each year (it currently stands at 30.51 GBP/MWh). The money collected from buy-out payments is distributed back to the companies in proportion to the number of ROCs that they submitted. The main characteristics of ROCs are:

- ROCs are issued and managed electronically by the regulator (OFGEM).
- ROCs are issued on a monthly basis.
- ROCs are issued for installations of wind, biomass, biogas, solar, wave & tidal, hydro (capacity <10 MW), geothermal.
- ROCs can only be issued for generation in Great Britain.
- ROCs can be revoked and are valid for two years[15].

The current price of a ROC is around 48 GBP/MWh (~6.25 ct/kWh), i.e. around 30 GBP for the penalty plus 18 GBP for the recycled buy-out payments. The Renewable Obligation scheme will be reviewed in 2005.

The legislation for the implementation of the GO for Great Britain (in the legislation referred to as Renewable Energy Guarantees of Origin (REGO)) came into force on 27th October 2003. In addition to the minimum requirements for a GO as specified in the Directive, the legislation requires that the GO include the address of the producer, whether the producer is accredited for the ROC scheme and whether the producer is accredited for the Climate Change Levy Exemption scheme. The GO exists along side, but independently from other existing support schemes such as fiscal measures and the Renewables Obligation.

It is possible to make some comparison of GO implementation in Great Britain with the minimum GO requirements specified within the Renewables Directive:

- The purpose of the GO. There is no provision at present for ROCs and GO to be exchanged for one other. However, in a consultation document prepared by the Department of Trade and Industry in 2003, possible purposes for the GO which are mentioned are:
  - GO may be used as part of the ROC accreditation process,
  - GO may be used as partial fulfilment for accreditation for Climate Change Levy Exemption.
- National and cross border trade of GO. No national trade in GO is foreseen in the UK but the proposed procedures for the register of GO includes ownership transfer procedures. However, a requirement of the Renewables Directive is to recognise GO issued by other Member States. GO can also be exported to other Member States.
- Redemption of GO. There is no mention of redemption in the Renewables Directive and no redemption procedure is currently proposed for the GO.

[15] Revocation can apply if ROCs have been wrongly issued. However, the possibility of revocation endangers the market, as a ROC can already have been sold and even redeemed before it is revoked. In Great Britain this is usually dealt with in contractual arrangements. As the possibility for revocation is not included in other Member States' legislation, this could be an obstacle to international trade.

- GO linked to physical electricity. This is not clear in the Renewables Directive, and no requirement to link the GO to the electricity is proposed in the GO system. However, there is an intention to use GO for electricity disclosure and for the GO to represent the electricity generated from renewables, such that it should be sold as being renewable without the GO.
- Multiple counting. If a producer is an accredited generator under the Renewable Obligation and/or the Climate Change Levy exemption, this is shown on the GO. Potential GO users/purchasers can therefore determine whether the associated electricity has received financial support from two other UK policy tools. Still, multiple counting can only be prevented when the ROC is defined as a purely financial support scheme, and not as a proof of renewable generation.

Case study: the Walloon Renewables Obligation

In Wallonia a quota obligation support mechanism was introduced in January 2003. This obligation is linked to a green certificate system to administer the compliance of the obligation. The Walloon obligation was set at 3% in 2003 and will increase to 7% in 2007. In Wallonia, green certificates are issued not only based on the source of the electricity but also according to CO_2 emissions avoided. The validity of the certificates is five years and banking of certificates is allowed. The minimum price for a certificate (1 MWh) is 65 euro and the maximum price for a certificate is determined by the penalty of non-compliance which was in 2003 100 euro per missing certificate. The main characteristics of green certificates:

- Certificates are issued and managed electronically by CWAPE, the regional regulator.
- Certificates are issued on a monthly basis.
- Certificates are issued for installations of solar-energy, wind energy, small-scale hydropower (less than 10 MW), tidal stream energy and tidal wave energy, biogas from the fermentation of organic wastes, animal manure, biomass and for CHP generation if at least 10% reduction in CO_2 emissions is achieved compared to a modern thermal power plant.
- Certificates can only be issued for generation in Wallonia.
- Certificates from Flanders are not contributing towards the Walloon obligation.
- In 2003, 610,000 certificates were issued. The obligation of 3% required 700,000 certificates. The average price of a green certificate in 2003 was 85 euro.

In Wallonia, GO legislation has been passed and the GO system has been operational since October 2002. In Wallonia the GO and the green certificate systems have been fully merged into one system. All the functions of the green certificate system are taken over by the GO, including transfer and redemption. The GO in Wallonia include a lot more information compared to the minimum requirements as indicated in the Renewables Directive. The following main differences between GO in Wallonia and the minimum GO requirements according to the Renewables Directive can be identified:

- The purpose of the Walloon GO is to demonstrate compliance with the quota obligation. This linkage to a support scheme is one step further than the purpose stated in the Directive. However, imported GO do not count towards the obligation, because other conditions are not met.
- In Wallonia, GO are also issued for CHP (smaller than 20MW) provided that at least 10% reduction in CO_2 emissions is achieved.
- Walloon GO are redeemed when used for meeting the obligation. Redemption is not mentioned in the Renewables Directive.
- The Walloon GO are not linked to physical electricity.

3.1.4 Recommendations

It can be concluded from the analysis presented in this section that interactions between GO and TREC systems can occur at different levels. The most important question is whether the TREC and GO represent the same, or different, benefits. If a Member State has a TREC system in place (facilitating an obligation), which contains the renewable benefits, then it must immedi-

ately be merged with the GO system. If the TREC system is not containing the benefits, then the TREC and GO systems can coexist. In this case, synergies should be harvested during accreditation, and issuing of both, in order to reduce cost.

GO and TREC separated

If the GO are kept separate from the TREC system, some overlap and duplication may exist for the issuing phase, including accreditation, verification and issuing of the GO and TREC. However, if no provision is made in the legislation to actually establish a link between the GO and TREC systems (as is the case now in Great Britain), GO implementation does not serve any purpose within the obligation. GO may be used for other purposes, such as the use in an accreditation process, export to other Member States, proof of eligibility for other financial support schemes, or as a proof of 'greenness' for green electricity products. It depends on the exact definition of both the GO and the TREC in a specific country whether the latter is a case of multiple counting. Only if the TREC system is defined according to Option c in the introduction (Section 1.2) - containing no environmental benefits - other uses of the GO can be justified. Still, using the criterion of environmental additionality, sales of (TREC supported) renewable electricity with a GO under a green electricity product can be considered multiple counting[16].

In the case of coexistence of the GO and TREC, there is a chance of duplication and multiple counting problems. In order to prevent this, the following recommendations are in place.

- Legislators should define unambiguously which renewable attributes are represented by the TREC and GO respectively.
- GO should be earmarked for the fact that the underlying electricity has also received a TREC, so potential GO purchasers can determine whether the associated electricity has been in receipt of financial support. This is particularly important in the case of export of GO, to make sure that the renewable electricity is not counted for targets of different Member States.
- GO should be administered in a central registry jointly with the TREC.

GO and TREC merged

The possibilities for multiple counting are significantly reduced when the GO and TREC systems are merged into one system, which in practice means that the GO function as TREC. To bring about such a merger, the following requirements are needed in addition to the minimum requirements mentioned in the Renewables Directive.

- In order to become tradable, GO must represent a market value. This value can result from a demand for GO by means of incorporating GO into a quota obligation for renewable electricity.
- If the GO are part of a mandatory scheme, national trade requires a monitoring and tracking system in order to determine legitimate holders of GO. An independent body should administer all transactions between traders, as well as redemption and expiration of the GO.
- Tradable certificates are redeemed when the transaction related to the purpose of the TREC has taken place, in order to prevent multiple counting. Redemption of GO is not mentioned in the Renewables Directive. However, as soon as GO represent a value, redemption should be incorporated into the scheme in order to reduce the potential of multiple counting.

Finally, it should be noted that whilst Member States need to recognised GO from other Member State, it is not necessarily required that the importing Member State accepts these GO within its RES-E support mechanism. At present, most Member States operating a TREC system are reluctant to accept imported RES-E, because of the large differences between support schemes and resources in different countries.

[16] The issue of additionality under green electricity quality labels is further elaborated in Chapter 4.

3.2 Interactions between GO and feed-in tariffs

3.2.1 Introduction to feed-in tariffs

In many EU Member States feed-in tariff schemes have been considerably successful in stimulating the development of renewable electricity generation. When carefully developed, feed-in schemes are relatively fast and easy to implement, easy to comprehend and offer - depending on the guaranteed tariff period - a high degree of investment security for RES-E operators. Feed-in tariff schemes generally consist of:

- the obligation of grid operators to connect RES-E generators to the public grid,
- generally an obligation for the energy market to purchase electricity generated from eligible RES sources and technologies (exceptions see Cluster C in Table 3.5),
- and to pay a minimum tariff per kilowatt-hour for the electricity produced by RES generators.

In most feed-in schemes operated throughout Europe, the minimum tariff varies with the technology used. In addition to that, feed-in tariff schemes vary in the eligibility of RES sources and technologies, in the tariff level as well as in the development of the tariffs over time and the duration a feed-in tariff is guaranteed.

A variant of the fixed feed-in tariff is a fixed premium or bonus mechanism. In this variant RES-E generators receive a fixed premium above the electricity market price. In reality and for the purpose of the analysis of the interaction between feed-in schemes and the GO there is little difference between the fixed feed-in and fixed premium schemes. Therefore these options will not be treated separately.

In feed-in tariff schemes no quota or maximum limit is set for RES-E generation. Different to support instruments with explicit fixed quotas or maximum budgets (e.g. obligations and RPS schemes, bidding systems) the volume of renewable generation is implicitly determined by the level of the feed-in tariffs.[17]

There are rather different options for the detailed design of a feed-in scheme. The following aspects can be identified as relevant regarding the interaction with the GO:

1. 'Allocation of electricity': Who is becoming legal owner of RES-E volumes that have been funded through a feed-in tariff? Is there any mechanism in place to distribute the electricity among the market players?
2. 'Flow of money':
   - Who is directly paying the RES-E operators? This can either be a grid operator (DSO, TSO) or a public body (e.g. the Ministry of Environment or a regional authority).
   - How and through which mechanism are the system costs distributed among the market players? The allocation can be done through integration in the system charges or via a supplement on top of the final electricity market price.
3. Allocation of environmental benefits: Who is finally claiming the environmental benefit of the RES-E which has been funded through the feed-in scheme?
4. Verification: How is verification of the feed-in system organised (in order to avoid multiple counting such as double funding or other options of deceitfully receiving financial support over and above the regulations of the respective feed-in scheme)?

Regarding the aspects mentioned above the clusters of feed-in system design in EU Member States that can be observed are given in Table 3.5.

[17] Some feed-in schemes have established technology specific caps which restrict the support to a specific maximum. For instance, the original version of the German Renewable Energy Law (EEG) contained a provision to restrict the payment of feed-in tariffs to PV installations, which were commissioned before 31 December of the year following the year in which eligible PV installations have reached a total installed capacity of 350 MW. However, due to an appropriate subsequent regulation, this respective restriction was abandoned.

Table 3.5 *Clusters of feed-in systems in EU Member States*

	Cluster A	Cluster B	Cluster C
Who is directly paying the feed-in tariff to eligible RES operators?	TSO or DSO.	TSO or DSO.	TSO/DSO or public body.
How are costs allocated to final consumers?	Costs are distributed among all electricity suppliers, supplying final consumers proportionally to their annual sales volumes. Through this mechanism the costs are finally borne by all customers according to their electricity consumption.	Costs are distributed among all electricity consumers via system charges or directly by a supplement on the electricity tariff.	Costs are distributed among all electricity consumers via system charges or directly by a supplement on the electricity tariff.
Allocation of electricity volumes supported through the feed-in scheme	Distribution among all electricity companies supplying final consumers proportionally to their annual sales volumes.	No legal regulations regarding who is becoming the legal owner of electricity funded by the feed-in tariff (ownership can either remain with RES generators or with grid operators who are paying the tariff).	Legal ownership stays with the RES operator who has received the feed-in tariff. RES operator is allowed to sell supported electricity on green power market.
Who is finally claiming the attributes?	Electricity companies supplying final consumers which are obliged to purchase funded electricity proportionally to their annual sales volumes.	No legal regulations who finally is permitted to claim the 'greenness' of the respective electricity generation (RES generator or grid operator).	RES operator.
Examples	Germany, Austria.	Spain, France.	The Netherlands.

3.2.2 Case study: Germany

System design

The German feed-in system is regulated through the Act on Granting Priority to Renewable Energy Sources (EEG). The EEG obliges a grid operator whose grid is closest to the location of an eligible RES installation to connect the respective RES installation and to buy electricity from the installation in accordance with fixed feed-in tariffs, which are set forth in the law.

Eligible sources cover hydro power plants <5MW, biomass (<20MW), wind power, geothermal energy, landfill and sewage gas and photovoltaic energy.

The feed-in tariffs are technology-specific and depend on the capacity of the respective plants. For several technologies the EEG holds a degressive price element which reduces the tariffs for RES installations each year. The annual reduction factor varies between 1% for biomass and 5% for PV. For most eligible RES sources and technologies the feed-in tariffs are guaranteed for a period of 20 years from the year of commissioning.

Currently, the EEG is under revision. Major amendments will cover the adjustment of specific tariffs as well as the reduction factors and the inclusion of hydro power plants larger than 5 MW in the scheme.

Encouraged by the EEG, power generation from renewable energies is expected to rise from 3% (related to the total domestic consumption) in 2000 to 12% in 2008, according to the grid operators association VDN, which is in charge of assessing these volumes.

Allocation mechanism for RES-E funded through the feed-in scheme

Section 11 of the EEG regulates the so-called nation-wide equalisation scheme. As outlined above, the local grid operators are obliged to connect eligible RES-E installations and to compensate them with the feed-in tariffs set forth in the EEG. The upstream transmission grid operator[18], which is operating in the respective area, is obliged to purchase and pay compensation for these RES-E volumes which have been funded by the local grid operators. Thus the local grid operators are generally transferring all electricity volumes and the corresponding financial burdens to the level of the TSOs.

By the 31st of March of each year, the TSOs determine the total volume of electricity purchased in accordance with the above-mentioned procedure and the share, which this volume represents relative to the overall electricity volume delivered to final consumers either directly by the operator or indirectly via downstream grids. If a TSO has purchased more RES-E than this average share (this is relevant to TSOs which cover areas with a higher RES penetration than the average), they are entitled to sell electricity to, and receive compensation from, the other TSOs, until all TSOs have purchased an electricity volume, which is equal to the average share mentioned above.

Energy supply companies which deliver electricity to final consumers, are obliged to purchase and pay compensation for that part of the electricity which their regular TSO purchased in accordance with the above-mentioned allocation mechanism. The volume that an energy supplier has to purchase is related to the total electricity volume delivered to its final customers and is determined in such a way that each supplier receives a relatively equal share.

Thus, the total electricity volume supported through the feed-in scheme is distributed equally among all electricity suppliers, according to the total electricity volume delivered to their final customers.

GO implementation in Germany

Implementation of the GO requirement will be integrated into the revision of the Renewable Energy Law (EEG). In Germany the GO system probably will not go beyond the minimum requirements set forth by the Renewables Directive.

GO in Germany shall specify - in line with the minimum requirements by the Renewables Directive - the energy source, whether it covers electricity which is in line with the definition for renewable electricity laid down in the Renewables Directive, the location of the RES-E installation, the name and contact of the plant operator, and the respective electricity volume. In addition to that (and going beyond the minimum requirements of the Directive) GO shall specify the installed capacity and the commissioning date of the corresponding RES-E installation. Furthermore, GO shall be earmarked as to whether a RES-E installation has received a feed-in tariff. In the case of biomass, GO have to specify whether the biomass is covered by the Biomass Ordinance.[19]

Operators of RES-E installations can commission accredited environmental auditors to issue the GO. Auditors or auditing organisations/institutions eligible to issue GO have to be accredited following the rules set forth in the Umweltauditgesetz (eco management and audit scheme).

[18] Currently there are 4 TSOs in Germany.

[19] Ordinance on Generation of Electricity from Biomass (Biomass Ordinance) of 21 June 2001. The Biomass Ordinance regulates what substances shall be considered biomass, what technical processes for generating electricity from biomass fall within the scope of the EEG, and what environmental standards must be met in the generation of electricity from biomass.

The draft legislation neither covers regulations how to organise the transfer of GO between market participants nor how to handle the redemption of GO once they have been used. As the use of GO is limited to the voluntary market it will be left to the market players to deal with these questions.

Interaction between the GO and the feed-in scheme
RES-E installations eligible to the EEG are not excluded from receiving GO. However GO which have been issued for electricity which has received a feed-in tariff are explicitly not allowed to be transferred to other market participants. In principle, this means that RES -E operators will have no real (legal) incentive to request GO once they have obtained a feed-in tariff.

The main problem which can be identified with respect to the aforementioned procedure, is the risk of multiple counting. Although the draft legislation to implement a system of GO explicitly forbids to sell the 'greenness' of one kilowatt hour renewable electricity to more than one customer, multiple counting will not be effectively prevented by the system design. The implementation of the GO requirement envisaged in Germany does not foresee the establishment of a central registry in which issuing, transfer and redemption of all GO will be centrally organised and monitored. Therefore, it cannot be prevented that plant operators mistakenly (or fraudulently) apply for GO at more than one issuing body. This would result in several GO being issued for the same volume of renewable electricity. Provided the GO contain the 'greenness' of the respective RES-E generation the RES operator would be able to offer the greenness of one kilowatt hour green electricity to several customers. Lacking a sound verification system it will be more or less impossible to control and prevent RES operators to abuse the GO system.

3.2.3 Case study: Spain

System design
The main support mechanism for renewable electricity in Spain is defined by what is referred to as the Special System (Régimen Especial) for electricity generation. This Special System was defined by Law 54/97 on the Electricity Sector (Ley 54/97 del Sector Eléctrico). It distinguishes between electricity generators operating under the Ordinary System (Régimen Ordinario) and those generating electricity under the Special System. Royal Decree 2818/1998 implements the aspects of Law 54/97 relating to the Special System.

Electricity generating facilities with a capacity of 50 MW or less[20] are eligible for the Special System, provided that they are

a) autoproducers which use cogeneration or other forms of thermal generation of electricity associated with non-electrical activities, provided that they involve high energy efficiency,
b) facilities using renewable energy sources such as biomass or any type of biofuel, solar, wind, geothermal, wave energy, tidal energy, energy from hot and dry rocks, hydropower plants <50MW,
c) installations based on waste products which are not covered by b),
d) facilities for the treatment and reduction of wastes from agricultural, livestock farming and services sector, with an installed capacity of 25MW or less.

Producers of renewable electricity (according to the definition given in the Renewables Directive) are entered in the Administrative Register of Generating Facilities under the Special System (Registro Administrativo de Instalaciones de Producción en Régimen Especial), which is maintained by the Ministry of Economy. The only exception in this regard are hydropower plants >50MW, which are subject to the Ordinary System and are entered in the Administrative

[20] Power stations with an installed capacity of more than 50MW are automatically subject to the *Ordinary System.*

Register of Generating Facilities under the Ordinary System (Registro Administrativo de Instalaciones de Producción en Régimen Ordinario).

Renewable electricity generation under the special regime offers three basic guarantees to RES operators:

- the right to get connected to the grid,
- a standard five-year purchase contract with the grid operator nearest to the RES-E installations, and
- a specific price or premium per kilowatt-hour generated.

The special regime offers RES operators two options to get funded to this respect. RES operators can choose between a fixed price per kilowatt-hour (feed-in tariff) or a fixed premium on top of the market price. Both fixed components differ among technologies and are annually revised by the government.

On 27 March 2004, a new Royal Decree has been passed (R.D. 436/2004) in order to facilitate the participation of RES-E producers in the electricity market and give more confidence to them on the stability of the special system.

From now on, for new RES-E installations, there are two main options: either to feed their RES-E into the grid at a fixed price (calculated as a percentage of the regulated tariff for electricity consumers, which varies from the date of commissioning) or to make bids to the spot market (where the RES-E will compete with conventional electricity), receiving the same hourly price as the rest of the producers, plus a premium and an incentive to participate in the market (both calculated as a fixed percentage of the regulated tariff for electricity consumers, different for each technology). This second option is supposed to give stability to the electrical grid, because RES-E producers will have to pay certain penalties for deviations between expected production and real production (also RES-E producers of power >10 MW on the first option are obliged to make predictions on electricity production to the DSO/TSO).

Allocation mechanism for RES-E funded through the feed-in scheme

Within the special regime it is legally not clear as to whether the local grid operators, who pay the premiums or the feed-in tariff, become legal owners of the supported electricity volumes or whether the ownership stays with the RES generators. All costs for the financial support (feed-in tariff or premium payments) are allocated to all consumers proportionally to their electricity consumption.[21]

GO implementation in Spain

For the time being, Spain has drafted legislation to implement a system of GO as required by the Renewables Directive. GO will be issued on request of the RES-E generators. The draft Decree appoints the National Energy Commission (Comisión Nacional de la Energía) as the Issuing Body and for the management of the Register of Certificates on Guarantee of Origin (Registro de Certificados de Garantía de Origen).

The GO will contain the details of the RES-E installation which are recorded in the Administrative Register of Generating Facilities under the Special System (or in case of hydro >50MW in the register of generating devices operating under the Ordinary System). As a minimum, GO

[21] The system costs are distributed among all electricity consumers. This applies to those who choose their supplier and those who don't: The overall system costs are taken into account to determine the regulated tariff (tariff paid by those who don't choose their supplier) and the grid tariffs that have to be paid by those who choose their supplier.

will provide information about the name and location of the respective RES device, the installed capacity, and the owner of the plant.[22]

Interaction between the GO and the feed-in scheme
The draft Decree regulating the GO does not introduce any changes to the Special System and thus ignores all interactions which might occur between the two systems. This means that RES-E installations, which operate under the Special System, will be eligible to request a GO. So far no regulations have been foreseen to minimise the risk of multiple counting of the environmental benefits, which might occur from the unorganised coexistence of the two systems.

For instance, provided legal ownership of the supported electricity which includes the environmental benefits is transferred to the DSO who pays the feed-in tariff, multiple counting would occur if a RES-E operator receives funding under the Special Regime but would at the same time sell the environmental benefit of the same electricity volume in form of GO to a third party.

3.2.4 Differences with other countries

Currently nine out of all EU-15 Member States operate feed-in schemes. The list of countries includes Austria, Denmark, France, Germany, Greece, Luxembourg, Portugal, Spain and The Netherlands. Most feed-in schemes can be more or less assigned to one of the three main clusters outlined in Section 3.2.1.

3.2.5 Analysis of interactions

The two case studies in Section 3.2.2 elaborate a couple of problems, which might derive from the interaction between feed-in systems and GO. Those problems mainly become apparent in the risk of multiple counting of the environmental benefit of RES-E eligible to both systems.
For the development of recommendations of

a) how a GO scheme can be designed in the context of a feed-in system avoiding system shortfalls such as multiple counting, and
b) how a GO system can even be designed to facilitate a feed-in system.

Several permutations of the two systems have to be analysed. In this context it is assumed that a GO contains the 'greenness' of the electricity volume it stands for encompassing all benefits related to RES-E generation which are not traded separately in the scope of a coexisting scheme (such as the European emissions trading scheme).

The following section gives an overview of how the interaction of the two instruments could be designed provided that no major modifications shall be made to the respective feed-in scheme. The following analysis is based on the clusters of feed-in schemes as outlined in Section 3.2.1.[23]

[22] The definition of biomass given in Royal Decree 2818/1998 is not the same as that in the RES-E Directive. Therefore, the draft decree regulating the GO follows the definition of the Royal Decree 2818.1998 and states that GO will only be issued for the electricity generated from the biodegradable fraction of industrial and municipal waste.

[23] The option that RES-E volumes which have been funded through a feed-in tariff could be excluded form being eligible to receive GO hasn't been discussed any further as it would breach the RES Directive which states that all RES operators are eligible to request the issue of a GO disregarding of any eligibility to public support.

Options of GO interaction with feed-in schemes of Cluster A

Option A1. RES-E volumes which have been funded through a feed-in tariff are eligible to receive a GO but it will be forbidden to transfer the respective GO to a third party.
This option is independent from the approach taken for the design of the GO scheme (e.g. minimum compliance or joined-up approach). However in 'decentralised' systems (which do not use a central registry) it will be difficult to control as to whether all RES generators comply with this restriction. In these minimum compliance systems an earmark indicating as to whether RES-E volumes have been funded through a feed-in scheme (see below) might assist to facilitate this regulation.

Option A2. RES-E volumes which have been funded through a feed-in tariff are eligible to receive GO but RES-E operators are not obliged to transfer the GO with the electricity to the DSO/TSO (who is obliged to purchase the electricity) but are allowed to transfer the respective GO to a third party.

In this option multiple counting of the environmental benefit reflected by GO might occur. On the one hand, all final suppliers are allowed to create green electricity products as the total volume of funded RES-E has been distributed among them through the allocation mechanism outlined above. On the other hand, RES-E operators who are holding GO might use them to sell the environmental benefit on e.g. the green power market.[24]

Option A3. GO are facilitating the feed-in scheme: GO are transferred in such a way that they are following the allocation mechanism of electricity funded through the feed-in scheme. This option is the only option in which the GO can really assist the operation of the feed-in scheme. In this regard the GO could be the proof of origin grid operators require in order to pay the feed-in tariff to the plant operators. It has to be mentioned that this approach would only be beneficial if the GO are covering all RES-E installations eligible to the feed-in scheme. This would go beyond minimum compliance of the Renewables Directive.

Beside this, it has to be carefully considered what institution will be appointed as Issuing Body in this system and how the GO implementation costs will be covered.
The distribution mechanism provokes another interesting aspect: As the GO will be plant specific (which means that each GO mirrors one specific plant) and as it would be completely impracticable to split each GO in order to distribute it equally among all obliged final suppliers each final supplier will receive GO of specific plants. Whereas the above-mentioned distribution mechanism for electricity has been plant anonymous so far it now has to reflect specific plants.

A good example to overcome this problem is given by the Austrian GO scheme. Allocation of GO among all final suppliers is technology specific not plant specific. Supplier X does not receive a small share of the GO from every single supported RES device in Austria. He rather receives a technology specific quota of e.g. GO from biomass disregarding which biomass plant is concerned. That means that GO from the biomass Plant A will be allocated to one supplier whereas another supplier will receive GO from biomass Plant B.

[24] This problem of multiple counting might even occur in GO schemes in which GO will be earmarked as to whether the respective RES-E volume has been funded through a feed-in scheme. Earmarking as such might result in a lower value of the respective GO. However there might be several suppliers who deliberately create green products on the basis of such earmarked GO. As a supplier won't be obliged to inform its consumers about this specific aspect (as to whether earmarked GO have been used) finally several consumers will claim the environmental benefit of the same kilowatt-hour RES-E.

Options of GO interaction with feed-in schemes of Cluster B

Option B1. see previous page.

Option B2. see previous page.

In this option multiple counting is likely to occur for the same reason as outlined in Option A2. The local grid operator who has purchased electricity by paying the feed-in tariff might claim the greenness of the respective volumes and create a green electricity product out of it. On the other side the RES operator who still is holding the GO might use it to sell the environmental benefit attached to it to a third party. Finally, two parties claim they have received the environmental benefit of the same green kilowatt-hour.

Option B3. GO are facilitating the feed-in scheme (for the description of the respective procedure see above).

This option requires clear regulations on where the greenness of funded RES-E lies in the feed-in system. Provided that the greenness goes to the DSO/TSO who is paying the feed-in tariff the GO would need to be transferred to this actor as well. Provided no other customer is claiming the environmental benefit of the electricity which has been supported by the feed-in scheme (e.g. in the course of a mechanism to distribute the financial burden)[25] the GO are either directly used for a green electricity product created by the respective grid operator or is transferred to a third party which is using it in this regard.

This option would require that GO are issued for all RES-E volumes which apply for receiving the feed-tariff.

Options of GO interaction with feed-in schemes of Cluster C

Option C1. GO is staying with the RES generator

Provided that no other party claims the environmental benefit of the respective electricity volumes (e.g. the DSO/TSO who is obliged to pay the bonus might also claim the environmental benefit) the RES generator might use the GO to market his RES-E generation as green electricity.

Option C2. GO are staying with the RES generators and are facilitating the feed-in scheme (for the description of the respective procedure see above).

In this option RES operators would submit copies of the GO as proof of origin to the responsible grid operator in order to receive the feed-in tariff for the respective RES-E volumes. The original GO stay with the respective RES operators who can use them to market their electricity on the green power market.

Again this option would require that GO are issued for all RES-E volumes applying for the feed-tariff.

Recommendations

Member States which operate a feed-in scheme clearly need to define where the greenness of the renewable generation lies throughout the whole ‘lifetime’ of a funded kilowatt-hour RES-E. A clear definition in this regard would be essential for sound regulations to organise the interaction of the feed-in scheme and the GO.

Generally in countries which operate feed-in schemes the GO system should be designed in such a way that the risk of multiple counting is minimised.

[25] This might occur where the feed-in tariff partly is paid by a third party (e.g. a ministry) which also might claim the environmental benefit of the funded electricity.

Depending on the individual design of the respective feed-in scheme we recommend to consider one of the following two main options:

1. Both systems interact in such a way that the GO are facilitating the feed-in scheme (options A3, B3, C2). This would require the issuance of GO for all RES generation which is eligible under the feed-in scheme.
2. Both systems coexist with no hard interaction (e.g. Options A1, B1, C1).

Both options would require Member States to establish a redemption methodology by which GO are retired (or earmarked) once the GO has been used in a green product.

In addition, earmarking of all GO which have been issued for RES-E volumes which have been funded through a feed-in scheme must be introduced. Such earmarking would mainly facilitate players on the green power market to distinguish between RES-E which has already been funded through public support and that which has not. Based on this earmarks would also assist consumers of green power products - provided they actively ask their supplier to demonstrate the respective GO - to identify whether a green electricity product has been created by subsidised sources or not. As earmarks are not foreseen in the GO provisions set forth in the RES directive this would go beyond minimum compliance.

3.3 Interactions between GO and fiscal incentives

3.3.1 Introduction

This section examines the interactions between GO and fiscal incentives. The most important systems used in the EU to promote RES-E are renewable electricity feed-in tariffs and quota obligations. In addition, fiscal incentives, often in combination with other instruments, are also used in most MS to promote renewable energy. These incentives include tax rebates and tax exemptions.

Fiscal incentives to promote renewable energy are applied in different ways depending on the MS, but could be grouped as follows:

- fiscal incentives related to the production of RES-E,
- fiscal incentives related to the consumption of RES-E,
- fiscal incentives related to capital investment in RES-E capacity building, either investments in RES-E projects, in qualified RES-E corporations, or through the so-called green electricity funds (RES-E project funds).

3.3.2 Fiscal incentives to RES electricity in the EU

For the design of the most appropriate fiscal incentive, the following three questions have to be addressed:

- How: applicability through direct (income tax)[26] or indirect taxation[27].
- To whom: who can benefit? Private or corporate beneficiaries.
- Why: the reason why the fiscal incentives are allowable, that is to say, RES-E production, RES-E consumption or investment on RES-E projects.

Since fiscal incentives used to promote RES-E can have very different forms, they are classified as shown in Table 3.6.

[26] The definition used for direct taxation is the most commonly used, taxes that are imposed directly on the individual paying them, such as income tax or capital gain tax.

[27] The definition used for indirect taxation is also the most commonly used, taxation that is levied in an indirect way rather than being charged directly on an individual's income (charged on goods and services and paid by consumers).

Table 3.6 *Description of table containing information on fiscal incentives by type of tax and by beneficiary*

Type of tax	Beneficiaries	Subject	Concept
Direct	• Private	– Production	Fiscal incentive is in function of the amount of RES-E produced.
		– Consumption	Fiscal incentive is in function of the amount of RES-E consumed.
		– Investment	Fiscal incentive is in function of the amount either invested in RES-E projects or of the benefits got from the investments made in RES projects/green funds. Allowance of accelerated amortization of investments.
	• Corporate	– Production	Fiscal incentive is in function of the amount of RES-E produced.
		– Consumption	Fiscal incentive is in function of the amount of RES-E consumed.
		– Investment	Fiscal incentive is in function of the amount either invested in RES-E projects or of the benefits got from the investments made in RES-E projects/green funds. Allowance of accelerated amortization of investments.
Indirect	• Either private or corporate	– Consumption	Electricity consumed. CO_2 and/or SO_2 generated (emitted) for producing electricity. Fuel purchased to generate electricity. VAT.
		– Investment	Reduced VAT rates for purchases of RES-related equipment.

The forms adopted by the allowable fiscal incentives vary a lot among the Member States (an evaluation of the real influence on the promotion of RES-E of each of them is beyond the scope of this project).

The most common fiscal incentives support direct investments in RES plants, although benefits from investments in or interests from green funds also are subject to tax reductions in a few countries. These incentives are applicable on the direct taxes payable by both individuals and corporations in 13 of the former 15 Member States (Austria, Belgium, Denmark, France, Germany, Greece, Ireland, Italy, Luxemburg, Netherlands, Portugal, Spain, Sweden). Nevertheless, the conditions, upper limits, and other details, like the RES subject to reductions, vary among the Member States.

Accelerated amortisation of RES investments is also allowed at least in four countries, and is also applicable to direct taxes.

Tax reductions on production or consumption of RES-E are also permitted in some countries like Austria, Denmark, Finland, Denmark, Netherlands, Sweden and the United Kingdom. In this case, in some countries, there are upper limits to the amount of RES-E eligible for the support, whereas in other countries only some RES-E technologies are eligible.

A special case of fiscal incentive is that given to the amount of RES-E produced for own consumption, in Germany and Austria (in this case, it has to be taken into account that, depending on the Member State, GO could only be issued for electricity fed into the grid).

The details of fiscal incentives used in each of the Member States of the EU-15 to promote renewable energy are presented in the following tables which show the different fiscal incentives applied by the Member States for production and consumption of RES-E and for direct/indirect investment in RES-E plants.

Table 3.7 *Fiscal incentives in Austria by type of tax and by beneficiary*

Type of tax	Beneficiaries	Subject	Description	Comments
Direct	• Private	– Investment	Maximum deduction of 2,929 € on individual income tax for investments in RES projects (mostly affects to PV electricity).	
Indirect	• Private & Corporate	– Production	At national level (Electricity Tax Law): tax exemptions to the electricity producers that produce electricity exclusively for their own use, if production does not exceed 5,000 kWh/year; 0.015 €/kWh.	Objective is to favour electricity production from all RES by autoproducers.

Table 3.8 *Fiscal incentives in Belgium by type of tax and by beneficiary*

Type of tax	Beneficiaries	Subject	Description	Comments
Direct	• Corporate	– Investment	13.5 % (in 2002) tax abatement for investments in renewable energy technologies at Federal level (only for industry), from 1992 and on.	The % is determined by the Ministry of Finance on an annual basis. The relevant regional governments are responsible for the certification of eligibility and conformity of the completed investment.
			Accelerated amortisation of investments related to RES.	

Table 3.9 *Fiscal incentives in Denmark by type of tax and by beneficiary*

Type of tax	Beneficiaries	Subject	Description	Comments
Direct	• Private	– Investment	The first 3,000 €/year of income is tax-free for individual persons who participate in wind energy co-operatives. The remainder is taxed at a 60% rate.	Only for wind energy. Applied from 1997. An individual person can own up to 20,000 kWh/year-worth of shares in the cooperatives.
Indirect	• Private & corporate	– Production	Exemption of CO_2 tax at a maximum of 1.2 ct/kWh, depending on the electricity price.	

Table 3.10 *Fiscal incentives in Finland by type of tax and by beneficiary*

Type of tax	Beneficiaries	Subject	Description	Comments
Direct	• Corporate	– Production	Tax reduction allowed to RES-E producers, of 0.25-0.69 ct/kWh depending on the RE sources. This reduction is independent of whether producers have got benefits or losses.	See Section 3.3.3.

Table 3.11 *Fiscal incentives in France by type of tax and by beneficiary*

Type of tax	Beneficiaries	Subject	Description	Comments
Direct	• Corporate	– Investment	Accelerated amortisation of RES related investments.	
	• Private	– Investment	Deduction of 15% investment costs with a maximum of 3,000 €/applicant.	

Table 3.12 *Fiscal incentives in Germany by type of tax and by beneficiary*

Type of tax	Beneficiaries	Subject	Description	Comments
Direct	• Private	– Investment	Investors in RES plants may deduce the losses from RES-E projects due to depreciation from their personal income tax.	
Indirect	• Private	– Production		
		– Consumption	Electricity from renewable sources intended for the producer's own use is exempt from the electricity tax.	Eco-tax introduced on April 1, 1999, electricity tax being 1.02 ct/kWh (increased by 0.256 ct/kWh each year from 2000 to 2003).
			Electricity which is taken from a grid fed solely by RES-E is exempt.	
	• Corporate	– Production		
		– Consumption	Electricity from renewable sources intended for the producer's own use is exempt from the electricity tax.	Eco-tax introduced on April 1, 1999, electricity tax being 1.02 ct/kWh (increased by 0.256 ct/kWh each year from 2000 to 2003).
			Electricity which is taken from a grid fed solely by RES-E is exempt.	

Table 3.13 *Fiscal incentives in Greece by type of tax and by beneficiary*

Type of tax	Beneficiaries	Subject	Description	Comments
Direct	• Private	– Investment	Deductions in individual income tax up to 75% of investments in RES.	
	• Corporate	– Investment	Tax deductions of 75% of the investment costs, in RES investments.	As a part of a package combined with loan interest subsidies.

Table 3.14 *Fiscal incentives in Ireland by type of tax and by beneficiary*

Type of tax	Beneficiaries	Subject	Description	Comments
Direct	• Corporate	– Investment	Tax relief for investments up to 50% in shares of a qualifying company, which invest in qualifying energy projects. The relief depends on the investment in the projects. Only for wind, biomass, hydro and PV projects.	The maximum eligible amount of investment that receives relief is not clear: Section 62 of the 1998 Finance Act.

Table 3.15 *Fiscal incentives in Italy by type of tax and by beneficiary*

Type of tax	Beneficiaries	Subject	Description	Comments
Direct	• Corporate	– Investment	Tax reductions of 50% for SMEs and 35% for large companies for investments in RES projects.	From March 2001 until December 2006.

Table 3.16 *Fiscal incentives in Luxembourg by type of tax and by beneficiary*

Type of tax	Beneficiaries	Subject	Description	Comments
Direct	• Private & Corporate	– Investment	Accelerated amortisation of investments made in RES projects.	

Table 3.17 *Fiscal incentives in the Netherlands by type of tax and by beneficiary*

Type of tax	Beneficiaries	Subject	Description	Comments
Direct	• Private	– Investment	Exemption on the 35-60% of interests from investments in environmental funds.	
	• Corporate	– Investment	Investments in technologies that are explicitly defined on a qualifying list (including renewable energy technologies) may be deduced from taxable profit at a rate varying from 55% of the total investment.	
Indirect	• Private	– Consumption	Energy from RES is exempt for the REB (Regulating Energy Tax). The exemptions are set at 2.9 ct/kWh for wind onshore and offshore, pure and grid-connected biomass, small stand-alone biomass, PV, wave, tidal and landfill (not for mixed biomass, waste or hydro).	(1)
	• Corporate	– Production	Exemption on the Ecotax levied on electricity production.	
		– Consumption	Energy from RES is exempt for the REB (Regulating Energy Tax). The exemptions are set at 2.9 ct/kWh for wind onshore and offshore, pure and grid connected biomass, small stand-alone biomass, PV, wave, tidal and landfill (not for mixed biomass, waste or hydro).	(1)

(1): REB is a levy on electricity consumption by small and medium-size customers. Fiscal incentives for the demand side will disappear by 2005. Since 2001, a green certificate system has been used for the validation and monitoring of the production and sales of green electricity under the REB.

Table 3.18 *Fiscal incentives in Portugal by type of tax and by beneficiary*

Type of tax	Beneficiaries	Subject	Description	Comments
Direct	• Private	– Investment	Tax credits for investment in RE technologies (all RES). The deduction limit to the tax total amount was 20% in 1999 and 30% in 2002. The maximum ceiling was 700 €/year in 2002 (125 € in 1999).	Since 1988.
Indirect	• Private & Corporate	– Investment	Reduced VAT rate for RES equipment, for all RES excluding services and auxiliary investment. Since 2001, 12% instead the general rate at 17%.	Before 2001 the reduced VAT rate for RE technologies was 5%, but this was revised due to the European fiscal harmonisation.

Table 3.19 *Fiscal incentives in Spain by type of tax and by beneficiary*

Type of tax	Beneficiaries	Subject	Description	Comments
Direct	• Private & Corporate	– Investment	Tax reduction equivalent to a 10% of investment in RES-E plants; not included wind power. In Navarra Region, deduction up to 30% of investments in RES-E projects.	The basis of calculation of the amount of the reduction is the total investment minus the capital grants received.

Table 3.20 *Fiscal incentives in Sweden by type of tax and by beneficiary*

Type of tax	Beneficiaries	Subject	Description	Comments
Direct	• Private	– Investment	Accelerated amortisation of investments made in RES projects.	
Indirect	• Private	– Production	Small-scale RES-E production exempt of the pollutant emissions levy (1 ct/kWh).	
		– Consumption	Biomass electricity is exempt from CO_2, SO_2 and NO_x levies.	
	• Corporate	– Consumption	Biomass electricity is exempt from CO_2, SO_2 and NO_x levies.	

Table 3.21 *Fiscal incentives in the United Kingdom by type of tax and by beneficiary*

Type of tax	Beneficiaries	Subject	Description	Comments
Indirect	• Corporate	– Consumption	Climate Change Levy Exemption to RES-E (0.64 ct/kWh).	See Chapter 3.3.4.

3.3.3 Case Study: Finland

Renewable Energy support schemes

The Finnish electricity market[28] was gradually opened up for competition with the Electricity Market Act (386/1995). Since Autumn 1998, it has been possible for all electricity consumers, including households, to arrange tender competitions for their electricity purchases. Fingrid, the national grid operator in Finland, issues the GO.

Promotion of RES is based on a specific action plan, which was completed in 1999. It aims to make the electricity produced from RES competitive on the open market. The action plan was integrated into the National Climate Strategy of 2001.

On 5 September 2002 the Ministry of Trade and Industry set up a working group to prepare the revision of the action plan for renewable energy sources. The revision was linked to the parliamentary statements that were given in connection with the decision-in-principle on the construction of a fifth nuclear power plant.

The working group proposed that the use of renewable energy should be increased by 30% by the year 2010, as compared to the year 2001. They also proposed a vision that by 2025 renewable energy sources would be used approximately 2/3 more than at present. Among the main actions proposed to achieve these objectives are development and commercialisation of new technology and financial steering instruments, such as energy taxation, investment aid and subsidies for the production chain of forest chip.

On January 1, 2004, the electricity price for medium scale industry was 7.20 ct/kWh, from which 7% is the electricity tax (0.504 ct/kWh). For households, the price in the same date was 10.10 ct/kWh, from which 8% is electricity tax (0.808 ct/kWh).

The existing subsidies for power production were introduced in connection with the tax reform in 1997. Since then, a change from taxation on electricity production to taxation on electricity consumption was brought about. The tax reduction model thus established has been utilised as a means to promote electricity produced with RES. The aid was recently extended from 2003 onwards and at present it covers nearly all power production based on RES, except for large hydropower (>1 MW).

In 2003 the tax subsidies had three different levels:

- Wind power and electricity produced from forest chips: 0.69 ct/kWh
- Electricity produced from recycled fuels: 0.25 ct/kWh
- Other renewable: 0.42 ct/kWh.

In 2003, a little over €50 million was paid in taxation subsidies to RES-E production. This figure is expected to vary annually in the range of € 50-55 million per year.

The Commission has approved the tax subsidies for power production in Finland until the end of 2006. The authorisation for the refund scheme of energy-intensive companies is valid until the end of 2011.

The Districts Customs Offices handle the applications for energy tax subsidies and pay the subsidies. The system works as follows:

1. Consumers of electricity pay an electricity tax (apart from VAT).
2. The tax is conveyed through the market chain from the retailer to the producer.
3. The producer pays the amount of electricity taxes to the District Customs Offices.

[28] Information on Finnish and Nordic electricity markets can be found at: http://www.ktm.fi/index.phtml?menu_id=170&lang=3.

4. If the producer is a RES-E producer, it is allowed to make a reduction in the payment, whose amount is equivalent to the product of the kWh sold by the specific value (0.25, 0.42 or 0.69 ct), depending on the RE source used in the RES-E power station.

Guarantees of Origin

By Government Decree no. 1357 of 30 December 2003[29], from 1 January 2004, GO may be issued, on request for electricity that has been produced from RES, excluding electricity consumed by the plant's own-use appliances for the production of electricity or CHP.

For this purpose:

- RES means: wind, solar, geothermal, tidal, and hydroelectric energy, biomass, landfill gas, sewage-treatment gas and biogas.
- RES-E means: electricity produced from power plants using only RES or that part of the electricity produced from RES by power plants using both renewable and other energy sources, and electricity produced from RES used to fill storage systems, excluding the electricity produced from storage systems.

GO are issued monthly on the basis of the production information supplied by the owner of the power plant. Issuing GO requires that an accepted production registrar has verified the power plant and there is a service agreement with Fingrid.

Prior to the issuing of GO, the RES-E power plant must obtain an accreditation of its method of production and energy sources. A certificate issued[30] for the accreditation of the plant is valid for a period of five years, and may be extended for five years further. It can be issued by a company authorised by the Energy Market Authority. The certificate must contain the following information:

- Name of the power plant, its location, and when it started operating.
- Address, telephone number and, if available, the e-mail address of the plant owner.
- Capacity in MVA and estimates annual output.
- Information on methods of production and energy sources used.
  - For multi-fuel units, information on the method of calculating what proportion of output each fuels accounts for and the method of measuring fuel flow.
  - Electricity and steam charts that show how the plant is connected to the grid and what system is used for measuring the energy produced by the plant.
  - Information relating to the method of measuring the energy produced by the plant, from which it must be apparent where the measurements are taken and how measurements data are calculated, including data on electricity produced by the plant for own use, on what measures are taken to ensure that the measurements are reliable and how they are reported.
  - For cooperative plants, information on the partners and the method used to divide the plant's electricity between them.

GO must contain:

- information on the production method,
- the energy source used,
- the place and date of production.
- For hydro electricity, the capacity of the power plant, and whether the electricity has been produced by a cooperative power plant, a statement to that effect, and information on the size of each partner's shareholding.

[29] The present decree is adopted on the basis of the Act no.1129/2003 of 19 December on certification and notification of the origin of the electricity.

[30] A certificate issued within the framework of RECS shall be deemed equivalent to a certificate: if it is issued for a period longer than five years, it shall be deemed valid for five years from its date of issue.

There are neither legal provisions for GO redemption or cancellation, nor for holding a register. However, there is a register of plants that can be issued GO for the electricity produced.

Interaction between GO and fiscal incentives
According to the legal framework for GO, in the Finnish system there is only one possible (non explicit) relation between fiscal incentives and the origin of renewable electricity, since the level of tax refund varies with the renewable energy source used for generating electricity. However, neither Act no. 1129 nor Decree no. 1357 say anything about GO as a proof to claiming tax reductions.

Therefore an unlikely interaction between GO and tax subsidies for RES-E producers could be to prove the customs that electricity produced is subject to the above-mentioned incentives. This is only a possibility based on the fact that GO information includes the source of the electricity. However, this possibility is not mentioned in the new Act.

In what regards international trading, fiscal incentives are given only to RES-E produced in Finland, which implies that RES-E imported is not eligible for incentives, independent of having GO or not.

In what concerns exports, GO issued in Finland do not include information on the level of fiscal incentives given to the production of electricity connected to. Since then, there will no way to have this information into account in a potential European GO market.

3.3.4 Case Study: United Kingdom

Renewable Energy support schemes
In the UK, the framework to promote RES-E is based on the following:
- Quota obligations[31]; Renewable Obligation Certificates (ROC) are issued.
- Climate Change Levy and LEC (Levy Exemption Certificates).
- Capital grants (only for demonstration plants offering new capacity).

A review of Renewable Obligation follows, because:
- Both ROC and GO are issued by the same body.
- Upon the producer's application, OFGEM[32] determines whether the plant is eligible to receive LEC and/or ROC. A plant may be eligible for LEC but not ROC, because slightly different technologies are covered by the two schemes.

Renewables obligation
Renewable obligation target is established from 2004-2011. From then on, the obligation is fixed at 10.4% of supply. All licensed electricity suppliers in the UK are obliged by law to purchase a portion of their previous year's consumption from renewable sources, in accordance with the 'Utilities Act 2000'. Suppliers prove that they have purchased renewable electricity by presenting Renewable Obligation Certificates (ROC) to OFGEM.

If suppliers are unable to purchase the required number of ROC, they can instead pay a buy-out price to OFGEM. The revenue obtained by OFGEM from the buy-out is 're-cycled' to those suppliers who redeem ROC.

OFGEM is responsible for accreditation of all renewable generators. Many RES-E generators have registered for the Climate Change Levy and the process for registering for the Renewable Obligation is very similar.

[31] See Chapter 3.1. 'Interaction between obligation support mechanism and guarantees of origin' in this report.
[32] OFGEM is the regulator for UK´s gas and electricity industries.

Levy exemption certificates

The Climate Change Levy is a tax imposed at the time of supply to industrial and commercial consumers of almost all fossil-fuel derived energy products, including electricity. CCL is a single stage tax that is chargeable only on taxable supplies to end users. The rate applied to electricity is 0.64 ct/kWh (0.0043 £/kWh).

Electricity is a taxable commodity subject to CCL, if it is to be consumed in the UK. Bodies liable for CCL must register, notify customs, and pay the levy that is due according to the type and amounts of electricity supplied to non-domestic end users.

Household consumption is not covered by the CCL. For other end users, tax reductions can be obtained under several conditions[33]. Finally and most relevant to this Case Study is the fact that electricity generated from renewable sources is CCL exempt.

The way to claim for CCL exemption is by means of presenting the appropriate number of Levy Exemption Certificates (LEC). RES-E which is exempt from the CCL can be issued with LEC. OFGEM is responsible for issuing LEC at the request of accredited renewable electricity generators. The issuing schedule for LEC is monthly.

Since the CCL is only applicable within the UK, any electricity eligible for LEC to be consumed outside the UK will not be granted LEC. To avoid generation plants applying for LEC on renewable electricity to be exported, OFGEM can require from accredited generator consumption declarations, as well as carry out audits on particular generating stations on an annual basis.

Guarantees of Origin

The UK Regulation on GO[34] came into force on 27 October 2003. GO are available for all RES electricity generators, and they are issued on request for electricity amounts equal or larger to 1 kWh per month. GO provide evidence that electricity is produced from renewable sources.

GO are to be held in an electronic registry. Eligible generators will be accredited by OFGEM, and GO will be issued on request. GO may be transferred at request of the original holder to another account.

The information to be included in the GO issued by OFGEM is in accordance with the Renewables Directive. It should be noted that GO issued will be earmarked to show whether the electricity for which GO are requested is accredited to receive LEC and ROC.

Interactions between LEC and GO

LEC and GO stand for and are issued for very different purposes. Nevertheless, they are both issued by OFGEM and they are kept in internet-based registers.

However, LEC and GO differ on the following:

- LEC are the titles to obtain fiscal benefits derived from the production of renewable electricity.
- Holding a LEC is not compulsory to get GO and vice versa, so they have different eligibility criteria.
- LEC are only issued for renewable electricity produced and consumed, or to be consumed, in Great Britain, whereas GO are issued wherever the electricity is to be consumed.

[33] By means of signing voluntary agreements (Climate Change Agreements) with the Government. The company will receive up to a 80% discount on CCL in return of meeting energy savings or carbon targets, measured every two years.

[34] Statutory instrument 2003 No. 2562 'The Electricity (Guarantees of Origin of Electricity Produced from Renewable Energy Sources) Regulations 2003: http://www.europa.eu.int/comm/energy/res/legislation/doc/electricity/member_states/uk_2003_statutory_instrument_2002_n2562_en.pdf.

- GO system recognises RES electricity imports (which are neither eligible in the RO nor for LEC), and LEC is only issued for electricity generated in the UK.

Within the current framework, GO and LEC will not be gathered into a single title because they have different meanings and are valid for different purposes.

Based on the similarities, differences and nature of GO and LEC, they can coexist. Anyway, from this coexistence, some advantages could be obtained:

- GO allow UK RES-E to enter the mainland market with a recognised guarantee of origin, and this could promote new RES-E plants in the UK further than those necessary to fulfil RO.
- To avoid double verification process/overlapping (reduce verification costs) it would be advisable to apply a 'one-time' verification process for LEC and GO, which independently verifies the level of production the generator claims for.

In addition, the risk of misuse (double support) of GO is avoided by the fact that they are earmarked to show whether the electricity production for which they are issued is accredited to receive LEC.

UK RES-E producers may claim GO for the amounts of RES-E they intend to sell overseas. Therefore electricity traders will be able to make use of GO to prove the origin of the electricity.

3.3.5 Conclusions and recommendations

Given the very different ways Member States have designed their fiscal instruments for promoting RES-E, it is very difficult to give recommendations that fit well in all situations and, at the time, are simple and easy to implement.

The case studies on the UK and Finland show different approaches regarding who pays taxes and who may claim for fiscal incentives. The following table shows a summary of the conclusions.

Table 3.22 *Summary of the results of the case studies for Finland and the UK*

Finland	UK
Electricity tax is paid by all end users.	CCL is paid by non-domestic end users.
RES-E producers can benefit from fiscal incentives.	CCL payers can benefit from meeting LEC. LEC is transferred from RES-E producers to end users jointly with the electricity.
GO go with the electricity until the retailer sells the electricity to final consumers.	GO can be transferred with the electricity they represent.
GO do not interact with the current Finnish support scheme.	GO do not interact with the current UK fiscal support scheme.
GO are likely to be used abroad to certify the origin of the electricity they represent.	GO are likely to be used overseas to certify the origin of the electricity they represent.

GO and fiscal incentives can coexist, because they do not interfere with one another. In some cases, like in the UK, there is mutual partial recognition with Levy Exemption Certificates (LEC), and the issuing and verification processes could be slightly simplified, since some steps could be combined.

In general terms, GO and any type of fiscal incentive to RES-E, will not create significant market distortions. On the one hand, all fiscal incentives are supposed to have been approved by the European Commission. On the other hand, having a look at the table in Section 3.3.2, the level of support given by fiscal incentives in the Member States is not enough for creating market distortions by themselves. Additionally, GO will facilitate international trading, but double support could be avoided if they are earmarked with information on fiscal incentives received, because no Member State is likely to allow fiscal incentives for RES-E produced in other Member States.

From the analysis made in this chapter, it would be advisable to try to avoid repetition of similar activities that could occur at the moment of issuing and verifying GO. Sometimes very similar procedures take place just to issue two different documents (i.e., GO and LEC in the UK).

To avoid repetition, a scenario of total integration of GO within the fiscal system could be as follows:

a) GO are transferable together with the electricity which origin they guarantee, and would be initially issued with no earmark for any support.
b) There must be enough information contained in the GO to be able to use GO for claiming fiscal incentives, according to the requirements of the MS of production.
c) GO would be considered as the only proof to receive the fiscal incentive (according to the rules established in the Member State of production), e.g. LECs would be integrated into the GO scheme.
d) At the moment the support is given for production or consumption of RES-E, the GO is duly earmarked by the body managing the support.

A condition for the right and prompt functioning of the above-mentioned system is that every support management body is connected to its national GO register holder.

However, to hold a GO register is not compulsory according the Renewables Directive. The integration of the GO with the national tax aid systems would be well beyond minimal compliance with the Renewables Directive. However, such an integration would prevent multiple counting of RES-E in an effective way and would reduce overall transaction cost.

On the other hand, Member States are free to decide themselves, respecting the framework established by the Renewables Directive. Because the Directive contains only few requirements for the information content of the GO, the GO implementation design vary considerably among Member States. Therefore, the short-term future could be as follows:

a) GO are transferable independent of the electricity, and they could be initially issued with or without earmark about fiscal incentives received.
b) Information in GO respects the mandate of the Directive, although each country may include any other piece of information.
c) GO neither interfere with the current fiscal systems, nor reinforce them.
d) Each MS decides whether either holding a register, earmarking GO, and redeem them, when and how.

However, it could be very difficult for end users to know whether the electricity they purchase has got a true back up on RES-E. Even being sure of that, end users will never be sure about the level of support received by the product they purchase or if it has got more than one support, and how much they had to pay for the green product. Both small and large end users will have to learn about the management system and procedure followed in every MS in order to really understand what is meant in different GO.

In conclusion, in order to keep the value of GO as a promotion instrument for increasing renewable electricity consumption, the following suggestions can be made:

- Partial integration at national level of GO and national fiscal systems to promote RES-E could reduce management costs, i.e., avoiding double issuing, verification and monitoring procedures.
- Practical information on how GO are managed in every MS should be available and easily accessible, in all official EU languages.

National Issuing/Management Bodies should be available to help end users understand what national and foreigner GO mean.

4. GO AND GREEN ELECTRICITY QUALITY LABELS

4.1 Definition of green electricity

There is a wide range of 'environmentally friendly' technologies that can be used to generate electricity. However, there is no widely accepted single definition as to which of these technologies should be classed as 'green' or indeed 'renewable'.

While the definition of 'renewable' can be formulated objectively, the definition of 'green' generally involves a qualitative assessment of whether an energy source has a 'low environmental impact'. A source which is renewable may not always be green. For example, hydro systems make use of natural energy flows, but some may lead to significant environmental impacts. Conversely, some sources may be considered to be 'green' even though they are not renewable, such as the efficient use of natural gas in a Combined Heat and Power (CHP) plant. Some companies advertise nuclear and electricity from high efficiency CCGT plant as being green, but the criteria set by most independent green electricity quality labels would not allow products focusing on electricity generated by these technologies to be accredited.

Given the differences in the development of energy resources and public perception in EU countries it is unsurprising that different definitions have been used for both 'green' and 'renewable' energy. The commonly adopted definition of 'renewable' is given in the Renewables Directive:

a. *'renewable energy sources'* shall mean renewable non-fossil energy sources (wind, solar, geothermal, wave, tidal, hydropower, biomass, landfill gas, sewage treatment plant gas and biogases).
b. *'biomass'* shall mean the biodegradable fraction of products, waste and residues from agriculture (including vegetal and animal substances), forestry and related industries, as well as the biodegradable fraction of industrial and municipal waste.
c. *'electricity produced from renewable energy sources'* shall mean electricity produced by plants using only renewable energy sources, as well as the proportion of electricity produced from renewable energy sources in hybrid plants also using conventional energy sources and including renewable electricity used for filling storage systems, and excluding electricity produced as a result of storage systems.

While falling within the definition of 'renewable', it has been argued that medium and large-scale hydroelectric plants (e.g. above 10 MW) should be excluded from any support scheme for renewables. The reasoning is that existing plants are already economic, and the small number of new plants that are expected to be built are likely to be cost-effective without additional financial support. Additionally, the argument is used that the environmental impacts of medium and large-scale plants are likely to be significant[35]. However, whilst all hydropower is included in the definition of renewable energy, the European Commission has made it clear that support schemes using public funds should only support renewable sources and technologies which are not yet competitive.

[35] In contradiction to this surveys in Germany (e.g. UBA 2001) have shown that in many cases small-scale hydro power plants result in a larger environmental impact than large-scale hydro plants in the capacity range of 100 MW. This is mainly due to the fact that large-scale hydro plants generally have been and will be built in rivers which already have been heavily effected by their commercial use (e.g. shipping streets, flood protection).

4.1.1 Quality labels

As a result of liberalisation of the electricity markets, many consumers are now able to choose their electricity supplier. Some electricity suppliers have seen green products as a tool to attract new customers in these liberalised markets, and differentiate products from those of their competitors. Electricity consumers in the majority of EU countries now have the option of purchasing a green electricity product. Many electricity suppliers are offering a green option and well over 2 million consumers[36] in Europe have switched to a green electricity product. In order to provide consumers with assurances concerning the value of these products, several organisations have established green electricity quality labels, which are granted to those products which meet certain environmental criteria.

Green electricity quality labels are issued to products that meet certain subjective criteria set by the Labelling Body. Such criteria may show a preference for certain renewable energy sources and not allow other sources. This information for quality labels is different from the regulation on 'disclosure', which requires an objective display of information regarding the electricity provided without attaching any value judgement to that disclosed information.

Generally, green electricity quality labels are characterised by the following features:

- Consumption-based or contribution-based products (also referred to as supply offerings and fund offerings).
- Environmental characteristics (often referred to as eligibility).
- Energy balancing period.
- Additionality requirement.
- Inclusion of other supply services.

These features are briefly explained below.

Consumption based or contribution based products

Where the product matches the energy which has been supplied to customers with energy generated from green electricity sources, the product is called a consumption product. For every kWh used by a green electricity customer, one kWh of green electricity is supplied onto the electricity grid. Other green electricity products allocate funds for investment in new green energy projects but do not necessarily match consumption with generation from existing green schemes. Products of this type are called contribution products. Some products mix a supply-based product with an additional contribution. Most quality labels are awarded to both types of product[37].

Environmental characteristics

Most green electricity quality labels specify the environmental characteristics of the product. This may involve a list of renewable energy sources (some also include CHP) used to generate electricity, or may specify the CO_2 saving over the standard product. Suppliers often take different approaches to the definition of green and renewable electricity. A labelling organisation will provide strict criteria regarding the environmental characteristics of products eligible for its quality label. This may include the establishment of ecological standards which power plants have to comply with in order to be eligible to the respective labelling scheme.

Energy balancing period

Where the quality product is a consumption-based product, the amount of energy used by the customer is matched by green electricity supply. This is not usually matched in real time (although some products offer this feature), and for many products the energy is balanced over a

[36] In December 2003 Green Prices (see web site www.greenprices.com) estimated the total number of green tariff customers in the Netherlands alone to be about 2.4 million.

[37] E.g. the German ok-power label awarded by EnergieVision e.V. (www.energie-vision.de).

year. A quality label may have specific criteria for the energy balancing, but may also allow some flexibility when supply does not exactly match consumption over the settlement period. In the case of contribution-based product, the 'fund balancing period' may be treated in a similar way to the energy balancing period so that the contributions have to be invested within a specified timeframe.

Additionality
Many consumers expect their decision to switch to a green electricity product to have a positive effect on the environment. In effect, they are often paying a premium for green electricity which acts as a voluntary support mechanism for renewable energy. If their green supply comes from existing plants, then the effect of the green customer is simply to make supply to all other customers somewhat 'browner'. Therefore many consider it important that new plants are introduced as a result of the green product.

Most consumers would not be happy to pay a premium for electricity generated from projects which are already profitable to developers through having received public funding in the past, since they have effectively funded such projects through their taxes. Additionality will be ensured for consumption-based products if the electricity generated is over and above that required to meet existing legal obligations or that which benefits from a state-funded initiative. For contribution based products additionality will result if the electricity generated from the new plant built does not contribute to the existing commitments nor benefit from a state-funded initiative. However, it may still be possible that plants qualify as additional despite receiving feed-in tariff or other financial support, if this existing financial support is insufficient for economic operation of the plant.

Some labelling organisations have strict requirements for additionality. For example, the ok-power label in Germany will not award a quality label to supply offerings based on renewable electricity which has already received a feed-in tariff, since the product is not providing any additionality according to their definition.

Inclusion of other supply services
A green electricity product may include extra services such as energy efficiency advice, a renewable energy newsletter, loyalty bonuses or donation to affiliated environmental charities. Some labels set criteria for provision of energy efficiency advice or use of environmental management systems.

4.2 Other labelling schemes

4.2.1 Certificates as labels

With the introduction of tradable renewable energy certificates (TRECs) in a number of countries, these certificates can simplify the label eligibility assessment for quality labels. They are already proof of compliance with the criteria of the TREC scheme in that country or region. The credibility of such an approach is based on the criteria of the TREC scheme and independent auditing of the redemption of the certificates to green the supply.

RECS International[38] has produced a Code of Conduct for all of its members, which outlines the RECS approach to quality assurance for RECS based green electricity products. The Code of Conduct requires that a supplier opens a redemption account for each green electricity product

[38] RECS International advocates a standard certificate as evidence of the production of renewable energy and provides a methodology for trading, or otherwise using it, separate to the associated physical energy. RECS (Renewable Energy Certificate System) has produced a set of system rules which can be applied to individual systems in order to harmonise and thereby facilitate trade between systems. More information can be found at: www.recs.org

they supply. Suppliers must guarantee that the green product sales are covered by redemption of the same volume of RECS certificates.

The Code of Conduct specifies that, during the contract period with any customer for a RECS-based green electricity product, the supplier shall transfer to the redemption account for the product in question a volume of certificates (with a composition as defined in the green electricity product) corresponding to the actual volumes delivered. An accredited third party shall audit the supplier's redemption of RECS certificates related to each green electricity product. Any discrepancies between the number and the composition of certificates, and the actual volume and composition of the product delivered shall be reported to the relevant customer[39].

The interaction between GO and certificates, both for voluntary schemes and obligation schemes, is dealt with in more detail in Chapters 3 and 6, respectively.

4.2.2 GO as labels

The information contained within a guarantee of origin could be used as proof of generation in helping to determine whether a label for green electricity supply-based products should be issued, in the same way as described in Section 4.2.1 for TRECs. However, some quality labels may have requirements that cannot be verified through GO, where for example additional information on environmental criteria for hydro plant or biomass sources, as well as information required to prove compliance with the label's additionality criteria, is not contained on the GO, but is a condition for the labelling body.

4.3 Interaction of labels with GO

GO have been introduced partially to provide an assurance that a certain amount of electricity which is being traded has been produced by a (specified) renewable energy source, whilst labels provide assurance that the electricity products being purchased by consumers are authentically green.

Through the GO issuing bodies, information about the type of generation will already be collected and verified by an independent body. This information may include whether feed-in tariffs or subsidies have been received, which would be required by most green electricity quality labels. However, not all information that is required for the quality labels currently in use throughout Europe can be derived from GO.

The GO requirement applies to renewable energy generation, and therefore will ensure official tracking for at least a small part of the market (depending on the share of RE in each MS). Quality labels which incorporate CHP, for example, will not be able to use renewable energy guarantees of origin as a suitable auditing and tracking tool. However, the CHP Directive adopted in February 2004[40] also introduces a guarantee of origin for CHP.

One potential problem with GO being used as an appropriate auditing tool for quality labels could arise if they are issued as separate certificates from existing certificate schemes, such as the Renewables Obligation Certificates (ROCs) in the UK. This could lead to multiple counting of renewable electricity. Indeed, if quality labels that are based on electricity consumption do not utilise GO, this problem may be exacerbated as the GO may be used by others. It will be essential that only one method and only type of certificate (e.g. GO) is used for tracking in order to eliminate this problem, or that regulations have been established which ensure well organised

[39] Secretariat RECS International (2003). Code of Conduct (Version 3).
[40] 2004/8/EC, 11 February 2004.

coexistence. This issue of potential multiple counting, is described in detail in the Phase 3 report.

4.3.1 The potential role of GO to support labelling organisations

There are a number of areas where GO can facilitate accreditation of a quality label.

Renewable energy sources
GO are only issued for renewable energy sources, and indicate the renewable energy source or technology used. However, the definition of 'renewable' energy for the purpose of GO is wider than that for many labels. It would be easy to check which GO are from sources or technologies specified under a label. However, there may be some additional criteria set by the labelling bodies for which the information may not be included in the GO. Such additional information could include special environmental criteria for hydro plants, or the source of biomass fuel.

New plant
While GO give the date and place of production, they do not include the year of commissioning of the plant and therefore cannot help identify new plants (which is required for the validation of additionality in many quality labels).

Imports
The use of GO could facilitate the validation of any imported green electricity. Indeed, one of the reasons for establishing GO was that renewable energy could be recognised as being 'green' throughout Europe. GO are well placed to facilitate the validation of imported green electricity, but it may not be sufficient for the purpose of a quality label.

Co-generation
GO are initially issued for renewable energy only, however, the new CHP Directive has also introduced a requirement for a GO system for CHP, which will carry slightly different information.

Contribution/consumption
GO are issued for renewable energy generated, and therefore can only be used in conjunction with consumption-based products.

Publicly funded plant
GO will not necessarily specify any feed-in tariffs or subsidies received by the plant, and therefore cannot be used for the validation of additionality.

CO_2 reduction
GO do not specify the CO_2 reductions achieved. Electricity with a GO has been produced with zero/low net emissions. However, greenhouse gas emissions from the power sector are now covered by the EU ETS - the interaction of the ETS and GO is discussed elsewhere.

Energy balancing period
The energy-balancing period is not information given on a GO. However, the GO will give a date of issue or period of production, which may help establish whether the product complies with the balancing period.

Special conditions
GO cannot assist with the 'new plant' condition, as indicated above, and neither does it help with tracking any financial contributions towards new plants.

4.4 Case study: EUGENE

Within the EU there are numerous quality labels in use. In some cases this can lead to customer confusion. In order to better co-ordinate different labelling activities in EU Member States the European Green Electricity Network (EUGENE) has been established. EUGENE is an independent network bringing together non-profit organisations such as national labelling bodies, experts from environmental and consumer organisations, and research institutes. The network has agreed on a common European standard for Green Electricity (the 'EUGENE standard'). The intention of the standard was to use it as a common reference, against which national labels can be accredited. EUGENE has accredited two labels to-date (*ok-power* in Germany and *nature made star* in Switzerland).

4.4.1 EUGENE environmental criteria

The EUGENE environmental criteria for its silver and gold standard labels are given in the following table.

Table 4.1 *EUGENE environmental criteria for its silver and gold standard labels*

Coverage	– RES-E	Yes
	– CHP	Yes
	– Demand Side Management	No
	– CO_2 emissions	No
Scope	Electricity products.	
Renewable Energy Sources	Photovoltaics, wind, hydro (subject to ecological criteria), biomass and biogas (subject to ecological criteria), and geothermal.	
Co-generation (fossil fuel-fired)	Restricted to natural gas only, and limited up to maximum 50% of supply. The plant needs to be at least 85% efficient and meet certain emission limits.	
New plant	'New plant' is defined as having been put into operation on or after January 1st of year of liberalisation of the respective electricity market.[41] Re-investment qualifies a renewable plant for being 'new' if the re-investment occurs after the respective dates for defining 'new' plants (not applicable for green hydro). For investment equivalent to more than 50% of the value of a comparable new plant, the plant is regarded as 100% new. In other cases, a fraction of the plant output is regarded as new, which corresponds to the ratio of the re-investment to 50% of the value of a comparable new plant. If the re-investment leads to a determinable increase of the plant output, at least this additional generation is regarded as 'new'.	
Additionality	– Consumption based products: 10% (silver standard)/30% (gold standard) of supply must be from new renewable sources. These new sources must be over and above governmental renewable legislation such as incentive products. – Contribution based products: at least 0.5 ct/kWh (silver standard)/ 1.5 ct/kWh (gold standard) is invested in new renewable plant. – Green hydropower: at least 0.15 ct/kWh (silver standard)/0.5 ct/kWh (gold standard) is invested in measures to reduce the facility's environmental impact (Green Hydro Eco-investments). These plants must have a significantly reduced ecological impact.	
Imports	Eligible	
Contribution/Consumption	Consumption or contribution based products.	
Publicly funded plant	Eligible, but only to the level required under mandatory obligation.	
CO_2 reduction	No requirements.	
Energy balancing period	Annual.	

[41] For countries with no liberalisation of the electricity market, the year 1999 is used instead of the year of liberalisation.

4.4.2 The potential role of GO under the EUGENE label

Renewable energy sources

The definition of 'renewable' energy for the purpose of GO is wider than that for EUGENE. The EUGENE standard does not recognise municipal waste or landfill gas as renewable. Additionally, EUGENE sets criteria for hydro and biomass use. While GO will specify the capacity of the hydro plant certified, this may not satisfy the EUGENE criteria that 'the plant has to meet basic ecological criteria at local scale, so that the river system's principal ecological functions are preserved'.

New plant

As mentioned above, the GO might not help identify new plants, which is important for EUGENE.

Imports

GO are ideally suited to validate the import of renewable electricity. However, some issues regarding multiple counting may need to be clarified, for example if the producing MS uses the electricity generated as part of its own national target, whilst the importing country claims the 'greenness' of the GO.[42]

Co-generation

Co-generation can form part of a green electricity product supported under EUGENE and so it is important to the labelling body to be able to track electricity from co-generation, which is not possible with renewable energy GO, but will be possible with the CHP GO.

Contribution/consumption

EUGENE supports both consumption-based and contribution-based product, whilst GO can only be used for tracking for consumption-based products.

Publicly funded plant

GO will not necessarily specify any feed-in tariffs or subsidies received by the plant, and therefore cannot be used for the validation of a product under the EUGENE label.

CO_2 reduction

EUGENE has no requirements regarding CO_2 reductions, whilst some other labels do have.

Energy balancing period

EUGENE only requires annual balancing, though individual products supported under EUGENE can have more frequent balancing requirements, which would not necessarily be supported by the GO.

Special conditions

Unless additional information is included, GO cannot assist with the 'new plant' condition, as indicated above, and neither does it help with tracking any financial contributions towards new plant, both of which are important for EUGENE.

[42] Although meeting a national target and claiming the 'greenness' are two separate issues, instinctively there is a link which is important from the point of view of consumer confidence - one of the main reasons for the introduction of GO. Issues surrounding multiple counting are described in detail in the Phase 3 report.

Note
The EUGENE standards and criteria do not yet incorporate a direct link to GO. Nevertheless currently two options are being discussed regarding how to consider the GO in the scope of labelling schemes accredited to the EUGENE standard:

1. Where electricity is physically contributing to a labelled green electricity product suppliers have to submit GO as proof of origin of the corresponding electricity delivery. Unless a sound redemption procedure has been established which ensures that a GO is unambiguously marked as being redeemed once it has be used (e.g. in order to proof the green origin of electricity within a green electricity product) GO have to be submitted to the respective labelling body which will organise redemption.
2. Where electricity is physically contributing to a labelled green electricity product GO which have been issued for respective RES-E generation have to be submitted to and will be redeemed by the labelling body in the respective country. Where RES-E generation has not been covered by the issue of a GO the supplier has to submit a written confirmation from the respective plant operator that no GO has been issued in this respect.[43]

4.4.3 Conclusions

GO can assist with determining the compliance of a product with quality label standards, and will most likely be accepted as proof of production of electricity by renewable energy sources. However, the GO only provide part of the information that is required for such verification for most quality labels, including those that are less demanding than EUGENE.

4.5 Differences with other countries/labels

EUGENE represents a common standard for a large range of quality labels internationally, including in a number of Member States. Therefore, the conclusions from the case study above are applicable to a number of countries and labels. However, we believe that the general conclusions are representative for all labels.

4.6 Recommendations

GO may be able to play a larger role for quality labels once they are in place in all Member States. The GO are likely to be the primary source for validating the renewable energy source or technology, imports and the data and place of generation. However, criteria such as financial contributions towards new investment in renewable plant, or 'ecological criteria' of hydro plant will not be part of the GO systems as they have been implemented or currently are envisaged by the Member States.

This section will give some recommendations on how the GO and labelling systems can be designed to facilitate each other, and to avoid system shortfalls such as multiple counting. While the GO and labelling systems have different purposes, some small changes may lead to improved interactions.

- The GO already indicates the source, place and date of production, and is installation specific. It would therefore only be a small step to include the date (year) of commissioning of the plant. The inclusion of this additional date would help quality labels identify 'new' plant. In the case of the EUGENE standard this would only leave a simple comparison with the year of liberalisation to identify 'new'. Other labels may have defined 'new' by an actual date which would make comparison even easier, or allow 'new green' electricity production only for a limited time. However, decisions will have to be made about how to deal with capacity additions, re-powering and refurbishments with regard to date of commissioning.

[43] This latter option has been adopted by the German ok-power label.

- An earmark for subsidies or feed-in tariffs may be included in the GO system, which would help the labelling system. Such an earmark could reduce the potential for multiple counting, in particular in MS where the feed-in tariffs or subsidies are administered through GO. Similarly, earmarks for any tradable certificates also issued (as a financial support) parallel to the GO may be introduced to reduce multiple counting.
- Information on whether plants have *previously* been subsidised through general taxes, investment grants, etc., is not included on the GO. The information on the GO only relates to the energy produced for which the GO is issued. If a quality label wishes to take this information into account, it will have to obtain information for these 'additionality criteria' itself.
- If GO are used to validate the generation of electricity by renewable sources for a quality label, it is important that such GO are redeemed after use to avoid multiple counting. If redemption is not introduced in the GO system, a tradable GO could be used more than once. To guarantee that no multiple counting takes place the Labelling Body could require the transfer of the GO to a redemption account on the register (if an appropriate register is available).
- As GO are issued upon request only, it is likely that some renewable electricity would qualify for labelling despite not having a GO. It may be possible that some labelling bodies will require mandatory submission of GO to resolve this issue. However, as GO issuance costs are unlikely to be a hurdle for any medium or large installation, as the premium price obtained for the labelled electricity is likely to be much greater than the costs, only small-scale renewable installations may fail to be able to claim and submit a GO cost-effectively.

In the long-term, green electricity quality labels will need to work efficiently in parallel with feed-in tariffs, obligation schemes and/or the indicative targets, etc. Many quality labels will aim to guarantee that the green power bought is over and above the requirements of obligation schemes and does not receive feed-in tariffs. A number of steps can be taken to facilitate this. First, the GO system could recognise and earmark any support (such as feed-in, subsidy, and meeting an obligation), so that quality labels could exclude such GO from their label.

5. GO AND ELECTRICITY DISCLOSURE SCHEMES

5.1 Introduction to electricity disclosure

The Electricity Directive[44] states within Article 3, Paragraph 6:

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

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

(b) at least the reference to existing reference sources, such as web-pages, where information on the environmental impact, in terms of at least emissions of CO_2 and the radioactive waste resulting from the electricity produced by the overall fuel mix of the supplier over the preceding year is publicly available.

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

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

Member States (MS) are required to bring into force the laws, regulations and administrative provisions necessary to comply with the Electricity Directive by 1 July 2004. The Commission is required to report on the application of the Electricity Directive before the end of the first year following the entry into force, and thereafter annually.

Electricity disclosure requires that information links are made between power plants and electricity consumers. In physical terms these links are impossible, since the flow of specific electrons cannot be traced. Electricity markets effectively use the public grid as a huge reservoir, within which links from sources to sinks are created by commercial contracts, independent of physical electron flow. The purpose of a tracking scheme is to make these bilateral links explicit and to assign the characteristics of power plants to electricity delivered to final customers. The Electricity Directive stipulates that these links are made on a supplier portfolio basis ex-post, i.e. 'over the preceding year'.

Since GO represent information about the electricity produced by a renewable energy power plant, GO can be part of a contract-based approach or certificate-based approach to tracking. Two main options for tracking electricity are usually distinguished, a contract-based approach or a certificate-based approach. The EC-funded 4CE project has discussed these two approaches, and their variations in detail[45]. A third tracking option may be identified from the Electricity Disclosure regulation - implicit tracking. Implicit tracking schemes rely on statistical data and averages to cover the main sectors of the market Phase 3 of this project will look at using GO for these three tracking methods in more detail.

[44] Directive 2003/54/EC of the European Parliament and of the Council of 26 June 2003 concerning common rules for the internal market in electricity and repealing Directive 96/92/EC.

[45] C.Timpe, V.Bürger et al, 2003. *Electricity Disclosure in a liberalised European market*. Phase 1 report of the ALTENER project 'Consumer Choice and Carbon Consciousness for Electricity (4CE)'.

5.1.1 GO within a contract-based approach to tracking

A strict contract-based tracking system requires the assignment of qualities to every financial transaction. This may have an impact on the electricity markets and reduce liquidity. GO can be utilised to assign these qualities to transactions of RES-E. However, as the system of tracking must be reliable and transparent for all electricity trade regardless of source then GO will be required for all fuel sources if they are to be used as the sole method of tracking for electricity disclosure.

A variation on contract-based tracking is to link information in the form of so-called tags[46] to financial transactions for the sales of electricity. The use of these information tags better supports the creation of standardised products and may reduce the impact on market liquidity. It could also better facilitate disassembling and re-bundling of electricity contracts. In this instance GO could be the format on which these tags are based, since GO systems must already be put into place for RES-E. This method of tracking would compliment the Renewables Directive requirement that RES-E trade between MS incorporate the transfer of GO. However, there is no obligation for all RES-E transfers to incorporate GO.

It is also possible that GO would not be used for contract-based tracking, either by implementation of a 'tag' system as explained above, or by using a different system altogether. Since GO covers initially RES-E, with CHP being added later, the system only applies to a relatively small percentage of the current electricity market in Europe, and may therefore not be considered the best basis for a contract-based tracking system. However, the implementation of yet another system tracking electricity attributes would result in duplication and inefficiency, and is likely to increase the risks of multiple counting occuring.

5.1.2 GO with a certificate-based approach to tracking

In this system the qualities of electricity generation are completely separate from the physical electricity trade, and separately tradable certificates are used to determine disclosure information. This limits the impact of electricity disclosure on electricity markets, though the certificate markets themselves may be affected by liquidity issues. Certificates are more flexible in terms of avoiding geographical and technical electricity trade barriers and facilitating the creation of standard wholesale products.

GO are to be distinguished from tradable renewable energy certificates (Recital11) which are used to facilitate support mechanisms for renewable energy. However, this does not mean that GO cannot be transferred. Whilst the Renewables Directive does not necessarily require that trade between Member States in RES-E be accompanied by GO, Member States must recognise GO from other Member States.

In the case of electricity disclosure with certificate–based tracking, GO or certificates which incorporate all the information required for a GO could be exchanged/traded within the Member States separately from the underlying electricity. It may be required to rebundle the certificate/GO with the electricity for cross-border trades, if this is a requirement of the importing MS. A pure certificate-based tracking system may also be employed in some MS, thus without requirements to re-bundle with the electricity. However, this method of tracking could result in low consumer confidence in electricity disclosure due to the potential ability to 'greenwash'[47] electricity supplies. A variation on this theme of tracking is to limit certificate trade to regional power pools. This may avoid the credibility problem of free flow of certificates around Europe, but would limit beneficial trade between national markets.

[46] In the 4CE project a distinction was made between tags and certificates: both stand for standardised pieces of information, but whereas certificates are freely tradable tags stay with the contracts.

[47] 'Greenwash' refers to a certificate system that would enable electricity trade that was clearly non-renewable to be given green electricity attributes through the purchase of an appropriate number of certificates. This is further explained in Phase 3 and the 4CE project report.

5.1.3 Advantages and disadvantages of utilising GO for electricity disclosure

Accuracy

Because GO include information on the location of the plant, and the energy source, it is possible for electricity disclosure based on GO to incorporate information on plant-specific emissions, rather than a generic technology average[48]. Of course, in the case of GO such information on emissions – being net-zero in the case of renewables – is less relevant than for fossil fuel based generation, including CHP.

Transparency

Because MS are required by the Electricity Directive to recognise GO from other MS on the basis of objective, transparent and non-discriminatory criteria, these systems are therefore ensuring a level of transparency in any associated electricity disclosure system.

Harmonisation

Because there is a minimum requirement for GO systems as laid down in the Renewables Directive, electricity disclosure systems based on GO will have a minimum degree of harmonisation. However, the level of harmonisation is still very low and limited to the minimum information requirements.

Non RES-E

GO currently only apply to RES-E, and following the adoption of the CHP Directive in February 2004 GO will also apply to CHP in the near future. Therefore an electricity disclosure tracking system based on the use of GO must harmonise the use of GO with tracking of electricity for which no GO exists, i.e. currently all electricity from non-renewable sources.

Multiple counting

If GO and certificates can be harmonised such that the GO is part (or all) of a certificate, then there is reduced risk of multiple counting and reduced duplication of systems such as registries. However, by incorporating the GO into a certificate, this may limit the trading possibilities of certificates if - as currently in some MS - GO can only be transferred if bundled with the electricity.

Redemption

If electricity disclosure tracking uses GO to describe the quality of power, then any GO used for electricity disclosure should be redeemed in the system to ensure they cannot be double counted. However, if different organisations are responsible for monitoring electricity disclosure and administering the national support mechanism for renewable energy, then there may be an issue in terms of when and to whom the GO is redeemed.

Beyond the EU

At present Finland imports electricity from Russia. Norway and Switzerland also trade electricity with their EU neighbours. None of these exporting countries are required to implement GO or electricity disclosure. Electricity imported from these countries could therefore not be accounted for by GO, and could lead to anomalies (if no other proof of origin is excepted), distortion (in case of multiple counting or unsubstantiated claims of clean imports), or 'greenwashing'. However, Norway and Switzerland are likely to adopt both GO and electricity disclosure, and their GO may be accepted in the future within the EU.

Residual mix

[48] The 4CE project discussed the environmental information required for disclosure, e.g. C.Timpe, V.Bürger 2003.

In case of contract-based tracking, it may not be possible to clearly determine the quality of the power supplied (e.g. trade via a Power Exchange). This could result in a residual mix, which should have qualities that are an average of all electricity transactions that were not successfully tracked. If any GO are not redeemed during an accounting period for the purposes of disclosure, they can be considered to be part of the residual mix. Using GO could help statistically with the determination of the qualities of the residual mix, but it will be important that any GO that are used should be 'stripped out' from the statistical average.

If attributes cannot be tracked for trades that go through a power exchange, this may result in a very large share of residual mix - in some markets trades through the power exchange represent the vast majority of electricity traded. In such cases this may significantly diminish the relevance of accurate tracking for disclosure.

5.2 Case study: Austria

The legislation relating to electricity disclosure for Austria is within the Austrian Electricity Act (ElWOG) of 2000, which required disclosure by October 2001.

The Austrian regulator Elektrizitäts-Control GmbH (E-Control) was responsible for overall implementation issues concerning electricity disclosure, but implementation was delegated to the nine federal states. As the federal states pursued different implementation paths and different information disclosure formats, there was a confusing variety of disclosure labels and very little verification.

The legislation was amended in the 'Ökostromgesetz', BGBl l No 149/2002, which also introduced legislation on GO. This legislation entered into force on 01/01/03.

As from July 2004 a harmonised electricity disclosure system has been in operation in Austria. All electricity companies supplying final consumers will be obliged to display the fuel mix used to generate the electricity based on the company portfolio. The primary energy sources to be disclosed are coal, natural gas, oil, nuclear energy, hydropower, wind, solar and geothermal energy, sewage gas, biomass and biogas. Electricity which can not be directly allocated must be assigned to the European generation mix (UCTE). The information displayed on the bill refers to the most recent financial year.

The new electricity disclosure system was initially foreseen as an electricity contract tracking system in which all RES-E had to be traded with a GO and trading of GO certificates alone was not allowed. However, this interpretation has recently changed, and Austria now believes that GO should be allowed to be traded separately from the electricity, otherwise GO may complicate rather than facilitate trade of RES-E. E-Control has recognised that through swap contracts any such regulation linking GO and RES-E trade could be circumvented. To further facilitate trade and minimise transaction costs, an electronic database has been established, which has links with the Austrian Power Exchange and enables cross border transfers via the EECS interface established by RECS.

By 2004, after a test phase, the registry was taken into the normal operation. The registry is based on the former certificate registry used for an obligation scheme for small hydro plants. Any GO used for electricity disclosure purposes are redeemed in the GO registry. Imported GO enter the Austrian system (accompanied by physical import of electricity or swap arrangements) via the central registry. This can be automatic, if interfaces between the MS systems exist, or manual.

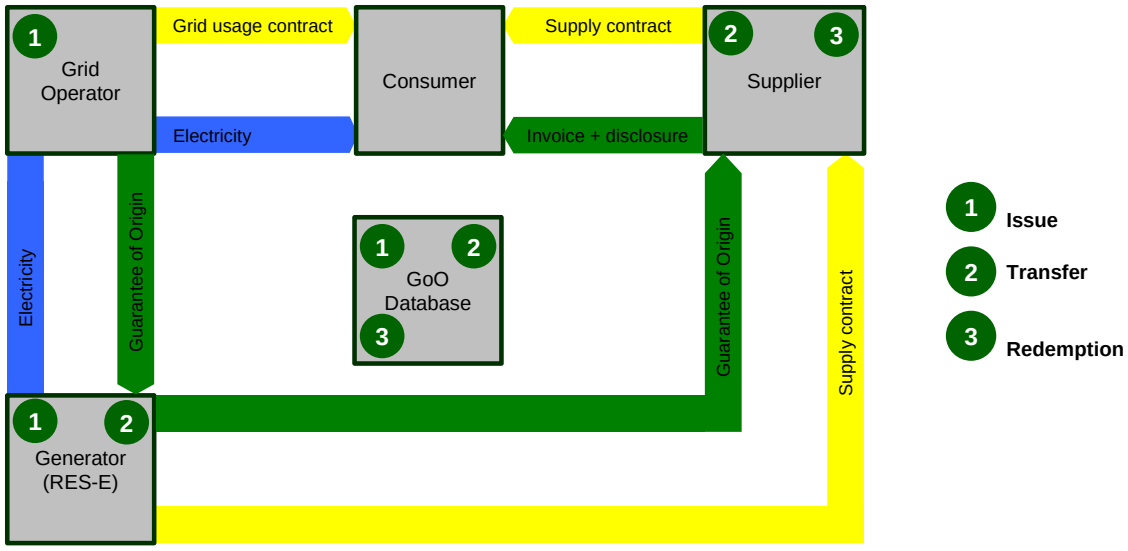

Figure 5.1 *Austrian process for GO and disclosure*
Source: D. Preinstorfer, E-Control. Presentation to Eurelectric Disclosure Workshop, 28/11/03.

If the GO system and central registry is considered a success, it is envisaged to extend the registry to the whole electricity market, including all fuel sources and technologies. Given that the proportion of electricity from renewable sources in 1997 was 70% in Austria (using the data from the Renewables Directive), covering the majority of all power plants, an expansion of the system to cover the remaining 30% of production may not be as difficult as foreseen for other MS.

It is evident that in the case of Austria, the GO has been fully integrated into the electricity disclosure scheme. GO from other Member States are also used in the disclosure scheme.

5.3 Differences with other countries

Austria was the first EU-15 country that had implemented electricity disclosure and GO systems. Based on a previous certificate system, and incorporating the majority of electricity generated in the country, Austria's experience has already led to an adjustment in the interpretation of the GO regulation: Austria now allows unbundled transfers of GO. While many countries allow unbundled transfers of GO, Austria's approach to GO and electricity disclosure is more integrated than in most MS.

5.4 Recommendations

GO can facilitate the implementation of electricity disclosure. GO contain enough information to enable a supplier to disclose the required information with regard to renewable energy (and in the near future CHP).

How GO can best be integrated into an electricity disclosure system is dependent upon the choice of disclosure system. If it is decided that GO are to be used as proof of RES-E for electricity disclosure, it should be clarified that no other 'proof', such as tradable green certificates, would be allowed (in order to avoid multiple counting).

If the electricity disclosure system is based on *contract tracking*, the following amendments to the GO and electricity disclosure systems would be useful:

- Disclosure information is generated using GO for electricity from renewable sources.
- GO are issued to all RES-E in a country, automatically, involving all RES-E producers.
- A central registry of GO is created, to enable issue, transfer and redemption of GO.
- GO are not traded separately from electricity in the country.
- All GO used to prove the fuel mix for electricity disclosure are redeemed within the GO system.

If the electricity disclosure system is based on *certificates*, then the following amendments to the GO and electricity disclosure systems would be useful:

- Disclosure information is generated using GO for electricity from renewable sources.
- GO and any certificates (provided they represent the attributes) use a combined registry, and may be fully integrated, to prevent unnecessary duplication of systems.
- Certificates/GO are issued to all RES-E in country, automatically, involving all RES-E producers.
- A central registry of Certificates/GO is created, to enable issue, transfer and redemption of Certificates/GO.
- Certificates/GO can be traded separately to the electricity in country and cross-border. Export of RES-E can be bundled with the related Certificate/GO if required by the importing country.
- All Certificates/GO used to prove the fuel mix for electricity disclosure are redeemed within the Certificate/GO system.

Going beyond the above-mentioned amendments allowing full integration:

- Disclosure information is generated using Certificates/Tags/GO for all electricity (not just RES-E).

Member States may wish to implement some variation of either the contract-based or certificate-based approaches to tracking. Regardless of the tracking approach, the following amendments would be useful:

- GO are issued to all RES-E automatically.
- A central registry of GO is created.
- GO are used to provide information on the renewable part of the fuel mix (and the associated environmental impact) for electricity disclosure.
- GO which have been used for electricity disclosure are redeemed.

Extending the GO system to issue GO automatically, rather than on request, moves the GO system from a voluntary mechanism to a mandatory approach. This is only likely to occur if the GO system and electricity disclosure are combined, since electricity disclosure is mandatory.

In the longer term, electricity disclosure systems which are harmonised across (regions of) Europe would better track and verify the trade and supply of electricity. Extending GO to all electricity sources would be a step towards a more harmonised electricity disclosure system. This would enable the disclosure tracking system to be based on one standard information format regardless of fuel source. If all electricity generated was issued with a GO, then all electricity traded across borders could also be bundled with a GO. This would facilitate tracking of electricity imports and exports, regardless of whether the countries involved in the trade have a contract-based or certificate-based electricity disclosure system.

In the long-term, in order to build consumer confidence, electricity disclosure will need to work efficiently in parallel with green electricity quality labels, indicative targets, etc. Electricity disclosure, green electricity sales, quality labels and indicative targets should all correlate, so that consumers have a clear picture of what they are buying.

6. GO AND THE RENEWABLE ENERGY CERTIFICATE SYSTEM

6.1 Introduction to the Renewable Energy Certificate System (RECS)

The Renewable Energy Certificate System is a harmonised European standard for handling Tradable Renewable Energy Certificates (TREC). It has been developed by a group of companies from the electricity sector and private consultancies and is supported by regulators of some Member States. However, RECS is a private initiative, which aimed originally at facilitating a market for TRECs for meeting the voluntary demand for Green Power.[49] Because of the attractive prices which TRECs could receive in the Netherlands due to the tax exemption for consumers of RES-E (which is currently gradually being phased out), a large part of the market for RECS certificates was focused on the Netherlands. Consequently, the eligibility criteria of the Dutch Green Certificates System, which entitles to the tax exemption, had considerable influence on the development of RECS.

RECS consists of the following elements:

- A joint standard for the certificate system, which is laid down in the 'Basic Commitment'
- Detailed rules for implementation in different geographical domains (which in most cases. are identical with the territories of Member States), which are called 'Domain Protocols'.
- Technical specifications of the interfaces between the certificate registries ('Central Monitoring Offices') in different domains, which are called 'CMO-CMO-interface'.

From an institutional point of view, RECS is governed by two separate organisations, which are both established as private non-profit associations:

- 'RECS International', which is the association of the users of RECS, i.e. generators, traders and suppliers of TRECs and RES-E. RECS International currently has about 110 members in most European countries and in some other countries around the world.
- 'Association of Issuing Bodies (AIB)', which is the organization of those independent actors, which are responsible for the operation of the certificate systems in each domain and which must be independent from market operations with TRECs. As of April 2004, the AIB has members from 18 European countries. Eight of these members are Transmission System Operators and two are regulators in the respective countries. The other AIB members are independent actors which have been appointed as Issuing Bodies by the users of the RECS system in the respective domains.

The RECS system is currently active in 17 European countries, which encompass all Member States of the 'old' EU-15, excluding Greece, plus Norway, Switzerland, and Slovenia as the first New EU Member State. Poland is currently preparing to join the system and other New Member States might follow soon. In each Domain, the users of RECS and the local Issuing Body form a 'Domain Team', which represent a local forum for interaction between all parties involved. The Domain Teams and the Issuing Bodies represent the federal structure of the RECS system and of both institutional bodies.

RECS is based on the definition of electricity from renewable energy sources as it is laid down in the Renewables Directive. Currently RECS certificates are defined to contain all benefits of RES-E compared to other forms of electricity generation. However, taking into account the upcoming EU Greenhouse Gas Emission Trading Regime, the definition of a RECS certificate will be changed to providing an 'unique and exclusive evidence of the production of renewable energy from a specified source'.[50]

[49] For the relation of GO to TGC systems which are facilitating mandatory obligation schemes see Section 3.1.
[50] For the relation of GO to the Emission Trading schemes see Chapter 7.

The development of the RECS system has started in 1999. In 2001 and 2002, a test phase was run and the two organisations, RECS International and AIB were founded in 2001 and 2002. After the end of the test phase, the RECS system was transferred into continuous operation. Since the start of the test phase, the number of certificates issued by the RECS system is equivalent to a RES-E generation of more than 36 TWh. However, only about 40% of these have been redeemed, the remainder is still available on the market, or has been removed from the market by an Issuing Body.

Table 6.1 *Comparison matrix: RECS and GO*

Feature *Overall system features*	*RECS certificates*	*GO (as in Renewables Directive)*
Definition of instrument	Tradable certificates. Purpose of RECS is to facilitate trading of RES-E.	Not specified in Directive. Purpose of GO is to guarantee the renewable origin of RES-E on the electricity market.
Level of MS government involvement	No direct involvement, some MS link their policies to RECS standards.	System implemented by or on behalf of governments.
Level of energy industry involvement	Voluntary system. Association membership is required for users.	Use of system is optional.
Degree of European harmonisation	Harmonised standard, available in 14 Member States of EU15, Norway, Switzerland, and Slovenia (as of April 2004).	Degree of harmonisation not specified in Directive, MS are required to vice-versa recognition of GO.
Verification	Requirements set per Domain by Issuing Bodies, limited harmonization.	Requirements set per MS by governments, MS ensure accuracy and reliability, harmonisation unclear.
Issuing		
Issuing agents	Diverse Issuing Bodies are active (TSOs, regulators, other independent actors).	Member States appoint issuing agents for GO.
Registration of production devices	Registration is required before issuing can take place.	Requirements for registration not specified in Directive (up to Member States).
Basis for issuing	Certificates are issued ex-post based on net RES-E generation in a certain period.	GO are issued on request, basis for issuing (gross or net) is not specified in Directive.
Relation to RES-E attributes	Certificates currently claim to contain the full benefit of RES-E, however the definition will change to 'unique and exclusive evidence of the production' of RES-E.	The interpretation of GO is not specified in the Directive, for possible interpretations see Chapter 1.2.
Information content	Size of certificate (or coupon) [MWh]. RES-E technology (from list). Issuing Body identity. Power plant identity (coded). Power plant capacity. Date of issuing. Public support received for investment or operation.	(Link to specific volume of RES-E not specified in Directive). (Renewable) energy source. 'Place of production'. Power plant capacity (for hydropower only). (First and last?) Dates of RES-E production. (Some MS require information on public support).
Safeguards against multiple counting	Generators are required to sign binding Renewable Energy Declaration, which forbids multiple selling of RES-E benefits.	MS must ensure accuracy and reliability, harmonisation not specified in Directive.
Transfer		
Limitations to transfers (domestic and international)	No limitations.	Not specified in Directive, might be imposed by Member States, but this is restricted by the Directive.
Relationship to RES-E during transfers	Unbundled after issuing.	Directive leaves room for interpretation.[51]
Final use		
Relationship to RES-E in final use	No direct link, but certificates are usually re-bundled with electricity for final customers.	Directive leaves room for interpretation.[51]
Redemption	Certificates are redeemed when used.	Redemption not mentioned in Directive.

Note: throughout this table, 'Directive' means the Renewables Directive.

[51] Article 5 (1): '… the origin of electricity produced from renewable energy sources can be guaranteed as such …', Article 5 (3): '… serve to enable producers of electricity from renewable energy sources to demonstrate that the electricity they sell is produced from renewable energy sources'.

From Table 6.1 it can be concluded that both the GO and RECS certificates are intended to represent evidence of RES-E generation. Therefore issuing of GO and RECS certificates for the same volume of RES-E would be a case of multiple counting for such generation (which may be seen as a breach of the RECS Renewable Energy Declaration), unless the GO is regarded as a pure financial support option (which seems not to be covered by the wording of the Renewables Directive, see Chapter 1.2).

The matrix further shows that although there are some similarities between the RECS system and GO as outlined in the Directive, some significant differences remain. These comprise:

- the information content,
- clarity of standards for verification and safeguards against multiple counting,
- redemption procedures,
- issuing agents and system governance.

Depending on the interpretation of the Directive, the relationship of RECS certificates and GO to RES-E during transfers and final use might be seen as defined differently or quite similar.

The Association of Issuing Bodies has developed a new certificate standard which is able to transfer GO between registries in individual Member States, even if these are not fully compatible to each other. For details about this 'European Energy Certificate System' (EECS) see Section 6.2.5.

6.2 Options for interaction of RECS and GO

In principle, four options exist for the interaction between RECS and Guarantees of Origin. In practice, it is likely that individual Member States will choose different options and that therefore combinations of these options will exist in the EU, at least for an initial phase.

6.2.1 Option 1: Independent co-existence

The RECS system and the GO are implemented and operated as two independent systems. The GO can be implemented by individual Member States in different ways, full harmonisation is not required.

The co-existence of both systems incurs a danger of multiple counting of attributes. This would regularly occur if a generator would receive RECS certificates and GO for the same amount of electricity. Currently, the RECS Basic Commitment does not allow generators to receive any other '*tradable evidence such as certificates which represent the benefit of renewable electricity generation from both RECS and another system that similarly certifies the origin or represents the benefits of the associated renewable electricity and can be exchanged for financial support.*'

In order to make things even more clear, RECS could include a declaration of the generator in the Renewable Energy Declaration, which must be signed by generators before RECS certificates can be issued, that GO and RECS may not be claimed for the same volume of electricity generation. On the side of GO, Member States could implement legislation that prohibits multiple sale of electricity attributes.

However, even if both suggested measures are implemented, it is not clear how verification could be performed, because there will be no common data format or interface between RECS and GO systems (and the GO systems themselves are not harmonised between Member States).

6.2.2 Option 2: Integration into one system with two types of certificates

The RECS and GO systems could be integrated into a harmonised certificate system, which allows for two different types of certificates. The first type would be the GO, and the second type would be RECS. Depending on which conditions are fulfilled, each certificate could carry either a flag indicating compliance with GO requirements, or a flag indicating compliance with RECS requirements, or both flags, if both requirements are fulfilled.

Such an integrated certificate system would facilitate easy verification of RECS and GO and multiple counting of electricity attributes between the two systems could be prevented in an efficient way. This is because all renewable generation data for which generators ask either for GO or a RECS certificate (or, in error or fraudulently, for both) would be managed in one single registry system and any case of multiple counting could be detected automatically.

However, this option requires a joint understanding between Member States that GO can be implemented in the form of certificates. This seems not to be very likely at first view, given the different renewable electricity policies in MS and the statement in Recital 11 of the Renewables Directive.[52] On the other hand, a certificate which is technically a tradable certificate can also be used just like a GO, which has been defined as not being tradable, and therefore is passed on only in conjunction with electricity contracts. So if some Member States insist on a view of GO not being tradable independently from electricity contracts, such requirements could be implemented even if GO are handled in a registry which also contains tradable certificates.

6.2.3 Option 3: Merger of the RECS system into the GO system

Here, both approaches would be merged into one system which is based on the information content and verification requirements set by Member States under the GO system. This requires a harmonised understanding between all Member States that the GO should be a system of tradable certificates (or at least a system which makes renewable proofs of origin tradable across national borders, see above).

This option means that the RECS system would cease operation once the GO is implemented in an effective way. The reason for this could be that there is no market for certificates with a different set of information content and verification requirements than the GO system. This would require that the voluntary markets for Green Power in the Member States, which currently represent the major demand for RECS certificates, would accept the standards set by MS governments for the GO. It would also require a harmonised implementation of GO in all MS, which is not very likely in the near future.

The risks of multiple counting would be reduced, because no separate systems would exist.

6.2.4 Option 4: Merger of both systems into a new stage of the RECS system

Here, both systems would be merged into one certificate system which accumulates the information content and verification requirements set either by the RECS or the GO system. Governments and RECS Issuing Bodies would have to agree on such joint standards. Also, Member States would have to reach a harmonised understanding of the GO as a system of tradable certificates.

In simplified terms this could mean that the RECS system would be expanded by the additional data requirements of the GO system, which is the place and time of RES-E generation, and MS governments would endorse the RECS system. However, this could include the replacement of

[52] 'It is important to distinguish guarantees of origin clearly from exchangeable green certificates.'

some of the current RECS Issuing Bodies by other parties which are selected by MS governments.[53]

Again, the risks of multiple counting would be reduced, because no separate systems would exist.

6.2.5 Cross border transfers can be based on an adapted RECS standard

While the four options outlined in the previous section refer to the situation in a single country, the RECS standard can also be used as a basis for cross-border transfers of GO between different countries with only limited harmonisation of their respective GO schemes. However, this requires adaptations to the RECS system in order to overcome the differences discussed in Section 6.1. In order to facilitate this, the Association of Issuing Bodies has developed a revised European certificate standard, based on the RECS system, which is called European Energy Certificate System (EECS). The adaptations include:

- inclusion of GO flags into the certificate system,
- inclusion of additional information required for GO into the EECS system (which is the place and time of RES-E generation).

The use of the new EECS infrastructure would allow automated data exchange between registries in different countries and would make verification relatively easy. However, other means of transferring GO between different countries might have to be accepted by Member States as well.

6.3 Case study: The Netherlands

6.3.1 The Dutch Green Certificate system

The Dutch Transmission System Operator TenneT has been operating a system of Tradable Renewable Energy Certificates (TREC) since the introduction of an ecotax exemption for consumers of RES-E in 2000. Suppliers of green electricity had to redeem certificates in this system in order to prove that they have acquired the proofs of origin for a certain volume of RES-E and for this volume, their customers were exempt from the ecotax. The operation of the Dutch Green Certificate system was passed on to CertiQ, a subsidiary of TenneT. This system can be seen as the blueprint for the development of the RECS system.

The Dutch system of ecotax exemption is accepting imports into the Netherlands under the following conditions:

- The production device must meet certain eligibility criteria (e.g. hydro power is excluded).
- The production device must be accredited to the Dutch certificate scheme.
- The importer must prove that he has acquired sufficient interconnector capacity to import the physical electricity together with the certificates into the Netherlands.

The ecotax exemption per kWh consumed has been reduced in January 2004 and it has been announced that it will be removed completely in January 2005. In parallel to this, the Netherlands are increasing the payments to domestic generators, which are similar to a premium-based feed-in system.[54]

[53] This could mainly apply to the consultants and other independent bodies (not being TSOs nor regulators), which currently operate the RECS system in five domains.

[54] These MEP payments are administered by EnerQ, another subsidiary of TenneT.

6.3.2 Transformation into the GO system

Since January 2004, the Green Certificate system has been transformed into the new Dutch GO system. This system handles two types of certificates in parallel, which both can be either from domestic production or imported:

- Standard GO, which do not qualify for the ecotax exemption.
- GO, which qualify for the ecotax exemption (for imports, this is based on reciprocity criteria).

This approach follows the Option 2 outlined in Section 6.2.2. By handling both types of certificates in one system, multiple counting of RES-E can be avoided. The eligibility for the ecotax exemption is recorded within the certificate registry in the form of flags on eligible GO. The production subsidy for domestic RES-E generation ('MEP payments') will also be administered based on the GO system.

The stringent accreditation process which was used for the Green Certificate system will also be used for GO. The validity period of GO will be one year.

Dutch GO carry more information than required by the Renewables Directive, such as serial numbers and an indication of financial support received.

The Netherlands will participate in the EECS system for cross-border transfer of GO as outlined in Section 6.2.5.

6.4 Differences with other countries

It is not clear yet to which extent and how other countries will facilitate cross-border transfers of GO. However, a total of six EU Member States have linked their GO systems to the EECS standard and will be able to exchange GO between their registries. Other countries are expected to join the scheme later.

6.5 Recommendations

The interaction of GO and the Renewable Energy Certificate System should be designed in a way that

- Multiple counting of RES-E benefits is prevented.
- Cross-border transfers of GO are enabled.

All four options for interaction of both systems discussed in Section 6.2 can prevent multiple counting. The approach chosen by the Dutch TSO makes use of the established infrastructure of the RECS system, which needs only slight adaptations in order to handle GO as well. However, it must be noted that the Dutch GO system is building upon the former Green Certificate scheme, which was already very similar to the RECS system. It is not certain how many other Member States will follow the Dutch example.

The following recommendations can be given:

- From their definitions, both the GO and RECS certificates claim to represent a proof of origin for RES-E. Therefore issuing of GO and RECS certificates for the same volume of RES-E would be a case of multiple counting and must be prevented.
- In order to prevent multiple counting and to reduce the cost for verification, all systems issuing certificates or GO for RES-E should at least be interconnected, but possibly even be based on one single registry system for data collection and handling. Option 1, where two separate systems are operating for GO and RECS, is not recommended.

- The RECS system currently provides the only EU-wide mechanism for transfer and tracking of RES-E attributes. The new EECS standard under development by the Association of Issuing Bodies will be able to handle GO. Member States should consider to link their GO systems to the EECS standard, in order to facilitate cross-border transactions of GO.
- In order to establish an international market for RES-E based on GO, the technical infrastructure, such as data communications between registries, must be harmonised. Additionally, it is also necessary to agree on joint minimum standards for verification of the information on the GO and to ensure that it is reliable. Again, the standards developed by the RECS system, such as the CMO-CMO interface, could be used by Member States.

It is very likely that several options for the handling and transfer of GO will coexist in different Member States at least during an introductory phase. It can be expected that within due time, more than the current six Member States will accept the RECS/EECS standard for international transfer of GO and will link their GO systems to RECS/EECS. However, the use of this standard might not be mandatory in these countries, as some of its features go beyond the minimum requirements of the Renewables Directive. Therefore, RES-E generators in some countries might have a choice to either use the RECS/EECS system in their country or a parallel, less advanced system.[55] In other countries, no RECS/EECS compatible system for GO might be available.

The advantage of the GO systems compatible to RECS/EECS will be that they allow for easy participation in an international RES-E market. It will be up to the market participants to determine how large this advantage is and, if necessary, to press their governments to link the national GO system to this standard.

[55] It must be noted though, that this option again opens up possibilities for multiple counting, because there are GO which are not managed centrally in one registry per geographical domain.

7. GO AND THE EU EMISSIONS TRADING SCHEME

7.1 Introduction

This chapter considers the interaction between ongoing implementation of GO in the EU Member States and the EU Emissions Trading Scheme (EU ETS). Firstly, it is considered as to whether implementation of the GO schemes may facilitate or complicate implementation of the EU ETS and vice versa.

7.2 The EU Emissions Trading Scheme

7.2.1 Key elements and contentious issues of the Emissions Trading Directive

In October 2001, the European Commission published a draft Directive on establishing a scheme for greenhouse gas emissions trading in the EU (CEC, 2001), the 'Emissions Trading Directive'. After nearly two years of intensive discussions among stakeholders, policy makers and experts, a political agreement was reached in July 2003 on an amended version of this Directive between the European Parliament, the Commission and the Council of Environmental Ministers. According to the agreed Directive, an EU Emissions Trading Scheme (EU ETS) will be introduced in all Member States - including the newly acceded countries of Central and Eastern Europe - starting from the 1st of January 2005. This implies that within short, the first international and largest ETS in the world is due to become operational.

The EU ETS is a so-called downstream cap and trade system covering direct emissions. The major characteristics of such a scheme are:

- A cap is set on the total emissions of all participants in the scheme by allocating a certain amount of emission allowances, which is fixed ex ante for a certain period. The cap might well be reduced over time. The emission allowances can be freely traded among the participants.
- Participants are obliged to surrender a quantity of allowances equal to their actual emissions over a certain period. A surplus of allowances can be sold (or banked), while a deficit has to be covered by purchasing additional allowances (or paying a penalty).
- The obligation to surrender allowances is imposed on greenhouse gas emitters (in contrast to an upstream system in which this obligation rests on the *suppliers* of fossil fuel).
- Emissions of electricity and off-site heat are attributed directly to power and heat *producers* (in contrast to an indirect system in which such emissions are imputed to *consumers* of electricity and heat).

The first phase of the proposed EU ETS will run from 2005 to 2007, followed by a second phase, which overlaps with the first commitment period of the Kyoto Protocol (2008-2012). Participants in the scheme include electricity generators, oil refineries and energy intensive installations in manufacturing sectors such as iron and steel, paper, and minerals. Overall, it is estimated that initially the EU ETS will cover some 10,000-15,000 installations, accounting for approximately 45-50 percent of total CO_2 emissions in the EU during the period 2008-2012, and of some 36-40 percent of total GHG emissions in these years. It is envisaged, however, that the scope of activities and emissions covered by the EU ETS will be gradually extended over time.

The EU ETS has been discussed intensively since the Commission published the draft Directive in October 2001. The major contentious issues have been:

1. *Sectoral coverage (Articles 2 and 30, and Annex I).* The sectoral coverage of the ETS is based on that of the Integrated Pollution Prevention and Control (IPPC) Directive, but sev-

eral IPPC sectors are excluded, notably chemicals, food and drink, non-ferrous metals and waste incineration. The European Parliament and some Member States have been in favour of expanding the sectoral coverage of the scheme, but this idea has been strongly opposed by other Member States, especially Germany, who wanted to ensure that the chemical sectors remained outside the scheme.

In the Directive of July 2003 (Article 30), it has been agreed that the Commission may make a proposal to the European Parliament and the Council by 31 December 2004 to amend Annex I of the Directive to include other activities or sectors such as the chemicals, aluminium and transport sectors.

2. *Opt-in (Article 24).* Several Member States pressed for opt-in provisions in order to allow non-eligible installations to voluntarily join the scheme. Such provisions have indeed been included in the Directive of July 2003 but only for the second phase of the scheme. Opt-ins are subject to approval by the Commission, taking into account the effects on the environmental integrity and monitoring reliability of the scheme.

3. *Opt-out (Article 27).* Originally, the Commission intended the EU ETS to be mandatory for all Member States and all proposed sectors and installations, but this was opposed by Germany and the UK who were interested in avoiding major modifications of their existing policy framework (notably in protecting their existing negotiated agreements with manufacturing industry). The Directive agreed in July 2003 allows Member States to apply to the Commission for the unilateral exclusion of installations during the first phase of the scheme. Opts-outs will only be allowed if installations can show that they will limit their emissions by as much as would be the case if they were subject to the requirements of the Directive ('equivalence of efforts'), as well as be subject to the same monitoring, reporting and verification requirements and to equivalent penalties for non-compliance as installations within the scheme. For the second phase, no opt-outs are allowed.

4. *Allocation (Articles 9-11 and Annex III).* The allocation of emission allowances (EUAs) to individual installations is evidently one of the most contentious issues of the proposed EU ETS. Although the Directive provides some general allocation criteria, this issue is largely delegated to the individual Member States that have to design national allocation plans to be reviewed by the Commission. These criteria, however, are not always clear and sometimes contradictory. A major point of discussion has been whether allowances should be allocated free of charge or (partly) auctioned. In the final Directive, it has been agreed that for the three-year period beginning 1 January 2005 Member States shall allocate at least 95 percent of the allowances free of charge. For the five-year period beginning 1 January 2008, Member States shall allocate at least 90 percent of the allowances free of charge.

5. *Interfaces with other emissions trading and credit schemes (Articles 25 and 30).* Many business groups are in favour of opening the EU ETS to other emission trading and credit schemes, including JI, CDM, trading with Eastern Europe, or with other Annex I countries (such as Japan of Canada). On the other hand, environmentalist groups and members of the European Parliament have been more restrictive on this issue as they would like to ensure an adequate amount of emissions reduction to be realised within the EU rather than buying 'hot air' or 'dubious' JI/CDM credits from abroad. According to Articles 25 and 30 of the Directive, the relationship between the EU ETS and internal emission trading with other Annex I countries during Phase 2 will be addressed in the review of the scheme scheduled for 2006.

   It has now been proposed by the European Commission that the EU ETS will be linked to the project-based instruments of the Kyoto Protocol (JI and CDM), through the so-called Linking Directive. According to the draft Linking Directive, participants of the EU ETS may convert emission credits from JI and CDM projects into EU allowances in order to ful-

fil their obligations under the EU ETS. All types of JI/CDM credits are allowed for conversion, except credits from nuclear facilities, carbon sink enhancement projects and large-scale hydropower projects not meeting certain criteria. The European Parliament has negotiated the Directive, and with some amendments adopted the proposal. It has been agreed upon that no upper limits will be imposed to the number of project-based credits, that eligible for conversion into EU ETS.

As for the link between the EU ETS and 'renewable certificates' the adopted directive provides no directions. It can be safely assumed that the following statements in Point 20 of the explanatory memorandum to the draft emissions trading directive (EU, 2001c) still holds:

'Emissions trading under this proposal should also be compatible with another market-based instrument being developed within several Member States, namely 'Tradable Renewable certificates'. Moreover, provisions for issuing of a 'guarantee of origin' of electricity produced from renewable sources are also contained in community legislation on renewable energy. These guarantees represent the additional benefits of electricity from renewable energy sources[56]*…. However, so as not to create confusion, renewable certificates should not be integrated with the greenhouse gas allowances needed for compliance with the obligations of this directive. Furthermore, Member States should take account of renewable energy targets when deciding on the quantity of allowances to be allocated under this proposal.'*

7.3 Facilitative interactions between the EU ETS and GO

Generally, GO cannot be used for facilitation of the EU ETS. For this function EU emission allowances are used. However, one exception is constituted by the case of Joint Implementation. GO could play a role in the accounting of the emission reduction units (ERUs) received. The baseline would be set by agreement or through a project design document (PDD). The reductions would be derived directly from the amount of electricity produced by the plant, which is evidenced through the GO. However, given the draft Linking Directive text, chances for JI projects in the electricity sector in the Accession Countries are small.

Conversely, some form of facilitation for issuance, monitoring and verification of GO by the EU ETS tracking system is possible if (i) a GO accounting system will be developed in which GO will be issued covering all forms of electricity and (ii) this system is to facilitate disclosure of environmental attributes, notably GHG emissions[57]. Then this GO accounting system could be aligned to the EU ETS tracking system for the mutually consistent provision of 'content' for the GHG attribute of each GO relating to power generation affected by the EU ETS.[58] Such alignment of information systems, pertinent to the GO accounting system considered, and EU ETS tracking systems could reduce the aggregate monitoring and verification costs of GHG emission information produced by both systems by cutting overlapping administrative procedures. Incidentally, this may also denote a potential disclosure improvement, compared to the disclosure requirement warranted by the recent Directive on the internal electricity market (EU, 2003c) as information on GHG emissions would be issued instantaneously during the electricity generation process and, consequently, not describe the CO_2 emission situation in during the last annual accounting year.

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[56] It has been argued elsewhere that the so far quite widespread perception expressed by this sentence is legally untenable (see for example Jansen, 2003), a position that has recently been endorsed by the Environmental Resources Trust, Inc. (ERT, 2004).

[57] It is remarked that recently adopted EU legislation warrants disclosure by electricity suppliers of information on -among other environmental attributes - CO_2 emissions (See Chapter 5).

[58] For example, the EU ETS mandates credible procedures for monitoring and auditing of CO_2 emissions by affected power 'installations'. If such installations include (e.g. hybrid) RES-E generation facilities, synergy benefits in the monitoring and verification of GHG (CO_2) information on GO - if and where applicable - are to be reaped from alignment of the GO tracking systems concerned to the EU ETS tracking system.

7.4 Market interactions between the EU ETS and GO

Market interactions between GO and the EU ETS can only occur if GO will be traded. This is the case when GO will serve the following functions:

1. facilitate the achievement of the national indicative RES-E targets by way of eligible intra-country GO trade,
2. Ditto for RES-E consumption targets, but by way of GO cross-border trade at multi-MS level or EU level.[59]

If there will only be intra-country GO trade, any interactions with the EU ETS are poised to be subdued given the asymmetry in the volume of trades in EU carbon emission allowances on the one hand and the GO trading volume on the other. In this case, the GO market will be too small to be able to influence the EU ETS market.

Regarding market interactions under a harmonisation scenario between the markets for GO/TREC and for EU Allowances much analysis has already been done. The EU ETS regulation fully separates the markets for greenhouse gas allowances and TRECs. This is logical given that RES-E stimulation is done for a variety of reasons. Although GHG reduction ranks among these, RES-E stimulation tends to remain a relatively expensive GHG reduction option in the short and medium run. In addition, eligible RES-E generators receive policy support in order to render their output competitive, while the EU ETS will push up wholesale electricity prices which generally favours RES-E generators.[60]

The suggestion has been made that RES-E generators should be granted an allocation of allowances. This would render carbon permits and tradable RES-E certificates (TRECs) fungible by regulation. This is, e.g., one of the recommendations of the EU-sponsored RECerT project (ESD, 2001: p.107). This, it is argued, could be one of the options to make the TREC market less volatile. However, experience with existing RES-E certificate and emission schemes, albeit limited, does not seem to corroborate this claim: prices for emission allowances are equally if not more volatile. Moreover, it may lead to multiple counting of RES-E on the one hand and/or to multiple counting of GHG reductions on the other with the associated uncertainty about the property rights of emission permits which consequently would not be clearly circumscribed.

It has already been noted that the Commission has not adopted this recommendation (see Section 7.2). For various reasons the suggestion to fix an 'exchange rate' between carbon permits and TRECs is unlikely to be endorsed, including:

- Although some overlap exists, the aims of the EU ETS and RES-E stimulation do not correspond one-to-one.
- It can be assumed that the carbon constraint will become increasingly stringent bringing about upward pressure to the carbon price.
- Conversely, for a range of technologies the costs of RES-E are expected to come down, while as a result of increasing scarcity of oil and, notably, gas the commodity price of electricity may well go up. This in turn, would make for bearish TREC markets, if and where existent.

Yet, as has already been stated, it makes sense to allow for (the expected impact of) RES-E stimulation policies when elaborating on the design details of the EU ETS. Increasing penetra-

[59] Communication COM(2004) 366 final of 26.5.2004 clarifies the conditions under which cross-border trade can contribute to achieving consumption targets: 'A Member State can only include a contribution from import from another Member State if the exporting state has accepted explicitly, and stated on GO, that it will not use the specified amount of renewable electricity to meet its own target and thereby also accepted that this electricity can be counted towards the importing Member State's target.'

[60] RES-E generators receiving preferential feed-in tariffs constitute a notable exception. To the extent that upward movements in the electricity commodity price do not completely obviate the preferential status of the feed-in tariffs concerned, these RES-E generators are sheltered from the volatility of the electricity market, including from upside 'risks'.

tion of RES-E in the EU electricity market will, other factors remaining the same, reduce GHG emissions. If the EU ETS regulator would aim for a certain level of reduction effort by the affected companies (e.g. in terms of marginal abatement cost) projected increasing penetration of RES-E could be a reason to lower the overall cap and, likewise, across-the-board the initial allowances in the National Allocation Plans (NAPs). In fact, the Commission has provided instructions to that effect and some Member States, including notably Germany, have stated explicitly that they have accounted for RES-E stimulation policies due to be in place during 2005-2007 - the first EU ETS implementation period - in the determination of their respective NAP.

When GO/TREC are traded, interactions may occur between the markets for GO/TREC on the one hand and allowances of the EU emissions trading system on the other. When GO/TREC are traded, indeed ambitious RES-E targets may push up GO/TREC prices. Yet at the same time, in the absence of adjustments for ambitious RES-E targets GHG emission targets are easier to achieve. Consequently, these may at the same time impact negatively upon allowance prices. Conversely, making carbon caps more stringent will drive the carbon price higher. This, in turn, will improve the competitiveness of RES-E relative to fossil-fuel-based electricity. As, in a more carbon-constrained economy RES-E targets will be more easily achievable, GO/TREC prices may fall as a result.

Some analysts have correctly pointed out that, in theory, the relationship between the price of RES-E certificates and carbon emission allowances is ambiguous as a result of induced changes in aggregate demand for electricity. In our view, this theoretical ambiguity characteristic is of less relevance in practice as the demand for electricity turns out to be rather inelastic. Because of the low price elasticity of electricity, when GO markets and carbon markets exist in a certain jurisdiction one might expect, if anything, a negative relationship between the price of carbon and the price of GO. It should be stated, though, that elaboration of this type of interactions is clearly beyond the scope of the present project and would certainly warrant more detailed investigation.

7.5 Recommendations

GO should be designed so that multiple counting of RES-E benefits is prevented, and cross-border transfers of GO are enabled. This will have impact upon the interaction between GO and the EU ETS.

It has to be noted that the EU ETS is a cap and trade system based on direct emissions and emission allowances, which are initially distributed mainly free of charge to the market players through the national allocation plans. The operation of this core of the system is not affected by GO in anyway. However, there are interactions and the following recommendations are given to optimise these interactions through the design of GO.

First, because of the design of the EU ETS and the existence of emissions allowances for this system, GO cannot represent GHG emissions or emission reductions. Those renewable energy generators that do not own installations affected by the EU ETS (i.e. the great majority of RES-E generators) are not covered by the scheme, which - to emphasize this scheme feature once more - is based on direct emissions only. Indeed, if GO were to represent GHG emissions (or reductions) this would introduce multiple counting.

Fossil fuel-fired power generation (over 20 MW) is covered by the EU ETS. The generators concerned will need to submit allowances to cover their emissions. Depending *inter alia* on whether power demand is inelastic or not, the power price will rise fully or partially by the additional costs for acquiring such allowances. Renewable electricity generators do not emit greenhouse gases and are thus not obliged to surrender allowances, but - with the notable exception of generators receiving preferential feed-in tariffs - will receive the power price which includes the

cost of the allowances. If renewable generators would receive allowances or emission reduction credits, this would lead to multiple counting as they would receive both a higher power price which includes (part of) the marginal emissions reduction costs and the allowance which they can sell.

It is recommended that the clarification be given that GO do not represent CO_2 emissions or reductions.

Secondly, because the EC proposed the so-called Linking Directive, which has been approved by the European Parliament and will enter into force at the same time as the ETS itself, a possible linkage between GO and the ETS exists. GO could play a role in the accounting of the emission reduction units (ERUs) received under Joint Implementation.[61] While the exact baseline will have to be agreed and approved, it is likely to be derived directly from the amount of electricity produced by the plant, which may be evidenced through GO. However, given the problem of multiple counting, the first draft Linking Directive text did not allow for JI projects in the electricity sector. The final adopted text may allow for these projects.

It is recommended that if RES-E JI projects are approved, GO are used as evidence of RES-E production which would eliminate any further multiple counting.

Finally, interaction between GO and CO_2 emissions in general, and the EU ETS in particular, would exist if GO were to be introduced for all forms of electricity generation. In particular when introduced to facilitate Electricity Disclosure, GO would have to include additional environmental attributes such as GHG emissions. By using EU ETS monitoring and compliance data, the GO system could include accurate emissions data at relatively low cost, while presenting consistent information to stakeholders.

It is recommended therefore that were GO to be introduced for all generation plants - presumably to facilitate Electricity Disclosure - emissions data from the EU ETS should be included to ensure consistency of information.

[61] GO can also be used to prove emission reductions in the non-Annex I EU MS for the purpose of CDM projects.

8. CONCLUSIONS AND RECOMMENDATIONS

In the previous chapters the potential role GO can play as a tool for renewable energy policy formulation has been analysed and evaluated. This final chapter consists of two parts: first, the conclusions and recommendations presented in the previous chapters regarding the potential interaction between GO and renewable energy policies are summarised; secondly, the recommendations regarding the GO implementation design are presented and discussed.

8.1 Summary of conclusions and recommendations with regard to the role GO can play in various renewable energy policies

The salient points of the recommendations presented in the previous chapters are as follows:

Recommendations with regard to GO and national indicative targets
In order to improve the use of GO in accounting for the indicative target it would be beneficial to:

- issue GO to all generation from RES-E, including off-grid and auto production,
- issue GO automatically rather than on request only.

In order to reduce the risk of multiple counting it would be beneficial to:

- establish an electronic registry,
- have only one issuing body for a particular region - this would reduce the potential for multiple issuing of GO for the same kWh,
- have a standard size for GO, e.g. 1kWh,
- develop effective interfaces between registries in different MS,
- require registries to perform full tracking of GO transfers, including imports and exports,
- establish one standard for all GO transferred across borders,
- establish a system for redemption of GO.

In order to reduce the potential for 'improper accounting' it would be beneficial to:

- require that any GO used for any purpose carries the earmark to indicate that use,
- issue GO in vintages equivalent to calendar years,
- limit the GO validity to the calendar year of issue only.

Recommendations with regard to GO and mandatory quota obligation support schemes

- If GO are kept separate from the TREC system (TREC does not contain attributes), some overlap and duplication may exist for the issuing phase, including accreditation, verification and issuing of the GO and TREC. However, if no provision is made in the legislation to actually establish a link between the GO and TREC systems (as is the case now in Great Britain, Italy and Sweden), GO implementation does not serve any purpose within the obligation. GO may be used for other purposes, such as the use in an accreditation process, export to other Member States, proof of eligibility for other financial support schemes, or as a proof of 'greenness' for green electricity products. It depends on the exact definition of both the GO and the TREC in a specific country whether the latter is a case of multiple counting.

In order to prevent multiple counting, the following recommendations are in place:

a) Legislators should define unambiguously which renewable attributes are represented by the TREC and GO respectively.
b) GO should be earmarked for the fact that the underlying electricity has also received a TREC, so potential GO purchasers can determine whether the associated electricity has been in receipt of financial support. This is particularly important in the case of export of GO, to make sure that the renewable electricity is not counted for targets of different Member States.
c) GO should be administered in a central registry jointly with the TREC.

- The possibilities for multiple counting are significantly reduced when the GO and TREC systems are merged into one system, which in practice means that the GO function as TREC or becomes part of TREC. To bring about such a merger, the following requirements are needed in addition to the minimum requirements mentioned in the Renewables Directive.
- In order to become tradable, GO must represent a market value. This value can result from a demand for GO by means of incorporating GO into a quota obligation for renewable electricity.
- If the GO is part of a mandatory scheme, national trade requires a monitoring and tracking system in order to determine legitimate holders of GO. An independent body should administer all transactions between traders, as well as redemption and expiration of the GO.
- Tradable certificates are redeemed when the transaction related to the purpose of the TREC has taken place, in order to prevent multiple counting. Redemption of GO is not mentioned in the Directive. However, as soon as GO represent a value, redemption should be incorporated into the scheme in order to reduce the potential of multiple counting.

Recommendations with regard to GO and feed-in tariffs support schemes

EU Member States that operate a feed-in scheme clearly need to define where the greenness of the renewable generation lies throughout the whole 'lifetime' of a funded kilowatt-hour RES-E. A clear definition in this regard would be essential for sound regulations to organise the interaction of the feed-in scheme and the GO. Generally in countries that operate feed-in schemes the GO system should be designed in such a way so as to minimise the risk of multiple counting. Depending on the individual design of the respective feed-in scheme it is recommended to consider one of the following two main options:

- Both systems interact in such a way that the GO system is facilitating the feed-in scheme. This would require the issuance of GO for all RES generation that is eligible under the feed-in scheme.
- Both systems coexist with no hard interaction.

Both options would require EU Member States to establish a redemption methodology by which GO are retired once the GO has been used in a green product.

In addition a methodology must be introduced to earmark all GO which have been issued for RES-E volumes which have been funded through a feed-in scheme. Such earmarking would mainly facilitate players on the green power market to distinguish between RES-E which has already been funded through public support and those which have not. Based on this, earmarks would also assist consumers of green power products - provided they actively ask their supplier to demonstrate the respective GO - to identify whether a green electricity product has been created by subsidised sources or not. As earmarks are not foreseen in the GO provisions set forth in the RES directive this would go beyond minimum compliance.

Recommendations with regard to GO and fiscal incentives

In general, GO and any type of fiscal incentive for the promotion of RES-E will not create significant market distortions. On the one hand, all fiscal incentives are supposed to have been approved by the European Commission. On the other hand, the level of support given through fiscal incentives in the Member States is not enough to create market distortions. GO will facilitate

cross border trade of green electricity, but will not lead to double support if they are earmarked with information on fiscal incentives received.

It would be advisable to try to avoid repetition of similar activities that could occur to issue two different documents (i.e., GO and LEC in the UK). To avoid repetition, the GO system could be fully integrated with the fiscal system as follows:

a) GO are transferable invariably joint to the electricity whose origin guarantee, and would be initially issued with no earmark about supports (whatever).
b) Information to be included on the GO must be the necessary to make GO enough proof to claim for fiscal incentives, according to the requirements of the MS of production.
c) GO would be considered as the only proof to receive the fiscal incentive (according to the rules established in the Member State of production), e.g. the LECs in the UK would be integrated into the GO scheme.
d) At the moment the support is given for production or consumption of RES-E, the GO is duly earmarked by the body managing the support.

A condition for the correct and proper functioning of the above-mentioned system is that every support management body is connected to the national GO register.

However, a GO register is not compulsory according the Directive. The integration of the GO with the national fiscal incentive system would be well beyond minimal compliance with the Renewables Directive. However, such an integration would prevent multiple counting of RES-E in an effective way and would reduce overall transaction cost.

On the other side, Member States are free to rule by themselves, respecting the framework settled by the Directive. As Member States are able implement the Directive in very different ways, the short-term future could be as follows:

a) GO are transferable independent of the electricity whose origin it guarantees, and they could be initially issued with or without earmark about fiscal incentives received.
b) Information on GO respects the mandate of the Directive, although each country may include any other piece of information.
c) GO neither interfere with the current fiscal systems, nor reinforce them.
d) Each MS decides whether to use a registry, whether to earmark GO, and whether to establish a system of redemption.

Under such a scenario it would be very difficult for end users to know whether the electricity they purchase is generated by RES-E. Even being sure that it is generated from RES-E, end users will not be sure about the level of support received by the product they purchase or if it has received support from more than one source.

Recommendations with regard to GO and green electricity quality labels

GO may be able to play a larger role for electricity labels once they are in place in all Member States. GO are likely to be the primary source for validating the renewable energy source or technology and place of generation. However, other criteria which is important to green electricity labelling organisations, such as financial contributions towards new investment in renewable plant, or ‘ecological criteria’ of hydro plant, will not be part of the GO systems as they have been implemented or currently are envisaged by the Member States.

While the GO and labelling systems have different purposes, some small changes may lead to improved interactions.

A number of recommendations on how the GO and labelling systems can be designed to facilitate each other, and to avoid system shortfalls such as multiple counting are given below:

- The GO already indicates the source, place and date of production, and is installation specific. It would therefore only be a small step to include the date (year) of commissioning of the plant. The inclusion of this additional date would help quality labels identify 'new' plant. In the case of the EUGENE standard this would only leave a simple comparison with the year of liberalisation to identify 'new'. Other labels may have defined 'new' by an actual date which would make comparison even easier, or allow 'new green' electricity production only for a limited time. However, decisions will have to be made about how to deal with capacity additions, re-powering and refurbishments with regard to date of commissioning.
- An earmark for subsidies or feed-in tariffs should be included in the GO system, which would help the labelling system. Such an earmark could reduce the potential for multiple counting or double benefits - in particular if the feed-in tariff or subsidy is based on GO. Similarly, earmarks for any tradable certificates also issued (as a financial support) in parallel to the GO may be introduced to reduce multiple counting.[62]
- Information on whether plants have *previously* been subsidised through general taxes with feed-in tariffs, investment grants, etc. is not included on the GO. The information on the GO only relates to the energy produced for which the GO is issued. If a quality label wishes to take this information into account, it will have to obtain information for these 'additionality criteria' itself.
- If GO are used to validate the generation of electricity by renewable sources for a quality label, it is important that such GO are redeemed after use to avoid multiple counting. If redemption is not introduced in the GO system, a tradable GO could be used more than once. To guarantee no multiple counting takes place the Labelling Body could require the transfer of the GO to a redemption account on the register (if an appropriate register is available).
- As GO are issued upon request only, it may be possible that some renewable electricity should qualify for labelling despite not having a GO. It may be possible that Labelling Bodies require mandatory submission of GO to resolve this issue. However, as GO issuance costs is unlikely to be a hurdle for any medium or large installation, as the premium price obtained for the labelled electricity is likely to be much greater than the costs, it is the small-scale renewable installations that are likely to fail to be able to claim and submit a GO cost effectively.

In the long-term quality labels will need to work efficiently in parallel with feed-in tariffs, obligation schemes and/or the indicative targets, etc. Ideally, quality labels would guarantee that the green power bought is over and above the requirements of obligation schemes and does not receive feed-in tariffs. A number of steps can be taken to facilitate this. The GO system could recognise and earmark any support (feed-in, subsidy, obligation), so that quality labels could exclude such GO from their label.

Recommendations with regard to GO and electricity disclosure

GO can facilitate the implementation of electricity disclosure. GO contain enough information to enable a supplier to disclose the required information with regard to renewable energy (and in the near future CHP).

How GO can best be integrated into an electricity disclosure system is dependent upon the choice of disclosure system. If it is decided that GO are to be used as proof of RES-E for electricity disclosure, it should be clarified that no other 'proof', such as tradable green certificates, would be allowed (in order to avoid multiple counting).

[62] This is discussed in greater detail in the RE-GO Phase 3 report on multiple counting.

If the electricity disclosure system is based on *contract tracking*, the following amendments to the GO and electricity disclosure systems would be useful:

- Disclosure information is generated using GO for electricity from renewable sources.
- GO are issued to all RES-E in country, automatically, involving all RES-E producers.
- A central registry of GO is created, to enable issue, transfer and redemption of GO.
- GO are not traded separately to electricity in the country.
- All GO used to prove the renewable share of fuel mix for electricity disclosure are redeemed within the GO system.

If the electricity disclosure system is based on *certificates*, then the following amendments to the GO and electricity disclosure systems would be useful:

- Disclosure information is generated using GO for electricity from renewable sources.
- GO and any certificates use a combined central registry to enable issue, transfer and redemption of Certificates/GO. Thus GO and certificates may be fully integrated, to prevent unnecessary duplication of systems.
- Certificates/GO are issued to all RES-E in country, automatically, involving all RES-E producers.
- Certificates/GO can be traded separately to the electricity in country and cross-border. Export of RES-E can be bundled with the related Certificate/GO if required by the importing country.
- All Certificates/GO used to prove the fuel mix for electricity disclosure are redeemed within the Certificate/GO system.

Recommendations with regard to GO and the Renewable Energy Certificate System (RECS)

The interaction of GO and the Renewable Energy Certificate System should be designed in a way that

- multiple counting of RES-E benefits is prevented,
- cross-border transfers of GO are enabled.

Four options for possible interaction of the GO and RECS system can be distinguished:

1. The RECS system and the GO system are implemented and operated independently.
2. RECS and GO are integrated into a harmonised certificate system which allows for two different types of certificates.
3. RECS system is incorporated into the GO system.
4. GO system is incorporated into the RECS resulting in a new stage of the RECS system.

The following recommendations are made:

- From their definition, both the GO and RECS certificates claim to represent a proof of origin for RES-E. Therefore issuing of GO and RECS certificates for the same volume of RES-E would be a case of multiple counting and should be prevented.
- In order to prevent multiple-counting and to reduce the cost for verification, all systems issuing certificates or GO for RES-E should at least be interconnected, but possibly even be based on one single registry system for data collection and handling. Option 1 as mentioned above, where two separate systems are operating for GO and RECS, is not recommended.
- The RECS system currently provides the only EU-wide mechanism for transfer and tracking of RES-E attributes. The new EECS standard under development by the Association of Issuing Bodies will be able to handle GO. Member States should consider linking their GO systems to the EECS standard, in order to facilitate cross-border transactions of GO.
- In order to establish an international market for RES-E based on GO, the technical infrastructure, such as data communications between registries, should be harmonised. Additionally, it is also necessary to agree on joint minimum standards for verification of the information on the GO and to ensure that it is reliable. Again, the standards developed by the RECS system, such as the CMO-CMO interface, could be used by Member States.

Recommendations with regard to GO and the EU Emissions Trading System
The EU ETS is a cap and trade system based on direct emissions and emission allowances, which are initially distributed mainly free of charge to the market players through the national allocation plans. The operation of the core of the system is not affected by GO in anyway. However, there are interactions and the following recommendations are given to optimise these interactions through the design of GO.

Firstly, because of the design of the EU ETS and the existence of emissions allowances for this system, GO cannot represent GHG emissions or emission reductions. Those renewable energy generators that do not own installations affected by the EU ETS (i.e. the great majority of RES-E generators) are not covered by the scheme, which is based on direct emissions only. Indeed, if GO were to represent GHG emissions (or reductions) this would introduce multiple counting. It is therefore recommended that the clarification be given that GO do not represent CO_2 emissions or reductions.

Secondly, because the EC proposed the so-called Linking Directive, which has been approved by the European Parliament and will enter into force at the same time as the ETS itself, a possible linkage between GO and the ETS exists. GO could play a role in the accounting of the emission reduction units (ERUs) received under Joint Implementation.[63] While the exact baseline will have to be agreed and approved, it is likely to be derived directly from the amount of electricity produced by the plant, which may be evidenced through the GO. However, given the problem of multiple counting as explained above, the first draft Linking Directive text did not allow for JI projects in the electricity sector. The final adopted text may allow for these projects.

It is recommended that if RES-E JI projects are approved, GO are used as evidence of RES-E production which would eliminate any further multiple counting.

Finally, interaction between GO and CO_2 emissions in general, and the EU ETS in particular, would exist if GO were to be introduced for all forms of electricity generation. In particular when introduced to facilitate Electricity Disclosure GO would have to include additional environmental attributes such as GHG emissions. By using EU ETS monitoring and compliance data, the GO system could include accurate emissions data at relatively low cost, while presenting consistent information to stakeholders.

It is recommended therefore that were GO to be introduced for all generation plant - presumably to facilitate Electricity Disclosure - emissions data from the EU ETS should be included to ensure consistency of information.

8.2 Recommendations with regard to the GO implementation design

The Renewables Directive contains a set of minimum requirements for the implementation of GO, but does not provide guidance on how GO should be used by the EU Member States. It is therefore not surprising that the implementation design of the GO system varies considerably among the Member States. In principle, GO can facilitate the following functions:
1. Implementation of renewable energy support mechanisms.
2. Monitoring of the indicative targets for renewable energy.
3. Disclosure of information on fuel mix used for electricity production and use.
4. Auditing for electricity labels.
5. Monitoring the cross border trade of green electricity.

The possible role GO can play in the above-mentioned policy instruments to a large extent depends on the design of the GO system in a particular Member State. A review of the current

[63] GO can also be used to prove emission reductions in the non-Annex I EU MS for the purpose of CDM projects.

status of GO implementation shows that the following clusters can be distinguished for the way Member States have implemented their GO system (see also Section 1.4):

I. Minimum Compliance
II. Advanced Implementation
III. Policy Integration
IV. Harmonisation.

Model I: Minimum compliance

In this implementation model the information content of the GO is limited to the minimum requirements stipulated in the Renewables Directive. The analyses presented in the previous sections reveal that in this model:

- GO cover only part of the information that is needed for accreditation of renewable energy power plants for the support schemes feed in tariffs, quota obligation and tax exemption.
- GO cover only part of the information needed for accreditation of electricity labels.
- GO contain not enough information for monitoring of the indicative targets.
- GO contain not enough information to enable cross border trade of electricity produced from renewable source(e.g. no information on whether or not the GO has been used for compliance of the national RES-E target of the exporting country).
- GO can be used to enable suppliers to disclose the information with regard to renewable energy but cannot be used as the sole system for electricity disclosure.

For the Implementation Models II, III, and IV the Minimum Compliance Model is extended by adding additional information to the GO.

Model II: Advanced Implementation

A number of possible amendments which could strengthen the role of GO in the promotion of renewable energy have been identified and evaluated in the previous chapters and are presented in Table 8.1. The implementation of any number of these amendments would go beyond the minimum requirements of the Directive and towards policy integration.

Table 8.1 *Possible additions to the Minimum Requirement Model*

Additions	Impact on the potential role of the GO
– Introduction of redemption of GO.	– Would reduce the potential for multiple counting.
– Add year of commissioning of RE installation.	– Would improve the interaction between GO and green electricity quality labels.
– Standard GO size.	– Would improve the ease of transfers.
– More stringent standards for registration of eligible RES-E and issuing of GO.	– Would facilitate the use of GO as auditing tool for eligibility for support schemes.
– One central registry in each MS for monitoring the issuing, transfer and redemption of GO, including imported GO.	– Would reduce the potential for multiple counting.
– GO issued for all RES-E. .	– GO can be used to fully monitor the compliance with indicative targets. – Would help facilitate electricity disclosure.
– Establishment of interfaces between MS registries.	– Would facilitate standardised cross border transfer of GO.

Under the advanced implementation model GO can play a larger role in facilitating the implementation of national renewable energy policies, but is still too limited for full integration of GO into the support schemes. This means that the GO system exists alongside the national support mechanisms, which may create a potential source for multiple counting of environmental attributes.

The establishment of a central registry in each Member State for monitoring the issuing, transfer and redemption of GO would significantly reduce the risk of multiple counting. It may also assist with the disclosure of information on the energy mix used for the production of electricity as required by the Electricity Directive 2003/54/EC64. With a central registry, GO may also be used as a tool for monitoring renewable energy targets.

The introduction of a redemption system is crucial to reduce the potential of multiple counting and is probably the most important addition to make. Unfortunately, not many MS have introduced redemption in their GO design.

Interfaces between the GO systems would not necessarily mean harmonisation of the GO systems. Different implementation of GO in the MS is still possible, but harmonisation of the interfaces would be undertaken.

The implementation costs of the advanced model are higher than that in the minimum compliance scenario, depending on which elements are implemented. However, integration of systems may lead to streamlining and costs reductions over time. Additionally, while the set-up costs of an electronic registry would be high, the running costs of the system would be greatly reduced.

A number of MS have chosen the advanced implementation model, including a central (electronic) register, which will greatly enhance the potential uses of GO.

Model III: Policy Integration
The policy integration implementation model includes all or nearly all of the suggested additions of the advanced implementation models, and a number of further additions. In this model GO are fully integrated with the national support schemes and GO can be a key component of the national RES-E support mechanism, such as feed in tariffs and quota obligations. GO can also be used to further facilitate green electricity labelling systems on the voluntary green power market. In this model the potential for multiple counting of environmental benefits is reduced to a minimum.

Table 8.2 *Possible further additions to the advanced implementation model*

Further additions	Impact on the potential role of the GO
– RES installations eligible to national support scheme are also eligible to receive GO.	– GO can also be used to administer national support schemes.
– Earmark on the GO indicating whether any subsidies have been received (administered through a central registry).	– Would help green electricity-labelling systems. – Would support the green power market. – Would reduce potential for multiple counting.
– Earmark on the GO indicating whether the GO can be counted towards indicative target of importing country after bilateral agreement has been reached between exporting and importing countries.	– GO can be assist to monitor the compliance with indicative targets.

The Dutch system, incorporating their support mechanism, green power market and GO is one of the furthest towards policy integration, though it still misses a number of elements described in Table 8.2.

[64] The interaction between GO and Electricity Disclosure has been analysed in detail in Chapter 5.

The set-up cost of the policy integration implementation model would be higher initially, but through the integration cost savings may be made with implementing the existing renewable energy policies. Also, the potential benefits may be larger.

Model IV: Harmonisation
Finally, a number of additions could be made that lead to effective co-ordination and harmonisation of the systems across different (or all) EU MS. In this model GO could serve as tradable certificates in co-existence with feed-in tariffs and other support systems, as well as for green electricity quality labels and for environmental disclosure. Full harmonisation would reduce the potential for multiple counting further.

Table 8.3 *Possible final additions to the policy integration implementation model*

Final additions	Impact on the potential role of the GO
– Harmonisation of GO implementation in each MS. – GO for all electricity (not only RES-E).	– Would make the system more robust, particularly for cross border trade of GO. – GO can be used as sole tracking system for environmental disclosure.

Cross-border harmonisation of the GO system would not necessarily mean harmonisation of renewable energy support mechanisms. The use of different support mechanisms in different countries is still possible within this model.

Different levels of harmonisation are possible, and elements of co-ordination and harmonisation are already being implemented in some countries, and could be part of the advanced implementation and policy integration scenarios described above. While presently no MS can be described as implementing policy integration with harmonisation, the EECS system briefly described in the introductory chapters and implemented in some countries is a first step towards such harmonisation model.

Again, the set-up costs of a harmonised system are higher, but potential benefits also increase.

Based on the analysis presented in the previous chapters the following recommendations can be given with regard to the GO implementation design:

1. GO systems based on the minimum requirements (Implementation Model I) comply with the Renewables Directive but do not provide enough information to be very helpful in facilitating the implementation of renewable energy policy of the Member States. GO designed according to this model are not linked to national support mechanisms and therefore can easily lead to inefficiencies, in transparencies and also to multiple counting of the environmental attributes.
2. The more advanced implementation model allows for some interactions between GO and the national renewable energy policies and can also provide some of the information needed for electricity disclosure and green electricity quality labelling schemes. However, the risk of multiple counting still exists in this model and inefficiencies in the GO system are likely to occur because of the lack of integration between the GO and support schemes that could result in duplication of efforts. These models however would be the preferred model compared to Minimum Requirement model, particularly if the country's intention is to first gain some experience with GO before gradually moving to full integration.

3. In the Policy Integration model (Model III) GO can be fully integrated into the national support mechanisms (such as feed-in tariffs/feed-in premiums or quota obligation) and thus can become a key component of the national renewable energy policy. The risk of multiple counting is minimised in this model and GO can be used to fully monitor the compliance with the indicative targets.
4. A fully harmonised GO system across the European Union can only be achieved in the longer term (4+ years), but it is recommended to also take this longer time horizon into account while designing the implementation system for GO. Full harmonisation and combined issuance of GO/electricity label would avoid much duplication of efforts and would result in low-cost compliance verification, effective avoidance at low cost of multiple counting, and low transfer costs. A bottom-up approach starting with only a few participating countries (for example, countries participating in the Nordic power market) is conceivable in the medium term.

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