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Report on the Interaction of Green Power Labelling with Renewable Energy Policies

WP5 report from the CLEAN-E project

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The CLEAN-E project

Quality labels which define a minimum standard for green electricity products assist consumers to verify the ecological performance of green products. National labelling programmes which have emerged in some European countries are important and powerful instruments to strengthen consumer confidence in the voluntary green electricity market.

Objectives

The CLEAN-E project will accompany the establishment of new and the improvement of existing green electricity product labels in selected EU Member States. In this regard the CLEAN-E project will support the efforts of the European Green Electricity Network Eugene[1], a non-profit approach which has set up a minimum standard for green electricity labelling schemes. The Eugene standard will serve as the major point of orientation throughout the project.

The establishment of new labels will be accompanied by a wide range of activities. This includes the development of ecological minimum standards for two key renewable technologies hydropower and biomass. The project also investigates the feasibility of widening the scope of green power labelling towards the integration of energy efficiency as well as renewable heat (RES-H). CLEAN-E analyses the interface of green power labels with renewable energy related policies on the national and the EU level including the Guarantee of Origin for renewable electricity and Electricity Disclosure. Furthermore, the project will include a wide range of activities aimed at disseminating and sharing best practices for green power procurement.

Expected key results

- New green power labelling schemes in France, Italy and Spain including the establishment of sound labelling structures and the development of label criteria. Existing labels (e.g. in Sweden and Austria) are intended to be improved towards a harmonised European standard.
- Guidelines on how to implement ecological minimum standards for hydropower and biomass in the scope of green power labels.
- Procedures and methodologies on how to integrate measures in the field of energy efficiency and RES-H into the scope of green power labelling schemes.
- Guidelines on how to integrate new policies at the EU and Member States' level (e.g. Guarantee of Origin & Electricity Disclosure) and private sector initiatives (such as RECS) in green power labelling schemes.

[1] Eugene (www.eugenestandard.org) is an independent network bringing together non-profit organisations such as national labelling bodies, experts from environmental and consumers organisations, and research institutes. The Eugene network pursues no commercial interest. Some of the Eugene activities have been partly funded by the EU Commission (DG Environment).

EXECUTIVE SUMMARY

Green power labels assist consumers to verify the ecological performance of green products. National labelling programmes are therefore important and powerful instruments to strengthen consumer confidence in the voluntary green electricity market.

The CLEAN-E project is aimed at the establishment of new and the improvement of existing green electricity product labels in selected EU Member States. The minimum standard for green electricity labelling schemes set up by the non-profit organisation Eugene (European Green Electricity Network) serves as the major point of orientation throughout the project.

This report in particular provides a detailed discussion of the interactions between green electricity quality labels and the range of support mechanisms and other policies affecting renewable energy on national as on EU level, including the Guarantee of Origin for renewable electricity and Electricity Disclosure.

Interactions

Five different policy instruments and mechanisms interacting with green power labels have been identified:

- National renewable energy support mechanisms
- Electricity Disclosure
- Guarantees of Origin for electricity from renewables and CHP
- The Renewable Energy Certificate System – RECS
- Emissions Trading

Interaction with national renewable energy support mechanisms

Established regulatory RES-E instruments, such as price-based mechanisms (e.g. feed-in tariffs) and quantity-based regulation (e.g. quota obligations), currently represent the main financial support for the promotion of RES-E generation in Europe. In contrast, green power labelling is linked to voluntary initiatives, thus relying on consumers' motivation, but may have the benefit of generating additional finance from consumers and encouraging greater consumer participation. The voluntary green power market has to be regarded as a supplement to governmental support schemes as it cannot be an alternative. Therefore the interplay between green power labelling standards and mandatory instruments is critical for ensuring that the effects of both mandatory and voluntary initiatives on supporting/increasing RES-E generation are actually supplementary, i.e. do lead to environmental additionality and do avoid "double counting" and "double selling" of RES-E attributes.

When evaluating the interaction between feed-in tariffs and green power labels, labelling bodies are recommended to:

a) avoid double funding of labelled RES-E - in general, only RES-E which has not been supported by feed-in tariffs should be eligible for the label,

b) in case of inclusion of already subsidised electricity, care should be taken that additionality criteria are met - only in cases with a significantly improved environmental standard of the generation facility or in case of feed-in subsidies not adequately covering the cost of RES-E generation inclusion in the label should be considered.

As for the interaction between quota systems and green power labels, labelling bodies are recommended to ensure additionality by additional redemption of certificates (TREC) above what is mandated by the obligation; by redeeming the additional TRECs the respective certificates will be removed from the market and can not be used by another company to match its obligation. In this regard additionality is created by implicitly increasing the obligation target defined by the mandatory scheme.

Furthermore in the case of quota obligations policy makers are advised to clearly state that only one form of evidence of renewable energy supply is accepted, namely GoO, which are redeemed when used. In consequence other green certificates should be clearly advertised as a purely financial mechanism.

For both support mechanisms policy makers are recommended to:

a) implement a reliable tracking mechanism to avoid double funding, e.g. GoO are automatically issued and earmarked if subsidies have been received,

b) take care that double counting is avoided (which might happen where GoOs are issued by different bodies for the same amount of electricity); in this respect make sure that it is unambiguous who owns the environmental attributes of supported RES-E.

Interaction with Electricity Disclosure

The concept of Electricity Disclosure was introduced in the European electricity market by the revised Electricity Market Directive 2003/54/EC concerning common rules for the internal market in electricity. The Directive was due to be implemented by 30 June 2004. The idea behind Electricity Disclosure is to provide consumers with information about the electricity they buy. Apart from enhancing transparency on the demand side by facilitating consumers to make purchase decisions using their own individual preferences (such as environmental values), Electricity Disclosure can also be beneficial to the supply side, as electricity suppliers and traders are provided with a new marketing opportunity, being able to differentiate the electricity they sell on factors other than price.

Both Electricity Disclosure and green power labels aim to bring more transparency to the electricity market. Whereas Electricity Disclosure provides objective information about all suppliers' portfolios, green power labels evaluate the quality of specific products against a set of criteria based on subjective preferences of the labelling organisation. Therefore the introduction of Electricity Disclosure does not replace the need for green power labels.

The main synergies between green power labels and Electricity Disclosure lie in the tracking mechanism which is required by both instruments. Green power labels need to apply an explicit tracking mechanism as only this tracking option ensures the creation of unambiguous links between generation and demand. An explicit tracking mechanism is an indispensable prerequisite for the verification of product claims to exclude multiple counting of favourable electricity attributes, in particular, attributes associated to renewable electricity and thus for the credibility of a labelling scheme.

Green power labelling bodies therefore should thoroughly coordinate their tracking mechanism with the one applied in the context of the corresponding national and neighbouring Electricity Disclosure schemes. In particular, the following recommendations are given:

a) Where a Member State (MS) bases its disclosure scheme exclusively on an implicit tracking system (meaning that it only uses statistical data) the green power labelling scheme must use its own tracking mechanism which is operated independently from the disclosure scheme.

b) Where a MS bases its disclosure scheme on a mixture of explicit and implicit tracking elements (e.g. explicit elements: data on own generation, RES-E covered by RECS or GoO; remaining portfolio assigned to a statistically derived default production mix such as the UCTE mix) the green power labelling scheme could use this mechanism as long as it is ensured that all electricity eligible for the label is covered by the explicit elements of the tracking mechanism.

c) Where a MS applies a comprehensive explicit tracking mechanism the green power labelling scheme should base its verification scheme on the same mechanism.

As for policy makers it should be noted that, as long as several MS allow implicit tracking elements to be applied in the context of Electricity Disclosure, it must be expected that in individual cases the two instruments (disclosure on the one hand and green power labelling on the other) will deliver confusing and in the worst case contradictory information.

Furthermore, other policies, such as support schemes for renewable electricity, beside Electricity Disclosure and green power labels require a mechanism to track electricity attributes. In the long term, the different tracking mechanisms should be fully integrated allowing only one tracking scheme facilitating all different purposes.

Interaction with Guarantees of Origin for electricity from renewables and CHP

The 2001 Renewable Electricity Directive (2001/77/EC) and the CHP Directive (2004/8/EC) introduced the concept of a ‘Guarantee of Origin’ (GoO) respectively for renewable energy and for electricity from high-efficiency cogeneration. MS have been required to have legislation in place which establishes a system enabling producers of electricity from renewable energy sources (respectively high-efficiency cogeneration) to obtain, on request, a Renewable Energy Guarantee of Origin (RES-E GoO) and a CHP Guarantee of Origin (CHP GoO) for electricity produced from their plant, as proof that

the electricity they sell is effectively produced from renewable energy sources and high efficiency cogeneration respectively. MS are required to recognise RES-E GoO and CHP GoO from other EU countries.

A Guarantee of Origin (both RES-E GoO and CHP GoO) is thus potentially a very useful policy tool, which could facilitate a host of energy policies, including voluntary green electricity quality labels. In order to avoid double counting (by double use of a GoO) labelling bodies need the mandatory redemption of the GoO. Therefore labelling bodies should ask for the respective redemption statements of the GoO in the case where a registry and a formal redemption procedure are in place. Where no formal redemption procedure exists GoO should directly be submitted to the labelling body.

The integration of the CHP GoO and the RES-E GoO schemes would appear as a logical policy option, however the Directives leave room to the different Member States to adapt the GoO requirements to the specific national situation. Therefore labelling bodies should be active in asking Member States to include in the GoO all the information required in the context of the labelling process, such as fuel type, actual energy conversion efficiency of the plants, age of the plant, public funding such as feed-in tariffs, where applicable and emission quality performance.

Furthermore, labelling bodies (and policy makers) should encourage the integration of the CHP GoO and the RES-E GoO. Integration could mean either one bundled GoO for both RES-E and CHP (in those MS where this is feasible), or a system clearly outlining which attributes are covered by RES-GoO and CHP GoO respectively. Finally, policy makers should:

a) align the content and the general design (e.g. balancing period) of the GoO to the needs of green power labels and

b) strive for harmonisation of GoO systems e.g. by establishing schemes which are based on central registries such as the EECS system developed by the Association of Issuing Bodies (AIB).

Interaction with the Renewable Energy Certificate System – RECS

RECS certificates could be of relevance for green power labelling schemes across Europe, as they could integrate the information provided by the RECS certificate itself with that provided by the RECS Renewable Energy Declaration regarding the relevant plant. This information satisfies most of the requirements of a green labelling scheme, provided that each plant is inspected when requesting registration. On the other side the redemption scheme applied by RECS can be considered as fully transparent (in order to avoid double counting) and independent third party auditing of power plants is ensured. In general it would be beneficial for the auditors which operate in the scope of a green power label to get access to the Renewable Energy Declaration data.

Finally, the AIB has developed the European Energy Certificate System (EECS). This is a framework standard for the harmonised introduction and operation of energy certificate schemes and allows for RECS certificates, RES-E GoO, CHP GoO and Disclosure

Certificates. The information provided by certificates traded under the EECS system can also serve as a basis for labelling schemes (complemented with additional information). It is advisable that European countries comply with this standard (including the issuing of GoO) to avoid double counting and other incompatibilities of different schemes and to generate synergies with voluntary labels, international trading of certificates and policy instruments to support RES-E.

Interaction with Emissions Trading

The EU Emissions Trading Scheme (EU ETS), which started on 1st January 2005, is a cap and trade system covering direct emissions. The scheme sets an emission target on major greenhouse gas emitting installations through the national allocation plans. To show compliance with the target, covered installations are obliged to surrender allowances equal to their actual emissions over a certain period. A surplus of allowances allocated can be sold or banked (within one settlement period), while a deficit has to be covered by purchasing additional allowances. If the target is missed a penalty needs to be paid, and the emissions still have to be made good in the following year.

It must be made clear that while the use of RES-E may be one of the ways to reduce emissions, green power labels can not be said to contain any greenhouse gas emissions benefits, as this would automatically lead to multiple counting. Greenhouse gas (GHG) emissions are defined in, and captured by the ETS. Were green power to contain such emission reductions then both the RES-E generator and the fossil fuel generator whose electricity generation might partly be replaced could claim to own the respective benefits, the RES-E generator through the GoO/green label/certificate or even without any proof of origin and the fossil fuel generator through the excess allowances. It is therefore clear that renewables do not represent emission reductions nor would this be desirable given the resulting multiple counting of emission reductions were this is the case.

Suppliers of green products, green power labels, and customers of green products face the same communicative restrictions as RES-E generators. However for labelling bodies it should be noted that the benefits resulting from an extension of renewables in the electricity sector go well beyond their contribution to climate change. The benefits encompass positive contributions to the environmental, social and economical development of the national electricity sectors including supply security. All these benefits are important drivers for the transition of the electricity sector to greater sustainability. For that reason green power suppliers as well as national labelling bodies should be encouraged to focus their communication on these aspects.

Finally, it is not quite clear how the post-Kyoto process will look, in particular whether global climate policy will be based on further GHG caps. In this respect it is also not certain for how long Emissions Trading will be the predominant instrument in the field of climate protection policy for the industrial sector. It is therefore recommended to pursue a multidimensional policy mix which addresses different policy fields (e.g. technology development, market regulation, strengthening plurality of market players, enhancement of market transparency) in order to stabilise climate policy. In this respect reinforcing the voluntary green power market (e.g. by the establishment of acknowl-

edged green power labels) is also a key element to ensure continuity in the efforts to tackle climate change even if the post Kyoto process fails. In other words, green power labels are an important tool in the field of climate protection policy even whilst they are not entitled to claim any CO_2 emissions reductions under the EU ETS.

GLOSSARY

4CE	The Altener project *Consumer Choice and Carbon Consciousness: Electricity Disclosure in Europe*, (see www.electricitylabels.com)
AIB	Association of Issuing Bodies
CHP-GoO	GoO for CHP as defined in the CHP Directive
CLEAN-E	Intelligent Energy – Europe Programme Altener project *Clean Energy Network for Europe* (see www.eugenestandard.org/clean-e)
Commission	European Commission
EC	European Community
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
GHG	Greenhouse Gases
GoO	Guarantees of Origin for the purpose of the Renewable Electricity Directive
Green electricity product	Electricity product based on a green electricity product label
Green electricity quality labelling	Voluntary labelling of electricity from environmentally benign sources
JI	Joint Implementation, Article 6 of the Kyoto Protocol
LEC	Levy Exemption Certificate
MS	(EU) Member States
RECS	Renewable Energy Certificate System (see www.recs.org)
RE-GO	The *Renewable Energy Guarantee of Origin* part of the Altener-funded project *SETREC/GO* (see www.re-go.info)

Renewable Electricity 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 generated from RES
RES-E GoO	GoO for the purpose of the Renewable Electricity Directive
ROC	Renewable Obligation Certificate
TREC	Tradable Renewable Energy Certificate, used as a general term covering all such certificates in all countries

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1 Introduction

With the remarkable and continuous rise in electricity generation by renewable energy sources (RES-E) in the past decade, a wide range of support mechanisms and energy policies have emerged which directly and indirectly influence RES-E. While the majority of these schemes are mandatory and have been introduced by national governments as well as by the supranational European Community, voluntary initiatives, such as green power products and labelling standards, have also been implemented. The interaction between these instruments means that the impact on RES-E is not always straightforward and the effects of the instruments may, under certain circumstances, even counteract each other.

The focus of this report is the interface of green power labels with other support instruments in the promotion of RES-E as well as instruments aiming at enhancing transparency on the electricity market. In this context, it is thus crucial that green power products and the labelling standards that regulate them are structured in such a manner so as to maximise the growth in RES-E and minimise the negative interaction with other RE policy instruments.

The use of electricity generation from RES has seen a remarkable and continuous increase in the past decade. Worldwide, the technology with the highest growth rate between 2000 and 2005 has been grid-connected solar photovoltaic (PV) which grew at an average annual rate of 60% in the five-year period which meant an increase from 0.16 GW to 1.8 GW installed capacity (Worldwatch Institute, 2005), Other "new" renewable electricity (RES-E) generation technologies also grew rapidly during this period, with wind power capacity expanding by 28% annually. A large percentage of the increase in deployment of RE electricity generation technologies has taken place in the European Union which, by the end of 2004, had an installed capacity (excluding large hydropower) of 57GW or 36% of current global RES-E capacity, with two individual EU Member States (MS), Germany (20GW installed capacity excluding large hydro) and Spain (10GW installed capacity excluding large hydro) contributing more than half of the EU's share (*ibid.*). In general terms, this trend can be attributed to a large extent to policy and financial support through mandatory regimes, although the role of voluntary initiatives is growing.

A plethora of support mechanisms have emerged which directly and indirectly influence RES-E both within state boundaries and between MS at the supranational level. Given the variety and occasional overlap of scope between the mandatory policy instruments at the national and even regional level[1], there will inevitably be interactions between these support systems within a given MS. These interactions also vary across the EU due to the observed differences between MS[2] in system design within the same type of instrument as well as the differences in transposition of European Community legislation (Directives, Regulations, etc.) between MS. The resultant complex matrix of inter-

[1] In the case of three constituent Belgian regions: Flanders, Wallonia, Brussels

[2] For example, the difference in establishment of a quota obligation between the United Kingdom and Sweden.

actions relating to mandatory RES-E policies is widened when voluntary systems to further RES-E are taken into account.

The various and complex interactions between green electricity quality labels and RES-E support mechanisms means that additionality[3] may not be assured for different reasons, such as multiple counting and multiple funding.

This report has been produced under the requirements of Work Package 5 *Interaction with policy framework* of the CLEAN-E project. It provides a detailed discussion of the interactions between green electricity quality labels and the range of support mechanisms and other policies affecting renewable energy. The analysis presented in this report deals with the interactions between green electricity quality labels and:

1. National renewable energy support mechanisms (Chapter 2)
2. Electricity Disclosure (Chapter 3)
3. Guarantees of Origin for electricity from renewables and CHP (Chapter 4)
4. The Renewable Energy Certificate System – RECS (Chapter 5)
5. Emissions Trading (Chapter 6)

The individual chapters follow a uniform methodology with an initial introduction to the specific policy instrument, focusing on the aspects relevant to green electricity quality labels and a description of policy instrument implementation including case studies on national system design. The assessment of the interfaces of green quality labels with the policy instruments investigates the following features:

1. Eligible renewable energy sources
2. Additionality
3. Publicly funded plant
4. Consumption or contribution based electricity product
5. Avoidance of multiple counting
6. Auditing and verification of green labels

The report identifies where conflicts could arise and suggests solutions. The recommendations and guidelines for labelling bodies are derived from the conclusions so as to enhance the positive interactions between the policies and minimise the negative ones. The recommended solutions can be implemented either through an adaptation of government mandated support instruments or through the design of the green power labels. While coordinated action on putting the recommendations into action is desirable, ex-

[3] Additionality is given where the green product results in an improvement for the environment, additional to the baseline of 'business-as-usual'. Consumers that switch to green electricity products expect a positive effect on the environment which results from their purchase decision. In order to ensure this effect, several green power labels apply the concept of additionality. For instance, this can be ensured by the expansion of green power generation over and above the baseline defined by existing sources and public support. In this cases additionality is defined by the part of the eco-labelled GE product that comes from "new" plants which are not sufficiently funded through public support.

perience shows that the constructive realisation of the recommendations is generally the responsibility of the labelling organisations. Therefore, the recommendations are directed primarily at the labelling bodies.

2 Interaction with RES support policies

Established regulatory RES-E instruments, such as price-based mechanisms (e.g. feed-in tariffs) and quantity-based regulation (e.g. quota obligations) represent the main financial support for the promotion of RES-E generation and are likely to remain so in the foreseeable future (Gan *et al.* 2005; COM(2005) 627). In contrast, green power labelling is linked to voluntary initiatives, thus relying on consumers' motivation, but may have the benefit of generating additional finance from consumers, encouraging greater consumer participation, and inducing learning effects (Markard/Truffer 2006) However, the voluntary uptake of green electricity suffers the drawbacks of (i) not having being able to guarantee meeting a quantitative RES-E target, (ii) depending on electricity prices and (iii) on consumers' access to information. A recent study has shown that the direct eco-effects of green power have been very small in comparison to well-designed governmental support schemes (ibid). The voluntary green power market, therefore, has to be regarded as a supplement for governmental support schemes and cannot be an alternative.

An evaluation of the interplay between green power labelling standards and mandatory instruments is thus critical for ensuring that the effects of both mandatory and voluntary initiatives on supporting and increasing RES-E generation are actually supplementary, i.e. do lead to environmental additionality and avoid "double counting" and "double selling" of RES-E attributes.

2.1 Feed-in tariffs

2.1.1 Introduction

Setting favourable feed-in tariffs for the production of RES-E is currently the most widespread policy support mechanism for green power in Europe. A feed-in tariff either sets a minimum price or a premium on top of the market price per unit of electricity generated. At the end of 2004, 16 (respectively 17 if the promotion of PV in Flanders, Belgium, is also counted) of the 25 member states of the European Union had adopted a system of feed-in tariffs. In the meantime, Ireland has joined this group as well.

Although the detailed systems of regulating feed-in tariffs vary from country to country, there are some common basic features of feed-in tariffs:

- An obligation to give access to the grid;
- A purchase obligation by utilities (or system operators etc.) for RES-E;
- Guaranteed premium prices (in most cases guaranteed for a certain period, e.g. 15 years).

Regulations vary in the:

- Level of tariffs, with the aim generally for the tariffs to be set at a level which allows specific targets to be achieved, such as a certain proportion of RES-E production (e.g. 10% RES-E in 2010) which can also be technology-specific (e.g. 10.000 MW of wind power by 2010);

- Types of technologies eligible for feed-in tariffs and further differentiations (site-specific such as on-shore or off-shore wind energy; different classes for the power capacity of the plant) of tariff levels;
- Time-horizon within which a specific tariff is guaranteed (varying from a 15 year basis to decisions on tariffs taken year-by-year);
- Institutional set-up of the system governing procedures to commission generation plants, grid access, who is obliged to buy, who pays for the extra costs, how are the extra costs equalised between different parts of the system, mechanism for the tracking of RES-E, etc.

The classification of different feed-in tariff systems made by the European RE-GO project (see RE-GO report: van der Linden *et al*. 2004), distinguishing the characteristics of electricity allocation (ownership of RES-E, distribution), money flow (distribution of costs) and allocation of environmental benefits is shown in Table 1 below.

Table 1: Clusters of feed-in systems in EU Member States (Source: RE-GO project, van der Linden et al. 2004)

	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 markets.

Who claims the attributes?	Electricity companies supplying final consumers which are obliged to purchase funded electricity proportionally to their annual sales volumes.	No legal regulations regarding which party is finally permitted to claim the 'greenness' of the respective electricity generation (RES generator or grid operator).	RES operator.
Examples	Germany, Austria.	Spain, France.	The Netherlands.

For a more detailed discussion of specific feed-in system designs and its interactions with green electricity labels Austria and Spain are chosen as examples[4].

2.1.2 Case study 1: Austria

2.1.2.1 Feed-in system design

The EU Renewable Electricity Directive 2001/77/EC has been transposed into national Austrian law by the Green Electricity Act (BGBl. I Nr. 149/2002). As Art. 4 of this Act points out, its aim is to reach the Austrian indicative target of 78.1% of RES-E in 2010 (compared to 70% in 1997) and, in particular, to increase the proportion of electricity from small hydropower (< 10 MW) to at least 9% and from other renewables (without hydro and certain types of organic waste, such as landfill gas) to at least 4% by 2008.

Generation facilities for RES-E according to the Green Electricity Act are accredited at the level of provinces (Bundesländer). The following RES-E sources are eligible for accreditation and consequently guaranteed feed-in tariffs: small-scale hydropower (<10 MW), wind power, biomass, biogas, landfill gas, geothermal energy and PV (up to a total capacity of 15 MW). After accreditation the grid operator is then required to connect generators to the grid.

The Austrian electricity grid is managed within three control areas. RES-E plants within these control areas form a "green power balancing group" or "eco-balance group". The control area managers in their capacity as "green power balancing group representatives" (GPBGRs) are required to buy all electricity from generation plant approved by provincial governors and the feed-in law. Between the three GPBGRs green power is redistributed to achieve equal shares and then allocated to suppliers. Every supplier receives green power in amounts based on the past year's sales and has to pay the so-called "settlement price" which is above market price and currently at 4.5 EURct/kWh. Every supplier in Austria thus receives the same proportion of green electricity (including all environmental attributes – and this is a crucial feature to avoid double counting as will be pointed out below), which currently stands at around 10%.

[4] Germany as a success story for feed-in systems has already been widely discussed in other reports (e.g. RE-GO); the Netherlands as representative of a third basic type of feed-in scheme combines its system with green electricity certificates and will be discussed later in this report.

Beside the settlement price the second financing mechanism for green electricity is the "green power balancing group support contribution" taken as a supplement to the system charges paid by end-consumers (in 2005 it was set at 0.30 EURct/kWh for 'other renewables', whilst the figure has risen to 0.48 EURct/kWh in 2006, 0.08 EURct/kWh for small-scale hydro and 0.13 (2006: 0.07) EURct/kWh for CHP).

The detailed feed-in tariffs are not specified within the Green Electricity Act, which only requires tariff-setting at a level which leads to a constant increase of the proportion of green electricity and which should reflect production costs of cost-efficient generation facilities but are set by a decree of the Federal Minister of Economics and Labour. To ensure planning security for investments these tariffs are guaranteed for a period of 13 years.

In the respective ministerial decree feed-in tariffs have been set for plants accredited before 31st December 2004 and starting operation before 30th June 2006. The tariffs are technology-specific ranging from 5.68 EURct/kWh (first 25GWh) to 3.15 EURct/kWh (> 25 GWh) for small-scale hydro power, 60 – 47 EURct/kWh for photovoltaic (until a national cap of 15 MW of installed capacity is reached – which was the case already in 2003), 7.8 EURct/kWh for wind power, 16 EURct/kWh (for plants < 2 MW) to 10.2 EURct/kWh (> 10 MW) for solid biomass and organic waste, 10 to 13 EURct/kWh for liquid biomass, 16.5 to 10.3 EURct/kWh for biogas and 6 to 3 EURct/kWh for sewage gas.

For RES-E generators accredited according to the Green Electricity Act, Guarantees of Origin (GoO) are automatically issued by the grid operator and included in the central GoO database.[5] The GoO comprises the amount of electricity produced, the type and capacity of the plant, the time and location of production and the type of energy source. GoO for generators of RES-E not eligible for feed-in tariffs (due to the type of technology used or because the quota has been exceeded) are issued upon request as soon as the amount of electricity generated is reported to the GoO database by the grid operator. Generators of green electricity and traders are obliged to pass on GoO at no costs (and electronically) to the buyer of this electricity at his/her request.

The feed-in tariff system set up at the beginning of 2002 has been highly successful in Austria with increases in generation capacity beyond original expectations. In the last months of 2004 a large volume of new generation capacity was commissioned, due to the level of feed-in tariffs only being guaranteed for plants accredited before the end of 2004. With the currently accredited generation capacity (864 MW wind, 309 MW solid biomass, 70 MW biogas, 100 MW others) the share of green electricity (excluding hydropower) is expected to rise to 8% by 2007 (compared to the target of 4% by 2008).

As a result of this 'boom' of new plants it was decided not to extend the decree setting feed-in tariffs, though a revised Green Electricity Act (BGBl I Nr 105/2006) has recently been issued on 27th June 2006. While the ministerial decree for setting the new

[5] At the end of each month the grid operator reports the amount of electricity generated in the preceding month by the accredited plant to the eco-balance group (GPBGRs), which in turn generates an input to the central GoO-register and allocates the GoOs proportionally to the registered suppliers.

feed-in tariffs is still pending, the new law introduces an upper limit for the total level of support of 17 million Euro for the period 2006-2011. Moreover, full feed-in tariffs will only be paid for 10 years (instead of currently 13) with a reduced tariff in the 11th (75%) and 12th year (50%). By definition this will lead to a reduced growth in RES-E supported by feed-in tariffs. At the same time, the Austrian electricity regulator E-Control admits that given the current annual increase in electricity demand and the stagnation of large hydropower capacity the growth of new green power capacity mainly contributes to maintaining the high proportion of RES-E in Austria but will not be sufficient to reach the indicative target of 78.1% of electricity consumption.

2.1.2.2 Interaction of feed-in tariffs with green electricity labels in Austria

The introduction to chapter 2 has already pointed to issues where feed-in systems may interact with green electricity labels. Such interactions may either result from an overlapping of the two instruments which may have adverse effects (at least reduced overall effectiveness) or may lead to synergies and complementarities. The main interactions to be considered in case of a co-existence of feed-in tariffs and green electricity labels is the issue of double funding through feed-in tariffs and premium prices of labelled green electricity products.

The Austrian case of RES-E policy support will be used in the following paragraphs to discuss potential interactions with green electricity labels in general. The case study of Spain will then serve as an example of the dependence of some of these interactions on the specific design of the feed-in system.

Avoidance of double funding

As a general principle RES-E supported under the feed-in tariff scheme should not receive extra funding through premium prices of labelled green electricity products assuming that no additional effects result from this support. An example would be the creation and marketing of a green electricity product purely based on electricity generated within the feed-in system. In such a case green electricity consumers would pay a premium price without contributing to any additional electricity generation – or even to the contrary: with their premium they might even fund lower prices for the residual (and more fossil fuel based) mix of the supplier (see Markard/Timpe 2000).

Achieving additional effects could either mean enhanced sustainability standards for green power plants (compared to the standards required to be eligible for feed-in tariffs), the inclusion of ‘marginal RES-E plants’ which would not be economically profitable with standard feed-in tariffs or support of RES-E sources which are not covered at all by feed-in tariffs. In this situation – either additional RES-E generation or increased standards - it is also important to distinguish between consumption and contribution-based electricity products. While consumption-based green electricity products provide a direct connection from the electricity sold to the green electricity generated (though this is not possible physically, electricity can be tracked along financial and contract streams), contribution-based products mean that a certain amount of money per kWh consumed is allocated to specific funds or projects (in this case a supplier can sell la-

belled green electricity even if not directly purchasing green electricity from generators or traders).

The challenge with well-functioning feed-in schemes, such as the German one, is that they cover most new RES-E and leave only limited space for complementary products. Nonetheless, green electricity products are still of value (see Markard/Truffer 2006) due to their promotional effects, their fit with a liberalised market regime, the learning effects they induce and their ability to directly involve and activate customers (contrary to feed-in system support). Green electricity labels must thus strike a balance between the need for such a product and the avoidance of double funding.

In the case of the Austrian system double funding may be an issue in several aspects. On the one hand, eligibility criteria for publicly funded plant may differ from eligibility for labelled RES-E products (e.g. as defined in the Eugene standard). The latter financial mechanism permits the support of RES-E not covered by feed-in. Under the feed-in scheme certain categories of green electricity do not receive funding at all. This mainly applies to large hydropower which is not eligible for special feed-in tariffs, but also for PV electricity in Austria as soon as the threshold of 15 MW of PV has been exceeded (which is already the case). Moreover, the recently introduced cap for total annual funding under the revised law for feed-in tariffs in Austria will most probably leave a (potentially large) proportion of green power plants without public support through tariffs. Consumption-based RES-E labels should concentrate on the mobilisation of such electricity generation not supported by feed-in tariffs but which depend on support over and above current market prices. This could be the case for large hydropower with advanced sustainability standards and green electricity not receiving feed-in support because the quota has been exceeded.

However, excluding publicly supported green electricity from labelled products constitutes a problem especially for suppliers specialising in green electricity provision. Under Austrian electricity legislation such suppliers automatically receive an equal share of electricity (about 10% of the volume they supply to end consumers) under the feed-in scheme (which they have to buy at a set price). To strictly avoid double support this share would have to be excluded from their labelled product which would not allow them to offer a certified green electricity product. For such situations, the solution chosen for the Austrian label "Umweltzeichen" (which in this respect complies with the Eugene standard) makes sense: Publicly supported RES-E may be included in the labelled product (which means double support), however, to receive the label for a specific product the supplier has to equally distribute the electricity received from the ecobalance group over all products this supplier offers (i.e., the share of feed-in supported RES-E in the labelled product must not exceed the national share of RES-E from feed-in).

The electricity forming the remainder of the product could either fulfil additional criteria for sustainability, such as the type of biomass used, or be sourced from plant that would not be economically viable within the existing feed-in scheme (e.g. wind power in less favoured areas). Supporting the ‘extra-sustainability’ of plants already getting support through feed-in tariffs is more compatible with contribution-based products as

money from the price premium can be targeted towards specific extra costs and feed-in system subsidies can be easier kept apart from subsidies via green premium products.[6]

However, care has to be taken that the money is invested in the most efficient plant (no 'over-subsidisation') and the premium per kWh of the labelled product allocated to the fund is sufficiently high to avoid dumping prices compared to consumption based green electricity. One way to exclude price dumping would be to require a minimum additionality level (in terms of additional environmental improvements) which needs to be met in order to get the label.[7]

Verification[8] and auditing[9]

To avoid double funding it is important to have a reliable tracking mechanism for RES-E in place[10]. Under the Austrian system, GoO are automatically issued for supported RES-E and are transferred proportionally to the different suppliers. Moreover, these GoO are earmarked as being subsidised. GoO issued for RES-E outside the feed-in system thus can be distinguished from supported GoO in certification and control procedures under the labelling scheme. In the case of contribution-based or consumption based products which are e.g. based on "high quality" hydropower, the label has to build on plant-specific certification procedures which audit the enhanced environmental standards of the plant. Apart from that no overlap with the feed-in system should occur.

Avoidance of double counting

Double counting does not seem to be a problem specific to feed-in systems, but is related to wider issues of auditing and tracking RES-E. Double counting would mean that a certain amount of green power is used for more than one declaration of the 'greenness' of the electricity sold. This might be the case if GoO are issued twice (e.g. from different bodies) or if they have not been redeemed after use so that they can be used

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6 Under feed-in system designs like in Austria (or Germany) it is impossible to direct additional support from consumption-based green electricity to RES-E generators receiving improved feed-in tariffs, as the system operator purchases the electricity and proportionally distributes it to suppliers. The supplier does not have control over this allocation process and cannot receive feed-in supported RES-E from a specific plant with improved environmental standards.

7 An example how such a minimum additionality level could be determined is provided by the design of the German ok-power label (www.ok-power.de). For a detailed description of the respective label see CLEAN-E Work Package1 Report: Inventory of existing and intended green power labels.

8 Verification – Any specific claims with regard to technology employed should be supported by evidence (e.g. GoOs) by purchase of energy consistent with the claim as to origin, technology etc. and given the unpredictable nature of renewable energy it would be acceptable for evidence to be averaged over a year. Suppliers will need to have and retain evidence to verify all claims and to make it available to the public or an external verifier.

9 Auditing – suppliers are encouraged to use an accreditation system, if available, as a means to ensure verification. This may ensure public confidence that the claims are fully audited and verified by third parties. Premium raised under green offerings should be paid into a fund that is completely and verifiably separated from the general accounts of the supplier. Third party auditing of payments into and out of the fund is essential to match money collected with payments made, and to verify consistency with the criteria for payment.

10 See Chapter 3: Interaction with Electricity Disclosure

several times as proof of origin of 1 kWh RES-E. In the case of a central electronic registry for GoO like in Austria double counting should be excluded.

Displacement of public support with voluntary demand

A possible interaction of feed-in support with green electricity labels relates to political support. High demand for green electricity products at premium prices could be interpreted as a chance to reduce public support through the feed-in system. However, so far there is only a limited basis for such arguments, as, especially in countries with feed-in schemes, green electricity products play only a limited role (except where they are built on subsidised green electricity).

2.1.3 Case study 2: Spain

2.1.3.1 Feed-in system design

Spain has an indicative target of 29% RES-E in 2010. While the Spanish example shares the main features of feed-in systems with the above Austrian case study, it deviates from this case in some important elements. In particular, producers have the choice between fixed feed-in tariffs and a premium on the wholesale market price. The success of the Spanish feed-in regulation especially with respect to the growth in wind power generation has been remarkable.

The Royal Decree 436/2004 which sets out the current feed-in regulations consolidates the support system for renewable energy already in effect ('Special Regime') and is based on the guarantee to buy all the RES-E produced at a price above market level. The owners of green power generation facilities within the Special Regime that fully registered at the "Administrative Register of Generating Facilities under the Special Regime" later than 28th March 2004 have to choose between the two options when selling their generation (see Bustos, 2004; Ragwitz/Huber, 2005; Ritter, 2005):

- Option 1: To sell the electricity to the distribution company at a **regulated feed-in tariff**. The feed-in tariff is not guaranteed at a fixed level for a longer period in advance (as in Austria or Germany), but is calculated as a percentage of the average electricity tariff (AET) published every year.[11] The regulated tariff for RES-E generally drops after 5, 15, 20 or 25 years from the commissioning of the power plant. The tariff consists of several components: A basic component ranging between 80% and 90% of AET for RES-E, except for solar PV and solar thermoelectric plants (e.g. 575% in the first 25 years for PV <100 kW). The second element is a reactive power service supplement also set as a percentage of AET, depending on the type and installed capacity of the plant and according to the hourly period the reactive power is delivered. The final component is a supplement for continuity of supply against voltage dips and is only applicable to wind farms for four years provided they have installed specific technical equipment. This supplement has been set at a

[11] The AET is defined in detail by the Royal Decree 1432/2002 and considers the relation between costs forecast of electricity supply and of expected demand from final consumers. according to the Decree the AET will be increased between 1.4 and 2% every year until 2010 (see Bustos 2004).

level of 5% of the AET. The regulated tariff is invoiced and paid to the grid operator which receives the power from the RES-E plant.

- Option 2: To sell the electricity on the market and to receive a **premium per kWh**. In this case the electricity has to be sold to the pool operator (OMEL) on a daily basis or through bilateral or term contracts. The remuneration then consists of: a) the market price of electricity (or the price agreed with the purchaser); b) a premium which is again calculated as a percentage of the AET (30-40% for most energy sources with the exception of solar power); c) an incentive per kWh as a percentage of AET for participating in the market set according to the type and installed capacity of the power plant; d) a reactive power service supplement set as a percentage of AET and depending on the type and installed capacity of the power plant; e) a capacity payment (same requirements as under the ordinary regime); f) a supplement for supply continuity against voltage dips (same as in Option 1).

Decree 436/2004 obliges operators of installations with a capacity above 10 MW to provide the distributor with a forecast of the electricity they intend to feed into the grid. Since the beginning of 2005, deviation costs from the monthly forecasts are passed on to the generators. For plants installed before 28th March 2004 there are options to stay in a transitory regime or switch to the new regime. Currently, the premium option was the most profitable one, allowing for a tariff of 7.529 EURct/kWh for wind power in 2004 compared to 6.377-7.098 EURct/kWh within the regulated tariff option. The approach of offering two options is interesting as it allows larger RES-E companies learning opportunities in the traditional power markets with the security of switching back to the regulated tariff supporting mechanism.

In both cases the grid operator has to provide access to the grid: The invoice for the wheeled power is sent to the distribution or transmission company which pay for the electricity plus premiums and have to grant a standard power purchase agreement (PPA) for at least five years. In turn these companies are entitled to be settled by the national Energy Commission for the extra payments. The costs of electricity generation under the 'Special Regime' are taken into account for the annual calculation of the electricity tariff under the 'Ordinary Regime' and are thus paid by all electricity consumers.

The tariffs and premiums will be revised in 2006 and then every four years and, especially, when specific targets set out in the Spanish Renewable Energy Plan are reached, e.g. 13.000 MW of wind power.

Within the Special Regime it is not clear as to whether the local grid operators who pay the premiums or feed-in tariff have legal ownership of the supported electricity volumes or whether the ownership stays with the RES-E generators (van der Linden *et al*. 2004). A system for Guarantees of Origin is planned but not operational to date.

2.1.3.2 Interaction of feed-in tariffs with green electricity labels

The general interactions of the Spanish feed-in system are similar to the ones described in the Austrian case study. The main issue to avoid is double funding. In this respect it does not make much difference that levels of feed-in support are not the same between Austria and Spain. In both systems the feed-in tariff enables only a certain share of po-

tential RES-E projects to be economically viable. As pointed out earlier, in these cases, additional financing can be targeted more easily with contribution based products. For different levels of feed-in tariffs in different countries this means that the 'starting level' of additional funding is different. Potential interactions such as double funding and strategies to avoid such interactions are not affected by the tariff level.

A more significant difference with the Austrian system – although this does not directly refer to the institutional design of the feed-in tariffs - is the role of GoO as proof for RES-E funded under this scheme. While in Austria GoO are automatically issued and earmarked as publicly supported electricity, there is currently no comparable tracking system in place in Spain. Verification and auditing thus cannot be based on GoO but have to rely on bilateral contracts between suppliers and generators and check that the generator is not listed in the "Administrative Register of Generating Facilities under the Special Regime". Furthermore, the ambiguous situation of ownership of RES-E attributes increases the risk of double counting unless additional effort is made to track RES-E. This means that in principle a RES-E operator might argue (despite the fact that he has received the feed-in tariff) he is still the owner of the "greenness" while the grid operator who has taken the electricity might argue the same. This might end up in two virtual green kWh for one kWh actually produced.

2.1.4 Recommendations

Summing up, the following recommendations can be given to avoid negative interactions of feed-in support systems with green electricity labels:

Recommendations to labelling bodies:

- Avoid double funding of labelled RES-E. In general, only RES-E which has not been supported by feed-in tariffs should be eligible for the label.
- In case of inclusion of already subsidised electricity take care that additionality criteria are met. Only in cases with a significantly improved environmental standard of the generation facility or in case of feed-in subsidies not covering the cost of RES-E generation inclusion in the label should be considered. It seems to be easier to cover these extra costs via contribution based products. Moreover, a minimum level of environmental additionality should be required.

Recommendations to policy makers:

- To avoid double funding a reliable tracking mechanism is needed, e.g. GoO issued automatically and earmarked if subsidies have been received
- Take care that double counting is avoided (e.g. which might happen where GoO are issued by different bodies for the same amount of electricity); in this respect make sure that it is unambiguous who owns the environmental attributes of supported RES-E.

2.2 Quota obligations

This section examines the interaction between green labels and the Green 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.

2.2.1 Introduction to quota obligations

A renewable energy quota obligation aims at supporting new renewable energy generation by increasing demand from renewable sources. It sets a legally binding minimum amount or proportion of electricity supply that must be produced from renewable energy sources. It is a mandatory regulatory framework instituted and managed by a government. The obligation is either imposed on electricity consumption (often through supply or distribution) or electricity production, with penalties imposed on non-compliance.

Renewable Energy Quota Obligation Schemes first emerged in a significant way in the late 1990's in the US (RPS), Australia (Mandatory Renewable Energy Target MRET), Japan and several European countries. The obligation system is commonly administered by a system of Tradable Renewable Energy Certificates (TREC). TRECs provide 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. Depending on the design of the system, TRECs can then be traded, banked or consumed like any other commodity and can be used to verify and provide flexibility in achieving compliance. The price of the TRECs on the Green Certificate market is primarily determined by political targets, the associated non-compliance penalties and the price curves for different RES-E technologies.

Quota system designs differ also in the handling of the green attributes. In the UK for instance the Renewables Obligation quota system has been designed to be a pure financial support mechanism. This means that the green attributes of 1 unit of RES-E remains with the generator although he is selling the corresponding ROC which then can be used by a supplier to prove compliance with the obligation. Obligated suppliers do not receive the corresponding greenness and therefore they should not base green electricity products on this. In other obligation schemes the greenness might be passed to the obliged parties (e.g. suppliers) via the TREC.

To illustrate the use of green labels and possible interactions between green power labels and TREC system this section reviews two case studies: the UK which currently has no existing green power label and Italy with the green energy label Bollino Verde.

2.2.2 Case Study 1: UK

2.2.2.1 Quota and TREC system design

The obligation in the UK is placed on licensed electricity suppliers, who have to surrender Obligation Certificates or pay a penalty for non compliance. These TRECs are known as Renewable Obligation Certificates (ROCs) in England and Wales, Scottish

Renewable Obligation Certificates (SROCs) in Scotland and from the 1st April 2005 Northern Ireland Renewable Obligation Certificates (NIROCs) in Northern Ireland.

Since April 2002 there was interaction between the obligation systems across Great Britain (England, Wales and Scotland). More recently in April 2005 full recognition and tradability between the obligation systems across all three UK markets (including Northern Ireland) started to be established. The obligation level in GB started at 3% of electricity supply in 2002/2003 and rises to 10.4% in 2010/2011 and 15.4% in 2015/16 (Table 2). The obligation period runs from 1st April to 31st March the following year. Initially, the 10.4% obligation level in 2010/11 was set to continue at that level until the end of the Renewables Obligation in 2027. However, it was realised that in order to encourage investments, obligation levels needed to be fixed at higher levels for the period after 2010/2011. The obligation levels are ambitious, and the system is designed in such a way that the target is higher than the likely supply of ROCs in order that there is a always positive ROC value.

Suppliers can fulfil their obligations by producing renewable energy directly, buying ROCs from a generator or other supplier, or by paying the buy-out price. The buy-out payment for suppliers who cannot comply with the obligation level was set at GBP 30/MWh in 2002/2003, increasing in line with the retail price index (GBP 30.51 in 2003/2004 and GBP 31.59 in 2004/2005). The defining feature of the UK obligation system is the fact that the buy-out payments are "recycled back" to those suppliers who surrender ROCs for future investment in renewable energy.

Table 2: Key design element of UK obligation system

Starting date	1st April 2002 (Obligation period runs from 1st April to 31st March the following year)	
Obliged actors	Licensed electricity suppliers	
Quantitative obligation	Period (Starting 1st of April)	
	2002/3	3.0%
	2003/4	4.3%
	2004/5	5.5%
	2005/6	6.7%
	2006/7	7.9%
	2007/8	9.4%
	2008/9	9.7%
	2010/11	10.4%
	2011/12	11.4%
	2012/13	12.4%
	2013/14	13.4%
	2014/15	14.4%
	2015/16	15.4%
	2026/27	15.4%

Issuing Body	OFGEM
Eligible resources	Mostly following the Renewable Electricity Directive definition. Large hydro (>20MW) only plants commissioned after 1 April 2002. Mixed waste is only eligible using advance energy recovery processes (pyrolysis, gasification and anaerobic digestion). Energy crops, agricultural waste and forestry material are eligible. However, if co-fired requires a minimum percentage energy crop.
Banking	Up to 25% of a supplier's obligation may be met from certificates awarded in the previous period
Borrowing	Not allowed
Minimum Price	None
Penalty of non compliance	GBP 30 plus RPI
	2002/3 GBP30.00 2003/4 GBP30.51 2004/5 GBP31.39 2005/6 GBP32.33
Period of validity	2 years
International trading	RE produced outside the UK not eligible
Existing plants included	Plant commissioned or re-equipped after 1 January 1990 will be eligible
Recent certificate price	GBP 47 (auction price 20 Jan 2005)
Use of penalty revenues	Recycled back to certificates holders
Cost recovery method	Surcharge on electricity tariff

2.2.2.2 Support for green electricity labels

There were no quality labels for green electricity operating in the UK at the time of writing. The Future Energy Label which was initiated and financed by the UK government, and run by the Energy Saving Trust (EST) is no longer operating. Following the introduction of the Renewable Obligation in 2002, few electricity suppliers wanted to provide consumers with a green electricity tariff option which meets the UK electricity regulator's (Ofgem) guidelines. Since the termination of the EST's Future Energy Scheme there has not been an accreditation system for offerings. There has, however, been some attempt to benchmark the offerings and provide some consumer guidance (e.g. Friends of the Earth in its listing and recommendation for green supply).

Ofgem is currently in the process of revising the guidelines issued on Green Supply Offering in the domestic market in April 2002. The guidelines set out objective criteria for the use of environmental or "green" claims in the description and marketing of electricity by suppliers. The revision of these guidelines follows a number of developments affecting the Green Supply Offering since 2002 including: the closure of the Future En-

ergy Scheme; four years of experience operating the Renewable Obligation system; introduction of renewable energy Guarantees of Origin; the requirement for electricity suppliers to disclose the fuel used to generate electricity they supply; and the growing importance of green supply for non-domestic consumers. The new guidelines and the draft already supports the establishment of green electricity labels. It states that preferably there would be only one green electricity label, adding that more than one would undermine market confidence in green supply offering. The new guidelines (initially anticipated to be available at the end of 2005) are to be published later in 2006.[12]

2.2.2.3 Effects on additionality, multiple counting, verification and auditing

The new Ofgem guidelines intend to address the issues of additionality, multiple counting, verification and auditing. In the draft guidelines currently available for comment the following structure is being recommended.

Additionality. Consumers choosing a green supply offering need to be able to be satisfied that their support is making a difference to the environment. This may be through direct financial support for additional renewable generation or capacity, or through indirect support which may result in some identified future benefits. Ofgem has stated that green supply offerings 'should not be used to meet a supplier's costs in fulfilling their obligation but rather the intention is that any tariff should lead to additional generation, over and above a suppliers obligation'. As part of the Renewable Obligation the Government has established a mechanism for suppliers to delete ROCs from the register on demand – it is argued that retiring ROCs effectively strengthens the target provided by the Renewable Obligation by reducing the number of ROCs and that this leads to greater investment capacity. It is therefore a means of providing verification for the additionality element of green supply offering. If suppliers use the acquisition of ROCs beyond those required for their obligation for the verification of additionality, these ROCs should be deleted from the Register or held by other parties, such as third party accreditation bodies.

Multiple counting. Ofgem recommends a standardised industry-wide method of verifying supply of all renewable energy to reduce the risk of double counting with a suggestion that the most appropriate evidence for tracking supply of renewable electricity to consumers of green supply is through the holding of an equivalent number of REGOs (the name for GoO in the United Kingdom) for the relevant financial year at an agreed date and time. This is consistent with the rules that apply under the fuel mix disclosure supply license condition - 12 noon on 1st July following the financial year in question. Ofgem is currently seeking broad industry support for this position. The use of ROCs as the sole evidence of renewable energy supply would cause inconsistencies, as it would exclude some technologies and it would be complicated by the specific rules of Renewable Obligation as a support mechanism.

The UK currently lacks a green label or verifying body. The current draft green label guidelines revised by Ofgem offer a strong foundation on which to build such a system.

[12] Personal communication with Ofgem, August 2006

The use of REGOs (issued by Ofgem) as proof of a green source of supply would be recommended over the use of ROCs. The UK would benefit from establishing a third party accreditation and verification system in the shape of a labelling scheme, providing recognition and accreditation for products. The application of stringent labelling standard such as the Eugene Standard, which is an international benchmark for green electricity tariffs, would be advisable when setting up the green label.

2.2.3 Case Study 2: Italy

2.2.3.1 Quota and TREC system design

Italy's energy law, also known as the Bersani Decree, requires all energy producers and importers that source more than 100GWh/year from conventional energy sources to ensure that 2% of all electricity supplied to the national market comes from renewable sources as of 2002. The obligation does not apply to the first 100GWh/year produced by each company, and renewable energy and eligible co-generation are also exempt. The quota was initially set at 2%, is calculated on the basis of production and imports in the previous year, net of co-generation output, internal power plant consumption and exports. The legislative Decree 387/03 increased the minimum quota by 0.35% per year from 2004 to 2006, reaching 3.05% in 2006. Further increases are to be discussed in parliament. Before 31st December 2004 the Ministry of Productive Activities could establish a further increase for the period 2007 to 2009 and before 31st December 2007 for the period 2010 to 2012 (IEA, 2003b).

Eligible renewable energy sources include solar, wind, hydro, biomass, waste, tidal, and geothermal. Electricity produced from renewable sources is fed into the grid and given precedence in dispatching. In addition, upon request the electricity regulator, GRTN, issues the producer with green certificates, which are the documents proving the electricity was produced from renewable sources and constitutes the means by which entities subject to the minimum quota obligation have to prove their compliance with the obligation. A plant can generate green certificates over its first eight years of life.

Operators can fulfill the obligation by directly generating electricity from renewables, purchasing an equivalent number of Green Certificates from GRTN or purchasing an equivalent number of Green Certificates from other producers through bilateral contracts or in the electricity market (IEA 2003a). Each Green Certificate represents an energy value of 50 MWh or a multiple thereof[13]. Operators that do not comply with the obligation receive a warning from the Energy Authority and, in the most serious cases, see their participation in the electricity market restricted and are obliged to pay financial penalties (IEA 2003b).

[13] When it comes to the greenness of the electricity, double issuing of the RECS certificate and the Certificati Verdi is excluded, as the relationship between both certificates is clearly described in the Italian RECS Domain Protocol. It remains unclear though what the exact relationship of both RECS and Certificati Verdi is with regards to the GoO. At this point it can not be excluded that a GoO which has been issued for the same amount of electricity might be exported, thus enacting double counting.

Table 3: Key design elements of Italy's obligation system

Starting date	1st April 2002 (Obligation period runs from 1st April to 31st March the following year)
Obliged actors	Electricity producers and importers
Quantitative obligation	Period (Starting 1st of April)
	2002: 2% 2003: 2% 2004: 2.35% 2005: 2.7% 2006: 3.05% 2007-2012: To be set by the Ministry of Environment and the Ministry of Production Activities (MAP)
Issuing Body	GRTN
Eligible resources[2]	Renewable energy plants (established or restructured after 1 April 1999) In 2002 the category of partial renovation was limited to hydropower and geothermal (Decree DM 8.3.2002)
Minimum Price	None
Penalty of non compliance	Receive a warning or in the most serious cases, participation in the electricity market is restricted and a financial penalty is paid.
International trading	Can be met by importing Energy produced by foreign renewable power plant put into operation after 1 April 1999 on the condition that such plants are located in countries adopting similar schemes or RE promotion that allow the same opportunity as those for RE plants in Italy.
Existing plants included	Plant commissioned or re-equipped after 1 April 1999 will be eligible
Certificate price in most recent years	84.2 EUR/MWh 82.4 EUR/MWh 2010: Expected to fall towards 50 EUR/MWh

2.2.3.2 Support for green electricity labels

The current green energy label is called Bollino Verde (Italian for "green stamp") owned by Re-Energy Foundation (REEF)[14]. The Label has been registered in Italy, the EU, the USA, Canada and Japan. REEF (Re-Energy Foundation) a non-profit organisation, grants its use to national and international bodies committed to the exclusive production of green energy. The Label is granted through mechanisms controlled by a Guarantee Committee, which includes among its members representatives from envi-

[14] See CLEAN-E Work Package 1 report: Inventory of existing and intended green power labels

ronmentalist associations (Legambiente, WWF) and consumer associations (Adiconsum, Unione Nazionale Consumatori). It is based on Renewable Energy Certificate System (RECS) certificates that demonstrate the correct origin of the energy. At present the certifying body in Italy is CESI.

2.2.3.3 Effects on additionality, multiple counting, verification and auditing

The current green labelling scheme Bollino Verde is based on the use of RECS to certify the electricity's green origin. RECS is a voluntary European certification scheme that promotes the use of electricity from renewables[15]. In Italy, the plants that receive Green Certificates are not admitted to RECS. GTRN certifies such plants on the basis of electricity generation and manages the RECS trading and redemption platform (GRTN 2004).

GTRN also manages the issuing of Guarantee of Origin (GoO). In Italy, these are issued for the generation of renewable energy to plants having a yearly generation greater than or equal to 100MWh (*ibid.*). GoO are issued in compliance with the Directive No 2001/77/EC and in Italy act as a tool to verify whether the electricity that is imported and declared is actually of renewable origin and facilitates the definition of common rules for the trading of electricity from renewables between European producers (*ibid.*). Green Certificates are used to verify compliance to the obligation whereas GoO are used to certify the green source of the electricity.

Under certain circumstances, RECS certificates promote additionality as they are independent and additional to Green Certificates and they are not limited to the 100MWh yearly generation as GoO and Green Certificates are, and they are attainable by smaller (less than 100MWh) generators. However, in the case of amortised power plants, no additionality is ensured as the Italian system design only ensures additionality above public support but not additionality above existing generation. Bollino Verde also state that at least 80% of the income generated by the label will be devoted to financing high visibility activities geared to development and propagation of green energy, as selected by the Guarantee Committee.

Verification and auditing of the Green Certificates, GoO and RECS certificates are all carried out by GTRN and as a result should control and limit multiple counting. Verification of compliance with the Renewable Obligation is monitored on a yearly and three year basis (planned to begin in 2005).

2.2.4 Recommendations

Recommendations to labelling bodies:

- Additionality can be ensured by additional TREC redemption above what is mandated by the obligation; by redeeming the additional TRECs the respective certificates will be removed from the market and can not be used by another company to

[15] See Chapter 5: Interaction with RECS

match its obligation. In this regard additionality is created by implicitly increasing the obligation target defined by the mandatory scheme[16].

- Where a supplier sells more electricity products than the labelled green electricity offering, that company must ensure that the number of green certificates which have been redeemed to create additionality is higher than the obligation the supplier has to meet for its whole supply portfolio. The supplier is not allowed to allocate green certificates which are required for another product's compliance with the obligation (e.g. a product with no green claim) to the labelled green offering.

Recommendations to policy makers:

- Clearly state and publicise that only one form of evidence of renewable energy supply is accepted, namely GoO, which will be redeemed when used. In consequence, other green certificates, such as ROCs and LECs in the UK, should then be clearly advertised as being purely financial incentives.
- So as to avoid double funding a reliable tracking mechanism is needed, e.g. GoO issued automatically and earmarked if financial incentives have been received. In the UK, this would mean that GoO would be earmarked for the issuance of both ROCs and LECs.
- Take care that double counting is avoided (e.g. GoO issued by different bodies for the same amount of electricity); in this respect make sure that it is unambiguous which market player owns the environmental attributes of supported RES-E.

[16] However, additional TREC redemption does not automatically lead to additionality as removing additional TRECS from the market might result in more suppliers choosing the buy out option which does not necessarily lead to additional RES-E generation. This also depends on the destination of buy out payments, e.g. recycling, being deposited in a dedicated fund for RES-E projects or simply being included in the general public budget.

3 Interaction with Electricity Disclosure

3.1 The principal concept of Electricity Disclosure

The fundamental idea behind Electricity Disclosure is to provide consumers with information about the electricity they buy. This could encompass information about the fuel mix used to produce the electricity of a specific product, information about the environmental impact resulting from the respective power plants but also information about any other item which can be associated with this electricity.

The main objective of Electricity Disclosure is not to promote a particular type of electricity generation. It is rather to bring more transparency into the electricity market. This can be achieved by providing objective information about suppliers and products in a (at least to a certain extent) standardised manner. Electricity disclosure in particular aims to allow electricity consumers to get better access to several pieces of information linked to the different offers on the electricity market. This will facilitate consumers to make purchase decisions using their own individual preferences (such as environmental values).

Apart from enhanced transparency on the demand side Electricity Disclosure can also be beneficial to the supply side. Electricity suppliers and traders are provided with a new marketing opportunity, being able to differentiate the electricity they sell on factors other than price. Generators benefit from increased diversity of generation types and products. For governments, disclosure provides a tool to identify consumer preferences and upon which future policies can build. This means that several other policies and instruments (e.g. tax exemptions or reductions for electricity from specific fuel sources) could at a later date be built upon the system elements behind the respective disclosure schemes (e.g. the tracking system, see section 3.3).

Electricity Disclosure has to be differentiated from green power labels which also aim at enhancing transparency in the electricity market, in particular in the green power market (see section 3.2). Electricity disclosure provides objective information on the different types of electricity generation, though without evaluating them. Green power labels on the contrary generally apply subjective criteria indicating to consumers that a product has been officially approved and comply with the minimum standard set forth by the actors behind a labelling scheme.

The concept of Electricity Disclosure was introduced in the European electricity market by the revised Electricity Market Directive 2003/54/EC concerning common rules for the internal market in electricity. The Directive, which was adopted in June 2003, was due to be implemented by 30 June 2004.

The Electricity Disclosure provision was included in Article 3 section 6 of the Electricity Market Directive. The provision reads as follows:

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 European Union, 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.

This provision provides guidance only in general terms and leaves a number of details unspecified.

A disclosure system consists of two fundamental elements:

- The "interface" between electricity suppliers and consumers which represents the "visible" part of Electricity Disclosure. This so called "front-side" of Electricity Disclosure relates mainly to aspects of the design and layout of the disclosure label, the respective information content and the way the label is distributed among consumers.
- The backbone of a disclosure scheme (the so called "back-side") is the tracking system for electricity which creates unambiguous links between the power plants and the electricity sold to end consumers.

A detailed description of these distinct system elements have been provided by the research project "Consumer Choice and Carbon Consciousness (4C Electricity)" which was sponsored by the Altener programme of the European Commission as well as the project "Consumer Choice on Electricity (CIE)" funded by DG TREN.[17]

In June 2005 the extent of transposition of the Electricity Disclosure requirement among EU Member States was as follows:[18]

[17] All reports from these two projects can be downloaded at http://www.electricitylabels.com (4C Electricity) and http://europa.eu.int/comm/energy/electricity/publications/index_en.htm (CIE).

[18] Table taken from the report Lise *et al.* (2005): "Existing tracking schemes for electricity generation attributes in Europe" produced in the course of the EIE project E-TRACK (http://www.e-track-project.org/); data on degree of market opening taken from SEC(2004)1720 (Technical annexes to COM(2004)863 final).

Table 4: Extent of transposition of the Electricity Disclosure requirement among EU Member States (June 2005)

	Legislation	Market opening	Ready to disclose
EU15			
Austria	Passed	100%	Completed
Belgium (Flanders)	Passed	90%	Completed
Belgium (Wallonia)	Proposed	90%	Under way
Belgium (Brussels)	Proposed	90%	Under way
Denmark	Proposed	100%	Under way
Finland	Passed	100%	Completed
France	Passed	70%	Completed
Germany	Passed	100%	Completed
Greece	Not proposed	62%	Not implemented
Ireland	Passed	56%	Completed
Italy	Not proposed	79%	Not implemented
Luxembourg	Not proposed	57%	Not implemented
Netherlands	Passed	100%	Completed
Portugal	Not proposed	100%	Not implemented
Spain	Not proposed	100%	Not implemented
Sweden	Proposed	100%	Under way
United Kingdom	Passed	100%	Completed
NEU10			
Cyprus	Not proposed	35%	Not implemented
Czech Republic	Passed	47%	Completed
Estonia	Not proposed	10%	Not implemented
Hungary	Passed	67%	Not implemented
Latvia	Not proposed	76%	Not implemented
Lithuania	Not proposed	70%	Not implemented
Malta	Passed	0%	Completed
Poland	Not proposed	52%	Not implemented
Slovakia	Passed	66%	Completed
Slovenia	Passed	75%	Completed
OEU6			
Bulgaria	Not proposed	22%	Not implemented
Croatia	Not proposed	0%	Not implemented
Norway	Proposed	100%	Under way
Romania	Not proposed	33%	Not implemented
Switzerland	Passed	-	Completed
Turkey	Not proposed	45%	Not implemented

3.2 Differences between Electricity Disclosure and Green Power Labelling

The term "label" often is used in the context of both instruments, Electricity Disclosure and green power labelling. However both instruments need to be carefully distinguished.

Both instruments strive for the same overall goal to increase market transparency and to assist consumers to make well-informed decisions when choosing among different suppliers or products. Whereas Electricity Disclosure is covering the whole electricity market green power labels operate only in the market segment of green electricity which comprises in particular electricity generation from renewable energy sources and (in some labelling schemes) also electricity from high efficiency CHP.

However there are still major differences in the principal concepts of these two instruments which need to be considered:

- Product disclosure offers consumers objective information about a product. By providing standardized information about a product (e.g. price, ingredients, energy consumption) consumers are able to take a purchase decision on their own criteria.

Without evaluating or judging the quality of the products, disclosure is a means to increase market transparency and therefore strengthens consumer protection.

- Quality labels usually define minimum standards for products. Quality labels or product valuations are normally based on subjective criteria of the issuing organization (e.g. environmental or consumer organizations). To get the permission to carry a quality label, a product must fulfil these minimum standards. Normally, it is subject to an independent audit verifying the quality of the product.[19]

When these basic concepts are transferred to the electricity market, the following picture appears:

Electricity disclosure offers objective information on the fuel mix used to generate electricity and on the environmental impact (at least in the two categories CO_2 emissions and nuclear waste production) associated with this electricity. The adoption of the Electricity Market Directive the European Council has decided to follow the concept of portfolio disclosure. In this respect all disclosed information refers to the company's total supply mix of the previous year. However, as the requirements of the Directive can be regarded as minimum requirements Member States are allowed to include additional information on specific products (product disclosure) in their national disclosure scheme.

During the initial implementation phase, it can be expected that many Member States will choose a minimal compliance approach when introducing Electricity Disclosure in their markets. The minimal compliance approach represents the minimum that needs to be done in order to comply with the Electricity Market Directive. In this approach Electricity Disclosure is limited to the suppliers' portfolios providing no additional information about specific products. This alone illustrates the difference between disclosure and green power labelling.

However, even more progressive disclosure systems (going beyond minimal compliance) will by far not provide all information which is required to evaluate a product against the quality criteria applied by a green power labelling scheme. For instance, in most Member States disclosure labels will not display any information on the age of the power plants contributing to the supply portfolio of a company or specific products. And, generally, consumers will not be informed whether and to which extent electricity has been funded under a public support scheme. However, these two pieces of information (commissioning date of a power plant and eligibility to public support) are key data for many green power labels as they allow consumers to identify whether and to which extent a product creates additionality.[20]

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[19] A third option in the field of transparency instruments which can be located between product disclosure and product quality labelling is the ranking of products (based on criteria applied by the ranking organization) or ranking of disclosure information. Ranking is a step towards evaluation and judgment on qualities. At least, the choice of attributes to be ranked and the threshold for ranks also contain a high degree of subjective criteria.

[20] See CLEAN-E Work Package 1 report: Inventory of existing and intended green power labels

To clarify this important aspect with an example: In most Member States Electricity Disclosure will not distinguish between electricity from old and new power plants, e.g. electricity from an old existing hydropower plant which already has been amortized for several years and electricity which has been produced in a brand new hydropower plant with higher generation costs.[21] Moreover disclosure labels will not provide any information whether a power plant involved has received any form of public support. For that reason consumers who are willing to contribute to the expansion of green electricity generation will not be able to unambiguously identify those products or suppliers which offer products which meet this specific preference for additionality.

Finally, and contrary to green power labels, Electricity Disclosure is mandatory and must be implemented by all electricity companies supplying final customers throughout the European Union.

Green power labels define ecological minimum standards specifically for green electricity products. In most cases labels are operated by third parties, such as independent organisations often including environmental and/or consumer groups, which have no commercial interest in the green power market. The labelling body takes a key role in the whole labelling process as it represents to a large part the credibility of the scheme. The criteria applied by the different existing national labels differ widely and reflect the national framework conditions (e.g. current share of RES-E, legal support framework for different technologies). The criteria are more or less subjective and reflect the view and value judgements of the labelling body.

In order to have a positive impact on green power generation several green power labels apply some form of additionality, a concept which is not known in the context of Electricity Disclosure (see above). Additionality ensures that the demand for labelled products increases green power generation over an above the baseline of existing RES-E plants and over the stimulating effects of public support schemes.

Contrary to Electricity Disclosure, which is mandatory, green power labelling is a voluntary process. Thus, green power labels do not provide a comprehensive overview of the whole green power market. Only those suppliers are allowed to market a product under a label which have applied for accreditation and which comply with the labelling standard. On the other hand, this means that some environmentally sound products which might fulfil the labelling criteria but where the respective supplier does not apply for accreditation will not carry the label.

Summary

While both Electricity Disclosure as well as green power labels aim to bring more transparency to the electricity market, which allows consumers to become better informed, these are two distinct concepts. Whereas Electricity Disclosure provides objective in-

[21] In some Member States (e.g. Germany) disclosure labels will display fuel mix information a very aggregated way (e.g. in only three fuel categories such as nuclear, fossils and others, renewables). In these case consumers will not even be able to distinguish between different fuel sources (such as wind, biomass, hydro, solar) in the field of renewables.

formation about all suppliers' portfolios, green power labels evaluate the quality of specific products against a set of criteria based on subjective preferences.

The introduction of Electricity Disclosure does not replace the need of green power labels. Electricity disclosure facilitates comprehensive transparency on some basic information about electricity suppliers and their offered products. Green power labels – provided they apply the concept of additionality - provide an additional piece of information in particular regarding the environmental quality of a product, thus allowing consumers to choose a product which guarantees a positive benefit to the environment over and above what would have happened anyway, e.g. due to public support. While all suppliers will be required to disclose their fuel mix and information about the environmental impact (at least data on CO_2 emissions and production of nuclear waste) to their customers only a few suppliers will be able to additionally market their products under a quality label.

3.3 Electricity Tracking

3.3.1 Significance of electricity tracking in the context of green power labels

Green power labelling requires thorough auditing procedures to verify the green product claims made by the suppliers who offer labelled products. Sound auditing and verification processes are indispensable in strengthening consumer confidence in a labelling scheme. On the other hand, only labels which have gained a good public reputation (and this reputation is also partly based on reliable auditing and verification procedures) will actually become an important and recognised tool in the field of consumer protection, thereby allowing consumers to make an informed choice between different green power products.

One of the core elements within each auditing process is the verification whether a green power supplier has matched the total supply volume sold under the labelled product name with an adequate volume of green power generation or purchases over a fixed period of time.[22] And it must be assessed whether the electricity generated or purchased meets all the eligibility and additionality requirements set forth by the labelling scheme.[23]

Thus, the auditor needs to track the electricity which has been sold under a labelled product back to the respective power plant where it was produced. For this purpose it is necessary to create unambiguous links between these power plants and the respective suppliers and their products. The creation of these kind of linkages is called "electricity tracking".

Obviously, it is not possible to base these links on the physical electricity flows since any electricity which is fed into the public electricity network flows into a homogenous

[22] This applies in particular to all supply models but also to the delivery part of funds models where this part needs to be matched by RES-E (this is for instance required for the fund models in the scope of the German ok-power label).

[23] See CLEAN-E Work Package 1 report: Inventory of existing and intended green power labels

pool of electricity and cannot be distinguished with regard to its source. Therefore, other means of linkages, e.g. following the contractual links between market actors have to be established to create unambiguous links between generation and supply.

One of the main requirements which have to be met by a reliable tracking system is to exclude multi counting of certain attributes. Multi counting would be given when selected attributes associated to a certain unit of electricity (such as the "greenness" created by renewable electricity generation) are used several times for the same purpose. For instance this would be the case when the greenness of a unit of RES-E were to appear in more than one unit of electricity sold as green electricity. To prevent multiple counting a tracking mechanism which is used in the context of a product audit needs to ensure that the respective "greenness" a) has been transferred to the supplier, and b) will not be "used" in other green products than the labelled one.

3.3.2 Tracking mechanisms currently applied by green power labelling schemes

Existing green power labelling schemes use different methods of tracking electricity and the respective attributes associated to it. The main tracking options are the following ones:

- Contract based tracking: In this option electricity contracts provide evidence that green electricity (or at least the corresponding green attributes)[24] has been transferred between power plant and supplier.
- Tracking based on an acknowledged certificate system, such as the European RECS system[25]: In such a system, certificates holding the attributes, such as the greenness, which are required by the labelling scheme, are used as proof of origin. For instance, RECS certificates are eligible as proof of origin in the scope of the Swiss nature made star label and the German ok-power label; however, the eligibility of RECS certificates is subject to several constraints.[26]
- Tracking based on the official Guarantee of Origin for renewable electricity[27]: In this system, tracking is based on the Guarantee of Origin (GoO) for renewable elec-

[24] Contract based tracking does not require that each electricity contract is followed by physical electricity delivery. Many market players conclude so called swap contracts. A swap contract involves two vice versa electricity contracts which cover an identical electricity volume and load schedule. As a consequence, swap contracts do not result in any physical delivery but are rather limited to the transfer of electricity attributes (such as the greenness).

[25] The Renewable Energy Certificate System (RECS, www.recs.org) is an open pan-European initiative of energy companies, environmental organizations, trade associations and governmental agencies which has established the organizational, technical and procedural framework for the pan-European trade in green certificates.

[26] Some labelling schemes accept RECS certificates as proof of origin but apply additional criteria. For instance the German ok-power label requires the unambiguous identification as well as provision of additional data of the power plant which is represented by a certificate. This is necessary as the RECS certificates (neither the certificate nor the redemption statements once the certificates has been used) currently do not provide all information which are necessary to assess whether a power plant or its electricity generation complies with the label criteria. See Chapter5: Interaction with RECS and CLEAN-E Work Package 1: Inventory of existing and intended green power labels for more details.

[27] See Chapter 4: Interaction with Guarantees of Origin (GoO)

tricity following the EU Directive (2001/77/EC) on the promotion of electricity produced from renewable energy sources in the internal electricity market. For instance, this concept is applied by the Dutch Milieukeur Groene Elektriciteit label.[28]

- Tracking based on a non-official scheme of Guarantees of Origin: In this system, tracking is based on a system of GoO which solely has been introduced for the purpose of a green power labelling scheme. For instance, this concept is applied by the Australian Green Power Accreditation Program.[29]

3.4 Different models for electricity tracking within Electricity Disclosure

A fundamental prerequisite of Electricity Disclosure is that there is a methodology which allows the creation of unambiguous links between power plants and electricity sold to final consumers. These links are necessary to transfer information about power generation attributes (of all kinds of power plants) to electricity suppliers and finally to consumers. The disclosure labels will then be based on the aggregated data transferred through the tracking mechanism.

The Electricity Market Directive does not specify any requirements regarding the tracking mechanism Member States should pursue when establishing national disclosure schemes. However, in an explanatory note[30] published in March 2004, the Commission gives some guidelines which Member States are advised to recognise when setting up procedures to implement an Electricity Disclosure tracking mechanism:

- *It is recommended that for the tracking of the generation attributes, Member States ensure that the best available information is used: a combination of information on own generation related to the supplier, generation of known fuel source, reference to a suitable regional/national mix in the case of traded electricity, information on Guarantees of Origin, as defined in Directive 2001/77/EC on Renewable Electricity Sources.*
- *The use of estimations should be avoided.*
- *The use of statistical averages should be avoided as much as possible.*
- *Member States should ensure that double counting of generation attributes, such as generation based on renewables, is avoided, as this is contrary to the reliability required under the Directive.*

Member State governments have been discussing several tracking alternatives when implementing their national Electricity Disclosure schemes. The tracking options can be classified in two main categories, implicit and explicit tracking.

- Implicit tracking schemes rely on statistical data (e.g. UCTE mix) and all sorts of averages (e.g. individual company portfolio mixes) for the largest part of the market.

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[28] See CLEAN-E Work Package 1 report: Inventory of existing and intended green power labels

[29] See CLEAN-E Work Package 1 report: Inventory of existing and intended green power labels

[30] Note of DG Energy & Transport on Directives 2003/54 and 2003/55 on the internal market in electricity and natural gas

- Explicit tracking systems are based on mechanisms which create unambiguous virtual links between power plants and supply portfolios. In the field of explicit tracking methods two main options currently are pursued: (1) contract-based tracking (with or without a central registry keeping track of all contractual arrangements); and (2) certificate-based tracking.

The different tracking options have been described and evaluated in detail by several projects. A detailed introduction and evaluation of the different tracking options can be found in the reports produced in the context of the projects 4C Electricity, CIE and E-TRACK (see above for references). All alternatives show advantages and disadvantages to varying degrees. However, especially implicit tracking might contradict the idea of enhancing market transparency through the introduction of Electricity Disclosure. Provided implicit tracking methods (e.g. based on national or European data on the overall generation mix) are used extensively, this could lead to mostly identical information being supplied to customers of a large number of suppliers (Lise *et al* 2005).

The uncoordinated combination of explicit and implicit tracking elements might also damage the credibility of the disclosure system. For instance, multiple counting of attributes can easily occur when a Member State allows the use of statistical data (implicit tracking) for those parts of a supplier's portfolio for which no explicit attributes are available (undisclosed electricity). For example, if all RES-E were tracked explicitly based on GoO, while other electricity is implicitly tracked via the UCTE mix, RES-E attributes would be counted more than once: it would be represented by GoO and at the same time contribute to the UCTE mix. However, these problems could be avoided if the statistical data used for implicit tracking were corrected by all attributes that have been tracked explicitly (Lise *et al.* 2005).

3.5 Potential Synergies between Electricity Disclosure and Green Power Labelling in view of Electricity Tracking

As outlined above. both instruments discussed in this section need to apply some form of tracking mechanism in order to keep track of attributes associated with electricity generation. For that reason the following questions need to be addressed from the perspective of the tracking requirements within green power labelling schemes:

- Which shortfalls (in particular as regards to multiple counting) would occur when a green power labelling scheme would apply a completely different tracking mechanism as the one applied by the national disclosure scheme.
- To which extent could synergies (beneficial to a green power labelling scheme) be created by a thorough coordination with the tracking mechanism applied in the context of a national disclosure scheme? How could this coordination look like in order to create maximum compatibility?
- Which requirements (potentially restrictions) should be applied in the case of electricity imports into the scope of a green power labelling scheme? Here the tracking mechanism needs to be coordinated with the one applied by the disclosure scheme of the exporting country.

In the following sections the potential synergies are discussed following the different tracking categories applied in the context of Electricity Disclosure:

3.5.1 100% implicit tracking elements

Where a Member State bases its disclosure scheme exclusively on implicit tracking elements which are solely based on statistical data[31] the green power labelling scheme must use its own tracking mechanism which is operated independently from the disclosure tracking scheme. As outlined above, this is necessary as a reliable labelling scheme must be based on unambiguous links between generation and supply, allowing the clear identification of the power plants involved. Statistical data will not facilitate this form of identification.

However, as outlined by the following example, the establishment of a different tracking mechanism could lead to contradictory information presented to a customer. Imagine a green supplier offers only one product which is certified by a green power label. In this case the supplier's portfolio (basis for disclosure) would be identical to the product portfolio which is subject to the certification under the green power label. The product can then be sold under the label as the supplier can prove on the basis of his purchase contracts (which form the tracking basis in the scope of the green power labelling scheme) that he complies with the label criteria. On the other hand, the disclosure label would display a completely different fuel mix (e.g. the European UCTE mix) which contains fuel sources (e.g. nuclear or fossil fuels) which are not eligible under the label.

3.5.2 Mixture of explicit and implicit tracking elements

Several Member States will base their disclosure schemes on a mixture of explicit and implicit tracking elements. Explicit tracking elements might be all data on own generation (where a supplier operates own power plants), GoO for renewable electricity generation or RECS certificates for the same purpose. The remaining portfolio could then be assigned to some sort of averages such as the UCTE mix.

A green power labelling scheme operating in such a disclosure environment could be based on such a tracking mechanism as long as it ensures that all electricity eligible under the label is covered by the explicit elements of this tracking mechanism. However, it has be noted that in those cases where the implicit part of the tracking system is not corrected against the attributes which have been explicitly tracked, the disclosure system will not precisely mirror the overall national generation mix including corrections against cross border transfers due to multiple counting which will inevitably occur (see above).

3.5.3 100% explicit tracking elements

Synergies arise especially where Electricity Disclosure is based on an explicit tracking mechanism. In this case the tracking mechanism applied in the context of the disclosure

[31] This option describes more or less a theoretical option as most Member States will at least allow for some explicit tracking elements such as data on own generation or the GO for renewable electricity.

scheme would create the unambiguous links between generation and supply which are the prerequisite to exclude multiple counting. A green power labelling scheme which would base its auditing and verification procedures on the same mechanism would then benefit from this reliability provided by the disclosure system.

In this case, it would rather be the operation of a parallel tracking system (in the context of a green power label) which bears the risk of multiple counting. When for instance Electricity Disclosure is based on a system of tradable certificates whereas the labelling scheme applies contract based tracking, multiple counting of certain attributes will be unavoidable.

In this tracking category a different problem might arise. Several Member States which have decided to implement a full explicit tracking scheme will base this scheme on a central electronic registry, e.g. Austria. This central registry is created for the issuing, transfer, redemption and tracking of the respective attributes assigned to electricity generation. In most cases these registries will be operated and maintained by the regulator or the TSO. The registry holds various pieces of information which are confidential and not publicly accessible. Where a labelling scheme uses the same tracking mechanism as the disclosure system and this mechanism is based on such a registry, regulations need to be implemented allowing the auditors involved as well as the labelling body to receive all data required in the scope of the auditing and verification procedures (e.g. information about individual power plants involved).

3.5.4 Information content

As outlined above, even the more progressive tracking schemes which pursue explicit tracking elements, thus, going beyond the minimal compliance required by the Electricity Market Directive will not satisfy all information needs in the context of green power labelling. For instance, it can be expected that none of the disclosure tracking schemes will transfer information about the age of a power plant or the eligibility of a plant to public support. Moreover, it can be expected that none of the disclosure schemes will be designed to deliver information about a power plant's compliance with the eligibility criteria applied by a voluntary green power labelling scheme. For instance, Electricity Disclosure will not distinguish between electricity from biomass which originates from forestry operations with FSC certification and electricity from biomass grown without any quality certification. Whereas the first fuel category (FSC wood) might be eligible to a labelling scheme, the latter could be excluded.

This means that in most cases auditors of a labelling scheme need to collect additional data from the contributing power plant, this means that the tracking mechanism applied in the context of Electricity Disclosure can be of great benefit to a green power labelling scheme but will not completely replace all auditing needs to prove compliance.

3.5.5 Handling of imports

Handling of cross border trade is one of the key issues when developing a tracking scheme for the purpose of Electricity Disclosure. Problems occur especially when the interface between the tracking systems of the countries involved has not been designed

to be compatible. Insufficiently developed interfaces could either lead to a loss of information or even to multiple counting of specific attributes. The problems in the context of Electricity Disclosure arising from cross border trade have been discussed in detail in the research projects 4CE, E-Track, CIE, mentioned above. Shortfalls which are due to the incompatibility of different disclosure systems or their tracking schemes respectively will not be discussed any further in this section.

The handling of imports and the respective interaction to Electricity Disclosure is also important in the context of green power labelling schemes. Where the disclosure systems of the exporting and importing country are to a certain extent compatible, meaning that electricity attributes can be explicitly transferred across borders, both countries can be seen as one coherent disclosure region and comparable recommendations can be given as described above.

Where the compatibility of the disclosure tracking mechanisms is not given, even greater inaccuracies between the information provided by Electricity Disclosure and the green power labels might occur than at the purely national level. This would be the case when – in the context of green power labelling - attributes are explicitly transferred between countries, e.g. on the basis of contract based tracking whereas the respective disclosure systems assign certain default values, such as the UCTE mix, to all imports. If, for instance, a green supplier located in country B imports renewable electricity from country A he could market a certified green product provided the imported electricity complies with the criteria of the labelling scheme in country B. If, on the other hand, the disclosure system in country B does not allow the import of explicit attributes (in this case green attributes) but assigns the attributes of for example the UCTE mix to all imports, the disclosure label of the supplier would display something completely different, e.g. a different fuel mix, from what is communicated in the scope of the labelling process.

3.6 Conclusions and recommendations

Both Electricity Disclosure as well as green power labels aim to bring more transparency to the electricity market. Whereas Electricity Disclosure provides objective information about all suppliers' portfolios green power labels evaluate the quality of specific products against a set of criteria based on subjective preferences of the labelling organisations.

The introduction of Electricity Disclosure does not replace the need for green power labels. Whereas Electricity Disclosure provides some basic information about a supplier's electricity portfolio green power labels allow consumers to assess the environmental quality of a product, thus facilitating the choice of a product which creates additionality.

The main synergies between green power labels and Electricity Disclosure lie in the tracking mechanism which is required by both instruments. Green power labels need to apply an explicit tracking mechanism as only this tracking option ensures the creation of unambiguous links between generation and demand. An explicit tracking mechanism

is an indispensable prerequisite for the verification of product claims to exclude multiple counting of favourable electricity attributes, in particular, attributes associated to renewable electricity and thus for the credibility of a labelling scheme.

At least at the outset of implementation of disclosure requirements the information content provided by the disclosure tracking system (irrespective of it being an implicit or an explicit mechanism), will not cover all data required by most labelling schemes. This means that in most cases additional data have to be collected from contributing power plants in order to be able to assess compliance with all labelling criteria.

Recommendations to labelling bodies:

- Green power labels have to thoroughly coordinate their tracking mechanism with the one applied in the context of the corresponding national and neighbouring Electricity Disclosure schemes.
- Where a Member State bases its disclosure scheme exclusively on an implicit tracking system which only uses statistical data the green power labelling scheme must use its own tracking mechanism which is operated independently from the disclosure scheme.
- Where a Member State bases its disclosure scheme on a mixture of explicit and implicit tracking elements (e.g. explicit elements including data on own generation, RES-E covered by RECS or GoO, with remaining portfolio assigned to UCTE mix) the green power labelling scheme could use this mechanism as long as it is ensured that all electricity eligible for the label is covered by the explicit elements of the tracking mechanism.
- Where a Member State applies a comprehensive explicit tracking mechanism the green power labelling scheme should base its verification scheme on the same mechanism.

Recommendations to policy makers:

- As long as several Member States allow implicit tracking elements to be applied in the context of Electricity Disclosure it must be expected that in individual cases the two instruments will deliver confusing and in the worst case contradictory information.
- Furthermore, other policies, such as support schemes for renewable electricity, beside Electricity Disclosure and green power labels require a mechanism to track electricity attributes. In the long term, the different tracking mechanisms should be fully integrated allowing only one tracking scheme facilitating all different purposes.

4 Interactions with Guarantees of Origin (GoO)

Green labels interact with numerous energy policies, in particular those directed directly at renewable energy sources and other "attractive" energy sources. Guarantees of Origin (GoO) have been introduced for both renewable energy sources and for high-efficiency combined heat and power (CHP) installations. This chapter explores in detail the interaction between these GoO and green labels, first focussing on GoO for renewables which have been in existence longer than GoO for cogeneration.

4.1 GoO for RES-E

4.1.1 Brief introduction to GoO for RES-E

The key objectives for EU energy policy are threefold: improved competitiveness, security of supply and the protection of the environment.[32] Therefore the different Directives on energy, although focusing on different specific objectives, each at least take into account all three of these key objectives.[33]

The Renewable Electricity Directive was agreed in 2001[34]. This Directive requires MS to encourage consumption of renewable energy, setting national indicative targets for electricity consumption from renewables by 2010 for every MS. The Renewable Electricity Directive does not prescribe a particular support system; it is up to every MS to decide on a certain support mechanism.

Besides the indicative targets, the Renewable Electricity Directive introduced the concept of a 'Guarantee of Origin' for renewable energy,.MS have been required to have legislation in place by 27 October 2003, which establishes a system enabling producers of electritity from renewable energy sources to obtain, on request, a Renewable Energy Guarantee of Origin (GoO for RES-E) for electricity produced from their plant, as proof that the electricity they sell is effectively produced from renewable energy sources. [35] MS are required to recognise GoO for RES-E from other EU countries.

4.1.1.1 Renewable Electricity Directive Article 5: definition of GoO for RES-E

The Renewable Electricity Directive does not give a literal definition of Guarantees of Origin. However, it says that GoO should be mutually recognised as providing proof of the energy source, specifying date and place of production (and capacity in case of hydro), and enable producers to demonstrate that the electricity they sell is RES-E. The purpose of GoO is to facilitate trade in RES-E and increase transparency, especially towards energy suppliers, and finally towards end consumers.

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[32] European Commission, White paper, An Energy Policy for the European Union, COM(95)682, Brussels, 13 December 1995.

[33] For a more detailed discussion about the context of energy policy in Europe, see for example Christiaan Vrolijk (ed), 'Climate Change and Power: Economic Instruments for European Electricity', London: RIIA/Earthscan, May 2002.

[34] Directive 2001/77/EC of the European Parliament and of the Council of 27 September 2001 on the promotion of electricity produced from renewable energy sources in the internal electricity market.

[35] Member States from the 10 New Member States have only been bound from their Accession date.

However, it must be made clear – and this is further discussed below[36] – that while the use of RES-E may be one of the ways to reduce emissions, GoO do not contain any greenhouse gas emissions benefits, as this would automatically lead to multiple counting.[37]

Greenhouse gas emissions are defined in, and captured by the EU Emissions Trading Scheme, a harmonised EU-wide system. Indeed, the RE-GO project analysed a number of possible permutations for the definition of GoO, in particular with regards to the inclusion of the 'attributes' of RES-E generation. The preferred definition, aiding utilisation of GoO and reducing the possibilities for multiple counting, is: "GoO 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". Under this definition, therefore, there are no other forms of proof of RES-E generation.

Article 5 of the Renewable Electricity Directive requires that Member States ensure that a GoO is issued on request in respect of electricity generated from eligible renewable energy sources, as defined by the Renewable Electricity 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 require that Guarantees of Origin:

- specify the energy source(s) from which the electricity was generated, the dates and place of production, and in the case of hydro-electricity, 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; and
- should be mutually recognised by Member States, and any refusal to recognise them should be based on objective, transparent and non-discriminatory criteria.

Further details are left to the discretion of Member States.

Text of Article 5 of the Renewable Electricity Directive, Guarantee of Origin of electricity produced from renewable energy sources

1. *Member States shall, not later than 27 October 2003, ensure that the origin of electricity produced from renewable energy sources can be guaranteed as such within the meaning of this Directive according to objective, transparent and non-discriminatory criteria laid down by each Member State. They shall ensure that a Guarantee of Origin is issued to this effect in response to a request.*
2. *Member States may designate one or more competent bodies, independent of generation and distribution activities, to supervise the issue of such Guarantees of Origin.*
3. *A Guarantee of Origin shall:*

[36] See Chapter 6: Interaction with Emission Trading

[37] See van der Linden *et al.* (2004).

- *specify the energy source from which the electricity was produced, specifying the dates and places of production, and in the case of hydroelectric installations, indicate the capacity;*
- *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.*

4. *Such Guarantees of Origin, issued according to paragraph 2, should be mutually recognised by the Member States, exclusively as proof of the elements referred to in paragraph 3. Any refusal to recognise a Guarantee of Origin as such proof, in particular for reasons relating to the prevention of fraud, must be based on objective, transparent and non-discriminatory criteria. In the event of refusal to recognise a Guarantee of Origin, the Commission may compel the refusing party to recognise it, particularly with regard to objective, transparent and non-discriminatory criteria on which such recognition is based.*
5. *Member States or the competent bodies shall put in place appropriate mechanisms to ensure that Guarantees of Origin are both accurate and reliable and they shall outline in the report referred to in Article 3(3) the measures taken to ensure the reliability of the guarantee system.*
6. *After having consulted the Member States, the Commission shall, in the report referred to in Article 8, consider the form and methods that Member States could follow in order to guarantee the origin of electricity produced from renewable energy sources. If necessary, the Commission shall propose to the European Parliament and the Council the adoption of common rules in this respect.*

4.1.1.2 Renewable Electricity Directive: definition of renewable energy

The definition of renewable energy sources is set out in Article 2 of the Renewable Electricity 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)"*. With regards to GoO, GoO are issued for electricity generated from renewable energy sources.

4.1.2 Uses for GoO for RES-E as a green electricity label

The Renewable Electricity Directive and other regulations and documents hint at interactions between GoO and other (renewable) energy policies. Primarily the Directive requires MS to recognise Guarantees of Origin (GoO) as the exclusive proof that the underlying electricity was produced from renewable energy sources. In this respect, GoO may be used for a number of different applications, ranging from claiming a feed-in tariff, supporting Electricity Disclosure and as a useful tool for tracking attributes from renewable electricity. These applications are in line with the objective of GoO as stated in the Renewable Electricity Directive, ‘to facilitate trade in electricity produced

from renewable energy sources and to increase transparency for the consumer's choice'[38].

Three separate, but inter-related main uses for GoO have been identified:

1. Proof of generation of RES-E for any *financial support mechanism* for the market players, including feed-in tariff systems, quota obligations and tax exemptions.
2. Proof of RES-E generation for the purpose of the *MS indicative targets*.
3. Proof of RES-E generation for any *reporting requirements to end consumers*, in particular Electricity Disclosure and green electricity quality labels.

A Guarantee of Origin is thus potentially a very useful policy tool, which could facilitate a host of energy policies, including voluntary green electricity quality labels. There are a number of attractive features to GoO with regards to quality labels:

- First, the information included in a GoO specifies the energy source, date and place of production, and in the case of hydro also the capacity of the plant. GoO, therefore, can assist in the determination of eligibility for a green label. Each of these specific elements of information are "objective data". However, green labels generally need additional information to assess eligibility (e.g. commissioning date of a power plant, specific environmental plant criteria,…).
- Secondly, in order to gain or retain consumer confidence in the market and to secure the credibility of green label product claims green suppliers or labelling bodies must establish tracking schemes in order to facilitate proof of compliance. GoO is able to fulfil this role, because the system must already be in place in each MS in accordance with the Renewable Electricity Directive although it is voluntary.
- Thirdly, despite the fact that GoO formats and systems are not the same across Europe, the minimum information contained is harmonised.

GoO has been introduced to serve as exclusive proof for generation of renewable electricity. It would be perverse if quality labels would not utilise this proof to facilitate labelling and a refusal to do so would probably lead to double counting. However, green labels may have a requirement for a number of additional information elements, which is outside the scope of GoO and may have to be tracked separately, and GoO are issued after RES-E production has taken place, while green labels also cover future generation in which case GoO may only be used as proof post-hoc. Most labels which have ex-ante elements (e.g. where a labelled supplier can use a label before the relevant compliance assessment has taken place) always require an ex-post assessment in which the GoO could be included.

4.1.2.1 Tracking requirements for a green electricity quality label

A fundamental prerequisite of an electricity label is that there is a way to create unambiguous links between power plants and electricity sold to final consumers. These links are used to transfer information about power generation attributes to electricity suppli-

[38] EC Directive 2001/77/EC.

ers and finally to consumers. The transferred information is aggregated, displayed, explained and verified by the Issuing Body on the labels. In an ex-post scheme, the tracking system generates the information to be displayed to consumers as an average of a previous period (e.g. one calendar year). An ex-ante scheme may use forward contracts, generation portfolio ownership or the good name of the supplier based on historic track record with ex-post verification to present a green tariff with a label.

The physical flow is the most evident means to assign the electricity characteristics to the supplied electricity, but in practical terms it is impossible to create the link between the generation of an individual power plant and the final consumer, as generally there is no way of distinguishing 'brown', 'green' or any other electricity. Statistical averages offer another possibility, but they are likely to be insufficiently detailed or accurate for these purposes.

The above suggests that only explicit tracking schemes present a meaningful result for tracking purposes. By means of such a tracking scheme it would be possible to assign generation attributes of a specific power plant to specific suppliers and final consumers.[39]

4.1.2.2 Tracking with GoO

The information included in a GoO specifies the energy source, date and place of production, and in the case of hydro also the capacity of the plant. Additionally, the place of generation indicated on the GoO may help with the statistics on the share of electricity supplied imported. While GoO can thus be a very useful tool to give information on the electricity supplied, GoO are currently only issued for renewable electricity and thus only cover a small share of the total European market. However, more important than the coverage is whether the system design for GoO is appropriate for the purpose of green power labelling and Electricity Disclosure. In the case of minimum compliance implementation of GoO, this may indeed not be the case. An integrated implementation, however, is likely to cover all requirements and form the perfect basis for an Electricity Disclosure system, which in turn would allow the use for green labels (van der Linden *et al.* 2004).

Guarantees of Origin can thus enable the tracking of electricity attributes in the free market for electricity. In the present situation, GoO can be used to derive the information for a variety of policy instruments. However, for some of these policies other 'proofs' of RES-E may already exist, in particular proofs such as tradable certificates, and interactions need to be defined in order to rule out multiple counting.

GoO can facilitate the implementation of green power labelling. If it is decided that GoO are to be used as proof of RES-E for electricity labels and provided there is a reliable GoO scheme, it should be clarified that no other proof, such as tradable green certificates, would be allowed (in order to avoid multiple counting).

[39] See also Chapter 3: Interaction with Electricity Disclosure

If the green electricity labelling system is based on ‘certificates’, they can be traded separately from the electricity in country and cross-border. Green electricity can be bundled with the related Certificate/GoO if required by a labelling body.

In the longer term, Electricity Disclosure systems that are harmonised across (regions of) Europe would better track and verify the trade and supply of electricity. Similarly, labelling systems based on such disclosure systems using GoO would be improved. Extending GoO to all electricity sources would be a further 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 GoO, then all electricity traded across borders could also be bundled with a GoO. 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, green electricity quality labels will need to work efficiently in parallel with Electricity Disclosure, indicative targets, etc. Electricity Disclosure, green electricity sales, quality labels and indicative targets should all tally, so that consumers have a clear picture of what they are buying.

4.1.3 Support for green electricity labelling

As described above, GoO are well suited to support green labelling as proof of RES-E generation, mainly through the application of GoO for Electricity Disclosure for green electricity. However, a number of potential problematic issues exist, in particular the possibility of double counting.

4.1.3.1 Issues to investigate

The information contained within GoO could be used as proof of generation in helping to determine whether a label should be provided to the respective electricity product. Through the GoO issuing bodies, information about the type of generation will already be collected and verified by an independent body. In some countries the GoO may include additional information on whether feed-in tariffs or subsidies have been received, which may also be required by green electricity quality labels. However, not all information that is required for the quality labels currently in use throughout Europe can be derived from GoO. The interaction of existing labels with GoO is described in the CLEAN-E Work Package 1 report.

- **Renewable energy sources**

GoO may be issued for all electricity generated from renewable energy sources as defined in the Renewable Electricity Directive. Some labelling bodies may only issue quality labels for a subset of these renewable energy sources as defined in the Directive, for example, only allowing ‘clean’ biomass or small hydro. While GoO will specify the energy source, it may not always be specific enough for the labelling body which then will have to investigate further. Additionally, some labels may also include some sources which would not receive GoO.

- **New plant**

A GoO will specify the date and place of production. However, it will not necessarily add the age of the plant or the date of commissioning, so some additional research by the labelling body may be needed.

- **Imports**

Imports can easily be traced using GoO, as it will specify the place of production. However, GoO systems being implemented across Europe may not always allow for cross-border transfers.

- **Contribution/consumption based product**

The labelling body will have to determine the contribution or consumption basis of the green product through other means.

- **Publicly funded plant**

Some countries may implement their GoO system in such a way as to incorporate attributes such as public funding (e.g. feed-in tariffs). However, this would be a voluntary addition and is not harmonised throughout the EU.

- **Energy balancing period**

Most labels require an energy balancing period of one year. Whatever the period, this could be assisted by the date of generation indicated on the GoO, although this may also indicate a period that spans more than one balancing period if they are short, or over a calendar year.

- **Special conditions**

Special conditions that need to be met by the electricity before a green label is issued are likely to be of an additional nature, thus not lending itself to inclusion on the GoO. However, it is likely that many countries will include various earmarks such as an indication of whether support has been received, where it may be counted towards the national targets etc.

4.1.3.2 Possibilities for multiple counting to occur due to interactions between policy instruments

A potential problem could arise if GoO are issued as separate certificates in parallel with existing tracking systems or certificate schemes, such as the Renewables Obligation Certificates (ROCs) in the UK. This could lead to multiple counting of renewable electricity depending on the definitions of these schemes, for example if both ROC and GoO, issued for the same unique quantity of RES-E, are used for compliance with the labelling requirements. Indeed, if green electricity quality labels do not utilise GoO as proof and earmark them upon use, this problem may be exacerbated as the GoO could be used by others as proof of green supply. It will be essential that only one method and only one type of certificate (e.g. GoO) is used for tracking electricity attributes in order to eliminate this problem, or that regulations have been established which ensure well-organised coexistence.

GoO may be able to play a larger role for electricity labels once they are in place in all Member States. GoO are likely to be the primary source for validating the renewable energy source or technology, imports and the data and place of generation.[40] While the GoO and quality labelling systems have different purposes, some small changes may lead to improved interactions. A number of recommendations on how the GoO and labelling systems can be designed to facilitate each other, and to avoid system shortfalls such as multiple counting are given below:

- As the GoO already indicates a significant amount of information (e.g. the source, place and date of production) per installation, it is only a small step to include the date (year) of commissioning of the plant.[41] This extra information is essential for quality labels to identify a 'new' plant.
- To facilitate the additionality requirement for some labelling systems, earmarks may be included in the GoO system indicating whether the plant has received subsidies, feed-in tariffs or support within the scope of obligation schemes.
- When using the GoO as the basis for a quality label, it is recommended for the labelling body to require redemption of such GoO after use, so as to guarantee no multiple counting takes place.

To increase clarity, GoO should be considered the primary proof of RES-E generation for all potential applications. For example, if a TREC system exists in parallel to GoO, GoO is considered the primary proof, or at least the GoO will need to indicate that TRECs have been issued for the same electricity generation and therefore the TREC and the GoO will not be used for the same purpose. When earmarks on GoO are introduced a) to indicate provided financial support, b) to demonstrate whether GoO can be used for the MS's indicative targets and c) to establish a system for Electricity Disclosure purposes, this results in a threefold GoO, meaning that these three distinctive attributes can be used for three different purposes, each of which may have a value. The question arises whether the introduction of three separate GoO for three purposes, is the best approach. It is clear that, to avoid multiple counting, the different attributes need to be unfolded. On the other hand, removing any link between the applications may cause inconsistencies and confusion for consumers.

The issue was further elaborated upon within the E-TRACK project, which aims at the administration and allocation of power generation attributes. In short, it was concluded that the issue of multiple counting can be addressed by clearly distinguishing the explicitly tracked attributes (explicit tracking implies the use of contracts or certificates by which the attributes can be allocated to the generation) from implicit tracking (implicit tracking relies on statistical averages, and basically accounts for the remaining generation that is not explicitly tracked, the so called residual mix). Multiple counting can

[40] However, there may be some additional criteria set by the labelling bodies for which the information may not be included on the GoO. Such additional information could include special environmental criteria for hydro plant, or the source of biomass fuel.

[41] However date of commissioning needs to be clearly defined in the case of refurbishments or repowering.

only be avoided by correcting the statistical data for those generation attributes that have been explicitly tracked.[42]

A few attempts have been carried out to actually address the issue of multiple applications for GoO and the risk of multiple counting. The European Energy Certificate System (EECS) is provides a standard for the use and transfer of GoO, as a kind of umbrella surmounting the different ways in which the GoO is currently used in different MS. The EECS standard is developed by the Association of Issuing Bodies (AIB) to manage the RECS system.[43] In a so called multi-certificate approach it is argued that, since a GoO might be used for different purposes (e.g. disclosure, public support, target contribution), therefore different redemption methodologies might be necessary (redemption against different purposes).[44] In such a system each MWh RES-E would be eligible for three different types of certificates (one for support, one for target contribution and one for disclosure). The idea is that all three certificates can be (but do not necessarily have to be) traded separately. The main advantage of this approach is a flexible model allowing the integration of all types of certificates.

Finally, the alignment of the GoO system with other policies, for example with regards to vintages, accreditation and verification requirements, definitions of RES-E categories, etc. would improve the role of GoO in facilitating these other policies, reduce duplication of efforts and systems, and therefore reduce overall costs.

4.1.4 Conclusions

Recommendations to labelling bodies:

- In order to avoid double counting (by double use of a GoO) labelling bodies need the mandatory redemption of the GoO. Therefore labelling bodies should ask for the respective redemption statements of the GoO, in the case where a registry and a formal redemption procedure are in place. Where no formal redemption procedure exists GoO should directly be submitted to the labelling body.

Recommendations to policy makers:

- GoO should be considered the primary proof of RES-E generation for all potential applications.
- Align the content and general design (e.g. balancing period) of the GoO to the needs of green power labels.
- Redemption statements should clearly indicate the purpose for redemption (e.g. redemption for product x).
- Adopt EECS compatible systems

[42] See E-TRACK www.e-track-project.org

[43] See chapter 5: Interaction with RECS

[44] Personal communication with AIB

4.2 GoO for electricity from high-efficiency cogeneration

4.2.1 Brief introduction to CHP-GoO

In "Doing More with Less", the recent Green Paper by the European Commission on Energy Efficiency[45], potential savings achieved by cogeneration are estimated to be between 40 and 60 Mtoe in 2020. An in-depth analysis of the possible role of CHP in green labelling are presented in the WP3 reports about energy efficiency and renewable heat inclusion in green labelling schemes.

The Member States have to implement the Directive 2004/8/EC on the promotion of high-efficiency cogeneration[46] by February 2006. The CHP Directive introduces the Guarantee of Origin of electricity from high-efficiency cogeneration. High-efficiency cogeneration is defined by the following criteria:

- cogeneration production from cogeneration units shall provide primary energy savings of at least 10 % compared with the references for separate production of heat and electricity[47],
- production from small scale and micro cogeneration units providing primary energy savings may qualify as high-efficiency cogeneration.

According to the Directive, a CHP Guarantee of Origin (CHP-GoO) shall specify:

- the lower calorific value of the fuel source from which the electricity was produced
- the use of the heat generated together with the electricity (the use of the heat output for different purposes requires different temperature, and influences efficiencies of the cogeneration: based on these reasons cogeneration could be divided into classes such as ‘industrial cogeneration’, ‘heating cogeneration’ and ‘agricultural cogeneration’)
- the dates and places of production
- the quantity of electricity from high efficiency cogeneration that the guarantee represents
- the primary energy savings based on harmonised efficiency reference values established by the Commission.

Member States may include additional information on the Guarantee of Origin. In any case, such Guarantees of Origin should be mutually recognised by the Member States.

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45 COM(2005) 265 final of 22 June 2005

46 Directive 2004/8/EC of the European Parliament and of the Council of 11 February 2004 on the promotion of cogeneration based on a useful heat demand in the internal energy market and amending Directive 92/42/EEC

47 As stated in article 4 Article 4 (Efficiency criteria of cogeneration) "(…) the Commission shall, (…) not later than 21 February 2006, establish harmonised efficiency reference values for separate production of electricity and heat. These harmonised efficiency reference values shall consist of a matrix of values differentiated by relevant factors, including year of construction and types of fuel, (…)."

The integration of the CHP-GoO and the RES-E GoO schemes would appear as a logical policy option, but the Directive does not include any requirement about this issue. In particular, for electricity produced in a CHP plant with renewable fuel input (e.g. a biomass CHP plant), RES-E GoO can already be issued. However, it seems that the Directive presents the CHP-GoO for such plants as a separate GoO (relating to the same volume of underlying electricity) rather than one single GoO, qualifying for both the RES-E GoO and the CHP-GoO schemes.

Integration could mean either one bundled GoO for both RES-E and CHP, either a system clearly outlining which attributes are covered by RES-E GoO and CHP-GoO respectively.

The preliminary information collected on the state of the implementation in various member states show that in seven countries (Bulgaria, Cyprus, Czech Republic, Finland, Netherlands, Romania and Slovenia) plus Wallonia CHP-GoO is integrated in the RES-E GoO scheme, although details may differ between CHP and RES-E[48].

4.2.2 Uses for CHP GoO as a green electricity label

In order to identify the possible uses for CHP-GoO as a green electricity label, we investigate how CHP is currently included under different labels.

According to the Eugene Standard Technical Document, non-RES CHP is eligible (up to a maximum limit of 50%) for any consumption-based green electricity product, provided that:

- Fuel adopted is only natural gas
- Only that part of electricity generation from natural gas-fuelled cogeneration is eligible, which is related to maximum heat production ("back pressure" operation).
- If cogeneration plants can operate in condensing mode, only that part of their generation is eligible which corresponds to the power-to-heat ratio of back-pressure operation.
- The cogeneration part shall have an energy conversion efficiency of at least 85% over the average of the year.
- The eligible cogeneration plant should display air emissions quality criteria regarding the following pollutants: Carbon monoxide, Nitrogen oxide, Sulphur dioxide and Non-Methane Volatile Organic Compounds

The following national labels accept non-RES CHP production as eligible:

- Norppa ecolabel (Finland)
- ok-power (the share of electricity from CHP plants may not exceed 50%, is restricted to gas-fired plants, must derive from the CHP mode and needs to comply with specific emission limits)

[48] Existing Tracking Schemes for Electricity Generation Attributes in Europe - E-TRACK (2006) – http://www.e-track-project.org/

- Technischer Überwachungsverein TÜV UE01/UE02 (allows electricity from fossil fired CHP to contribute to a maximum of 50%, the respective power plants are required to exceed annual efficiency factors of 70%)

It appears clearly that the most important information needed for the eligibility of CHP in a green labelling scheme is:

- Fuel type
- Energy conversion efficiency
- Emission quality limits

While the first two pieces of information can be derived (at least indirectly) from the CHP GO, no information on the quality of the emission is provided by this document.

4.2.3 The CHP-GoO Implementing process

In the following we consider other possible issues to be considered in implementing CHP-GoO schemes that may have effect on the possible integration in green labelling schemes. Most of the issues are similar to those highlighted for RES-E GoO.

- **Fuel type**

The CHP-GoO must specify the lower calorific value of the fuel source from which the electricity was produced. From this information it should be easy to know what is the fuel that is used. It would be advisable that Member States explicitly include information on the fuel type in the national implementation of CHP-GoO.

- **Energy conversion efficiency - CO_2 reduction**

Emission reductions can be determined only when a baseline is defined. The baseline can be linked to the efficiency reference values for separate production of electricity and heat that the Commission shall establish not later than 21 February 2006. Until then only general comments can be made.

The CHP-GoO must specify the primary energy savings based on harmonised efficiency reference values established by the Commission. From this information it should be easy to calculate what the actual efficiency of the plant is. It would be advisable that Member States explicitly include information on the actual efficiency in the national implementation of CHP-GoO.

- **New plant**

As for the RES-E GoO, a CHP-GoO will specify the date and place of production which will help to identify the production site and possibly to establish whether this has been produced by a ‘new plant’. However, it will not necessarily add the age of the plant (in particular the date a plant started to operate), so some additional research by the labelling body will be needed.

- **Imports**

Imports can easily be traced using CHP-GoO, as it will specify the place of production. CHP GoO should be mutually recognised by the Member States, thus facilitating import.

- **Publicly funded plant**

The CHP Directive does not oblige Member States to incorporate in the CHP-GoO attributes such as public funding (e.g. through a bonus system for specific CHP plants). This would be a voluntary addition and would not be harmonised throughout the EU.

- **Energy balancing period**

The date of generation indicated on the CHP-GoO could assist the balancing, of labels that generally require an energy balancing period of one year.

- **Special conditions**

In order to assure that the introduction of CHP-GoO effectively facilitates the labelling of CHP for green products the Guarantees of Origin should explicitly include at least:

- Fuel type
- Energy conversion efficiency
- Emission quality performance

None of these requirements is explicitly excluded by the CHP Directive, while Member States may include additional information on the Guarantee of Origin. Therefore the inclusion of these information should be encouraged during the phase of national implementation of the Directive.

4.2.3.1 Possibilities for multiple counting to occur due to interactions between policy instruments

If a CHP generation plant is based on biomass, then double counting can incur in that a plant owner has the legal right to be issued with both a GoO for RES production and a GoO for CHP production for the same unit of electricity generated.

Moreover multi counting can take place due to the multi issuing of GoO by different auditors, or due to the lack of redemption once the GoO has been used.

4.2.3.2 Recommendations on how to avoid multiple counting

A central registry tracking both RES-E GoO and CHP-GoO can prevent double counting: it should indicate whether Guarantees of Origin for both RES and CHP have been issued for the same quantity of kWh produced.

An alternative would be the use of GoO with earmarking indicating which types of GoO it represents and what the status is (used / not used).

Recommendations to labelling bodies:

Similar to the recommendations concerning RES-E GoO and in order to avoid double counting, redemption statements for all applications that are covered by the GoO have to be mandatorily submitted. Therefore labelling bodies should ask for the submission

of the GoO or (in case of a registry) of the respective redemption statements. Where no formal redemption procedure exists GoO should directly be submitted to the labelling body.

Recommendations to policy makers:

As already seen, the CHP-Directive leaves room to the different Member States in the implementing process so that they can better adapt the GoO requirements to the specific national situation. In order to become compatible to the requirements of green power labels MS should include in the GoO all the information regarding:

- the fuel type;
- the actual Energy conversion efficiency of the plants;
- age of the plant;
- public funding, where applicable;
- emission quality performance.

Furthermore, MS should be encouraged to integrate the CHP GoO and the RES-E GoO schemes, although the CHP Directive does not include any requirement about this issue.

5 Interaction with RECS

Renewable Energy Certificates, also called Green Certificates, are an instrument to track the origin of a certain amount of electricity derived from renewable sources. In recent years in Europe a common platform has been developed by the Association of Issuing Bodies (AIB), an independent not-for-profit association. The RECS standard seems to be accepted on a European basis, and since the Eugene standard allows cross border trade of RES-E mainly the actual relationship between green labels and RECS and its possible development will be discussed.

5.1 The Renewable Energy Certificate System - RECS

The "Renewable Energy Certificate System" (RECS) is a voluntary trading system which aims to provide "a cost effective and reliable certificate system for renewable energy in Europe". The AIB advocates the creation of standard certificates as evidence of the production of renewable energy, and provides a methodology for trading or otherwise using the certificates separately from the associated physical energy. This enables a market for renewable energy to be created, so prompting the development of new renewable energy capacity in Europe. The AIB has produced a set of system rules which can be applied to individual systems in order to harmonise and thereby facilitate trade between systems.[49] From early 2001 to the end of 2002, RECS International tested the concept, determining the physical implementation of the system and building integrated computerised registries for certificates. The results of the "RECS Test Phase", far exceeded the initial goals of the promoters, and in their opinion "provided concrete proof to national governments that it is both possible - and desirable - to open their markets to foreign certificates". The RECS Test Phase has tested the three major processes of RECS certificates (issue, trade and redemption), and proved once and for all that the main functions of the Renewable Energy Certificate System are operable, robust, self-correcting, transparent and reliable.

- **Countries -** Of 25 European countries, 15 are now active: most offer RECS certificates, and 7 currently offer internationally transferrable renewable energy guarantees of origin (RES-GO). In the coming months, it is anticipated that up to 7 countries will commence issuing guarantees of origin for cogeneration (CHP-GO).
- **Participants** - Of more than 100 members of RECS International, 70+ are actively trading - and others are joining all the time.
- **Certificates** - As of May 2006, 135 million 1MWh certificates have been issued, of which 75 million have already been used to guarantee to consumers the origin of the renewable energy they have purchased.

RECS enables many types of support schemes, rather than being a support scheme itself, and is not restricted by national boundaries. RECS provides a mechanism for representing a specific instance of the production of a megawatt hour of renewable electric-

[49] www.recs.org is the official website of the Renewable Energy Certificate System.

ity by a unique certificate which can be transferred from owner to owner before being used as proof of generation, or exchanged for financial support.

To ensure that national systems are harmonised, built to the same standards and compatible with each other, RECS members have developed and adopted a set of rules: the Principles and Rules of Operation (PRO), formerly called the Basic Commitment[50].

RECS is administered within each geographical area by an Issuing Body, which is unique to this area and independent of other members of RECS. All Issuing Bodies are members of AIB, which guarantees the compatibility and adherence to the PRO of the various national certificate systems. In addition, the commercial operations of each Issuing Body are subject to peer review by the AIB.

The life cycle of RECS certificate is as follows:

1. **Issue**: A RECS certificate is issued for, and uniquely relates to, a specific instance of the production of a standard quantity - one megawatt hour - of renewable electricity.
2. **Transfer**: Each RECS certificate is registered as belonging to a single party at each point in its life, and this is updated accordingly after each transfer of ownership.
3. **Redemption**: RECS certificates are redeemed when they are "used" - this is normally at the point when the associated energy is consumed.

5.2 RECS interaction with other instruments

RECS could principally be used to enable many types of support schemes, whether voluntary (green energy and green label schemes) or obligatory (such as portfolio standards and feed in systems), and could provide a means of supporting Guarantees of Origin and international trade in renewable benefit. RECS certificates uniquely identify each unit of energy generated by a renewable power station, and could therefore link each certificate to the appropriate public support schemes.

5.2.1 Voluntary green energy schemes

In many countries in Europe, energy companies are supplying "green" energy. In doing so, the supplier promises the consumer that the amount of electricity consumed is the same as that generated by a renewable source in a certain period (consumption and generation don't necessarily need to be simultaneous). This enables RECS to facilitate green energy schemes:

Green suppliers can redeem RECS certificates to prove that the energy supplied to consumers comes from a renewable source; and it can be demonstrated that the total amount of green energy sold is the same as that purchased (as evidenced by redeemed RECS certificates); this can be independently verified.

[50] Although PRO replaced the Basic Commitment, both names are still used and to be considered interchangeable, the Basic Commitments being “The Principles and Rules of Operation of Members of the Association of Issuing Bodies for The European Energy Certification System.”

5.2.2 Labelling green energy

RECS certificates are a standardised auditing tool. They specify that a given quantity of renewable energy has been produced by a given source, in a given period. These proofs of origin may be traded.

A green power label guarantees the environmental quality of a certain green electricity product. In this respect a label should provide an assured and trusted means of stimulating the development of clean and renewable energy and contributing to sustainable development. RECS certificates however neither guarantee that the power plants which they represent fulfil all criteria applied by a green power label (e.g. specific eligibility criteria for hydropower), nor that the respective RES-E installations contribute to the additionality requirements relevant in the scope of a label. In this regard RECS does not represent a system which facilitates the operation of or even replaces the need for green power quality seals.

Additionality and eligibility issues are discussed in detail in the following paragraphs.

5.3 The RECS Principles and Rules of Operation

The Principles and Rules of Operation (PRO) are to be seen as the minimum common set of definitions and criteria for the creation, issue, transfer and use as evidence of transfer of ownership and eventually removal from the market of RECS Certificates. The PRO is set, amended or added by the Association of Issuing Bodies following a consultation procedure in which the interests of Participating RECS Members are duly regarded. The following information derives from the latest available release[51].

5.3.1 Eligible renewable energy sources and technologies

Renewable Energy shall comprise all energy excluding fossil and nuclear fuels and electrical energy derived from these sources. Reference shall be made exclusively to renewable energy sources and generation technologies included in the following table.

[51] Release no. 2.2 issued on July 2004

Table 5: Specification of renewable energy sources and generation technologies applied by RECS

Source	**Technology**	**Type**
Wind	Wind turbine	Onshore
		Offshore
Solar	Photovoltaic	
	Thermal	
Energy from water	Hydro power	
	Tidal energy	Onshore
		Offshore
	Wave energy	Onshore
		Offshore
Geothermal		
Biomass, using gasification and non-gasification technologies	Energy crops	
	Forestry and agricultural by-products and waste	
	Biogas	Landfill gas
		Sewage gas
		Other
	Energy from by-products and waste (with varying levels of filtration)	Municipal solid waste
		Industrial by-products and commercial waste

RECS does not make any distinction between plants with different environmental impact, once it is proved that they generate electricity from renewable sources.

5.3.2 Declarations and verification

Different actors of the RECS system have different roles.

Each RES-E Generator in order to receive RECS Certificates for a Production Device shall present a Renewable Energy Declaration to the Issuing Body responsible. A Renewable Energy Declaration shall state that the installation fulfils the criteria set out in the PRO and the relevant Domain Protocol. The Renewable Energy Declaration must have a period of validity no longer than 5 years, after which time it must be resubmitted. The generator shall periodically confirm that the claimed RES-E production is reflected in the physical meter reading.

A Renewable Energy Declaration shall include, among others, the following information regarding the Production Device:

1. The date of commissioning;

2. All possible sources of fuel to be converted into electrical energy by this Production Device, whether or not this is renewable;
3. The type of generation technology in place;
4. Any schemes associated with any Public Support that are or have been received, together with an indication as to whether they are currently being received;

The RES-E Generator shall inform the Issuing Body prior to planned changes rendering the statements made in the Renewable Energy Declaration inaccurate. This procedure must be fulfilled also when changes to any Public Support received occur.

Each Issuing Body shall be responsible for:

1. Performing ad hoc checks on Registered Production Devices to ensure that the corresponding Renewable Energy Declaration correctly reflects the current state of the Production Device and to confirm that RECS criteria set down in the PRO and the relevant Domain Protocol are being observed;
2. Ensuring that the claimed RES-E production has actually taken place and that any Public Support is recorded.; and
3. Assuring the validity of Renewable Energy Declarations, claimed RES-E production, registration of transfers of ownership and Redemption of RECS Certificates; and for ensuring that the associated procedures are robust, effective, efficient and adequate.

In most cases, inspections will be required only at the time of renewing the Renewable Energy Declaration or if changes to the configuration of the plant are material. Thus, all renewable energy generators would be subject to an inspection if the Issuing Body considers this appropriate. The Issuing Body will issue certificates once it has received a Production Declaration for the production device. In the case of biomass the Declaration will include a Consumption Declaration.

All plant will be subject to an Audit of appropriate data at least once during the lifetime of its Renewable Energy Declaration and in the case of Biomass plant the Audit would be each year.

The Association of Issuing Bodies may take such action as it considers necessary, when a participating RECS member does not observe the requirements of the PRO, as presented in this paragraph.

5.3.3 Issuing

The net electrical energy generation is the gross production minus demand of any generating auxiliaries and minus losses in the main generator transformers on the site of the Production Device. Meter data normally are collected by the organisation which is responsible for collecting meter data on the public grid. For every 1000 kWh of produced renewable energy, a RECS certificate is issued.

Only one Issuing Body shall issue RECS Certificates in any single Domain. Issuing Bodies may not at any time hold rights or title to RECS Certificates, nor may any body

holding title to RECS Certificates be a subsidiary, parent or related undertaking or operate as or have any controlling financial interest in any Issuing Body, unless they can prove to the satisfaction of the RECS Association of Issuing Bodies that their owners cannot materially affect the decisions of the Issuing Body.

The Issuing Body shall issue to that RES-E Generator such certificates as are supported by evidence of generation by that Production Device of a corresponding amount of electricity from renewable sources, as evidenced by appropriate meter readings and statements of the proportion of electricity which has been generated from renewable sources. This proportion will be calculated by reference to the energy content of the renewable and non-renewable fuels in the form of a Production Declaration.

A RECS Coupon will contain, among others, the following information:

1. Production device and its installed capacity in kilowatts;
2. Time of issuing;
3. Technology, among those accepted;
4. An indication whether any Public Support is currently or has in the past been received.

By default, the first owner of a RECS Certificate shall be the RES-E Generator responsible for production of this RES-E. Once it has been created, changes to a RECS Certificate shall not be allowed. All information contained in the Renewable Energy Declarations that is not shown directly on the RECS Certificate shall be made available on application in writing to the Issuing Body.

5.3.4 Trading

Once a certificate has been issued, it can be traded. The certificate owner who wishes to transfer ownership must inform the Issuing Body. The Issuing Body records the transfer of ownership in the Central Registration Database, retains all documentation related to the transaction and confirms to the parties that the transfer has taken place. Transfer of ownership of RECS certificates may be through private, bilateral arrangements between parties or through an intermediary (for example, an exchange or brokerage).

5.3.5 Redemption

Any RECS Certificates Owner may retain or "bank" its RECS Certificates for an unlimited period unless otherwise required by law.

Redemption of RECS certificates is the process whereby the owner of a certificate brings about its transfer to a Redemption Account and its removal from the market, and is then given proof that the RECS certificate has been consumed (also known as "retired") and that title and rights to it may no longer be transferred. Each Issuing Body shall be responsible for redeeming RECS Certificates that it or another Issuing Body has issued.

The owner of a certificate can redeem it (e.g.) to advertise its environmental performance, or to fulfil a purpose specific to that country or region (e.g. renewable obligation,

tax exemption, etc). Upon reception of the request by the certificate owner to redeem a certificate, the Issuing Body transfers the certificate to a redemption account and informs the owner in writing that the certificate has been redeemed and can no longer be transferred or traded.

The credibility of RECS is based on redemption of certificates for green products and independent auditing of such redemption.

5.3.6 RECS Code of Conduct

RECS International is discussing a Code of Conduct[52] for all of its members, which outlines the RECS approach to quality assurance for RECS based green power products.

The Code of Conduct is aimed at providing credibility for non-RECS members purchasing green energy based on RECS certificates. It contains the basic rules for quality assurance for RECS-based green power products as agreed between the members of RECS International. The rationale behind it is twofold:

- Providing customers easily understood information about renewable electricity products and services;
- Assuring that suppliers adhere to the highest standards of professionalism in business practices, by applying the Code of Conduct any user of RECS certificates has to guarantee that no double selling of Green Energy will take place, neither RECS-based nor non-RECS-based.

Since RECS certificates cannot be sold to customers not being a member of RECS International, the sale of green energy linked to RECS certificates to non-RECS customers must therefore imply redemption of certificates. This means that the supplier needs to redeem RECS certificates on behalf of its customers.

The Code of Conduct requires that a supplier opens a redemption account for all green products they supply. Suppliers must guarantee that the green products sales are covered by redemption of the same volume of RECS certificates.

An accredited third party shall audit the supplier's redemption of RECS certificates related to each green product. The audit must be carried out at least yearly.

Any discrepancies between the number and the composition of certificates, and the actual volume and composition of the green product delivered shall be reported to the relevant customer. Non-compliance by suppliers may lead to breach of contract by the customer and exclusion from membership of RECS International.

Though important, the Code of Conduct, when approved, will neither give to RECS the chance to be regarded as Eugene compatible quality label nor will it fully comply with the demand of many consumers for additionality. The most important differences between the Code of Conduct and a quality label are

[52] Secretariat RECS International (2005). Code of Conduct (draft version 6) currently under discussion.

1. The additionality issue: Many green electricity quality labels require additionality e.g. a certain share of electricity from newly built power plants. Under the RECS scheme this information is not included in the certificate, and will not be included even after the approval of the Code of Conduct;
2. The Code of Conduct does not include any specific eligibility criteria for specific energy sources such as biomass and hydro.

5.4 Interaction between RECS and green electricity labels

5.4.1 Options for interaction between RECS and green power labels

Tradable renewable energy certificates can facilitate accreditation and verification of labelling schemes in several ways. As the CLEAN-E Work Package 1 report on the different labelling schemes in Europe shows (see Table 6), these schemes can make use of RECS certificates at different levels: RECS certificates (or GoO which can be substituted for RECS certificates under certain conditions) can be fully integrated as part of the labelling scheme; they may be accepted e.g. as proof for imported RES-E or they may not be accepted at all as proof of the 'greenness' of RES-E.

Table 6: Overview of RECS integration in the scope of different green power labelling schemes

	Not eligible
	Eligible with restrictions
	Eligible
	Under discussion
	Not relevant

Label	**Country**		**Comment**
Umweltzeichen Richtlinie UZ 46 Grüner Strom	Austria		RECS are not eligible in the scope of the label
Norppa-ecolabel	Finland		Discussions is presently on-going
Ok-power label	Germany		RECS are eligible. As the criteria of the ok-power label currently cannot be verified solely based on the information content of a RECS certificate, the identification of the respective RES device which is represented by the certificate is required in order to facilitate the auditor to assess compliance.
Grüner Strom Label	Germany		As GSL certifies only fund models, RECS certificates which are issued for physical electricity generation do not have any relevance to the labelling scheme.
Technischer Überwa-	Germany		It must be possible to trace back all electric-

Label	Country		Comment
chungsverein (TÜV)			ity generated as renewable energy to clearly described and identifiable sources. RECS certificates are acceptable
100% Energia Verde (Bollino Verde)			Based on RECS
Milieukeur groene elektriciteit	The Netherlands		RECS certificates are not eligible. However, if RECS certificates have been verified as conforming to criteria under the incipient European Energy Certificate System (EECS) by an EECS Issuing Body outside the Netherlands, they can be imported into and accepted in the Netherlands as GoO.
Bra Miljöval	Sweden		There is no formal decision to allow RECS certificates in Bra Miljöval. The information available on the RECS certificates will not however be adequate to directly be included in Bra Miljöval and additional information is needed.
Ofgem Guidelines on Green Supply Offerings	UK		The Ofgem Guidelines do not address the recognition of RECS certificates.
FoE Guide to Green Electricity Tariffs	UK		The FoE Guide, which was merely a ranking, does not refer to RECS certificates
Naturmade labels	Switzerland		RECS are eligible. As the criteria of the *naturemade* labels currently cannot be verified solely based on the information content of a RECS certificate, the identification of the respective RES device which is represented by the certificate is required.

However, compared to the present situation there is potential for increased synergies. Moreover, care has to be taken to avoid negative interactions between green electricity labels and RECS. Firstly, an overview of positive and negative interactions will be given. Secondly the potential of RECS to better facilitate the labelling process and the way such schemes are implemented in different Member States will be treated in some more detail.

5.4.1.1 Synergies

RECS certificates could be used in labelling schemes for providing information regarding the electricity supplied under the label. If RECS certificates can be provided for the green electricity delivered to customers they can be taken as proof that this electricity complies with the criteria set out in the RECS scheme. RECS certificates therefore may support the assessment of the eligibility of the RES-E supplied under a green power labelling scheme and they can be used for the verification process. However, the information coming with the certificate usually is not fully compatible with the requirements of labelling schemes as will be pointed out below. Thus in general, additional informa-

tion and proof is needed for the certification of green electricity. This will be discussed further below.

5.4.1.2 Possible negative interactions

Apart from the compatibility of information needed for certification of RECS and for accreditation under green electricity labels there is some potential of negative interaction regarding the issue of 'double counting'. Double counting could occur where the green attributes of the same amount of electricity production is used twice, e.g. as proof under the labelling scheme and for RES-E export purposes. Whereas the delivery contract will be used as proof of origin within the labelling scheme, the green attributes may be simultaneously exported via RECS. Therefore if RECS are used as proof for green electricity it is important that redemption of the certificates after use is guaranteed. Under the European RECS scheme this means that a redemption account is opened in the country of use.

Difficulties may arise if certificates are issued in parallel, i.e. the UK Renewables Obligation certificates (ROCs) and Guarantees of Origin or RECS certificates. Regarding different certificates, the RECS scheme requires guarantees that no other tradable certificates are issued for the generation device listed for the RECS scheme. Moreover, some Member States have integrated registries for GoOs and RECS certificates thereby avoiding the pitfalls of double counting of these two types of RES-E certificates. As a consequence RECS International recommends that all labelling schemes should be based on GoO in order to avoid double counting.

5.4.2 Need for further information

In general, the criteria required to be eligible for a RECS certificate are different from the requirements to qualify RES-E for a green power labelling scheme.

Within the European RECS scheme certificates can be issued for all renewable energy, i.e. "all energy excluding fossil and nuclear fuels and electrical energy derived from these sources".

In certain cases RECS is closely integrated with the 'Guarantees of Origin' scheme, i.e. GoO can be turned into RECS. In the case of GoO the definition of the Renewable Electricity Directive applies: "(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"[53].

Compared to these rather broad definitions, green electricity labels usually have stricter standards of eligibility:

[53] Directive 2001/77/EC, Article 2

5.4.2.1 Environmental standards

Green electricity labels often require advanced environmental standards for the electricity supplied under this label, e.g. environmental standards for hydropower plants or standards regarding the sources of biomass to be used (e.g. only from certified forests). This information is not included in RECS certificates. There is thus still a need for plant specific accreditations under the labelling schemes. However, as RECS certificates include a code for the production device ("a separately metered device or group of devices that generates electricity") they can be used as proof for electricity generated in this specific plant after the initial accreditation process.

Plants producing RES-E from biomass may change the kind of fuel they use, e.g. from certified biomass to non-certified biomass. Therefore inspection of the plant during the registration phase may not be sufficient.

5.4.2.2 Additionality

Green electricity labels often require a certain level of additionality (i.e. additional environmental effects due to the label), e.g. a certain share of electricity from newly built power plants. To prove additionality the year of commissioning of the plant must be known (in order to allow to audit compliance with the new plant definition applied by a label). Under the RECS scheme this information is not included in the certificate. However, the year of commissioning has to be indicated when the generation device is listed under the RECS scheme (Renewable Energy Declaration - RED) and could help to prove compliance with the labelling criteria assuming the labelling body has access to this data.

However, the RED is not publicly accessible. The only way to make use of information from REDs to facilitate the accreditation process under a labelling scheme would be that the labelling body files a request with the RECS Issuing Body (IB) to get access to the RED of a RECS generation facility (this would certainly also need the agreement of the generator). In case of imported RECS this information should be passed on between the IBs and then to the labelling body. In any case the possibility to use information included in REDs will depend on the voluntary cooperation of the RECS Issuing Bodies concerned.

5.4.2.3 Public support

Green electricity labelling standards strive to avoid double counting (or funding) of RES-E. As an example, double funding would occur if electricity publicly funded under a specific support system (e.g. feed-in tariffs) were included in the label and sold at a premium price (which means funded again by consumers). It is thus important that a certificate used as proof of the ‘greenness’ of RES-E under the label includes information regarding public support. This is the case within the RECS scheme. RECS certificates can be earmarked to indicate whether "Public Support has been received by the RES-E Generator for the associated Production Device or the electricity produced by it".

In some labels publicly supported generation devices can be included as long as environmental additionality is guaranteed or if extra financial support is needed for economic viability of the plant. In the former case additional plant-specific certification is needed as pointed out above, the latter case usually is only compatible with contribution-based green electricity products (e.g. green fund schemes). However, RECS can only be used to facilitate the assessment of consumption-based products and cannot contribute to proving the additionality of contribution-based products.

5.4.2.4 Balancing period

Labels often require the electricity produced within a specific balancing period. As RECS certificates indicate "the calendar year and month when the energy associated with this RECS certificate was fully delivered" certificate can be used as proof of this requirement.

5.4.3 European Energy Certificate System (EECS)

Following the introduction of Guarantees of Origin the AIB developed a framework standard for the harmonised introduction and operation of energy certificate schemes allowing RECS certificates, RES-E GoO, CHP GoO and Disclosure Certificates. This system is known as the European Energy Certificate System (EECS) and acts as an umbrella covering different electronic records (EECS Certificates). The system is backed by PRO (see above) and its supporting documents[54].

EECS offers an integrated European framework for issuing, holding, transferring and otherwise processing of EECS certificates which certify, in relation to specific quantities of energy output, attributes of its energy source and/or the method and quality of its production.

Certification of the quality and the method of energy output provides an efficient mechanism for accounting for: the quality of the energy supplied to consumers and its method of production; the progress made towards targets for the use of sustainable energy technologies; and the production and consumption of energy for the purposes of stimulating investment in sustainable energy plant. Moreover, certification enables a value to be accorded to specific types of energy output and traded separately from the energy itself.

The information provided by certificates traded under the EECS system can serve as a basis for labelling schemes (complemented with additional information).

The facilitation of labelling procedures through tradable RES-E certificates (TRECs) probably is most advanced in countries which have joined the EECS agreement and have thereby made their national GoO system (and the information contained) compatible with the principles set out by the AIB. Since the introduction of EECS in March 2004, international trade of RECS certificates/GoO has been possible in Austria, Den-

[54] www.aib-net.org

mark, Germany, Finland, Flanders (Belgium), the Netherlands, Norway and Sweden. Some other countries are likely to join.

TRECs play an important role in most countries with a quota obligation type of RES-E support policy. This is the case in the UK, for example, where under the Renewables Obligation "Renewable Obligation Certificates" (ROCs) are issued as TRECs. However, these certificates are not traded internationally and they are not closely integrated with GoO. Moreover, GoO in the UK are not redeemed when they are used (e.g. for a green electricity declaration) and additional information such as year of commissioning etc. is not included (see the Work Package 1 report on national green power labels). Certificates of this type thus have a more limited potential to facilitate labelling processes.

5.4.4 Case study: Netherlands

The following will highlight the Netherlands as an example of a highly integrated single certificate system which is the basis for national support schemes, voluntary green power labels etc. The Netherlands run a single certificate system - formerly green certificates and meanwhile Guarantees of Origin – with GoO as tradable certificates (under specific conditions; both import and export possible), as a basis for claiming subsidies and tax-breaks and as a requirement for voluntary labelling schemes (if RES-E is supplied under a labelling scheme the corresponding GoO must be redeemed by law).

In the Netherlands TRECs have been closely integrated into the institutional system of the renewable energy market for some years already. At the beginning of 2001 a system of green production certificates has been introduced by the Dutch government.

On 1st of January 2004 Dutch green certificates were replaced with Guarantees of Origin (GoO). In contrast to green certificates, GoO are internationally tradable within Europe (imports on condition of compliance with EECS – see below). In a further step, the GoO system has been made compatible with the RECS system by adding some additional information to the initial GoO certificates, as part of an European effort to make RECS certificates compatible with GoO: the European Energy Certificates System (EECS).[55]

GoO are issued and monitored by CertiQ, a subsidiary of the national grid administrator TenneT. CertiQ is also the national issuing body for RECS certificates and thus strived for a maximum integration of RECS certificates within the Dutch GoO system. More or less the only difference left is that RECS certificates have to be signed by the Central Monitoring Office (CMO, in the Netherlands this is TenneT). A unit of RES-E may thus be issued with both a RECS certificate and a GoO. As soon as a certificate is transferred to a non-Dutch account, the GoO becomes void and only the RECS certificate remains. RECS certificates from abroad may also be eligible for green certification as long as they are in compliance with Dutch requirements, which means as long as they are from countries complying with EECS. However, so far no such imports have been reported.

[55] www.aib-net.org

A statement has to be signed that the imported RES-E has not been subsidised in the country of generation.

As detailed in the WP1 report on national labelling schemes, the Dutch green electricity labelling standard "Milieukeur groene elektriciteit" uses GoO issued by CertiQ as exclusive proof for RES-E supplied under the label. Milieukeur requires from the supplier that each year the respective quantity (expressed in kWh) of Guarantees of Origin must be redeemed with CertiQ. For sustainable energy sources within the Netherlands, GoO are used which are issued, registered and redeemed by CertiQ in the framework of the Electricity Code. For foreign sources, certificates are used which have been standardised by CertiQ (as member of the Association of Issuing Bodies (AIB)) following the standards accepted by the Dutch authorities. If the supplier carries several green products, a separate redemption account on which the required Guarantees of Origin are redeemed, shall be opened for the product which falls under the control seal.

5.5 Conclusions and recommendations

In the future RECS certificates developed by the voluntary RECS initiative could be of higher relevance for green labelling schemes in Europe than it is now. The RECS Renewable Energy Declaration provides a lot of relevant plant specific data which might be helpful in the scope of the product audits which built the key element of green power labelling procedures:

- The production device where the RES-E represented by the certificate was produced;
- The date of commissioning of this production device;
- The type of generation technology in place;
- All possible sources of fuel to be converted into electrical energy by this production device, whether or not this is renewable;
- Any schemes associated with any Public Support that are or have been received, together with an indication as to whether they are currently being received;
- The amount of RES-E that the certificate represent;
- Time of certificate issuance.

This information satisfies most of the requirements of a green labelling scheme, provided that each plant is inspected when requesting registration, so that it is possible to know whether it satisfies the additional environmental criteria set out by a green power label (see for instance WP2 reports on biomass and hydropower). On the other hand the redemption scheme applied by RECS can be considered as fully transparent (in order to avoid double counting) and independent third party auditing of power plants is ensured. In general it would be beneficial for label auditors of to get access to the Renewable Energy Declaration data.

Finally, the AIB has developed the European Energy Certificate System (EECS). This is a framework standard for harmonised introduction and operation of energy certificate

schemes and allows for RECS certificates, RES-E GoO, CHP GoO and Disclosure Certificates. The information provided by certificates traded under the EECS system can also serve as a basis for labelling schemes (complemented with additional information). It is advisable that European Member States comply with this standard (including the issuing of GoO) to avoid double counting and other incompatibilities of different schemes and to generate synergies with voluntary labels, international trading of certificates and policy instruments to support RES-E.

Where a country hosts a certificate system in which RECS and GoO are operated separately the GoO might not be the most reliable instrument. In particular, the risk of double counting arises where the certificate system is not based on a central registry. In this case, GoO should be mandatory submitted to the labelling body, but RECS should also be eligible as proof of origin (when including recommendations given above).

6 Interaction with Emissions Trading

In July 2003 political agreement was reached on the Emissions Trading Directive[56], introducing a greenhouse gas emissions trading scheme. The EU Emissions Trading Scheme (EU ETS) started on 1st January 2005, and includes all EU Member States, including the new Member States of Central and Eastern Europe.

The EU ETS is a cap and trade system covering direct emissions. The scheme sets an emission target on major greenhouse gas emitting installations through the national allocation plans. The allocation may be reduced over time. To show compliance with the target, covered installations are obliged to surrender allowances equal to their actual emissions over a certain period. A surplus of allowances allocated can be sold or banked (within one settlement period), while a deficit has to be covered by purchasing additional allowances. If the target is missed a penalty needs to be paid, and the emissions still have to be made good in the following year.

The first phase of the EU ETS is 2005–2007. The second phase overlaps with the first commitment period of the Kyoto Protocol, 2008–2012. Participants covered 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 45–50 percent of total CO2 emissions in the EU. It is envisaged, however, that the scope of activities and emissions covered by the EU ETS will gradually be extended over time.

6.1 Discussion of communicative aspects of the EU ETS

The EU ETS was introduced in order to limit greenhouse gas emissions from the electricity sector and aid MS compliance with the Kyoto targets. While the EU ETS covers more than just the electricity sector, the electricity sector is the largest single sector and accounts for the majority of emissions covered. Various ways exist to reduce emissions and comply with the targets, including a reduction in electricity production using fossil fuels, fuel switching to lower-carbon fuels such as natural gas, switching to or co-firing of renewables, or purchasing emission reduction credits. Renewables thus are expected to play a significant role in meeting the EU ETS targets.

However, it must be made clear that while the use of RES-E may be one of the ways to reduce emissions, green labels can not be said to contain any greenhouse gas emissions benefits, as this would automatically lead to multiple counting.[57] Greenhouse gas emissions are defined in, and captured by the EU Emissions Trading Scheme, a harmonised EU-wide system.

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[56] Emissions Trading Directive, Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC.

[57] See van der Linden *et al.* (2004).

6.1.1 Multiple counting and additionality

Because the ETS only covers installations' direct greenhouse gas emissions the role of renewable energy sources within the scheme is limited. Renewable energy plants – with or without a green power label – do not have direct net emissions and therefore will not play a part in the EU ETS.[58]

However, RES-E generators will benefit indirectly from the ETS through increased electricity prices because fossil fuel fired plant face costs (at least opportunity costs) related to compliance with their emissions target.[59]

In some MS the development in RES-E generation (initiated by public support instruments) has to a certain extent been taken into consideration when the ETS targets have been formulated. As RES-E generation has been anticipated, the additional RES-E generation can claim CO_2 reductions as the reduction target within ETS would have been lower without RES-E development.

Aside from practical problems with assigning emission reductions, were green power to contain such emission reductions then both the RES-E generator and the fossil fuel generator could claim to own them, the RES-E generator through the GoO/green label/certificate or even without any proof of origin and the fossil fuel generator through the excess allowances. It is therefore clear that renewables do not represent emission reductions nor would this be desirable given the resulting multiple counting of emission reductions were this is the case. With the introduction of ETS CO_2 became a value (allowances). Therefore, in the case of RES-E generation, the value stays in the emissions "bubble" covered by the ETS. Thus it is the fossil power plant which has to reduce its production (due to the replacement by increasing RES-E volumes), which owns and can claim the respective emissions reductions.

Suppliers of green products, green power labels, and customers of green products face the same communicative restrictions as RES-E generators. All other benefits resulting from RES-E generation and consumption apart from CO_2 reduction can nevertheless be communicated. These benefits are summarised in section 5.1.2.

However, this does not mean there is no interaction between renewables and the ETS. The costs on emitting due to the EU ETS will stimulate renewable energy generation and make it relatively cheaper, thus impacting on the market for green power and certificates. Conversely, if green power labels were to stimulate RES-E generation it will be easier to meet the emissions targets, reducing the price of allowances in the ETS.

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[58] With an exception for renewable co-fired fossil fuel plant.

[59] For example, at a market price of €10 per tonne of CO_2 equivalent (tCO_2e) for and EU allowance, a generator with emissions of 0.350 tCO_2e/MWh (approximate EU average) will face additional costs of €3.50/MWh to meet its target. However, allowances are (largely) allocated for free in the initial periods, meaning that this is initially an opportunity cost for most companies.

6.1.2 Benefits of green power labels in a carbon-constrained economy

As shown in section 5.1.1 with the specific design of the ETS neither suppliers offering a green power product or tariff nor the customers of respective products can claim the CO_2 reduction which is deriving from the generation of RES-E which is feeding such a product. The same communicative restriction applies to all green power labels which are operated in countries which have implemented ETS. Even labels which guarantee that labelled products provide environmental additionality (e.g. in the form of additional RES-E generation over the baseline which is set by public support schemes) are not entitled to claim the respective emissions reductions.

However this does not mean that the voluntary green power market has lost its value with the introduction of a cap and trade system for CO_2 emissions. The benefits resulting from an extension of renewables in the electricity sector go well beyond their contribution to climate change. The benefits encompass positive contributions to the environmental, social and economical development of the national electricity sectors. Examples are:

- Environmental benefits: Apart from CO_{2+} emissions reductions RES-E generation can lessen the emission of other air pollutants (e.g. acidifying emissions such as NO_x/SO_2, aerosols, organic compounds) with a more regional scope. In addition RES-E generation is not accompanied by similar severe waste problems which are e.g. resulting from the utilisation of nuclear power. And finally RES-E generation may contribute to protect habitats and to improve water qualities.
- Economic benefits: A growing share of RES-E generation is creating employment at several levels of the value-added chain (e.g. planning, construction, operation, maintenance). In addition to an increase of the total number of new jobs in the renewable energy sector many of these jobs are created locally with positive effects to regional economic developments.
- Supply security: An extension of RES-E generation contributes to strengthen security of supply which belongs to the most important policy objectives of EU energy policy. Exploiting national renewable energy resources leads to fewer imports of fossil primary energy resources thus minimising the risk of delivery disruptions and price swings.

All these benefits are important drivers for the transition of the electricity sector to more sustainability. For that reason green power suppliers as well as national labelling bodies should be encouraged to focus their communication on these aspects.

Furthermore, for the time being it is not clear at all how the post-Kyoto process will look like, in particular whether global climate policy will be based on further GHG caps. In this respect it is also not certain for how long Emissions Trading will be the predominant instrument in the field of climate protection policy for the industrial sector. For that reason it would be careless to solely rely on Emissions Trading for the reduction for GHGs.

It is therefore recommendable to pursue a multidimensional policy mix which addresses different policy fields (e.g. technology development, market regulation, strengthening plurality of market players, enhancement of market transparency) in order to stabilise climate policy. In this respect reinforcing the voluntary green power market (e.g. by the establishment of acknowledged green power labels) is also a key element to ensure continuity in the efforts to face climate change even if the post Kyoto process failed. In other words, green power labels are an important tool in the field of climate protection policy even without them being entitled to claim any CO_2 emissions reductions under the EU ETS.

7 Summary and conclusions

This report has focused in detail on how green electricity quality labels are expected to interact with the range of support mechanisms and other policies promoting renewable energy. It was found that a number of opportunities arise to create synergies between policy instruments and green electricity quality labels, thus enhancing the impact on renewable energy deployment. Equally it is clear that green electricity quality labels might effectively counteract the aim of increasing electricity generation from renewable energy sources, when not properly designed and correctly implemented.

As for the interaction of ***national renewable energy support mechanisms*** (such as feed-in tariffs and quota obligations) with green power labelling (being a voluntary initiative), the voluntary green power market shall be regarded as a supplement for governmental support schemes.

In the case of feed-in tariffs, labelling bodies are recommended to avoid double funding of labelled RES-E and, in case of inclusion of already subsidised electricity, take care that additionality criteria are met. In the case of quota systems, labelling bodies can ensure additionality by additional TREC redemption above what is mandated by the obligation.

For both support mechanisms policy makers are specifically recommended a) to implement a reliable tracking mechanism to avoid double funding, b) to take care that double counting is avoided and make sure that it is unambiguous who owns the environmental attributes of supported RES-E, and c) in the case of quota obligations, to clearly state that only one form of evidence of renewable energy supply is accepted, namely GoO, which are redeemed when used.

Regarding the interaction with ***Electricity Disclosure*** it is clear that both Electricity Disclosure as well as green power labels aim to bring more transparency to the electricity market. The main synergies between green power labels and Electricity Disclosure lie in the tracking mechanism which is required by both instruments.

Green power labels should apply an explicit tracking mechanism as only this tracking option ensures the creation of unambiguous links between generation and demand. Green power labelling bodies therefore should thoroughly coordinate their tracking mechanism with the one applied in the context of the corresponding national and neighbouring Electricity Disclosure schemes.

As for policy makers, it should be noted that as long as several MS allow implicit tracking elements to be applied in the context of Electricity Disclosure, it must be expected that in individual cases the two instruments will deliver confusing and in the worst case contradictory information. In the long term, the different tracking mechanisms should be fully integrated allowing only one tracking scheme facilitating all different purposes.

The discussion on the interaction with ***Guarantees of Origin (GoO)*** for electricity from renewables and CHP showed that a Guarantee of Origin (both RES-E GoO and CHP-GoO) is potentially a very useful policy tool, which could facilitate a host of energy policies, including voluntary green electricity quality labels. In order to avoid double

counting labelling bodies need the mandatory submission of redemption statements for all applications that are covered by the GoO.

As the RES-E and CHP Directives leave room to the different Member States to adapt the GoO requirements to the specific national situation, the labelling bodies should be active in asking Member States to include in the GoO additional information they consider necessary (in the case of CHP-GoO for instance information about fuel type, actual energy conversion efficiency of the plants, age of the plant, etc). Finally, labelling bodies should encourage the integration of the CHP-GoO and the RES-E GoO and policy makers should align the content and the general design (e.g. balancing period) of the GoO to the needs of green power labels.

It was also concluded that certificates developed by the voluntary ***Renewable Energy Certificate System (RECS)*** initiative could be of higher relevance for green labelling schemes in Europe in future, as this scheme has the potential to satisfy most of the requirements of a green labelling scheme. Furthermore, the labelling standard European Energy Certificate System (EECS) which was developed by the Association of Issuing Bodies (AIB) can also serve as a basis for labelling schemes (complemented with additional information). It is advisable that European countries comply with this standard (including the issuing of GoO) to avoid double counting and other incompatibilities of different schemes and to generate synergies with voluntary labels, international trading of certificates and policy instruments to support RES-E.

On the interaction with ***Emissions Trading*** it was found that in order to prevent multiple counting it should be clarified that GoO do not represent greenhouse gas emissions, or emission reductions, as this would automatically lead to multiple counting. However, it should be noted that although neither suppliers offering a green power product nor the customers of respective products can claim the CO_2 reduction, the benefits resulting from an extension of renewables in the electricity sector go well beyond their contribution to climate change. As all these benefits are important drivers for the transition of the electricity sector to more sustainability, national labelling bodies should be encouraged to focus their communication on these aspects.

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