Long-Term Developments and Integration of Energy-Related Certification Schemes

WP6 report of the E-TRACK II project (Deliverable 9)

A report prepared as part of the IEE project „A European Tracking System for Electricity – Phase II (E-TRACK II)"

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Summary

The focus of the discussions of the E-TRACK project is the tracking systems used in the electricity sector for purposes of providing electricity disclosure information to final consumers. However, this report also looks briefly into tracking mechanisms for purposes of support schemes for electricity from renewable energy sources or from high-efficient cogeneration and for purposes of accounting for the national targets for renewable energy under the respective European Directives.

The long-term development of tracking systems will have to build upon the systems which currently exist in European countries and the modifications which are required by recent European legislation. Most Member States currently operate several mechanisms of accounting for generation attributes for disclosure purposes. The systems in operation include national Guarantees of Origin and RECS certificates, some of which are coordinated by the European Energy Certificate System, and several further schemes such as private green power quality labels and national accounting schemes for disclosure mix calculations. The recommendations from the first phase of the E-TRACK project proposed an approach of consolidating the different schemes into a consistent tracking system for disclosure purposes which is highly reliable but at the same time leaves sufficient flexibility for the market actors, who can choose among different tracking options.

A significant impulse for the further development of Guarantees of Origin in Europe is given by the 2009 Renewable Energy Directive, which provides for a much clearer definition of the role of Guarantees of Origin, at least for electricity from renewable energy sources.

Based on an inquiry among selected key stakeholders, a vision is developed in this report for the future development of each relevant element of future tracking systems for electricity disclosure, support schemes and target accounting. The discussion confirms the main recommendations given by the first phase of the E-TRACK project and develops more detailed views on some of the elements.

The competent bodies, which are mandated by European governments to implement and operate the tracking systems and the overall scheme for electricity disclosure, are very important actors in the future consolidation and improved European-wide coordination of tracking systems. The example of the Residual Mix calculations shows that due to the exchange of Guarantees of Origin and of physical electricity across borders, the implementation of reliable electricity disclosure systems requires a cross-border cooperation of the competent bodies. As Guarantee of Origin systems might emerge in the future for biofuels, bioliquids, biogas and potentially other forms of energy, sector specific Issuing Bodies might be established which could use a joint registry for all energy-related tracking schemes.

The currently separated systems of Guarantees of Origin (GO), RECS certificates and any other type of systems for the bilateral allocation of generation attributes for purposes of disclosure should be merged into one coordinated system of GO. A Residual

Mix should be provided for each Domain, which excludes the double counting of attributes with all other tracking schemes in operation and which reflects exports and imports of attributes. In case that other tracking systems are operated besides GO and the Residual Mix, these should comply with the criteria of reliability and transparency and their operation should be coordinated with the other tracking systems.

If a country has decided to implement a support scheme which uses support certificates, then it may issue such certificates in addition to the tracking systems used for disclosure purposes (GO, other Reliable Tracking Systems and the Residual Mix). A harmonised European definition of support certificates should be available to those countries which choose to enter into Joint Support Schemes based on support certificates.

Following the stipulations of the 2009 Renewable Energy Directive, certificates which are transferable between private entities will not have any direct impact on the compliance of Member States with the national targets for renewable energy. However, in order to keep track of the potentially numerous notifications of Member States under the Cooperation Mechanisms of this Directive, a clearing house should be established by the Commission.

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1 Introduction

1.1 The project

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

1.2 Scope of this report

This report looks at the longer-term development of tracking systems for electricity and the potential synergies and coordination between these and other energy-related certification schemes such as White Certificates for energy efficiency and the EU Emissions Trading System. The report is based on considerations from the project team and on interviews with key stakeholders and develops visions on how the medium and long-term development and integration of energy-related certification schemes could look like. The stakeholders interviewed include the Association of Issuing Bodies, RECS International, The European Federation of Energy Traders and the European Commission.

1.3 Report outline

Chapter 2 summarises the challenges in current tracking systems for electricity and the recommendations from the first phase of the E-TRACK project. Chapter 3 outlines the potential future developments of tracking systems for purposes of electricity disclosure, which are in the focus of the E-TRACK II project. The different sections in this chapter deal with the individual elements of such tracking systems. Chapter 4 addresses those support schemes for renewable energy or high-efficient cogeneration which are based on support certificates, and chapter 5 looks into the certification needs for the compliance process around the national targets for renewable energy in the 2009 Renewable Energy Directive. Chapter 6 addresses further certification schemes and their potential relation to the tracking systems for electricity. Finally, chapter 7 gives a more visionary long-term outlook on the future of energy-related certification schemes. The Annex includes the discussion paper which was used as the basis for collecting the views of stakeholders.

2 Challenges in Current Tracking Systems

2.1 The Implementation of Tracking Systems in Europe

Generally there are three purposes for which tracking systems for electricity can be used in Europe (Timpe 2007, Draeck 2009, Lescot 2009):

- The provision of information for **electricity disclosure** as prescribed by Directive 2003/54/EC, its update in Directive 2009/72/EC and national regulations. This purpose requires tracking of all types of electricity generation, but a specific emphasis is usually put on electricity from renewable energy sources, for which a green power market has been established with higher prices than for electricity from other sources.
- The management of a **support mechanism** which is using a transferable evidence of electricity generation which is eligible for the support. This typically applies to electricity from renewable energy sources (RES-E) or from high-efficient cogeneration (HE-CHP-E).
- The accounting for purposes of **national targets**, e.g. regarding electricity or other forms of energy from renewable energy sources. Renewable energy is the only sector of the energy market for which European legislation has defined clear national targets. However, Directive 2009/28/EC limits the use of tracking mechanisms for target accounting to statistical accounting between governments (see below).

Tracking Systems for Electricity Disclosure

Table 1 shows the variety of tracking systems which are being used in Europe for the purpose of allocating electricity generation attributes to final consumers (and their suppliers of electricity) for the purposes of electricity disclosure. This purpose includes the market for green power, where consumers can buy electricity from RES (and in some cases also other preferred generation technologies such as HE-CHP-E) for a certain price.

The Guarantees of Origin (GO) for electricity from renewable energy sources and from high-efficient cogeneration are tracking systems which the EU Member States had to implement based on the respective Directives. They are instruments based on European and national legislation which can prove the origin of electricity to the final consumer.

However, their use is voluntary for the producers and most European countries do not require suppliers of electricity from these energy sources to use Guarantees of Origin.[1]

Partly due to this voluntary character of the Guarantees of Origin and partly due to historic reasons, private tracking systems are operating which basically fulfil the same function as the GO. This applies to the Renewable Energy Certificate system (RECS) as well as to some private green power quality labels which operate in several European countries.

Due to the fact that GO under European legislation and RECS certificates are only available for electricity from renewable energy sources and from high-efficient cogeneration, more general "disclosure certificate" systems have been established recently in a few countries, which allow the transfer of the generation attributes of any type of electricity generation.

The E-TRACK project has defined the term "explicit tracking" in order to denote mechanisms which allow the bilateral allocation of electricity attributes from a generator to a supplier or final consumer. This allocation can be based on certificates, but other mechanisms may be used for this purpose as well.[2]

The European Energy Certificate System (EECS), which has been established by the Association of Issuing Bodies (AIB) is a European-wide standardised way of implementing certificates for electricity generation. Currently, the EECS encompasses Guarantees of Origin for RES-E, for HE-CHP-E, RECS certificates and generic disclosure certificates and implements them in a coordinated way. Currently, 15 EU Member States as well as Norway and Switzerland are connected to the EECS system.

[1] In Austria, Belgium, Denmark, Luxemburg, Poland, Slovakia, Spain, The Netherlands and the United Kingdom the suppliers of electricity from renewable energy sources are required to use Guarantees of Origin in order to prove the green origin of the energy which they deliver.

[2] This is opposed by „implicit tracking", which denotes a mechanism which allows the allocation of electricity attributes from a group of generators to usually a large group of suppliers or final consumers for purposes of electricity disclosure. The typical method of implicit tracking is the use of a default set of electricity attributes for the disclosure of electricity of unknown origin in a domain (see the chapter on Residual Mix).

Table 1: Most relevant types of tracking systems in Europe

	Legal Basis in EU Directive	Usage by market actors	Applicable to		
			RES-E	HE-CHP-E	other generation
Guarantees of Origin for RES-E	(2001/77/EC) 2009/28/EC	optional	X		
Guarantees of Origin for HE-CHP-E	2004/8/EC	optional	(X)	X	
RECS certificates	(none)	optional	X		
"Disclosure certificates"	(none)	optional	X	X	X
National calculation schemes for electricity disclosure	2003/54/EC	optional (mandatory)	X	X	X
Green Power Quality Labels	(none)	optional	X	(X)	

Source: Authors' own compilation

Furthermore, national calculation schemes have been developed in order to determine the disclosure attributes of the large part of the electricity market, which is not covered by Guarantees of Origin. Most of these schemes either use a single national or European generation mix as the default set of disclosure information, or they implement a methodology of "contract-based" tracking, where participants in the electricity market allocate the generation attributes between each other based on their contractual relationships in the physical electricity market. This allocation is typically made "ex post", e.g. in retrospective of the total net sales between individual market participants of the preceding calendar year.

The coexistence of up to six different tracking mechanisms for purposes of electricity disclosure poses a significant risk of double counting of electricity attributes (e.g. of renewable energy) and loss of information on other forms of generation (Timpe 2007).

Tracking Systems for Support Schemes

Several European countries such as Poland, Sweden and the UK are using a support instrument for RES-E (or for HE-CHP-E) which is based on a transferable "support certificate". This certificate can be used by suppliers of electricity (or other obliged actors in the value chain of electricity) to comply with a quota obligation to support a certain share of energy production from eligible sources and technologies. The majority of European countries is using support instruments based on fixed feed-in tariffs or bonus payments, which do not require transferable certificates.

So far, certificate-based support instruments are usually restricted to national borders. The main exception is the "Levy Exemption Certificate" (LEC) of the UK, which can be issued for RES-E produced in foreign countries and can be used in the UK. There has been a recent announcement of Sweden and Norway to revive earlier plans for a joint support scheme based on certificates, but details remain unclear so far.

Tracking Systems for Target Accounting

Under the "old" renewable energy Directive 2001/77/EC, indicative national targets were defined for the share of RES-E production in the national consumption of EU Member States in the year 2010. Based on a communication from the Commission, transfers of Guarantees of Origin for RES-E across borders can be used for meeting these targets in case that the governments of the country which has produced the Guarantees of Origin the country which is cancelling them jointly agree that these GO are meant to be counted towards the target of the country cancelling the GO.

However, the recent Directive 2009/28/EC stipulates that transferable evidences such as Guarantees of Origin should not have a role in determining a Member State's compliance with the new 2020 targets for energy from RES.[3] Thus after 2010 the only tracking mechanisms in the field of national targets will be some form of statistical accounting which manages the so-called "cooperation Mechanisms" of Directive 2009/28/EC (Statistical Transfers, Joint Projects and Joint Support Schemes). This accounting will be done on the level of governments, and will most likely not involve transfers between private actors.

2.2 The E-TRACK Recommendation

The E-TRACK recommendation has been developed in the course of the first E-TRACK project. It can be summarised a follows:

1. Tracking systems should be defined consistently in certain geographical regions ("domains").
2. A mechanism of bilateral allocation of electricity generation attributes from a generator to a supplier or final consumer based on certificates should be available for voluntary use in all domains. This mechanism should include Guarantees of Origin for RES-E and HE-CHP-E, but it should also encompass similar Guarantees of Origin for any other type of electricity generation. The tracking mechanism should be implemented as a system of electronic certificates held in a registry, which allows for the issuing, transfer and cancellation of GO.
3. All domains should provide suppliers of electricity with a "Residual Mix", which can be used as default attributes for disclosure purposes, in case that no other reliable information is available for certain shares of their deliveries to final consumers. This Residual Mix must be calculated based on national electric-

[3] Article 15 (2) of Directive 2009/28/EC: "(…) The guarantee of origin shall have no function in terms of a Member State's compliance with Article 3. Transfers of guarantees of origin, separately or together with the physical transfer of energy, shall have no effect on the decision of Member States to use statistical transfers, joint projects or joint support schemes for target compliance or on the calculation of the gross final consumption of energy from renewable sources in accordance with Article 5."

ity generation statistics, adjusted by domestic cancellations and by imports and exports of Guarantees of Origin and other disclosure certificates. Uncorrected generation statistics are not acceptable as a replacement of the Residual Mix.

4. Domains may also operate a third group of tracking mechanisms for purposes of disclosure. These "Reliable Tracking Systems" (RTS) should meet similar reliability requirements as Guarantees of Origin and should exclude double counting with Guarantees of Origin and with the Residual Mix. Examples for such RTS are systems for contract-based tracking and support mechanisms such as feed-in tariffs, which stipulate a certain allocation of the attributes of supported generation to final consumers in terms of disclosure. In both cases, the conditions mentioned above should be met, and RTS should preferably be implemented based on registries (like it is the case for GO).
5. Producers and suppliers of electricity can choose to use the certificate-based tracking mechanism or to rely on the Residual Mix. If the respective domain has also implemented a Reliable Tracking System, then this may also be used.
6. If suppliers of electricity make specific claims about the origin of their products, then this must be verified based on the cancellation of Guarantees of Origin. If these suppliers also have customers, which do not receive a product with such specific claims, then the disclosure statement for these customers should not only state the company mix of the supplier, but also the company mix minus the attributes of all specific products. (This result could be called a residual product of the supplier.)

More details of the E-TRACK recommendations can be found in the Final Report of the E-TRACK I project (Timpe 2007, Lise et al 2007).

3 Future Tracking Systems for Disclosure Purposes

This chapter discusses the future of tracking systems for the purpose of electricity disclosure as outlined in Table 1. It looks at the different types of tracking systems explained above and their potential synergies, and also on the potential integration or mutual exclusion of separate systems in order to avoid errors in the tracking of electricity attributes.

3.1 Guarantees of Origin for Electricity

The Guarantees of Origin as defined by Directives 2001/77/EC and 2009/28/EC for RES-E and Directive 2004/8/EC for HE-CHP-E are the only tracking instrument with a clear legal basis on the European level.

For GO for electricity from RES, however, the result of the inventory of tracking systems in Europe undertaken in the E-TRACK II project has shown that the actual implementation was significantly behind the requirements of the 2001 Directive in early 2009 in four of the EU15 and in eight of the EU12 countries (Draeck 2009). Most of the GO for RES-E systems are implemented as purely national systems which are not well designed for cross-border transfers. Although in most cases the import and export is not formally prevented, the governments and competent bodies in many countries seem not to have made much effort for supporting the free transferability of GO across borders. Even many of the countries which have joined the European Energy Certificate System operate a national system as the basis of GO for RES-E in their country and have established the EECS system as a second layer on top of the national systems, which allows for the cross-border transfer of GO.

The three regions of Belgium as well as Austria, Denmark. Finland, Germany, The Netherlands, Norway and Sweden have implemented GO for RES-E as part of the EECS. In some of these countries, separate national GO systems are in use as well, but these are mutually exclusive of the GO under EECS. Many other countries operate national GO systems which are not connected to EECS. For further details on the implementation of GO for RES-E see the Inventory report of E-TRACK II (Draeck 2009).

For GO for HE-CHP-E, the situation is even weaker. Five out of the EU15 countries plus the Brussels region in Belgium had not properly implemented the requirements of Directive 2004/8/EC regarding GO by early 2009. So did four of the EU12 countries as well as Norway and Switzerland (which both are not legally obliged to implement GO for HE-CHP-E).

It can be expected that the implementation of the requirements of Directive 2009/28/EC regarding GO for RES-E will help to improve the picture. Most importantly, this Directive has defined the instrument of Guarantees of Origin in more detail and more consistently than this was the case under the previous 2001 RES Directive. It is now clear that GO for RES-E have the sole purpose of electricity disclosure and that they should be

issued transferred and cancelled electronically by one single competent body per geographic domain. The GO system also must be accurate, reliable and fraud-resistant and Member States shall accept GO from other Member States for disclosure purposes.

The regulations of Directive 2009/28/EC do not require Member States to join a single, harmonised system of GO across Europe, such as the EECS system. However, it can be expected that the quite diverging implementation of GO for RES-E will be streamlined in all or most of the Member States by December 2010, when the regulations of the Directive need to be transposed in national legislation, and that more Member States than before will consider joining the EECS system. This development might be supported by the project of developing a CEN/CENELEC standard for Guarantees of Origin, which is currently being considered by the relevant CEN bodies.[4]

Nevertheless, all these clarifications and improvements only apply to the GO for RES-E. Legally, the definition of the GO for HE-CHP-E remains unchanged. Unfortunately, Directive 2004/8/EC does not refer to the electricity disclosure requirement of Directive 2003/54/EC and thus the purpose of the CHP-GO remains ambiguous: Only ten out of the 27 EU Member States are using CHP-GO for disclosure purposes and some of these use them for support purposes as well. But there are also five Member States which use CHP-GO only for administering their CHP support schemes, and not for disclosure purposes. 17 Member States do not provide for the export and import of CHP-GO. This situation calls for a revision of Directive 2004/8/EC with regard to the use of the CHP-GO. This revision should follow the approach used in the RES Directive of 2009, and it should at the same time allow for support certificates to be issued in parallel to CHP-GO for those countries which operate a quota-based support system for HE-CHP (see chapter 4).

From historic reasons it is understandable that by EU legislation and in most European countries Guarantees of Origin have been implemented only for RES-E and HE-CHP-E so far. Firstly, these are the energy sources and technologies which are supported by most of the Member States and secondly, they are also preferred by environmentally conscious consumers in the Green Power market. However, in the longer run a separation of the retail market for electricity beyond RES-E and HE-CHP-E could be envisaged, e.g. with regard to low carbon electricity from nuclear or certain fossil energy sources.[5] From the discussions in the two phases of the E-TRACK project it has also become clear that GO should become available for any type of electricity generation, not only for electricity from RES and HE-CHP. However, if a CHP plant is using biomass, then only one GO should be issued for purposes of disclosure of each unit of elec-

[4] CEN Draft Resolution BT C88/2009.

[5] In the longer run this will also include electricity from power plants using Carbon Capture and Storage (CCS) technology.

tricity produced rather than not two separate GO for RES-E and HE-CHP-E which might both be used for the same purpose and thus would lead to double counting.

It must also be recognised that the use of GO in all countries is voluntary for the producers of electricity. However, several countries require suppliers of electricity to cancel Guarantees of Origin if they intend to disclose electricity from RES to their consumers as a specific green product or as a part of their overall company disclosure mix.[6]

The most straightforward approach to GO for electricity would be if GO were issued automatically for all generation. This would allow management of generation attributes in the GO registry and would make difficult separations between the different tracking mechanisms obsolete. Those GO certificates which have not been used until a certain deadline after the end of the respective calendar year could be collected from the accounts in the registry and would form the basis of the Residual Mix calculation.

The major arguments against this vision are the potential costs and other burdens which such an approach could put on the producers of electricity. However, as has been shown already in the E-TRACK I report on the costs of tracking systems (Ritter 2007), the specific costs of issuing GO are negligible for most of the power plants which are currently not covered by the GO systems for RES-E and HE-CHP-E. For small plants such as PV systems on individual homes a simplified approach could be used which limits or even completely avoids the extra cost of tracking.

Main issues from the stakeholder survey

- The legal obligations of EU Member States regarding Guarantees of Origin are defined in the relevant Directives. However, it would be beneficial for the reliability and the simplicity of tracking systems for disclosure purposes in Europe, if all European countries would cooperate to a larger extent than required by the Directives when designing their GO systems.
- It would be preferable if the currently separated GO systems based on national legislation and the national implementation of EECS would be merged to a single GO registry per geographic domain, which allows for issuing, domestic transfers, exports and imports and cancellation of GO. This would reduce costs and would help to avoid errors. However, there is no clear incentive for this in European legislation.
- In order to achieve such a coordinated approach, many countries would have to change their primary or secondary legislation, which are currently focused on national implementations of GO systems.

[6] See footnote 1 on page 9 for a list of these countries.

- The fees applied by the AIB to certificates issued under the EECS system might be one of the reasons why some countries maintain their national GO systems in parallel to EECS. This allows them to avoid the AIB issuing fee for those GO which are transferred only in the domestic market.
- In case that a country allows electricity for which GO have been issued to benefit from a support scheme the type of support given should be indicated on the GO. This is required for RES-E under the respective Directives and should also apply to GO issued for HE-CHP-E. However, in order to be able to record this fact on the GO, the competent bodies must have access to information regarding the electricity production which benefits from support schemes.

The E-TRACK vision

- The Commission takes an active role in encouraging Member States and other neighbouring European countries to join a coordinated system of implementation of Guarantees of Origin for electricity, which could be based on EECS.
- All European countries have implemented such coordinated GO systems for electricity. These systems are implemented firstly for electricity from RES and shortly after expanded to electricity from HE-CHP and all other forms of electricity generation.
- A continuous cooperation between the national competent bodies for GO is established, which ensures the coordinated future development of the national GO systems in Europe. The AIB could be used as the starting point for this cooperation structure. (See also chapter 7.)

3.2 Further Certificate Systems for Disclosure Purposes and Green Power Quality Labels

As explained in chapter 2, there are two certificate-based tracking systems besides Guarantees of Origin which are used for purposes of electricity disclosure.

Most prominently, the RECS certificates are being used in 13 countries. In seven of these countries, the RECS system is used in parallel to an EECS-based GO system for RES-E. Although from a market perspective, RECS certificates are equivalent to electronic GO under the EECS system, there is a number of reasons why RECS certificates remain in place: Most prominently, RECS currently allow transfers into some countries which are relevant for the market, such as France, which are not connected to the EECS system for GO. Other reasons are the possible existence of long-lasting contractual obligations between market participants based on RECS certificates and the unlimited lifetime of RECS certificates (a relevant number of RECS certificates is currently sitting in the accounts of traders which still hope to find customers for them).

Furthermore, the AIB has established a system of "disclosure certificates" as part of EECS, which can be issued for any type of electricity generation, including RES-E and HE-CHP-E. The purpose of this type of certificates is firstly to allow the explicit tracking of types of electricity generation, such as nuclear, for which GO under EU legislation are not available. Another reason was to allow for the connection of non-EU Member States to the EECS system. Similar to RECS certificates, these disclosure certificates are equivalent to GO from a market perspective (if issued for RES-E or CHP-E), but they are not fungible with GO.

The AIB is currently undertaking a major restructuring of the EECS system and its underlying description, the "Principles and Rules of Operation for the European Energy Certificate System". As part of this restructuring, the formerly separated "chapters" for the two types of GO (RES-E and HE-CHP-E), for RECS certificates and for disclosure certificates will be united into a generic system of electricity-related certificates. All certificates of the EECS system which are related to the disclosure of electricity will thus in the future be governed by a common set of rules. These certificates will be available both in EU Member States and in other European countries joining EECS. However, the four potential types of certificates can still be distinguished from the set of information kept for each certificate in the registration database. Thus the AIB makes a step towards one single system of Guarantees of Origin for all types of electricity generation, which does not separate RES-E and HE-CHP-E from other sources and technologies for electricity generation and also allows for a seamless integration of non-EU Member States into the certificate system.

A further group of explicit tracking systems for purposes of electricity disclosure is formed by several green power quality labels which are operated mostly by private bodies. Among the biggest labels are the Swedish "Bra Miljöval", the Finnish "Norppa", the Swiss "naturemade" and the German "ok-power" labels. Furthermore the German auditing organisation "TÜV Süd" operates several labels for green power which are available for use by generators in several European countries. These labels allow for different methods of tracking the origin of green power sold to final consumers, including generation owned by suppliers, electricity contracts, GO and RECS certificates. Some of the labels establish their own tracking regime, such as the "book and claim" system of the Bra Miljöval label and the TÜV Süd, who have established their own registry for the international handling of so-called "TÜV SÜD Renewable Units (TRUs)". The relationship of these accounting systems to the Guarantees of Origin and to the Residual Mix calculations in the respective countries sometimes remains unclear. There is a clear risk that the volumes which are certified by some of these labels are accounted for a second time, e.g. as part of the Residual Mix.

Main issues from the stakeholder survey

- In an ideal framework there would be only one system of Guarantees of Origin for purposes of disclosure which can be used for any type of electricity genera-

tion. All other tracking systems with the same purpose would be integrated into this comprehensive scheme.

- A strong coordination and eventual merger of existing certificate schemes for purposes of electricity disclosure reduces the risk of double counting and clarifies the responsibility of actors for tracking the origin of electricity, and thus increases the reliability of all systems.
- If the current co-existence of green power labels, certificate systems and other types of implementation of GO puts the reliability of the GO systems or electricity disclosure information at risk, then Member States are required to take adequate action.
- Another effect of parallel tracking systems for disclosure purposes is the reduced liquidity in the markets related to each of these instruments.
- The RECS system should be phased out gradually after the new GO for RES-E has become operational in all EU countries. It could still take up to five years from now to phase out the RECS system.
- Labelling bodies should use the GO system and the related registry. A precondition for this is that the GO system must be capable of conveying relevant information for the application of the eligibility and the additionality criteria of the labels.

The E-TRACK vision

- GO, RECS certificates and any other type of certificates designed for purposes of electricity disclosure are merged into one single GO system for explicit tracking, which is open for EU and non-EU countries. This system can be used not only for RES-E and HE-CHP-E, but for any type of electricity generation.
- Quality labels for electricity products are using this tracking mechanism. For this purpose, the information conveyed by the GO system has been extended by optional elements which are needed for the verification of eligibility and addi-

3.3 Other Reliable Tracking Systems

Following the E-TRACK methodology, there might be two types of other Reliable Tracking Systems (RTS) besides GO, similar certificate systems for disclosure purposes, green power quality labels and the Residual Mix calculation:

- Some support systems require an allocation of the supported electricity to final consumers in terms of disclosure, e.g. on a pro-rata basis. Such an allocation could in principle be done based on Guarantees of Origin, but their use towards the final consumers is not necessary, because the support system does not allo-

cate the production of certain supported power plants to individual consumers, but rather forms a pool of supported generation, whose average attributes are then distributed to a certain group of consumers based on the regulations of the support scheme.[7]

- Some domains have established a mechanism of contract-based tracking of generation attributes. For example, after the end of a calendar year the participants in the electricity market could make up the balance of their physical contracts in the electricity market with each of their counterparts during that year. Based on these net trading relationships, the generation attributes of generating companies could be allocated to the net buyers. Due to the complexity of the trading arrangements in the electricity market, several iterations of this allocation might be needed in order to come close to the ideal allocation result.[8] This ex-post tracking scheme allows to reflect the relationships in the physical electricity market in the disclosure information. For example it provides for an adequate picture in case that a supplier and a generation company are owned by the same parent company and due to this the supplier has purchased electricity mainly from the sister generation company. In order not to put unnecessary burdens on the trading of electricity, it would be difficult to use GO for the tracking of each transaction in the electricity market. In principle, the Residual Mix could be used instead of the contract-based tracking. However, in this case quite large volumes of the final energy consumption would be covered by the Residual Mix and this would reduce the selectivity of disclosure information given to consumers. (Actually, if only small shares of electricity are tracked based on GO, then the disclosure statements of most consumers could be nearly identical in this case.) Thus the use of a contract-based tracking system can support the meaningfulness of disclosure information to consumers.

The inventory of tracking systems in the E-TRACK II project found that most European countries are using a contract-based tracking approach in addition to a GO system in order to determine the disclosure information for their electricity suppliers. However, these systems are regulated to quite different levels of detail. Most significantly, none of the known contract-based tracking systems can identify the power plants and their generation volumes which have been allocated based on that mechanism. This makes it very difficult to determine a Residual Mix in addition to the contract-based tracking mechanism and to avoid double counting of attributes between these two mechanisms.

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[7] For example, such a regulation was used in Germany until the end of 2009. The feed-in law (EEG) allocated the supported electricity physically to all suppliers of end consumers on a pro-rata basis.

[8] The description used here is based on the ex-post contract tracking scheme which has been developed by the German electricity industry and whose operation is governed by the industry association BDEW.

Following the recommendations developed in the first phase of the E-TRACK project, other Reliable Tracking Systems are acceptable if they meet similar reliability requirements as explicit tracking, e.g. based on certificates. Preferably, their operation should be implemented based on registries.

Main issues from the stakeholder survey

- Several stakeholders expressed their general preference for a comprehensive system of Guarantees of Origin, which makes all other tracking mechanisms besides the Residual Mix obsolete.
- While these statements were rather general, there were diverging views on the reasonableness of contract-based tracking under the practical framework conditions of electricity markets. Some stakeholders questioned whether this mechanism is really needed, whereas other agreed that this mechanism can work and that it might make sense in some cases.

The E-TRACK vision

- Wherever a direct allocation of generation attributes to certain consumers or consumer groups is desired, GO are used. This means that all products which are differentiated regarding on their origin are based completely on GO (unless a certain mandatory share of supported generation is prescribed by law and is tracked by a Reliable Tracking System). Generation attributes acquired through a contract-based tracking system can only be used as part of energy supply which is not specified "ex ante" regarding its origin. It is not possible for any actor in the electricity market to split up generation attributes acquired through a contract-based tracking system into separate products.
- Each Reliable Tracking Systems operated in Europe is governed by a competent body which is responsible for the proper operation of the system. European governments ensure that all Reliable Tracking Systems operating in their countries fulfil two criteria:
    - Reliability: The Reliable Tracking System ensures that the attributes are tracked properly in this system, that no attributes are double-counted and that no attribute information is lost. There is no overlap between different Reliable Tracking Systems and if interfaces for transferring attributes between the RTS and any other tracking system exist, they are clearly defined.
    - Transparency: The Reliable Tracking Systems clearly identify the power plants and generation volumes which they are covering and thus allow avoiding double-counting between the attributes covered by the Reliable Tracking Systems and other tracking systems.

3.4 Residual Mix Calculations

The regulations for electricity disclosure in most European countries provide for a default set of attributes which can be used by electricity suppliers for disclosure purposes in case that no other reliable tracking information is available. The analysis of tracking methodologies for disclosure purposes in the first phase of the E-TRACK project has shown that the only way to make such a default set of attributes dispensable would be to require all generators, large consumers and suppliers of electricity to use Guarantees of Origin for all electricity generated and consumed. Following the recommendation from the first phase of the E-TRACK project, it would be possible to issue GO for most of or even all of the electricity generation in Europe, but an obligation to use GO for all final consumption of electricity could be an unfair burden on the large consumers and suppliers of electricity and thus is not likely to be implemented. Thus the provision of a de-

fault set of attributes for disclosure purposes remains part of the E-TRACK standard for tracking.

However, in many countries the default set of attributes simply consists of uncorrected generation statistics, determined either on a national basis or on the European level (e.g. from the statistics provided by ENTSO-E and its member associations).[9] Similarly, many countries are using national generation statistics from other countries in order to determine the attributes of electricity which has been imported physically. The use of uncorrected generation statistics inevitably leads to double counting of attributes in relation to GO systems and other tracking mechanisms and thus should be avoided. The first phase of the E-TRACK project has developed a proposal for the determination of a Residual Mix, which corrects the electricity generation statistics of a certain geographical region by the attributes tracked based on other tracking mechanisms. In order to deal properly with the exports and imports of GO and of physical energy, the Residual Mix calculations need to be coordinated on a European level and a European Attribute Mix needs to be established (Timpe 2007).

The proposal of this Residual Mix calculation has been taken up by RECS International and a first rough calculation for such mixes has been presented in early 2009 which was using an approach based on several regions in Europe (Hedenström 2009). In the discussions during the E-TRACK II project, the competent bodies from several European countries have expressed their general support for the Residual Mix approach as proposed by E-TRACK, but so for a formal cooperation between the competent bodies in different countries could not be established.[10]

It must be noted that even if the default set of attributes for disclosure purposes are calculated correctly as a Residual Mix, its use should still be restricted to the minimum extent possible. This is recommended because if the default set of attributes are used to a large extent, then this will level out the differences between the disclosure statements of different suppliers and thus will reduce the possibility for consumers to choose between suppliers based on the origin and the environmental indicators (CO_2 emissions and radioactive waste) of their electricity mix.

Main issues from the stakeholder survey

- The proposal for a Residual Mix calculation was broadly accepted by the stakeholders.

[9] In July 2009, the new organisation ENTSO-E has been formed by the members of six separate organisations of Transmission System Operators, ATSOI (Ireland), BALTSO (Baltic region), NORDEL (Nordic region), UCTE (western continental Europe) and UKTSOA (UK) and ETSO.

[10] The establishment of such cooperation is the objective of a newly formed European Platform for Electricity Disclosure (EPED) and a new proposal for an IEE project called "Reliable Disclosure Systems for Europe (RE-DISS)".

The E-TRACK vision

- All European countries determine a Residual Mix for purposes of disclosure, which excludes double counting of all attributes which have been tracked based on Guarantees of Origin or other Reliable Tracking Systems.
- The competent bodies of all countries in Europe cooperate in order to reflect the impact of cross-border transfers of Guarantees of Origin and of physical electricity. For this purpose they jointly determine a European Attribute Mix.
- The regulations for electricity disclosure in all European countries are designed in a way which incentivises the use of other tracking mechanisms than the Residual Mix.

3.5 Other Tracking Systems for Disclosure Purposes

The previous sections of this chapter have described the elements of tracking systems under the E-TRACK recommendation:

- Guarantees of Origin for RES-E, HE-CHP-E and more generic tracking certificates for purposes of disclosure
- Other Reliable Tracking Systems
- A Residual Mix calculated by the competent body for the respective domain

These three elements should be sufficient to ensure a smooth operation of a tracking system for purposes of electricity disclosure which meets the criteria which have been defined for the evaluation of tracking systems in the first phase of the E-TRACK project: informational value, accuracy, robustness, feasibility, costs and flexibility (Timpe 2007).

The competent bodies supervising electricity disclosure should ensure that all market participants are working exclusively with these three elements of the tracking system. If there are any other tracking mechanisms in operation, then the competent bodies should verify whether these could be integrated into the comprehensive system of Guarantees of Origin, or whether they fulfil the criteria for Reliable Tracking Systems and can be qualified as such a system. If both tests fail, the use of these tracking systems should be prohibited.

Main issues from the stakeholder survey

- This approach was supported by the stakeholders.
- The operators of tracking systems should cooperate in order to reduce the risks of double counting and loss of information.

- A proposal was made that all tracking systems should be approved by the competent body based on the criteria proposed above before they can be used by market participants.

The E-TRACK vision

- The tracking system in each domain in Europe consists of a comprehensive system of Guarantees of Origin which are available for all types of electricity generation and a Residual Mix. If required, the competent body for this Domain also approves Reliable Tracking Systems which fulfil the criteria of reliability and transparency.
- The competent bodies ensure that any other tracking mechanisms are not used by market participants before they have been approved as a Reliable Tracking System by the competent body.

3.6 The Handling of Environmental Information in Tracking Systems for Electricity

Directive 2003/54/EC and its update in Directive 2009/72/EC require suppliers of electricity to disclose to their customers the mix of energy sources used for generating the electricity which they have delivered during the previous year plus the related CO_2 emissions and the production of radioactive waste. This means that the tracking system established by EU Member States and other European countries needs to define rules how these two environmental indicators should be determined.

Following Directive 2009/28/EC, biofuels and bioliquids shall only be accounted for purposes of the national targets under this Directive, the compliance with support schemes based on renewable energy obligations and for other forms of financial support for the consumption of biofuels and bioliquids if they meet the sustainability criteria defined in Article 17 of the Directive. It can be expected that similar sustainability criteria will be defined on the European level for solid biomass in the near future. As bioliquids and solid biomass can be used for the production of electricity, the question arises whether European tracking systems for electricity should also convey information whether the bioenergy used for power generation has met certain sustainability criteria.

The E-TRACK standard developed in the first phase of the E-TRACK project recommends that the indication of plant-specific CO_2 emissions and radioactive waste production on Guarantees of Origin should be provided for by the registry systems, but that the actual use of this data field is optional. This recommendation was developed based on the expectation that GO will in the future not only be issued for RES-E and HE-CHP-E, but also for electricity from fossil and nuclear energy sources. In case that GO cancelled by a supplier do not contain this information, national average factors based on the en-

ergy source used and, where necessary, on the type of production device should be applied. The CO_2 emissions and radioactive waste production should also be part of the data provided by Reliable Tracking Systems and the Residual Mix.

Regarding the CO_2 emissions, definition is required whether only direct emissions at the power plant are accounted for or whether and to which extent the life-cycle emissions of the electricity production (including the steps of producing the non-renewable energy used and the power plant itself) and possibly also of the total electricity system should be included in the CO_2 figure. Another point for clarification is whether only CO_2 is accounted for or whether other greenhouse gases are included in the analysis and are accumulated to their CO_2 equivalents. In case that CO_2 emission figures are included on the Guarantees of Origin, these definitions should be taken jointly by all competent bodies. Regarding the provision of disclosure information to final consumers the related definitions should be taken consistently within each country, and preferably also across Europe.

The related report from the first phase of E-TRACK refers to the "Consumer Information on Electricity (CIE)" project (Palmer et al 2004), which has recommended to use CO_2 emissions only rather than CO_2 equivalents in order to reduce the complexity of the system.[11] The CIE project has also recommended that disclosed CO_2 emissions should be based on direct emissions from the power plants initially, moving to life-cycle emissions of the power plant and fuel after a basis has been agreed amongst the Member States on which lifecycle emissions are calculated (Pooley 2007). Because the specific production of radioactive waste per unit of electricity differs in Europe within a range of approximately 2,2 and 3,5 mg per kWh (a factor of 1,5), it seems also advisable to track this factor as well. This should be done on a plant-specific basis in case that GO are used for nuclear energy and in all other cases as part of Residual Mix calculations or Reliable Tracking Systems.

It must be noted that the CO_2 information on a GO, a disclosure statement or any information regarding a green power product may not be interpreted as an actual contribution to carbon emission reductions. This is due to the existence of the European Carbon Emissions Trading System (ETS), which establishes a "cap and trade" mechanism for carbon emissions which includes the electricity sector.

The third environmental indicator, the sustainability of bioliquids and potentially also of solid biofuels and biogas used for electricity production was not yet in the scope of the discussions in the first phase of the E-TRACK project. Within the sectors of biofuels, bioliquids and biogas, tracking systems are currently being established which show some similarities to the Guarantees of Origin used in the electricity sector. In case that

[11] Palmer, J., B. Boardman, V. Bürger, C. Timpe (2003): Consumer Information on Electricity – Final Report. September 2003. http://ec.europa.eu/energy/gas_electricity/studies/electricity_en.htm

GO are issued for electricity produced from one of these fuels, the GO could contain the information about the sustainability schemes which were met by the bioenergy.

Main issues from the stakeholder survey

- Clearly, plant-specific CO_2 information in GO cannot serve any compliance purpose under the EU ETS, it would only be for information of consumers. This could in theory support voluntary commitments by organisations to reduce the CO_2 footprint associated to their electricity consumption. But the GO cannot actually convey CO_2 reductions and thus this issue needs to be handled with care.
- A concern was raised that the inclusion of environmental indicators on GO and in other tracking mechanisms should not represent an undue burden for the generators of electricity and that the information provided must be accurate and reliable. There should be no extra burdens on GO issued for RES-E compared to GO for electricity from other energy sources.
- As long as there is no widely accepted method for the calculation of indirect CO_2 emissions, information on GO and electricity disclosure should be restricted to direct emissions, and allowing for credits for the CO_2 absorbed when growing bioenergy.
- The ultimate goal could be to include all greenhouse gases in the tracked information, but this would also require a widely accepted method for their calculation.
- The general preference was to use direct CO_2 emissions and to follow the recommendation that this information is optional of Guarantees of Origin and that national or regional fuel-specific emission factors are used if no other information is available.
- The inclusion of sustainability schemes met by bioenergy used for electricity production could be made optional in GO systems. The actual use of this option should follow the demand from the market. The sustainability schemes which could be included should be selected based on non-discriminatory criteria, following the practices taken by national governments in assessing the sustainability of bioenergy.

The E-TRACK vision

- The competent bodies in Europe agree to enable the indication of direct CO_2 emissions and of the production of radioactive waste per unit of electricity on the Guarantees of Origin. However, the actual use of this information is voluntary for the generators for the time being.
- Similarly, the compliance of bioenergy used for electricity generation with selected sustainability schemes can be included in the GO information if desired by the generator. The governments give guidance to the competent bodies which sustainability schemes are relevant for this purpose.
- Reliable Tracking Systems are also indicating the direct CO2 emissions and the production of radioactive waste per unit of electricity.
- If suppliers of electricity have no information available regarding the CO_2 emissions or the radioactive waste per kWh of electricity they have procured, they are required to use national or regional fuel-specific factors which are defined by the competent body as part of the Residual Mix calculations.
- The competent bodies or other designed bodies watch the claims of electricity suppliers regarding the CO_2 emissions of their electricity. This communication should not give false information regarding CO_2 savings and should reflect the effects of the EU ETS.
- All European countries have chosen to use the option contained in Article 15 (12) of Directive 2009/28/EC and thus require electricity suppliers which market RES-E with environmental claims to disclose the share of energy from "new" renewable plants in their disclosure and/or product portfolio, which became operational after 25 June 2009.

4 Certificates Administering Support Schemes for Electricity

When the system of Guarantees of Origin was introduced in the "old" Renewables Directive 2001/77/EC, the definition of the purpose of the GO for RES-E was left quite vague.[12] This was probably done by intention, because at that time, the development of certificate systems for energy was in quite an early stage. The Cogeneration Directive 2004/8/EC took over this vague definition for the description of GO for HE-CHP-E. These vague definitions have led to different types of implementation of Guarantees of Origin in Europe. Some countries have used GO for purposes of electricity disclosure, others used them for support purposes and some allocated both purposes to the GO. The different interpretation of the purpose of the GO proved to be one of the major obstacles against their transferability across borders.

Luckily, the new Renewable Directive 2009/28/EC has clarified that GO for RES-E shall be issued primarily for purposes of electricity disclosure. Although this has no legal impact on the GO for HE-CHP-E, one could expect that many European governments will use the time frame until December 2010, until when the new GO for RES-E has to be implemented, to revise the definition of the CHP-GO accordingly in order to achieve a consistent system of Guarantees of Origin.

As of early 2009, seven EU Member States were using a renewable energy obligation (quota system) as the main support instrument for renewable energy. In order to implement these support mechanisms, a transferable "support certificate" is required which can be purchased by the obliged actors in order to comply with the obligation. Six out of the seven Member States operating quota-based support systems have introduced support certificates for RES-E which are separate from the GO. Poland is the only country where the GO for RES-E is not linked to disclosure but is rather used directly as a support certificate. As the support system is restricted to domestic producers, exports and imports of GO are not accepted in Poland. Certificate-based support systems for HE-CHP are being operated in the three regions of Belgium as well as in Poland and the United Kingdom.

Given the emerging common understanding that Guarantees of Origin are used for disclosure purposes only, all countries operating a quota-based support scheme for RES-E and/or for HE-CHP-E would have to introduce support certificates which are legally separate from the GO.[13] However, the criteria for using the support certificate could, for

[12] Article 5 (3) of Directive 2001/77/EC: „A guarantee of origin shall (…) serve to enable producers of electricity from renewable energy sources to demonstrate that the electricity they sell is produced from renewable energy sources (…)."

[13] The separation of the functions of GO and support certificates is not required by European Directives, unless they are being used in a Joint Support Scheme which has effect on the national targets for re-

example, require the obliged actors to cancel the related GO as well. This would ensure that supported generation is not being exported. Another option for implementing such a regulation, which is provided for in Directive 2009/28/EC, is that Member States can prohibit the payment of financial support in case that a GO has been issued. (Note that this regulation does not apply as such to non-renewable HE-CHP-E.)

A cross-border harmonisation of support certificates would make sense in case that two or more countries intend to establish joint support schemes based on quota obligations.[14] The discussions between the governments of Sweden and Norway about a joint support scheme for RES-E have lasted several years and just recently seem to make considerable progress. This example shows that the complexity of such joint support schemes, including the economic distributional effects between the countries involved, can be difficult to handle.

Another issue regarding cross-border cooperation is the definition of the support certificate. Whereas it seems straightforward to issue the certificates based on the volume of electricity produced, the support certificates used in the Walloon region in Belgium are rather issued based on the CO_2 emissions avoided. Such differences would have to be levelled out if a cooperation of several countries in certificate-based support systems for RES-E or HE-CHP-E is envisaged.

It should be noted that Member States are not required to open up their support systems for cross-border transfer. Directive 2009/28/EC has clarified for the part of RES-E that such a decision has a purely voluntary character for the Member States. It is also important to note that Joint Support Schemes under this Directive can be based either on a renewable energy obligation using support certificates or on a joint feed-in mechanism. The latter option does not require support certificates and therefore was not discussed further in this section.

Main issues from the stakeholder survey

- The 2009 Renewables Directive would not prevent a Member State from using the GO directly for purposes of a domestic support scheme as well as for disclosure. However, if several countries engage in a Joint Support Scheme, then the 2009 RES Directive prevents the use of GO for the accounting of the distribution of the supported energy to the national RES targets of the countries involved. This would rather require separate support certificates.

newable energy under Directive 2009/28/EC. However, it makes things easier if all countries agree to dedicate Guarantees of Origin exclusively to disclosure, and not to support mechanisms as well.

[14] Note that Joint Support Schemes are also one of the so-called Cooperation Mechanisms under Directive 2009/28/EC regarding the national targets for energy from RES until 2020.

- There are no general objections against the introduction of support certificates in addition to GO in case that a country has chosen a support scheme which is operated based on support certificates.
- In order to avoid confusion, support certificates and GO should be clearly distinguishable and their misuse for other purposes than they were issued for should be prevented. This requires an adequate legislation in those countries where both types of certificates exist. Governments have a clear interest that GO, which typically are much cheaper than support certificates, are not misused for compliance with a quota obligation. However, suppliers of electricity should also be prevented to use information from cancelled support certificates for disclosure purposes without cancelling the corresponding Guarantees of Origin.

The E-TRACK vision

- Each country is free to decide about the design of the support scheme(s) which it uses for RES-E and HE-CHP-E, and whether it engages in cross-border cooperation in such systems or not, as long as it reaches the national targets which have been agreed on the European level. This choice includes feed-in tariffs, bonus models, renewable energy obligations and other support schemes.
- If a country has decided to use a support scheme which uses support certificates, then it may issue such certificates in addition to the tracking systems used for disclosure purposes (GO, other Reliable Tracking Systems and the Residual Mix).
- A harmonised European definition of support certificates is available to those countries which choose to enter into Joint Support Schemes based on support certificates.

5 Could Target Certificates be used under Directive 2009/28/EC?

As already explained in chapter 2.1, transfers of Guarantees of Origin for RES-E across borders can be used for meeting the indicative national targets defined under the "old" Renewable Energy Directive 2001/77/EC in case that the governments of the countries involved agree to the accounting of such transfers to their targets.

Under the "new" Directive 2009/28/EC, Guarantees of Origin can not have this role any more. Article 15 (2) clarifies that the transfer of Guarantees of Origin between Member States has no impact on their compliance with the national targets under this Directive. In order to introduce flexibility into the compliance procedures for the national targets, the Directive provides for three "Cooperation Mechanisms": Statistical Transfers, Joint Projects and Joint Support Schemes.

Statistical Transfers can be made between two Member States, one of which has exceeded its target for a given year. As specified in Article 6, both countries involved have to notify the Commission in writing about the transfer no later than three months after the end of each year in which the transfer shall have effect.

Joint Projects can be established between two or more Member States and may involve private operators. As specified in Article 7, a notification shall be made to the Commission by the Member State on whose territory the Joint Project is located ("host country"). The notification shall specify, inter alia, a fixed amount of renewable energy production or a share of the total renewable energy production of this project which shall be counted towards the national target of another Member State for a certain number of calendar years. Article 8 stipulates that the host country shall send a letter of notification to the Commission and the other Member States involved within three months after the end of each year in which the Joint Project has effect, which specifies the amount of renewable energy which is to be transferred to the national targets of the other Member State(s).

Joint Support Schemes can be set up by one or more Member States. Article 11 specifies two options for the implementation of such schemes in relation to the verification of compliance with the national targets. The countries involved can either use Statistical Transfers for every year of their cooperation or they can agree on a certain rule for the distribution of renewable energy produced under the Joint Support Scheme among the countries. In the latter case, the distribution rule shall be notified to the Commission and all countries involved shall send letters of notification to the Commission for each year of their cooperation which specify the volume of renewable energy which is subject to the distribution rule.

The Cooperation Mechanisms are first of all designed for use between EU Member States. However, the further members of the EEA and also the Energy Community Treaty countries could participate in these mechanisms after they have adopted the Di-

rective in their national legislation. The Commission reserves a right to verify in this case, whether these countries have actually adopted binding targets for the expansion of renewable energy of a similar level of ambition as the EU Member States. The status of Switzerland will depend on the results of bilateral negotiations between the Swiss government and the Commission. All other countries are treated as "third countries" under the Directive.

Joint Projects with third countries are also possible under the condition that they relate to new projects for RES-E production and that the volume of electricity which shall be counted towards the target of an EU Member State is physically imported into the EU (see Articles 9 and 10).

This description of the Cooperation Mechanisms shows that the target-related accounting will be done exclusively on the level of governments and that transfers of renewable energy between private actors will not be involved in this. However, the question arises how the potentially complex transfers among Member States and between them and third countries can be handled in practice and how the Commission can ensure that all parties involved have a full overview on the actual use of the mechanisms and its impact on the national targets in each year.

One of the options for implementing the accounting mechanisms between the countries could be "target accounting certificates", which would be issued and transferred by governments in order to implement an accounting tool for the notifications related to the Cooperation Mechanisms. Such certificates could be handled exclusively by governments without the involvement of private actors, and their use would not be to facilitate a market, but rather to formalise the transfers between countries under Articles 6 through 11 of the Directive.

Main issues from the stakeholder survey

- The spirit of the 2009 RES Directive is to rule out any relation between renewable energy certificates which are transferable between private entities and the compliance of Member States with their national targets.
- It seems sensible to address the issue of how the use of the Cooperation Mechanisms by European countries can be implemented properly. However, the idea of "target accounting certificates" which are transferred between governments seems not to be the right approach. What is needed is rather a "clearing house" which keeps track of the positions of each Member State and third country involved in the Cooperation Mechanisms.[15]

[15] This proposal was made by Phil Moody, Secretary General of the Association of Issuing Bodies, and has been taken up in the E-TRACK vision.

The E-TRACK vision

- In order to implement a transparent accounting for the volumes of renewable energy transferred between EU Member States and between them and third countries for purposes of target accounting under Directive 2009/28/EC, the Commission has established a clearing house for the Cooperation Mechanisms, which keeps track of all notifications of transfers related to Statistical Transfers, Joint Projects and Joint Support Schemes.

6 Other Certificate Schemes

This chapter addresses the relation of tracking systems for electricity to other energy-related certification schemes.

6.1 Guarantees of Origin for Other Forms of Energy

Directive 2009/28/EC establishes a system of Guarantees of Origin not only for RES-E, but also for heat and cooling from renewable energy sources (RES-HC). In principle, the same rules apply to Guarantees of Origin for RES-HC as to those for RES-E. However, the Member States are obliged to install the GO scheme for electricity, but they can decide freely whether they want to issue Guarantees of Origin for RES-HC at all and if they do so, the issuing can be restricted to installations above a certain capacity threshold. These regulations might have been added to the Directive due to an uncertainty whether a true market will emerge for RES-HC which, different to RES-E, can not be transferred in trans-European networks but are rather limited to local consumption or local distribution networks for heat (and possibly cooling).

There are no provisions in European legislation yet regarding Guarantees of Origin for heat and cooling from high-efficient cogeneration (HE-CHP-HC). This might be an issue for a future revision of the CHP Directive 2004/8/EC. Meanwhile such GO might emerge based on national regulations or private initiatives. However, similar to the RES-HC, a strong market activity with such GO seems not very likely.

Looking into other fields of renewable energy, significant progress has been made already regarding Guarantees of Origin for biofuels, bioliquids and biogas.[16] These two could have a direct relation to the GO for RES-E, as bioliquids and biogas can be used as fuel input to generators of electricity and thus the information about the renewable origin of the fuel could be taken over from the bioenergy GO system into the GO for RES-E.

The Association of Issuing Bodies is currently assessing the implications of expanding the scope of its activities to the harmonisation of Guarantees of Origin in these types of energy-related Guarantees of Origin (van Dijk 2009). Although an early harmonisation of the new GO schemes is seen as important by many, this step of AIB could increase the complexity of the European Energy Certificate System and of AIB's membership basis significantly.

[16] See for example www.biofuelgo.org and the activities of Gasunie (NL) and other companies on Guarantees of Origin for biogas.

Main issues from the stakeholder survey

- Biofuels, bioliquids and biogas are generally seen as important fields for the development of GO systems which are harmonised on an international level. For these energy sources, the scope of the GO schemes could easily extend to different parts of the world, as the related markets are not restricted to Europe.
- The current Issuing Bodies for GO for electricity are typically TSOs or regulators from the electricity sector. They are not very likely to expand their activity into the areas of heat & cooling from RES, biofuels, bioliquids and biogas as these are usually beyond their responsibility.
- The biggest challenges of new fields for Guarantees of Origin lie in the accreditation and registration of production devices and the issuing of the Guarantees of Origin. A potential long-term development in area of competent bodies for energy-related certificate schemes could be that these two tasks are performed by different sector-specific bodies, whereas the harmonised infrastructure of a GO registry which allows to transfer and to cancel different types of GO could be provided by a single, non-specialised body per domain, which could be mandated by the government.

The E-TRACK vision

- European countries are prepared to develop harmonised systems of Guarantees of Origin for heat & cooling from RES as well as for biofuels, bioliquids and biogas in case that there is a demand for such schemes from the market.
- In the longer run, each Domain establishes a generic registry for different types of energy-related Guarantees of Origin which is operated by a competent body. The accreditation and registration of production devices and the issuing of GO are undertaken by sector-specific Issuing Bodies. The operator of the generic registry and the sector-specific Issuing Bodies are mandated by the government.

6.2 White Certificates for Energy Efficiency

White Certificates are issued in response to an energy efficiency measure. They can be used for different mechanisms of supporting energy efficiency. The typical application of White Certificates is their combination with an obligation on certain actors in the value chain for energy, e.g. suppliers of energy to final consumers, to support a certain volume of energy efficiency gains in relation to their final sales in energy.

White Certificates are currently being used by three Member States (UK, Italy, France), a system in Poland is under preparation.[17] Following an obligation under the "Energy Services Directive" 2006/32/EC and the European Energy Efficiency Action Plan, the Commission is currently investigating whether it is appropriate to create a legal framework for White Certificates.

Unlike the certificates for production of energy from certain sources or technologies, which can be metered quite easily, competent bodies for White Certificates are facing the challenge of measuring and verifying energy savings. For doing this, the competent bodies for the three White Certificate schemes which are active in Europe have taken different approaches, which would make it difficult to connect the systems by exchanging certificates.

Main issues from the stakeholder survey

- The stakeholders agreed that although the objectives of increasing energy efficiency and increasing the share of renewable energy in total energy consumption are linked on the political level, the instruments of Guarantees of Origin for energy and White Certificates for energy efficiency are completely different tools and could not be merged.
- However, if a country is running a system of White Certificates, it might choose to implement this certificate system in the same registry as other energy-related certificates. See the proposal on sector-specific issuing of energy-related certificates in the previous section.

The E-TRACK vision

- The Commission develops a plan whether and how the implementation of White Certificates should be coordinated on the European level.
- Member States which run White Certificate systems could implement these certificates in the same registry as other energy-related certificates. However, the measurement and verification of energy efficiency gains and the issuing of White Certificates would have to be undertaken by a specific Issuing Body for this scheme.

[17] For more information, see also the EuroWhiteCert project, which was supported under the IEE programme and was concluded in 2007: http://www.ewc.polimi.it/index.php

6.3 The EU Carbon Emission Trading Scheme

The EU Emission Trading Scheme (ETS) establishes a "cap and trade" system for greenhouse gas emissions in the EU. It is implemented by the Member States based on Directive 2003/87/EC, which was amended recently in June 2009. The trading scheme is based on transferable emission permits, the EU Allowance Unit (EUA). The obliged actors under the ETS have to cancel one EUA for every ton of CO_2 which they have emitted. In the current phase of the trading scheme (2009 – 2012), the allowances are issued to the obliged actors mostly through free allocation (based on National Allocation Plans) and a certain share of auctioned allowances. In the third ETS phase starting in 2013, the allocation will be centralised and the share of auctioning will be increased gradually from 20% in 2013 to 100% in 2025. For the electricity sector, a full auctioning of the allowances will already be implemented by 2013 (with some exceptions).

The ETS and the system of GO are two completely separated schemes with fundamentally different mechanisms and objectives. Thus, a strong coordination between the two systems would not make sense.

The only potential connection between the two systems is the data on actual emissions from power plants, which is needed for the monitoring and reporting under the ETS scheme. This data could be used for determining plant-specific emission factors which could be reported on Guarantees of Origin for electricity. This would be possible for the direct emissions from power plants with a thermal capacity of more than 20 MW, as these are subject to the ETS system. As long as electricity disclosure is using only direct CO_2 emissions, data from the verified monitoring reports under the ETS could be used for determining the CO_2 emission factor on the GO. However, these reports are available only on an annual basis and are produced several months after the end of the year of power production. In many cases this will be far too late for issuing Guarantees of Origin. Thus if CO_2 information needs to be included on the GO, other sources of information will be required (Pooley 2007).

Main issues from the stakeholder survey

- The tracking system for electricity and the ETS are two separate systems which work in parallel and have no direct linkages. However, the data on emissions handled in both systems should be compatible, and not contradictory.

The E-TRACK vision

- Tracking systems for electricity and the ETS remain two separate systems.
- The competent bodies in each domain ensure that the data on CO_2 emissions reported to consumers in electricity disclosure statements match with the actual emissions of power plants in Europe, which are also reported under the ETS system.

7 A Long-Term Outlook on Energy-Related Certificate Systems

The E-TRACK II project has developed a proposal for a phased approach to the harmonisation of tracking systems for purposes of electricity disclosure in Europe. This proposal assumes that certain short-term adaptations of the GO systems and other parts of the tracking systems are undertaken within or shortly after the period given to Member States for the implementation of the new RES Directive 2009/28/EC. Further steps of harmonisation can then be taken in the following few years.

Table 2: Gradual development to a consistent tracking system for purposes of electricity disclosure

Situation today (typical)	**Short-term adaptation** *(Minimum recommendation for 1-2 years from now)*	**Medium-term target** *(Minimum recommendation for 3-5 years from now)*
Different explicit means of tracking can be used, there is no or little coordination.	All explicit tracking means are coordinated (joint registry). GO, RECS, TÜV and quality labels coexist in a reliable way.	GO are issued for all RES and HE-CHP generation. Explicit tracking is only possible based on GO. GO are available for any type of generation and support quality labels.
Only some support systems clarify disclosure.	All support systems clarify their relation to disclosure, e.g. as a pro-rata allocation (RTS).	All support systems clarify their relation to disclosure, e.g. as a pro-rata allocation (RTS).
Contract-based tracking is used by many countries. There is only little regulation and little transparency.	Contract based tracking is allowed based on basic regulations. Transparency is required.	Contract based tracking is allowed only if strict regulations are met and full transparency is ensured.
Uncorrected statistics are allowed, or a Residual Mix is calculated on a national level (shortfalls regarding cross-border transfers).	Residual Mix must be used. Large exporters and importers join a platform for a European Attribute Mix.	European Attribute Mix platform comprises all countries *or* Single European Residual Mix

Source: Timpe 2009

The discussions during the E-TRACK II project have shown that the competent bodies for the implementation of Guarantees of Origin for RES-E, for HE-CHP-E and for electricity disclosure play a crucial role in the harmonisation of tracking schemes. Although their activity is guided by the primary and secondary legislation in their countries, they usually have a certain range of options how they implement the tracking systems. They might also have an influence on revisions of the national legislation, as it is currently required in order to modify the implementation of the GO according to the new RES Directive.

Ideally, the tasks of implementing the electricity disclosure system as well as the Guarantees of Origin for RES-E, for HE-CHP-E and potentially also for any other type of electricity generation is be given to the same body. If this is not the case, then a close cooperation between the different bodies assigned with these tasks is essential.

For example, the competent body for the electricity disclosure system in a domain would be responsible for the overall reliability of the tracking system, for the acceptance of each of its elements and for the calculation of the Residual Mix. This requires detailed knowledge about the setup of the GO systems and the actual data processed in these systems.

As already proposed above, there could be one registry per domain which is not only managing all Guarantees of Origin for electricity in this domain, but could also handle other energy-related certificates such as GO for heat and cooling from RES, GO for biofuels, bioliquids and biogas, support certificates and White Certificates if any of these are being used in the respective domain. This registry would be operated by a single competent body, whereas the issuing of the individual types of certificates could be left to specific Issuing Bodies. However, it is too early to assess under which conditions this model can be recommended.

Depending on the further integration of electricity markets in Europe, the national tracking domains could be integrated into larger, multi-national tracking regions with uniform regulations for all tracking mechanisms. As an ultimate vision of E-TRACK, tracking could eventually be organised in a single uniform tracking domain for Europe after a truly single European electricity market has been achieved.

Main issues from the stakeholder survey

- The principles of the E-TRACK recommendations are broadly accepted by the stakeholders and are deemed to support a stable and reliable tracking system.
- In the long run, GO could be issued automatically for all electricity generation in Europe. The Residual Mix could be determined easily from those GO relating to generation in a calendar year which have not been cancelled by a certain deadline.
- The registration of power plants using renewable energy sources for purposes of issuing GO could be linked to the management of support schemes, priority grid access and priority dispatch.
- The future of the green power market will strongly depend on the future demand from private commercial and public energy consumers. Rising cost for public support schemes might reduce the willingness to pay extra for green energy on a voluntary basis.
- On the longer run, the discussion about the stronger coordination of the support schemes for RES-E and HE-CHP-E in Europe might reappear on the political

agenda. For example, EFET calls for a uniform market-based support scheme at a European level which could be based on GO (Styles 2009). However, such proposals were not successful during the political negotiations on the 2009 RES Directive.

The E-TRACK vision

- European countries follow the E-TRACK recommendation for a gradual harmonisation of their tracking systems for purposes of disclosure.
- The governments mandate a single competent body for the operation of all electricity-related tracking systems. The competent bodies from all countries work closely together in order to manage the cross-border aspects of electricity tracking.
- A joint register for all energy-related certificates is being created in each Domain. If there is a need to issue energy certificates which are not related to electricity, this task is given to sector-specific Issuing Bodies which use the joint infrastructure of the registry.
- Depending on the further integration of electricity markets in Europe, national tracking domains are gradually integrated into larger, multi-national tracking regions with uniform regulations for all tracking mechanisms.

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Annex: Discussion Paper Used for the Stakeholder Interviews

E-TRACK II Discussion Paper

Long-Term Developments in Energy Certificate Systems

The Association of Issuing Bodies (AIB) has developed the European Energy Certificate System (EECS). This is a comprehensive system for electronic Guarantees of Origin and similar certificates which are proving the origin of electricity, mostly for purposes of electricity disclosure. EECS currently comprises

- GO for RES electricity (under the RES Directive)
- GO for high-efficient CHP electricity (under the CHP Directive)
- RECS certificates for RES electricity (as a voluntary system)
- GO for the disclosure of any type of electricity generation (with no direct legal basis in EU Directives but supporting disclosure as required by the Internal Energy Market Directive)

Q1 Does it make sense to establish a single European system of Guarantees of Origin for purposes of electricity disclosure, which unites these four systems into one (but still allows to differentiate the legal basis of the certificates)?

Currently many countries are operating national GO systems and the EECS system in parallel. The national systems are often not based on electronic certificates. The EECS system is being used for cross-border transfers and partly also for domestic trading. National GO can often be converted into EECS, or the issuing is mutually exclusive between the national GO and the EECS system. This coexistence of two systems is often resulting from national legislation which in many cases foresees only a domestic implementation of the GO system.

Q2 Should this parallel existence be continued or should there be pressure on national competent bodies to connect national GO systems directly with each other on a European basis, e.g. through the EECS system?

The EU Internal Energy Market Directive 2003/54/EC requires the disclosure of CO_2 emissions related to electricity production. The CO_2 emissions from different power plants differ significantly. (The disclosure of the specific production of nuclear waste is also required, but nuclear power plants in Europe have a quite similar specific produc-

tion of nuclear waste per kWh of energy produced and thus tracking of plant-specific information is not necessary.)

Q3 Should all GO contain information regarding the specific emissions of CO_2 from power generation? Should this information be based on the direct emissions of the power plant alone or should it reflect full life-cycle emissions? Should other greenhouse gases than CO_2 be included? Or is it possible and sufficient to develop a pragmatic balance between the different options?

E-TRACK recommends that GO should *inter alia* contain the following additional information

- An indication of the relevant support schemes which have supported the investment in the production device or the ongoing production of energy
- In case of biofuels used for power generation (to be extended to other bioenergy where appropriate): information about sustainability labels fulfilled by the fuel used (the related CO_2 figure should be used in the calculation of the CO_2 emissions reported in the GO).
- Where feasible, information regarding the eligibility of the underlying generation to one of the major European green power labels.

Q4 Is this sensible and feasible? Is there any other information which should be included in the GO in the longer run?

Currently, RECS certificates exist in parallel to the GO for RES electricity and both basically serve the same purpose, electricity disclosure. Other tracking systems for purposes of disclosure are operated by private bodies, e.g. the German TÜV or several green power labelling bodies.

Q5 Should the system of voluntary RECS certificates be continued in parallel to the other EECS certificates mentioned above or should it be phased out (and if yes, under which conditions)?

Q6 Does it make sense that several Issuing Bodies are operating certificate systems and registries for purposes of electricity disclosure in the same geographic domain? If yes, how could their coexistence be made reliable, e.g. avoiding double issuing of GO?

The E-TRACK recommendation includes so-called “other reliable tracking systems”, which fulfil similar functions as a GO system (the allocation of generation attributes for purposes of electricity disclosure), but are not an electronic certificate system. Typical examples of such national systems are allocation rules for supported RES electricity or certain systems for contract-based tracking of attributes. E-TRACK recommends criteria for these mechanisms, which relate to their reliability (e.g. avoiding double counting

of attributes) and transparency (allowing to identify which energy volumes have been tracked by each of the systems).

Q7 Do you think that these "other reliable tracking systems" will be needed in the future as well or should they be replaced by specific usages of GO?

Under the E-TRACK recommendation, tracking for purposes of disclosure should only be undertaken based on GO, "other reliable tracking systems" (fulfilling certain criteria) and a Residual Mix to be determined by the national competent body in cooperation with similar bodies in other countries. This means that any tracking mechanisms which do not fall under any of these three categories would be seen as "illegal" and should be removed.

Q8 Do you agree to this recommendation? Do you think that it can actually be implemented within a reasonable timeframe?

Several countries operate support schemes based on transferable "support certificates". The UK even uses two separate transferable evidences, the Renewable Obligation Certificate (ROC) and the (Climate) Levy Exemption Certificate (LEC).

Q9 Should it be possible for countries to issue one or more support certificates or other transferable evidence of generation attributes, independently from GO systems, for purposes of administering support schemes?

Q10 Which measures should be taken to retain transparency and to avoid double counting between different types of certificates for different purposes?

Q11 Should support certificates be transferable across borders?

Directive 2009/28/EC states that GO should have no function regarding the accounting for the RES targets for 2010. This seems to exclude a relation between private trading of RES electricity and the target accounting. However, Joint Projects and Joint Support Schemes under this Directive require to account for volumes of energy produced and their allocation to the countries involved. Statistical Transfers are a mechanism for the statistical ex post re-allocation of energy from RES for purposes of target accounting.

Q12 Would it make sense to establish "target certificates" as an optional type of certificate (besides GO for disclosure purposes and support certificates) in order to administer the target accounting between European countries related to Joint Projects, Joint Support Schemes or Statistical Transfers under Directive 2009/28/EC? How could such target certificates be used?

The EU Emission Trading System (ETS) is issuing emission allowances which can be traded among the parties falling under the "cap and trade" system. By nature, an emission allowance is something completely different than a Guarantee of Origin, but both are transferable certificates which can relate to power generation. There are also White

Certificates being used in several countries as transferable evidences for energy efficiency gains.

Q13 Do you see any convergence between the Guarantees of Origin for purposes of electricity disclosure and the emission allowances used within the EU ETS system or the White Certificates for energy efficiency?

The current implementation of electricity-related certificates in Europe has evolved over nearly ten years and is influenced largely by its history (RECS certificates, national approaches to energy certification, GO under the "old" Directive 2001/77/EC).

Q14 How could the long-term future of electricity-related certificates look like in Europe (e.g. beyond 2015)?

There may also be needs for certification of other forms of energy, which in general could be quite similar to the Guarantees of Origin for electricity.

Q15 Do you think that the issuing bodies of GO for electricity should also engage in other energy-related certification, e.g. for heat & cooling from RES, biogas, biofuels, energy efficiency etc? Or should these tasks be undertaken by other bodies?