

# Monitoring and evaluation of the guarantees of origin system

ER 2007:32

Books and reports published by the  
Swedish Energy Agency can be ordered  
from the Swedish Energy Agency's  
publications service. Fax no for orders:  
+46(0)16-544 22 59  
e-mail: publikationsservice@energimyndigheten.se

© Swedish Energy Agency  
No of copies: 100

ER 2007:32

ISSN 1403-1892

## **Preface**

In its appropriation directions for 2007, the Swedish Energy Agency was mandated by the Government of Sweden to monitor and evaluate the application of the regulatory framework covering guarantees of origin for high-efficiency cogeneration electricity and renewable electricity (Mandate 9).

The purpose of this report is to describe how guarantees of origin for high-efficiency cogeneration electricity and renewable electricity function. The relationship to SFS 2003:437 *Lag om ursprungsgarantier avseende förnybar el* (Renewable Electricity Guarantee of Origin Act) has been taken into account in particular. Proposals for changes to the law are presented in some regards.

Jenny Hedström was the project manager for the work on this report. Participants in the project group were Jenny Johansson (Swedish Energy Agency), Anette Persson (Swedish Energy Agency) and Roger Husblad and Marie Larsson (Energy Markets Inspectorate). The results presented in this report were reviewed by Caroline Hellberg (Swedish Energy Agency).

This project was run in consultation with Svenska Kraftnät (Sweden's Transmission System Operator), which was represented by Jenny Fridström.

Eskilstuna September 2007

Thomas Korsfeldt

Jenny Hedström



## Table of contents

<b>1</b>	<b>Summary .....</b>	<b>7</b>
<b>2</b>	<b>Introduction.....</b>	<b>9</b>
	2.1 The mandate.....	9
	2.2 Organisation and delimitations of the report.....	9
	2.3 Background.....	10
	2.4 Method.....	12
<b>3</b>	<b>Guarantees of origin .....</b>	<b>13</b>
	3.1 Background.....	13
	3.2 Application of the Guarantees of Origin Act.....	14
	3.3 Areas of application of guarantees of origin .....	16
	3.4 Problems with the existing regulatory framework.....	19
<b>4</b>	<b>Origin labelling of electricity .....</b>	<b>24</b>
	4.1 Background.....	24
	4.2 Application of the origin labelling provision in Swedish law .....	25
	4.3 Origin labelling in practice .....	26
	4.4 Problems with the existing regulatory framework.....	27
	4.5 The connection between guarantees of origin and origin labelling of electricity .....	28
<b>5</b>	<b>Other initiatives linked to the promotion of renewable electricity production or trade in generation attributes for renewable electricity .....</b>	<b>30</b>
	5.1 Background.....	30
	5.2 Support schemes for renewable electricity.....	30
	5.3 Trade in the green value of electrical power .....	31
	5.4 Trading system in generation attributes for renewable energy.....	34
	5.5 Current inquiry projects.....	35
<b>6</b>	<b>Electricity certificates, guarantees of origin and green value .....</b>	<b>37</b>
<b>7</b>	<b>Potential consequences of the coming renewables directive .....</b>	<b>40</b>
<b>8</b>	<b>External viewpoints.....</b>	<b>42</b>
	8.1 The industry.....	42
	8.2 The Swedish Environmental Management Council.....	45
	8.3 Swedish Society for Nature Conservation (SNF) .....	46
	8.4 Elforsk report, <i>Ursprungsmärkning av el i de nordiska länderna</i> (Origin labelling of electrical power in the Nordic countries) .....	47
<b>9</b>	<b>Conclusions and proposals for changes to the regulatory framework.....</b>	<b>48</b>
<b>10</b>	<b>List of acronyms and terms.....</b>	<b>52</b>
<b>11</b>	<b>References .....</b>	<b>54</b>
	<b>Annex Guarantee of origin in PDF format .....</b>	<b>56</b>

# 1. Summary

Since 1 October 2003, producers of electricity have been entitled to obtain guarantees of origin for electricity produced using renewable sources of energy. SFS 2003:437 *Lag om ursprungsgarantier avseende förnybar el* (the Renewable Electricity Guarantee of Origin Act) is the transposition in Sweden of Directive 2001/77/EC of the European Parliament and of the Council of 27 September 2001 on the promotion of electricity produced from renewable energy sources in the internal electricity market (the renewables directive).

Since 1 July 2006, producers of electricity have also had the opportunity to obtain guarantees of origin for the production of electricity by high-efficiency cogeneration. SFS 2006:329 *Lag om ursprungsgarantier för högeffektiv kraftvärmeel och förnybar el* (the High-Efficiency Cogeneration and Renewable Electricity Guarantee of Origin Act) is the transposition of the cogeneration directive (Directive 2004/8/EC of the European Parliament and of the Council of 11 February 2004 on the promotion of cogeneration based on a useful heat demand in the internal energy market and amending Directive 92/42/EEC). This Act repealed SFS 2003:437 *Lag om ursprungsgarantier för förnybar el*.

The Swedish Energy Agency is the regulatory authority and exercises its authority under the Acts mentioned above. Svenska Kraftnät, the Swedish Transmission System Operator, is the guarantee institution and issues guarantees of origin for renewable electricity and high-efficiency cogeneration electricity on request. A guarantee of origin is a document specifying that a certain amount of renewable electricity or high-efficiency cogeneration electricity has been produced during a period of one month.

Producers who use a renewable energy source in their production of high-efficiency cogeneration electricity may request two separate guarantees of origin for the same MWh of electricity<sup>1</sup> – one guarantee for renewable electricity and one guarantee for high-efficiency cogeneration electricity.

Guarantees of origin were introduced so that producers would have documentary proof that their electricity is from renewable sources or produced by high-efficiency cogeneration. The documents were intended for use in marketing such electricity. The purpose of guarantees of origin was also to assist customers in making an informed choice of electricity supplier and allow them to actively choose the origin of the electricity they buy. Under both the boiler efficiency directive and the renewables directive, Member States are required to assure the accuracy and reliability of guarantees of origin.

The requirement that electricity suppliers are to declare to their customers the

---

<sup>1</sup> The same MWh of electricity means here the electricity produced in an installation during one hour.

source of energy used for the electricity they sell was introduced as a consequence of Directive 2003/54/EC of the European Parliament and of the Council of 26 June 2003 concerning common rules for the internal market in electricity and repealing Directive 96/92/EC.

The electricity supplier must also declare the environmental impact (in the form of at least carbon dioxide emissions) and the quantity of nuclear waste resulting from the generation of the electricity. Under the directive, Member States are charged with taking the necessary steps to ensure that the information provided by electricity suppliers to their customers is reliable. The requirement with respect to origin labelling under the electricity market directive is transposed in Chapter 8 Sections 12 and 13 of Sweden's Electricity Act (1997:857), which came into force in April 2006.

Origin labelling of electricity is something that is to be implemented for the customer's sake, allowing them to make an informed choice of electricity supply, taking into account factors other than just price. Consumers who wish to do so should be able to choose to buy their electricity from the supplier that supplies the type of electricity (e.g., wind power) that the customer prefers.

While working on this report, we have been able to conclude the following:

- Ownership of guarantees of origin for renewable electricity is being transferred today in Sweden as well as abroad.
- The guarantees of origin being issued today meet the requirement with respect to being accurate and reliable if they are used by the producer as proof that the electricity they sell is from renewable sources, which was the original purpose. On the other hand, if ownership of guarantees of origin is transferred separately from the physical delivery of electricity, the requirement cannot be deemed to be met.
- A guarantee of origin ought to be issued for each MWh of electricity produced instead of, as is the case now, for the production per month.
- A separate electronic registry for guarantees of origin ought to be set up.
- A joint guarantee of origin ought to be issued for those cases where the electricity is produced using both renewable energy sources and high-efficiency cogeneration.
- The electricity certificate system ought to be regarded as only a support scheme for producers of renewable electricity and thus be seen as separate from guarantees of origin. The green value is linked to the guarantee of origin<sup>2</sup>.

Against the background of what has been found, the regulations referring to guarantees of origin will need to be changed.

---

<sup>2</sup> Green value refers to the value that the consumer is prepared to pay for in order to get their electricity from a certain source/origin, for example, electricity from wind power or hydroelectric power.

## **2. Introduction**

### **2.1 The mandate**

The following is stated in the Swedish Energy Agency's appropriation directions for 2007: *In consultation with Affärsverket Svenska Kraftnät, the Agency shall monitor and evaluate the application of the regulatory framework covering guarantees of origin with respect to high-efficiency cogeneration electricity and renewable electricity. The Agency shall analyse the need for any changes in the regulatory framework and its application in achieving the purpose of guarantees of origin, and if found appropriate, submit proposals for changes. In particular, the relationship between guarantees of origin and origin labelling of electricity shall be considered. A report on this mandate is to be submitted by no later than 1 October 2007.*

### **2.2 Organisation and delimitations of the report**

The report has been organised in the following way: Chapter 1 comprises a summary of what has come to light during the work on the report. Chapter 2 is an account of the mandate and the method. Chapter 3 comprises an explanation of what a guarantee of origin is and how the law relating to guarantees of origin functions today, and identifies the problems that exist with the regulatory framework. Chapter 4 deals with origin labelling of electricity, and identifies the problems that exist with the current regulatory framework. To provide a good overview of the entire situation, Chapter 5 describes other initiatives related to the promotion of renewable electricity production or trade in electricity generation attributes. This chapter includes a description of electricity certificates, the *Bra miljöval* eco-label (termed in English, "Good Environmental Choice"), self declarations and bilateral agreements. Chapter 6 discusses electricity certificates, guarantees of origin and their relationship to green value. Chapter 7 describes in brief the possible consequences of the forthcoming renewables directive. While working on this report, views and comments from the industry and interest group organisations were gathered. These are found in Chapter 8. Conclusions and proposals for changes to the regulatory framework are described in Chapter 9. Finally, Chapter 10 contains a list of terms and acronyms, and Chapter 11 contains a list of references.

There are many sources of energy and a large number of production technologies, but it is only possible to obtain guarantees of origin for renewable electricity and high-efficiency cogeneration electricity. The question of whether there should also be guarantees of origin for other sources of energy and additional production technologies is not treated by the Swedish Energy Agency in this report.

## 2.3 Background

In Directive 2001/77/EC of the European Parliament and of the Council of 27 September 2001 on the promotion of electricity produced from renewable energy sources in the internal electricity market (the renewables directive), it is apparent that the directive has been adopted among other things because the possibility of using renewable sources of energy is not being utilised to the full in the Community. The increased use of electricity produced from renewable energy sources is an important part of the package of measures needed to comply with the Kyoto Protocol. According to the directive, to ensure the increased market penetration of electricity produced from renewable energy sources, all Member States should be required to set national indicative targets for the consumption of electricity produced from renewable sources.

The purpose of the renewables directive, according to Article 1, is to promote an increase in the contribution of renewable energy sources to electricity production in the internal market for electricity and to create a basis for a future Community framework thereof.

Article 5 of the renewables directive states that Member States shall, not later than 27 October 2003, ensure that the origin of electricity produced from renewable energy sources can be guaranteed as such within the meaning of the directive according to objective, transparent and non-discriminatory criteria laid down by each Member State. The Member States shall ensure that a guarantee of origin is issued to this effect in response to a request. The directive does not require Member States to recognise the purchase of a guarantee of origin from other Member States or the corresponding purchase of electricity as a contribution to the fulfilment of a national quota obligation for renewable electricity production. However, to facilitate trade in electricity produced from renewable energy sources and to increase transparency for the consumer's choice between electricity produced from non-renewable and electricity produced from renewable energy sources, the guarantee of origin of such electricity is necessary.

The directive further states that it is important to distinguish clearly between guarantees of origin and transferable green certificates. Guarantees of origin within the meaning of this directive are intended to serve to enable producers of electricity from renewable energy sources to demonstrate that the electricity they sell is produced from renewable energy sources.

Pursuant to Article 5 of the directive, Sweden introduced a system of guarantees of origin for renewable energy sources through its *Lag (2003:437) om ursprungsgarantier för förnybar el* (Guarantees of Origin for Renewable Electricity Act), which came into force on 1 October 2003.

Pursuant to Directive 2004/8/EC of the European Parliament and of the Council of 11 February 2004 on the promotion of cogeneration based on a useful heat demand in the internal energy market (the cogeneration directive), Member States are bound to ensure that the origin of electricity produced using high-efficiency cogeneration can be guaranteed. It shall be possible to provide a guarantee of origin. The purpose is to

promote the production of electricity by high-efficiency cogeneration. The purpose of the cogeneration directive is to increase energy efficiency and improve security of supply by creating a framework for the promotion and development of high-efficiency cogeneration of heat and power.

It is also apparent from the directive that it is necessary to ensure that the origin of high-efficiency cogeneration electricity can be guaranteed in order to increase transparency for the consumer's choice between electricity from cogeneration and electricity produced by other technologies.

Pursuant to the cogeneration directive, Sweden introduced *Lag (2006:329) om ursprungsgarantier för högeffektiv kraftvärmeel och förnybar el* (Guarantees of Origin for High-Efficiency Cogeneration and Renewable Electricity Act) and *Förordningen (2006:331) om högeffektiv kraftvärmeel och förnybar el* (Ordinance on high-efficiency cogeneration and renewable electricity). The Act came into force on 1 July 2006 when Sweden's *Lag (2003:437) om ursprungsgarantier för förnybar el* (Guarantees of Origin for Renewable Electricity Act) was repealed.

On 26 June 2003, the Third Internal Market Package of the European Parliament and the Council was adopted. The package aims to achieve a level playing field within the electricity and natural gas sectors and consists of two directives and one regulation. The directives would be transposed in national legislation by 1 July 2004.

The regulation, which concerns conditions for access to the network for cross-border exchanges in electricity, came into force in August 2003. The electricity market directives contain quantitative changes, such as the opening up of markets, a regulated system for grid access, and the introduction of an independent regulatory authority to approve in advance at least the methods for tariff setting. In addition, the directive includes new measures concerning public services, disclosure of the origin of the electricity, security of supply, tendering for new capacity, rules for the acquisition of electrical power to cover network losses, reporting and trade in electricity with third countries.

According to Directive 2003/54/EC of the European Parliament and of the Council of 26 June 2003 concerning common rules for the internal market in electricity and repealing Directive 96/92/EC(6), Article 3 (6), electricity suppliers shall specify in or with the bills and in promotional materials made available to final customers the following:

- The contribution of each energy source to the overall fuel mix of the supplier over the preceding year;
- At least a reference to existing reference sources, such as web-pages, where information on the environmental impact, in terms of at least emissions of CO<sub>2</sub> and the radioactive waste resulting from the electricity produced by the overall fuel mix of the supplier over the preceding year is publicly available.

Origin labelling is information to the consumer that is intended to give the consumer the opportunity to choose their electricity supplier on the basis of other criteria than just price.

## **2.4 Method**

Work on this report included mapping the initiatives that exist for the promotion of renewable energy sources or disclosure of the origin of the electricity. Thereafter, the work was focused on how the Guarantees of Origin for Renewable and High-efficiency Cogeneration Electricity Act has been applied in practice. This has been done through contacts with Svenska Kraftnät and electricity market players. The industry submitted comments and views on the purpose of guarantees of origin and their function in the electricity market.

Telephone interviews were conducted with electricity producers who have chosen to take out guarantees of origin in PDF format for their renewable electricity production.

The report was produced in consultation with Svenska Kraftnät, which received the report during its preparation for approval, and which was also given the opportunity at meetings to provide its views and comments. Other interested parties who provided comments or ideas concerning how guarantees of origin or origin labelling should be handled were the Swedish Environmental Management Council and the Swedish Society for Nature Conservation. They were also given the opportunity to present their views in various ways, including at a reference group meeting on 27 June 2007.

## 3. Guarantees of origin

### 3.1 Background

Guarantees of origin have been introduced into Swedish legislation as a consequence of the EU directive on the promotion of electricity produced from renewable sources (2001/77/EC) and the EU directive on the promotion of cogeneration (2004/8/EC). A guarantee of origin is proof that a certain amount of electricity has been produced using renewable sources of energy or by high-efficiency cogeneration.

Section 2 of *Lagen om ursprungsgarantier för högeffektiv kraftvärmeel* (the Guarantees of Origin for High-Efficiency Cogeneration and Renewable Electricity Act) defines a guarantee of origin as follows:

*Guarantee of origin for renewable electricity:* A document issued by an authority specifying that a certain amount of renewable electricity has been produced.

Under Section 4 of *Förordning (2006:331) om ursprungsgarantier för högeffektiv kraftvärmeel* (Ordinance on guarantees of origin for high-efficiency cogeneration and renewable electricity), a guarantee of origin shall contain the following information:

1. The amount of renewable electricity referred to by the guarantee and the period of time during which the electricity was produced;
2. The installation where the electricity was generated; and
3. The renewable energy sources used in the electricity production.

*Guarantee of origin for high-efficiency cogeneration electricity:* A document issued by an authority specifying that a certain amount of high-efficiency cogeneration electricity has been produced.

Under Section 3 of *Förordning (2006:331) om ursprungsgarantier för högeffektiv kraftvärmeel* (Ordinance on guarantees of origin for high-efficiency cogeneration and renewable electricity), a guarantee of origin for high-efficiency cogeneration electricity shall contain the following information:

1. The amount of high efficiency cogeneration electricity referred to by the guarantee and the period of time during which the electricity was produced;
2. The installation where the electricity was generated;
3. The fuel's lowest calorific value;
4. How the heat produced as a result of the cogeneration process has been used; and
5. The fuel savings resulting from the use of high-efficiency cogeneration compared with separate production of electricity and heating.

A guarantee of origin can be used by the producer to market its electricity in Sweden and in other Member States within the EU<sup>3</sup>.

### **3.2 Application of the Guarantees of Origin Act**

It is voluntary for a producer to request the issue of a guarantee of origin for electricity produced by high-efficiency cogeneration. Svenska Kraftnät in its capacity as the guarantee institution issues guarantees of origin on request from a producer.

The proprietors of installations that generate electricity from renewable sources of energy and/or high-efficiency cogeneration need to register their installations with the Swedish Energy Agency for each type of guarantee of origin. If the installation is approved for the allocation of electricity certificates however, the producer does not need to register it for guarantees of origin for renewable electricity. Once the installation has been registered by the Swedish Energy Agency, the producer can request that Svenska Kraftnät issues guarantees of origin.

If the installation is registered for guarantees of origin for both renewable electricity and high-efficiency cogeneration electricity, the proprietor can request that guarantees of origin are issued for renewable electricity and for high-efficiency cogeneration. This means that the proprietor is given two different guarantees of origin for the same MWh of electricity – one from renewable electricity and one for high-efficiency cogeneration electricity.

Svenska Kraftnät issues guarantees of origin for renewable electricity in PDF format<sup>4</sup> (see Annex). The guarantee of origin contains information about how much renewable electricity was produced in the installation during a specific month. If the producer requests the issue of a guarantee of origin via the IT system provided by Svenska Kraftnät, the producer downloads the guarantee of origin in PDF format to their own computer. Since there may be several purchasers of the renewable electricity produced in an installation during a month, and guarantees of origin are issued per calendar month, it is possible for the producer to print out several guarantees of origin for the same installation and month. The issue date on the guarantee of origin is set as the date on which the PDF file is downloaded by the producer. Downloads of guarantees of origin are logged in Svenska Kraftnät's computer system to permit monitoring, if needed. Where the producer does not have access to Svenska Kraftnät's IT system, Svenska Kraftnät sends the guarantee of origin in printed form by mail. A guarantee of origin of this type too can be issued several times. For installations registered for guarantees of origin for high-efficiency cogeneration electricity, the producer can only obtain the guarantee of origin in the printed form that Svenska Kraftnät sends by mail on request.

---

<sup>3</sup> Bill 2005/06:83 Ursprungsgarantier för högeffektiv kraftvärme el (Guarantees of origin for high-efficiency cogeneration electricity, etc), page 11.

<sup>4</sup> Portable Document Format (PDF) is a digital file format developed by Adobe Systems and introduced in 1993. The format is platform-independent and can therefore be opened in most computers, provided that a program for reading the file is installed.

If a producer is a member of GREXCMO<sup>5</sup> the producer can obtain electronic guarantees of origin according to the European Energy Certificate System (EECS) standard. Guarantees of origin for renewable electricity under the EECS standards are called RES-GO. However installations must follow the EECS rules which means *inter alia* that an installation cannot be granted a Swedish electricity certificate and RES-GO at the same time. A RES-GO is issued for each one (1) MWh of electricity produced. The producer cannot simultaneously obtain guarantees of origin in PDF format for the same production.

### 3.2.1 The Swedish Energy Agency's Regulations

The Swedish Energy Agency has regulated guarantees of origin in accordance with the authorising authority (in STEMFS 2006:8). When the regulations were circulated for comment in May 2006, a number of responses were received. Svensk Energi questioned guarantees of origin on fundamental grounds as they have been implemented in Sweden without the possibility of keeping account of guarantees of origin and their cancellation. Svensk Fjärrvärme AB stated *inter alia* that guarantees of origin were not reliable because they can be duplicated. RECS, the Swedish Society for Nature Conservation (SNF), Telge Kraft and Falkenberg Energi stated that the proposal does not comply with the requirement with respect to reliability under Article 5 in each of Directives 2001/77/EC and 2004/8/EC. The consequence is entirely unusable guarantees of origin. The group of companies proposed instead that guarantees of origin should be introduced as electronic files in accordance with the European Energy Certificate System standard (EECS). This would guarantee their reliability and the EU's intention with respect to guarantees of origin would be satisfied. Furthermore, they proposed that the draft regulations be reworked so that guarantees of origin become tradable, transferable and possible to cancel so that double counting<sup>6</sup> of the produced electricity cannot occur.

The Swedish Energy Agency has made the judgement that all comments received in conjunction with the round of consultation were such that they require changes in the legislation – not in the regulations – and is of the opinion that all comments received referring to the issuing of guarantees of origin should be dealt with by the guarantee institution, Svenska Kraftnät.

---

<sup>5</sup> GREXCMO is a registered database for Swedish and Finnish RES-GO and Renewable Energy Certificate System (RECS) certificates. The database is managed by Finnish company Grexel Systems Ltd.

<sup>6</sup> Double counting (sometimes referred to as multiple counting) refers to the producer or the electricity supplier selling the same MWh of electricity with this attribute to more than one customer.

### **3.3 Areas of application of guarantees of origin**

When the Guarantees of Origin for Renewable Electricity Act was introduced, it was assumed that guarantees of origin would not be transferable. Guarantees of origin would be used by producers to show as proof to potential purchasers that the electricity they were selling was renewable electricity<sup>7</sup>. No change in this policy was made in conjunction with the entry into force on 1 July 2006 of the Guarantees of Origin for High-Efficiency Cogeneration and Renewable Electricity Act. There is nothing in the Act itself or in its legislative history that declares that trade with guarantees of origin could occur separate from the physical delivery of the electricity. However, it can be included that a national and international market has developed where electronic guarantees of origin have a certain economic value and transfer of ownership occurs. When it comes to guarantees of origin that are only issued in PDF format, a limited market has developed. A possible reason for this is that the guarantee of origin, as described in Section 3.2 above, is not a unique, transferable document, but only a proof that can be shown to potential purchasers of electricity that can be printed out and copied an unlimited number of times.

#### **3.3.1 Guarantees of origin for high-efficiency cogeneration electricity**

The Swedish Energy Agency has not received any applications from producers of high-efficiency cogeneration electricity to register their installations for issuing of guarantees of origin for high-efficiency cogeneration. If guarantees of origin were instead a unique electronic document, conditions would be created that would encourage more producers to register their installations to receive guarantees of origin. A unique electronic document refers here to a guarantee of origin with a unique serial number in a closed electronic registry. The electricity market players have not advanced the need for electronic guarantees of origin for high-efficiency cogeneration electricity to the same extent as guarantees of origin for renewable electricity.

An additional reason for the demand for guarantees of origin for high-efficiency cogeneration electricity being low may be that in Sweden virtually all cogeneration plants meet the requirements for high-efficiency cogeneration. There is therefore no need to promote this type of production.

Very few countries in the EU have implemented the cogeneration directive and thus created the opportunity for producers to obtain guarantees of origin for high-efficiency cogeneration electricity. Consequently no international market for high-efficiency cogeneration electricity exists. The reference values for calculating high-efficiency cogeneration were determined by the Commission in December 2006, while the guidelines have not yet been determined. Because the guidelines are still lacking, the bases for calculating the figures that are to be provided to Svenska Kraftnät in conjunction with a request for guarantee of origin are limited. Since there is no market value in Sweden for guarantees of origin for high-efficiency cogeneration electricity, and not either any international market, as things stand today there is no demand for them.

---

<sup>7</sup> Bill 2002/03:85 Vissa elmarknadsfrågor (Some electricity market issues), pages 26 and 29 (Swedish version).

### **3.3.2 Electronic guarantees of origin for renewable electricity**

Electronic guarantees of origin are used either by electricity suppliers to keep account of sales of a certain product, for example, hydroelectricity, or these guarantees of origin are sold abroad via the EECS, provided that the holder of such a guarantee is a member of GREXCMO. In Svenska Kraftnät's IT system, producers who are members of GREXCMO can elect for the information in the PDF file to be transferred to the GREXCMO central registration database, which is managed by the Finnish company Grexel Systems Ltd. Once the information is transferred to GREXCMO, the producer can no longer request guarantees of origin in PDF format from Svenska Kraftnät. GREXCMO is a database system for keeping track of Swedish and Finnish guarantees of origin and RECS certificates. The information sent from Svenska Kraftnät will then exist for each guarantee of origin in GREXCMO. Each guarantee of origin also gets a unique ID. Guarantees of origin can then be transferred between the accounts of different producers and suppliers. The guarantees of origin sold abroad are used *inter alia* for origin labelling in countries that permit the use of guarantees of origin for origin labelling. This means that electricity suppliers abroad use Swedish guarantees of origin in their marketing to their customers to specify what sources of energy have been used to produce the electricity that the electricity supplier sells. There are also incidences of Swedish electricity suppliers importing guarantees of origin to use in the sale of electricity with renewable generation attributes or for origin labelling for Swedish consumers. Guarantees of origin are cancelled in GREXCMO after they have been used, for example, for origin labelling, which thus ensures that they cannot be used again, so that double counting is precluded.

### **3.3.3 Guarantees of origin in PDF format for renewable electricity**

Since SFS 2003:437 *Lagen om ursprungsgarantier avseende förnybar el* (the Guarantees of Origin for Renewable Electricity Act) came into force on 1 October 2003, around 230 of the total of 1 100 producers registered in the electricity certificate system (who thus can request the issue of guarantees of origin without registering themselves) have requested guarantees of origin for renewable electricity. However, most have only done so only one or two occasions, and barely 90 producers have requested the issue of guarantees of origin on three occasions or more.

In order to shed light on how guarantees of origin are used by producers, six of the market players that have been most active in requesting guarantees of origin in PDF format were interviewed. In the interviews, it became apparent that there are great differences in what the guarantees of origin have been used for. The interviews also showed that there is a small but growing market for these guarantees of origin in PDF format. Many producers have asked themselves what use the guarantees of origin are, but some have chosen to print them out and archive them in a binder in any case. All of the interviewed producers with one exception would prefer electronic guarantees of origin.

In addition, the interviewed producers were of the opinion that an electronic guarantee of origin per MWh was preferable to the current system where a guarantee of origin can be issued per month.

There are some differences in understanding of how the system works between small and large producers. The bigger producers with installations registered in the electricity certificate system are of the opinion that the existing system with guarantees of origin in PDF format is unusable because it is not reliable (a guarantee of origin can be issued several times). They would like electronic certificates that can be registered to an account and cancelled once they have been used in the sale of 'green-labelled' electricity. If such an electronic registry existed, the big electricity producers stated that they would pursue trade in guarantees of origin.

In some instances, the small producers have already initiated trade in guarantees of origin in PDF format. They have entered into agreements with purchasers of guarantees of origin with the assistance of brokers. Purchasers include for example manufacturing industries that use guarantees of origin in the marketing of their products, and public authorities or government offices that use guarantees of origin to profile their operations as environment-friendly in order to set a good example. All these purchasers want to be able to purchase their electricity via Nord Pool and at the same time make an informed environmental choice. The solution is then to purchase electricity via Nord Pool at the lowest possible price and then purchase guarantees of origin for the equivalent amount of electricity separately. The purchasers are in general big companies and the producers small, so the broker's role becomes to bring together many producers to cover one purchaser's need for guarantees of origin.

The seller must guarantee that it is only selling the green value once. This is done by this being written into the contract drawn up in conjunction with the sale. The seller also guarantees that they will not sell more than they have produced. Their printed out and saved guarantees of origin are used as proof.

The turnover on this market is small but appears to be growing rapidly. One broker was counting on a doubling for the year, from approximately 120 GWh in 2006 to approximately 200-250 GWh in 2007. It is difficult to get any idea of the total size of the market, but it is probably less than 1 TWh, which can be compared with the total production entitled to electricity certificates of 12 TWh in 2006.

The price of a guarantee of origin in June 2007 was approximately SEK 4/MWh. This is around SEK 1-2 higher than the price in 2003-2004. The demand differs for different types of power, and consequently the price can vary, too. Currently wind power is the type that fetches the highest price. This is followed by small-scale hydroelectricity, and then biofuel.

The interviews showed that those who use guarantees of origin in PDF format for marketing often sell the guarantees separately from the physical electricity, too.

## **3.4 Problems with the existing regulatory framework**

### **3.4.1 Accuracy and reliability**

According to the regulatory framework that exists today, a guarantee of origin is proof, or a “voucher”, that a producer has produced renewable electricity or high-efficiency cogeneration electricity. From the government bills<sup>8</sup> it can be deduced that there has never been any thought of there being trade in guarantees of origin. It was emphasised that a guarantee of origin should not be confused with, for example, an electricity certificate<sup>9</sup>. Despite this, a guarantee of origin has come to acquire a certain economic value. Guarantees of origin are sold largely separate from the physical delivery of the electricity through ownership being transferred between producers and electricity suppliers.

According to the renewables directive<sup>10</sup> and the cogeneration directive<sup>11</sup> Member States shall put in place appropriate mechanisms to ensure that guarantees of origin are accurate and reliable. The information that the guarantee of origin contains is accurate and reliable, but the guarantee of origin is not a unique document that is transferable. This means that it is up to producers and electricity suppliers to enter into contracts that prevent the renewable electricity from being double counted. If guarantees of origin are to be transferable and used for generation attributes requires that guarantees of origin are unique and that there are verification instruments in place to prevent double counting from occurring. A solution to this problem is that a unique guarantee of origin is issued for each amount of electricity, let us say, one guarantee of origin per MWh of electricity produced, in a closed electronic registry for guarantees of origin.

### **3.4.2 The amount of electricity covered by a guarantee of origin**

The Guarantees of Origin for High-Efficiency Cogeneration Electricity and Renewable Electricity Act defines a guarantee of origin as a document that is issued by an authority on which it is stated that a certain amount of electricity has been produced (renewable electricity or high-efficiency cogeneration electricity). Ordinance (2006:331) on guarantees of origin for high-efficiency cogeneration and renewable electricity specifies that a guarantee of origin shall also contain information on the period of time during which the electricity was produced.

---

<sup>8</sup> Bill 2002/03:85 Vissa elmarknadsfrågor (Some electricity market issues), page 29 and Bill 2005/06:83 Ursprungsgarantier för högeffektiv kraftvärme el (Guarantees of origin for high efficiency cogeneration electricity), page 11.

<sup>9</sup> Directive 2001/77/EC of the European Parliament and of the Council of 27 September 2001 on the promotion of electricity produced from renewable energy sources in the internal electricity market and Bill 2005/06:83, page 11.

<sup>10</sup> Directive 2001/77/EC of the European Parliament and of the Council of 27 September 2001 on the promotion of electricity produced from renewable energy sources in the internal electricity market.

<sup>11</sup> Article 5 in Directive 2001/77/EC of the European Parliament and of the Council of 27 September 2001 on the promotion of electricity produced from renewable energy sources in the internal electricity market.

The guarantees of origin issued by Svenska Kraftnät in PDF format cover the amount of electricity produced in an installation during the month for which the producer has requested the guarantee of origin. The electronic guarantees of origin issued by Svenska Kraftnät by sending the information to GREXCMO cover 1 MWh of produced electricity per guarantee of origin.

The Swedish Energy Agency proposes that all guarantees of origin should be issued per MWh of produced electricity. In this way, the market can choose to trade in the amount that it is appropriate. Contracts can then be drawn up based on an order of magnitude such as 100, 1 000 or 10 000 guarantees of origin. The law or authorities would then not be regulating the amount, which would instead be adapted to demand. As a result of such a change, better conditions should be created for setting up and using electronic registries, with the current electricity certificate system as the model. Electricity certificates are issued under SFS 2003:13 *Lag om elcertifikat per MWh producerad förnybar el* (the Electricity Certificate per MWh of Generated Renewable Electricity Act). This ought to be preferable for the electricity market players, since they would not need to use a completely new type of registry or system for keeping account.

The proposal to issue guarantees of origin for each MWh of electricity produced is also in accord with the EECS standard, which is the standard that the Commission recommends for guarantees of origin<sup>12</sup>.

### **3.4.3 One or two guarantees of origin for the same MWh of electricity**

#### *Background*

The renewables directive and the cogeneration directive indicate that a guarantee of origin has two functions: for the producer to be able to guarantee the origin of the electricity produced; and for the consumer when he/she is going to choose an electricity supply and/or electricity supplier.

The guarantee of origin can be used for marketing purposes as a way of verifying that what a producer or electricity supplier promises in the form of various products delivered to the consumer correspond to reality.

In a Communication<sup>13</sup> the Commission has stated that guarantees of origin can be used under certain conditions to count imported renewable electricity towards meeting national targets.

The guarantee of origin is needed to facilitate trade in renewable electricity and to increase transparency for the consumer's choice between electricity produced from renewable and non-renewable energy sources, respectively. The cogeneration directive states that to increase transparency for the consumer's choice between electricity from cogeneration and electricity produced on the basis of other technologies, it is necessary to ensure that, on the basis of harmonised efficiency reference values, the origin of high-efficiency cogeneration can be guaranteed.

---

<sup>12</sup> European Commission, Committee on cogeneration (Article 14, Directive 2004/8/EC), Brussels 3 July 2006 Summary record.

<sup>13</sup> Communication from the Commission, COM(2004) 366, page 18.

Bill 2005/06:83 *Ursprungsgarantier för högeffektiv kraftvärme el* (Guarantees of origin for high-efficiency cogeneration electricity), page 24, states that two guarantees of origin can be issued for the same MWh of electricity where the electricity has been produced by high-efficiency cogeneration and renewable energy sources. Guarantees of origin were intended to be used for marketing high-efficiency cogeneration electricity and electricity produced using renewable energy sources in Sweden and other Member States of the EU.

During work on this report, the question has arisen as to whether it should no longer be possible to obtain two guarantees of origin for the same MWh electricity. The alternative, for high-efficiency cogeneration electricity produced using renewable energy sources, is that instead a joint guarantee of origin should be issued containing all the relevant information for the electricity produced. Each guarantee of origin would then contain information stating that the electricity was produced using renewable energy sources and that the electricity was produced by high-efficiency cogeneration, provided that this is the case.

#### *Arguments in favour of two guarantees of origin*

- As the law is formulated today, two guarantees of origin can be issued for the same MWh of electricity: one for high-efficiency cogeneration electricity and one for the case that the high-efficiency cogeneration electricity has also been produced using renewable energy sources<sup>14</sup>. That two guarantees of origin are issued for the same MWh of electricity ought not to have any bearing if they are seen as two separate systems: one system for guarantees of origin for high-efficiency cogeneration electricity; and one system for guarantees of origin for renewable electricity. It is then possible to use the guarantees of origin for different purposes.
- The potential function of guarantees of origin when it comes to origin labelling of electricity in relation to the consumer is only of relevance with reference to renewable electricity. There are no obligations on electricity suppliers to report how much of the electricity they have sold was produced by high-efficiency cogeneration. However, it can be concluded that a difficulty in judging whether one or two guarantees of origin should be issued is that very few member states have implemented the cogeneration directive. There is therefore no guidance to draw on from how other Member States have handled this question.
- The renewables directive and the cogeneration directive were adopted at different times, as was the directive on origin labelling. In two separate Communications from the Commission, it is apparent that guarantees of origin can be used for origin labelling<sup>15</sup> and under certain conditions to count imported renewable electricity towards national targets<sup>16</sup>. Clearer signals for the Commission would be preferable before changes in Swedish legislation are introduced.

---

<sup>14</sup> Bill 2005/06:83 *Ursprungsgarantier för högeffektiv kraftvärme el* (Guarantees of origin for high-efficiency cogeneration electricity), page 24.

<sup>15</sup> EU DG TREN: Note of DG Energy & Transport on Directives 2003/43 and 2003/55 on the internal market in electricity and natural gas.

<sup>16</sup> Communication from the Commission, COM(2004) 366, page 18

### *Arguments in favour of a joint guarantee of origin*

- If you want a guarantee of origin to provide complete and comprehensive information on the origin of the electricity, it needs to contain information about the energy source (renewable electricity) and the technology (high-efficiency cogeneration electricity). If two guarantees of origin for these elements are issued which are then not synchronous, there is no longer complete and comprehensive information.
- The electricity market players have stated that the advantage of only one guarantee of origin is that the risk of double counting is minimised. Double counting means in this context that a guarantee of origin for high-efficiency cogeneration electricity can be sold to one customer and a guarantee of origin for renewable electricity can be sold to another customer. When the electricity supplier shall then guarantee that the amount of electricity sold is what the customer has demanded, the problem of double counting arises, that is, that the number of MWh in the form of guarantees of origin does not tally with the number of MWh of electricity supplied to final customers.
- The Commission's committee working with the directive for high-efficiency cogeneration electricity recommends using the EECS standard for guarantees of origin, or that it is used as the model.  
The EECS standard means that a joint guarantee of origin is issued for electricity produced using renewable energy sources and high-efficiency cogeneration. This guarantee of origin would then contain information specifying how the electricity was produced, that is, if the electricity originates from renewable electricity, high-efficiency cogeneration electricity, or both.
- The trade in guarantees of origin being carried on internationally is regulated in accordance with the EECS standard. Since the EECS standard only allows that a guarantee of origin is issued for each MWh of electricity produced, there is a risk that Swedish players will be excluded from the international market unless Sweden changes its legislation to the effect that a joint guarantee of origin is issued instead of individual guarantees of origin for renewable electricity and high-efficiency cogeneration electricity, respectively.
- During the Swedish Energy Agency's work on this report, only one electricity market player stated that two separate guarantees of origin – one for high-efficiency cogeneration electricity and one for renewable electricity – would be preferable. The other players were all of the view that a joint guarantee of origin is better to preclude the risk of double counting which they deem to exist.
- Unique electronic guarantees of origin require that Svenska Kraftnät undertakes extensive development of its IT system for keeping account of guarantees of origin. The system would be different depending on whether there is to be one guarantee of origin or two guarantees of origin for the same MWh of electricity and Svenska Kraftnät must therefore decide on how the system is to be developed before development of the system can take place.

Based on the Commission's recommendation of the EECS standard, the Swedish Energy Agency has determined that a joint guarantee of origin is the solution that should be chosen, which to all appearances has the greatest probability of being sustainable in the long term.

## 4. Origin labelling of electricity

### 4.1 Background

On 26 June 2003, the Third Internal Market Package of the European Parliament and the Council was adopted. The package aims to achieve a level playing field within the electricity and natural gas sectors and consists of two Directives and one Regulation. The directives were to be transposed in national legislation by 1 July 2004. The Regulation, which concerns conditions for access to the network for cross-border exchanges in electricity, came into force in August 2003. The electricity market directives contain quantitative changes, such as the opening up of markets, a regulated system for grid access, and the introduction of an independent regulatory authority to approve in advance at least the methods for tariff setting. In addition, the directive includes new measures concerning public services, disclosure of the origin of the electricity, security of supply, tendering for new capacity, rules for the acquisition of electrical power to cover network losses, reporting and trade in electricity with third countries. In addition, the directive contains a comprehensive and detailed regulatory framework<sup>17</sup>.

According to Directive 2003/54/EC of the European Parliament and of the Council of 26 June 2003 concerning common rules for the internal market in electricity and repealing Directive 96/92/EC(6), Article 3 (6), electricity suppliers shall specify in or with the bills and in promotional materials made available to final customers the following:

- The contribution of each energy source to the overall fuel mix of the supplier over the preceding year;
- At least reference to existing reference sources, such as web-pages, where information on the environmental impact, in terms of at least emissions of CO<sub>2</sub> and the radioactive waste resulting from the electricity produced by the overall fuel mix of the supplier over the preceding year, is publicly available.

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

Under the directive, Member States are charged with taking the necessary steps to ensure that the information provided by electricity suppliers to their customers as described above is reliable.

The EU's Directorate-General for Energy & Transport (EU DG TREN) has published a Note to assist Member States in implementing the directive<sup>18</sup>. The Note is not binding on the Member States. The Note describes *inter alia* the objectives of origin labelling.

---

<sup>17</sup> Bill 2004/05:62 Implementation of the EC Directive concerning common rules for the internal markets for electricity and natural gas, etc, page 35 et sq.

<sup>18</sup> Note of DG Energy & Transport on directives 2003/54 and 2003/55 on the internal market in electricity and natural gas.

The objectives of the specification with respect to origin labelling are fourfold:

- increase market transparency for providing open and easy access to relevant information,
- comply with the consumer’s right to information regarding purchased products,
- enable consumers to make informed choices about suppliers based on the generation characteristics of the electricity they supply,
- educate consumers and stimulate electricity generation that contributes to a secure and sustainable electricity system.

## **4.2 Application of the origin labelling provision in Swedish law**

The Directive has been transposed in Swedish legislation in Chapter 8 Sections 12 and 13 of Sweden’s Electricity Act. What has been introduced in the Swedish legislation is identical to what is specified in the directive. Chapter 8 Section 12 of Sweden’s Electricity Act states *inter alia* that electricity suppliers shall, on or in conjunction with invoices for the sale of electrical power and in advertising directed at electricity consumers, provide information about each individual energy source’s share of the average composition of energy sources used to generate the electrical power that the electricity supplier sold during the immediately preceding calendar year, and the impact on the environment in the form of carbon dioxide emissions and the quantity of nuclear waste resulting from the generation of the electricity sold.

Chapter 8 Section 12 of Sweden’s Electricity Act entails an obligation on electricity suppliers to keep track of the origin of the electricity they have purchased so that they are able to report the overall fuel mix of the electricity and the environmental impact that this has. If they do not buy electrical power via an electricity exchange, they must have information concerning which producer, electricity importer or other electricity supplier they have purchased the electrical power from. Based on this information, electricity suppliers shall then, in their information to their customers, list the overall mix of their purchased electricity in the form of the fuel mix and the environmental impact that this has. This information must always be specified on invoices and in advertising.<sup>19</sup>

Besides the electricity supplier’s obligation to provide information to their customers, a provision was introduced in Chapter 8 Section 13 of Sweden’s Electricity Act such that electricity producers shall publicise the information needed by the electricity suppliers in order to be able to satisfy their obligations concerning specification of the origin of the electricity, etc. Electricity suppliers that do not generate electrical power shall also, at the request of other electricity suppliers, provide the information needed in order to be able to satisfy their obligations concerning specification of the origin of the electricity, etc. For electrical power imported to Sweden from a country located outside the European Union (in Sweden’s case, Norway), under the directive the origin of the electrical

---

<sup>19</sup> Bill 2004/05:62 Implementation of the EC Directive concerning common rules for the internal markets for electricity and natural gas, etc, page 68.

power only needs to be specified at the aggregate level based on information from the preceding year. This means that how producers and importers are to provide the figures to the electricity suppliers must be determined; for example, if these may be specified at the aggregate level or not.<sup>20</sup>

According to the Note from EU DG TREN, the figures on the fuel mix shall relate to the preceding year. How often the figures are provided is determined by the Member State. However, figures must be provided at least once each year. Initially when the directive is implemented, it may be appropriate to send out the figures to customers more often so that they become more conscious of these figures.<sup>21</sup>

The Note also states that the use of estimations should be avoided in origin labelling. The use of statistical averages<sup>22</sup> should be avoided as much as possible. Member States should also ensure that double counting of generation attributes, such as generation based on renewables, is avoided, as this is contrary to the reliability required under the Directive. In order to avoid double counting of generation attributes in the case of electricity generated from renewable sources, only the supply company owning the certificates (guarantees of origin) is permitted to promote this as electricity generated by renewable sources. A company producing electricity from renewable energy sources and having sold the value attached to it is no longer permitted, in the event that it also supplies electricity to final customers, to declare on its bill that the electricity it supplies has been generated from renewable sources.

Under Chapter 8 Sections 12 and 13 of Sweden's Electricity Act, the Energy Markets Inspectorate is authorised to issue more detailed regulations. At the time of writing, the Energy Markets Inspectorate has not issued any detailed regulations within this area.

### **4.3 Origin labelling in practice**

Pursuant to the electricity markets directive and Chapter 8 Sections 12 and 13 of Sweden's Electricity Act, electricity suppliers and electricity producers have obligations with respect to disclosure of the origin of their electrical power. The rules began to be applied by electricity suppliers on 1 April 2006 and by electricity producers on 1 February 2006<sup>23</sup>.

Svensk Energi has issued a guidance document on how its member companies are to disclose the origin of their electrical power in order to comply with the requirements under the law. This document states that the figures that electrical

---

<sup>20</sup> Bill 2004/05:62 Implementation of the EC Directive concerning common rules for the internal markets for electricity and natural gas, etc, page 69.

<sup>21</sup> Note of DG Energy & Transport on directives 2003/54 and 2003/55 on the internal market in Electricity and Natural Gas, page 2.

<sup>22</sup> Statistical averages refers to tracking of the origin of the electricity by relying on statistical data on electricity mixes, such as the Swedish electricity mix.

<sup>23</sup> Bill 2004/05:62 Implementation of the EC Directive concerning common rules for the internal markets for electricity and natural gas, etc, pages 68-69.

power companies are to use for calculating the origin of their total sales of electrical power are divided into two categories:

- i) The power company's acquisition of electricity supplies with known origins, for example, *Bra miljöval* eco-label (in English, "Good Environmental Choice"). RECS certificate, guarantees of origin (in both PDF format and electronic format) and other bilateral agreements with origin disclosure clauses.
- ii) The power company's purchases of electricity supplies with unknown origins, for example, purchased via Nord Pool (the Nordic spot market) bilateral agreements without origin disclosure clauses. For this type of purchase, the Nordic generation mix excluding Iceland is used. Svensk Energi calculated and presented the Nordic generation mix for 2006 in its guidance document.

Svensk Energi has no control over and has no idea about how closely this guidance document is being followed by power companies.

#### **4.4 Problems with the existing regulatory framework**

The origin labelling provisions in Sweden's Electricity Act provide significant scope for interpretation and application, which means that the power companies may disclose the origin of their electrical power in a variety of ways. This in turn can be said to be contrary to the desire that exists for power companies to disclose the origin of their electrical power and the environmental impact of its generation in a uniform way. This makes it more difficult for customers to compare and make an informed choice of electricity supplier based on factors other than price alone.

In 2006, the Energy Market Inspectorate submitted a proposal for regulations based on an approach where attention would be focused on the physical flow of the electrical power. Following the physical flow of the electricity from electricity producer to electricity supplier to the final customer is very difficult, not least when taking into account that a large proportion of the electricity generated is traded on the Nordic spot market (Nord Pool).

One problem, particularly if attention is focused on the physical flow of the electricity, is that double counting can easily occur. Double counting means that the same volume of electricity is counted more than once. Nord Pool's statistics are based on the Nordic generation mix, that is, the statistics include the entire generation volume in the Nordic countries, not just the electricity that passes through the power exchange. When an electricity supplier discloses the fuel mix of the electricity supply to the consumer, the electricity supplier will thus disclose the electricity purchased bilaterally (internationally) and electricity purchased via the exchange. Because Nord Pool's statistics are based on a Nordic generation mix, figures from the generated electricity purchased bilaterally are already included in Nord Pool's figures, which means that double counting will occur.

It is unclear which organisation/authority might be responsible for calculating the residual<sup>24</sup> that arises.

#### **4.5 The connection between guarantees of origin and origin labelling of electricity**

Pursuant to Article 3 point 6 in Directive 2003/54/EC, Member States shall ensure that electricity suppliers specify the overall fuel mix in or with the bills and in promotional materials made available to final customers. The Commission has clarified in a Communication<sup>25</sup> that it regards this provision as an important measure in meeting the objective of consumer transparency, as it covers the whole electricity sector and not only electricity from renewable energy sources. The guarantee of origin can provide the basis for this information.

Guarantees of origin are already used today for origin labelling in other countries in Europe, and in Sweden. The guidance document produced by Svensk Energi for its members states that guarantees of origin in both PDF format and electronic format can be used for origin labelling.

It is in the nature of electrical power that the consumer lacks the possibility of tracing where, from which installation and in what manner the electricity that the consumer purchases has been generated. A guarantee of origin for renewable electricity is proof that a certain amount of electricity has been generated from a specific energy source. The value of the guarantee of origin depends on the customer's willingness to pay for electricity from particular energy sources. Trade in guarantees of origin thus converts customers' environmental preferences into economic signals to producers.

By choosing a product that includes renewable electricity, the consumer has contributed to supporting the increased production of this type of electricity. The more consumers there are who make this active choice, the greater the support can be said to be. Electricity suppliers are cognizant of an increased demand from consumers to supply this product.

It is important that consumers can feel that a reliable instrument exists to guarantee that their active choices make a difference. Electricity suppliers need to be able to guarantee to the customer that the product the customer is demanding entails a difference, for example, if the customer purchases wind power, it must be deducted from the electricity supplier's residual electricity mix. In this respect, guarantees of origin for renewable electricity could have an important function. If guarantees of origin are used so that electricity suppliers are permitted to label the origin of the portion of the electrical power they have sold that is renewable, then guarantees of origin must be unique documents – otherwise the origin cannot be guaranteed. With a unique and accurate guarantee of origin, the directive's requirements with respect to accuracy and reliability can also be deemed to have been met.

---

<sup>24</sup> The residual refers to the electricity mix that remains after electricity sold with various generation attributes, for example, wind power and Good Environmental Choice, have been deducted.

<sup>25</sup> Communication from the Commission, COM(2005) 627 page 15.

An electronic guarantee of origin refers to a file that exists electronically in an IT system for keeping account of guarantees of origin. Each guarantee of origin gets a unique number and all the information required under the directive and the national legislation is found on each guarantee. An electronic guarantee of origin in a closed registry where transfers and cancellations can be made prevents double counting. The possibility of cancellation probably needs to be regulated in law or regulations governing guarantees of origin. On the other hand, it is demand that will control when the actual cancellation ought to occur and should therefore be regulated in law or regulations on origin labelling, or in the regulatory framework that exists for the generation attribute for which the guarantee of origin is to be used. The possibility of cancellation does not mean that there should be an international system where the Member States are to approve each other's guarantees of origin, for counting towards national targets, for example.

In conjunction with the work on this report, the Energy Market Inspectorate (EMI) put forward particularly that if final customers begin to demand electricity with guarantees of origin to a greater extent, it is important that a ready and well functioning market for guarantees of origin can be set up so that even independent electricity traders (independent from production) can offer final customers electricity with guarantees of origin for origin labelling of electrical power obtained via an electricity exchange or bilaterally. Otherwise, an independent electricity trader without its own production will most likely incur higher costs for obtaining guarantees of origin than vertically integrated market players, and will thus have poorer prospects for competing in the final customer market. In addition, there are considerable entry barriers for some production that generates guarantees of origin (large-scale hydro electricity), in which the big, vertically integrated companies dominate today.

# 5 Other initiatives linked to the promotion of renewable electricity production or trade in generation attributes for renewable electricity

## 5.1 Background

There are various options for disclosing and trading in the origin of electrical power. There are also support schemes that are linked to the origin of the electricity. Below is a brief overview of the various options that exist.

## 5.2 Support schemes for renewable electricity

### 5.2.1 Electricity certificate

The electricity certificate system is a market-based support scheme intended to promote the production of electricity from wind power, solar energy, wave energy, geothermal energy, certain biofuels, peat and some hydroelectric power. *Lagen om elcertifikat* (SFS 2003:113) (the Electricity Certificate Act) came into force on 1 May 2003, replacing earlier public grants and subsidy systems.

The aim of the scheme was to increase the production of renewable electricity in the country by 17 TWh by 2016 from 2002 levels.

The market for electricity certificates is created by electricity producers receiving an electricity certificate from the government for each MWh of renewable electricity they produce, while electricity suppliers are obliged to purchase electricity certificates equivalent to a certain proportion (quota) of their sales of electrical power. Electricity-intensive industries are partially or wholly exempted from this obligation to purchase electricity certificates in relation to their use of electrical power in the manufacturing process.

Electricity certificates are tradable and have no connection to the physical delivery of the electrical power. Electricity certificates are accounted for in an electronic registry that is managed by Svenska Kraftnät. In this registry, electricity certificates can be transferred and cancelled each year for the fulfilment of the legislated quota obligation. Each electricity certificate has a unique ID in this registry.

The Swedish Parliament has decided that the electricity certificate system is the support scheme that will promote the production of renewable electricity up until the year 2030. Quotas have been determined for the years up until 2030. There are limits on the allocation of electricity certificates for production installations. New installations receive electricity certificates for 15 years while installations that were

commissioned before 1 May 2003 will be phased out of the scheme at various points in time.

In 2006, electrical power production in the electricity certificate system was 12.16 TWh. This constituted a total increase of 5.65 TWh compared to the comparison base year 2002 and an increase in the production of renewable electricity of **5.1 TWh** (excluding peat).

In 2006, the electricity consumer's cost for supporting the production of renewable electricity and peat with electricity certificates was on average 3.4 öre/kWh (SEK 0.034/kWh) including VAT.

The volume-weighted mean price (income) received by the producers in 2006 was SEK 191 per electricity certificate, which is the equivalent of 19.1 öre per kWh (SEK 0.191 per kWh).

Electricity certificates are used to meet the quotas of those who are obliged under the law to do so.

### **5.3 Trade in the green value of electrical power**

A number of products on the electricity market have reference to the origin of the electrical power and target final consumers. This section describes some of these.

#### **5.3.1 Bra Miljöval (Good Environmental Choice)**

*Bra Miljöval* is a Swedish eco-label and trademark owned by the Swedish Society for Nature Conservation. It is the Swedish Society for Nature Conservation's tool for driving development towards a more sustainable society. Electrical power labelled *Bra Miljöval* is intended to guarantee that the electrical power that the customer purchases is produced in accordance with a set of criteria.

Its aim is to:

- § Speed up the transition from nuclear power and electrical power from fossil fuel sources to renewable energy sources;
- § Prevent the continued expansion of hydroelectric power stations and speed up measures that reduce the damaging effects of hydroelectric power stations on the environment;
- § Increase the proportion of solar power, biofuel and wind power in the energy system in a way that reduces the damaging effects of electrical power generation on the environment.

A variety of goods and services can be eco-labelled as *Bra Miljöval* if they meet certain specified criteria. Electricity supply based on renewable energy sources can be eco-labelled. It has been possible to get electrical power labelled *Bra Miljöval* since 1996. At that time only a few companies were licensed. Today close to 42% of all power companies in Sweden have a licence to sell electricity labelled *Bra Miljöval*.

Companies wishing to use the *Bra Miljöval* label must comply with all obligatory requirements and draw up a licence agreement with the Swedish Society for Nature Conservation. These criteria apply irrespective of where the electrical power is generated. The licence holder must follow the applicable environmental legislation in each country. The company must also establish an environment policy in which the company describes how it is reducing its environmental impact. The criteria cover requirements on raw materials and production. In addition, there are special requirements for different sources of energy. The actual supply of electricity produced in accordance with the criteria must balance against the sales of *Bra Miljöval* electricity on an annual basis. Of the energy used for energy extraction, transport and refinement of the fuel, process energy at the installation, the transport of residual products and for balancing, the proportion that is not renewable may not be greater than 10 % of the electricity supplied and labelled as *Bra Miljöval*.

Companies holding a licence to use the *Bra Miljöval* label are required to undergo annual checks and be able to show compliance with the licence agreement. The licence agreement includes the conditions specified in the criteria and in the license conditions. The licence holder must have accounting systems and routines of an order such that it is possible to check that the criteria are being met. The information is audited by an auditor approved by the Swedish Society for Nature Conservation. This audit includes checking that the percentage of electrical power labelled as *Bra Miljöval* corresponds to the number of kilowatt hours sold.

The advantages of *Bra Miljöval* labelled electrical power are that, for example, companies that supply *Bra Miljöval* labelled power from hydroelectric power stations are required to set aside money in a fund that is used to reduce environmental impact, and those that supply it from cogeneration installations are required to return the ash to forests and the soil. The additional cost of eco-labelled electrical power for big customers often lies between 0.5 to 1 öre/kWh (SEK 0.005-0.01/kWh) while households customers on average pay between 1 to 1.5 öre/kWh (SEK 0.01-0.015/kWh).

Sales of *Bra Miljöval* labelled electrical power in Sweden in 2006 amounted to approximately 5 000 GWh. Just under 20 % of this power was produced in Norway and Finland, with the remainder being Swedish production.

### **5.3.2 Self declarations and bilateral agreements**

Self declarations and bilateral agreements are based on trade that specifies the origin of the electrical power without any connection to an official system that can guarantee the accuracy of such claims.

The sale of a generation attribute is linked to the physical supply, but generation attributes may also be sold separately in some instances. The electricity supplier itself exercises control over no more renewable electrical power being sold than what the electricity supplier has produced itself or has purchased. A customer who buys renewable electricity, for example, therefore cannot be entirely sure that the same electricity is not being sold to several customers. However, it ought to be in the interests of the electricity supplier that this does not occur<sup>26</sup>.

---

<sup>26</sup> Elforsk report, Ursprungsmärkning av el i de nordiska länderna (Origin labelling of electrical power in the Nordic countries), page 3.

Electricity suppliers sometimes sell electricity contracts that include eco-labelled electrical power, for example, in the case of fixed-price contracts for private customers. For other contracts, the customer normally pays around 1.5-2 öre/kWh (SEK 0.015-0.02/kWh) for eco-labelled electricity.

It is difficult to estimate how much electricity is managed in this way since much of this trade occurs between large corporations and business-to-business.

### **5.3.3 SERO-el®**

SERO-el® (SERO electricity) is a trademark owned by *Sveriges Energiföreningars RiksOrganisation* (SERO) – Sweden's National Federation of Energy Associations. This eco-label is used for wind power and small-scale hydroelectric power up to 1 500 kW. The additional cost for the customer is 1.25 öre/kWh (SEK 0.0125/kWh) including VAT, and 70% of this additional cost is passed back to the producers. Bigger consumers of electricity can get some discount. SERO-el® is currently sold by two electricity suppliers that have been licensed by SERO (Östkraft and Plusel) to sell to final customers but more electricity suppliers are interested a licence. On the producers' side, around 700 power stations are included, with a total annual production of around 0.8 TWh. Neither producers nor electricity suppliers need to pay a fee for a licence to sell their electricity as SERO-el®.

The requirement for an electricity producer to be able to sell its electricity under the eco-label SERO-el® is membership in one of the trade associations the Society of Small Power Plants for Hydropower (SRF) or the Swedish Wind Power Association (SVIF). The next requirement is that the electricity production is approved by the Swedish Energy Agency for allocation of electricity certificates.

Because SERO submits guarantees of origin for a certain production, SERO can give a licence to the producer to sell its electricity and its electricity certificates under the trademark.

When trading in SERO-el®, the origin of the electricity is linked to the physical electricity supply. The producer sells the electricity and often also the electricity certificates to the electricity supplier. The electricity supplier uses the electricity certificates to meet their quotas and also for their sales of SERO-el® labelled electricity. Internal audits are conducted to check that the electricity supplier does not sell the green value more than once. SERO is currently working on developing verification instruments. SERO-el® is currently being marketed as an environmental option among the electricity suppliers who are licensed to sell SERO-el®.

## **5.4 Trading system in generation attributes for renewable energy**

### **5.4.1 Renewable Energy Certificate System (RECS) and European Energy Certificate System (EECS)**

RECS<sup>27</sup> is an international trading system in Europe for renewable energy certificates. The system was initiated and is coordinated by RECS International Association in collaboration with the Association of Issuing Bodies (AIB)<sup>28</sup>. Each participating country has approved an independent national issuing body to manage the system. This issuing body is a member of the AIB, so that certificates can be exchanged based on the same standard (RECS).

RECS certificates are issued for each produced MWh of renewable electricity. To obtain RECS certificates, the producer must be a member of RECS International.

Once the producer is a member, an account is opened for the producer where certificates are registered.

The RECS International Association is a non-profit European organisation registered in Brussels. Its members are all producers of renewable energy, electricity traders or electricity suppliers in Europe that have a certificate account with their national issuing bodies. RECS International acts as the representative of its members in relation to national and European authorities to facilitate all possible events and activities that enhance its mission, which is to promote a pan-European renewable electricity market, facilitated by a commonly accepted and harmonised European information system.

The Association of Issuing Bodies (AIB) promotes the use of a standardised system, based on a harmonised environment, structures and procedures in order to ensure the reliable operation of international energy certificate systems. This standardised system is known as EECS – the European Energy Certificate System – and is set out in “The Principles and Rules of Operation” (the PRO) and its supporting documents.

Of the 25 countries in the European Union, 16 are now active members: almost all offer voluntary RECS certificates, and 8 offer international guarantees of origin for renewable energy sources (RES-GO). In the near future, a few countries will begin to issue guarantees of origin for high-efficiency cogeneration electricity. In October 2006, more than 157 million certificates have been issued (corresponding to 157 TWh), of which 84 million have been used to guarantee the origin of electricity that consumers have purchased as coming from renewable energy sources (origin labelling).

RECS and EECS comprise a voluntary system. The guarantees of origin are electronic and are issued as the electricity is produced, and the certificates are cancelled once they have been used. RES-GOs are in demand in Sweden for

---

<sup>27</sup> Information sourced from [www.recs.org](http://www.recs.org)

<sup>28</sup> Information sourced from [www.aib-net.org](http://www.aib-net.org)

counting towards electricity labelled *Bra Miljöval* and for origin labelling. Sweden is one of the countries that exports the most RES-GOs. During 2006, RES-GOs from Swedish installations were issued for the equivalent of 25 TWh, of which 10 TWh have been cancelled (that is, had been used and counted towards origin labelling, for example). Sweden's export of guarantees of origin during 2006 corresponded to 5.5 TWh. This has no connection to the physical supplies of electricity (across the nation's borders).

RECS International and AIB were established in 2001 and have been working towards a harmonised system for trade in certificates for renewable electricity since then. The system is regarded as being reliable and allows for the transfer of certificates between countries.

## **5.5 Current inquiry projects**

### **5.5.1 European tracking system for electricity (E-Track)**

E-TRACK<sup>29</sup> is a project under Intelligent Energy Europe and its purpose is to develop a pan-European standard for tracking electricity. This information can then be used for guarantees of origin and origin labelling of electricity in Europe. The project was started in 2005 and in March 2007 a first proposal for a standard for tracking electricity was presented. The final proposal is expected to come in September 2007. Subsequently the proposal will be presented to the European Commission.

In a continuation of the first phase, E-TRACK Phase II, the standard will be developed further. Among other things, the Phase II project will focus on the coexistence of guarantees of origin and green power certificates. Phase II will begin in September 2007 and continue for a period of two years.

The basic principle in the proposed standard from March 2007 is a certificate model where generation attributes, for example, the energy source that has been used to generate the electricity, are separate from the actual physical electricity.

The project recommends that guarantees of origin are used for origin labelling of electricity, and proposes that guarantees of origin for renewable electricity production can be used for trade between countries.

The same MWh of electricity can have two or more attributes represented by different certificates, for example, a guarantee of origin and a green certificate. If this is the case, it must be ensured that each certificate is clearly defined so that it cannot be cancelled for a purpose other than the one for which it was intended. The E-TRACK standard is compatible with all types of support schemes (feed-in systems, quota obligations, tax exemptions, etc).

---

<sup>29</sup> See also [www.e-track-project.org](http://www.e-track-project.org)

Under the E-TRACK system, for electricity that qualifies for a guarantee of origin for both renewable electricity and high-efficiency cogeneration electricity, only one joint guarantee of origin is to be issued. The guarantee of origin contains information stating that the electricity has been produced from renewable energy sources and that the electricity has been produced by high-efficiency cogeneration.

## 6. Electricity certificates, guarantees of origin and green value

The link that exists between electricity certificates and guarantees of origin is that an installation approved for the allocation of electricity certificates can also obtain guarantees of origin for renewable electricity for the same electricity (same MWh). Installations entitled to electricity certificates do not need to register with the Swedish Energy Agency if the holder also intends to request the issue of guarantees of origin. These installations can request guarantees of origin directly from Svenska Kraftnät for renewable electricity for a certain period.

For guarantees of origin to be used to verify the generation attributes of renewable electricity, for origin labelling, or for meeting national targets, they must be accurate and reliable. This can be ensured by issuing unique electronic guarantees of origin that can be cancelled after they have been used for their intended purpose. Thus, all guarantees of origin would exist in a closed system and only exist in electronic form. All the information that each guarantee of origin is the bearer of would be transferred with it in the case of its ownership being transferred.

The players in the electricity market that the Swedish Energy Agency has been in contact with have emphasised that the electricity's green value ought to be linked to the guarantees of origin.

In *DS (2005:29, page 69) förslag om ett utvecklat elcertifikatsystem* (Bill on broadening the electricity certification system) there is another conclusion. Electricity certificates should be seen as linked to green value when reporting the national percentage of renewable electricity (the green value in this context refers to the statistical value). In an international market, the country where the electricity certificate is cancelled should be able to count its value towards its national quota of renewable electricity. International trade with electricity certificates within the EU should also include guarantees of origin to satisfy the principle for reporting of the quota of renewable electricity that is applied by the European Commission. In the subsequent government bill<sup>30</sup> however, there is nothing about this and the question of an international market will be reviewed in conjunction with the review of the electricity certificate system in 2012.

---

<sup>30</sup> Bill 2005/06:154 Förnybar el med gröna certifikat (Renewable energy with green certificates).

If a registry for unique electronic guarantees of origin is introduced, there are two options regarding how this would function in relation to the electricity certificate.

1. For one MWh of electricity produced, an electricity certificate and a guarantee of origin are issued. These then exist in separate registries and are cancelled at different times. The electricity certificate is used for the fulfilment of quota obligations. The green value goes with the guarantee of origin.
2. Only one certificate is issued for each MWh of electricity produced. The certificate has flags that show if the installation is approved for electricity certificates and/or if it is registered for guarantees of origin.

The advantages of Option 1:

- There are two separate markets: a voluntary system and a legislated obligation. Electricity certificates are traded because there is a quota obligation, which means an obligation to submit electricity certificates at a certain specified time. The guarantee of origin is normally traded by electricity suppliers for the purposes of marketing their electricity sales and guaranteeing that there is a certain amount of renewable electricity in their total sales. However, bigger consumers might also purchase guarantees of origin directly from the producer in order to profile themselves as environmentally responsible.
- Generation attributes and electricity certificates have differing economic values.
- The electricity certificate system is expanded so that the various sources of energy can compete on a level playing field. The buyer and seller cannot obtain information about the type of installation from which the electricity has been produced via the electricity certificate, because the electricity certificate is intended to have the same value, irrespective of the energy source. However this information can be searched for in the database. Origin labelling can result in different types of energy sources having different values. For example, there may be customers who only want to purchase electricity produced using wind power. A joint certificate would mean that even the electricity certificate's value might vary and that the different energy sources in the electricity certificate system would not then compete any longer on a level playing field.
- The value of guarantees of origin for origin labelling or other generation attributes will be time limited, whereas the electricity certificate's life is unlimited (2030).
- The quota obligation penalty is worked out on the basis of the volume-weighted mean price on the electricity certificate. For Option 2, the economic value would consist in part of the value of the electricity certificate, and in part of the value of the guarantee of origin, which would then affect the size of the quota obligation penalty.

The advantages of Option 2:

- The consumer does not need to understand the difference between supporting renewable electricity production with electricity certificates and electricity suppliers' origin labelling. With Option 1, the electricity supplier's information can show that the electricity that the supplier sells comprises 0 % renewable electricity, while the customer still "pays" for renewable electricity through the electricity certificate system.
- If all electricity suppliers meet their quota obligations in the electricity certificate system, then all have at least a proportion of renewable electricity in their sales mix that corresponds to the quota.

Currently, there is nothing that argues in favour of electricity certificates and guarantees of origin being linked together. The Swedish Energy Agency is of the opinion that a completely separate electronic registry for guarantees of origin is preferable. If there is interest in a joint solution, the Swedish Energy Agency proposes that the question is investigated further.

If a separate solution is chosen, this would be on the condition that the electricity certificate system is seen solely as a system that directly promotes the production of renewable electricity through issuing electricity certificates to producers. Possession of these electricity certificates is a condition for the fulfilment of the statutory quota obligation for electricity consumption. The electricity certificate system should then be seen solely as the support scheme that it is, and electricity certificates would carry no green value. Possession of electricity certificates does not mean that the electricity can be origin-labelled with the support of these certificates. The electricity certificate then has no connection to generation attributes or origin labelling of the electricity in relation to the customer. The determinant for the generation attributes or origin labelling is linked only to the supplier's holding of guarantees of origin. Therefore, separate electronic registries are needed for guarantees of origin and electricity certificates.

In cases where guarantees of origin are used for attributes and/or origin labelling, clarification with respect to the green value is important for the credibility and reliability of the electricity certificate and guarantee of origin systems.

## 7. Potential consequences of the coming renewables directive

On 2 May 2007, the Council of the European Union in Brussels approved a binding target of 20 % renewable energy as a proportion of the total energy consumption in the EU by 2020.

Member States are to adopt national targets for the use of “green” electricity from renewable energy sources.

The question is: Under what conditions shall the Member States be permitted to count imported renewable electricity towards their targets under the directive? For countries outside the EU, it is not possible to import the green value, but the situation is not as clear when it comes to importing from EU countries. The Commission has decided to apply a certain principle in determining how the national targets for renewable electricity are to be achieved. Under certain conditions, guarantees of origin can be used to count imported renewable electricity towards meeting a country’s national targets<sup>31</sup>.

If, in the future, guarantees of origin should be approved for import, and if Sweden should not be able to meet its targets through its own renewable electricity production, should Sweden be able to purchase guarantees of origin (for the number of MWh lacking) from another country that produces more renewable electricity in that country needs to meet its targets?

A quota obligation system may need to be linked to guarantees of origin if guarantees of origin are to be used to meet the country’s national targets. Since it is the producers who are able to control to whom guarantees of origin are sold, the producer is most likely to sell its guarantees of origin to the player that pays the most, whether or not that player is in Sweden or abroad. Since guarantees of origin are not linked to any requirements in Sweden, the producers can then sell them abroad without the government having any possibility of influencing or controlling that Sweden can meet its targets. A possible alternative is that guarantees of origin could be linked to electricity certificates.

Provided that no directive provides, or the Swedish parliament decides, that guarantees of origin are to be approved for import/export, the risk of Sweden not achieving its targets due to producers being able to sell guarantees of origin abroad does not exist. To determine if guarantees of origin are to be used for the enforcement of national targets, Sweden needs to consider whether or not Sweden is willing to finance the expansion, not just in Sweden but within the EU.

---

<sup>31</sup> Communication from the Commission, COM(2004:66), page 18.

The Swedish Energy Agency does not have a position on whether or not guarantees of origin should be used for meeting national targets. The question needs to be investigated further. But if guarantees of origin are to be used to meet national targets, this places demands on their accuracy and reliability so that transfers of ownership are possible.

## 8. External viewpoints

### 8.1 The industry

During work on this report, it has been apparent that interest in these issues is great. Many players have provided written comments and views were also put forward at the reference group meeting held on 27 June 2007. Below is a brief account of the comments and views that have come in to the Swedish Energy Agency.

*Vattenfall AB*: A guarantee of origin is not intended only as a unique proof for the producer but is also proof that electricity with a certain origin has been distributed to and consumed by a customer. The latter also means that it must be possible to cancel a guarantee of origin, that is, it must be apparent that electricity with a specific origin has been consumed. The consequences of this are that:

- The guarantee of origin must be formulated as an electronic document that is managed in a closed central registry.
- It must be possible to issue guarantees of origin for a producer, transfer ownership of them to an electricity trader/supplier when the electricity is marketed, and to cancel them once the electricity has been consumed by the customer.
- Guarantees of origin must be standardised (e.g., one MWh) so that producers can market the volume they want and electricity traders and customers can also purchase the volume they want both in Sweden and in other countries.
- Since the electricity is sold as different products, for example, *Bra Miljöval*, it should be possible to utilise guarantees of origin as documentation providing consumer protection that a specific product is sold exclusively to only one customer.

The EECS standard fulfils all these requirements. The EECS standard is found in all Nordic countries today.

Sweden's interpretation of the EU directive – that the ownership of guarantees of origin is not transferable – is a unique interpretation of the EU directive. In countries where guarantees of origin have been introduced such as Denmark, the United Kingdom, the Netherlands, Austria, Germany, Poland, Norway and Slovenia, guarantees of origin provide unique proof that electricity has been produced from renewable energy and can be transmitted to the customer. In the Netherlands, a guarantee of origin must always be used when the renewable electricity product is sold to the customer and is cancelled when the electricity is consumed. The customer then gets some consumer protection and is guaranteed that the renewable value is not sold to any other customer.

For a market with certificates to be able to function well and not least so that it leads to as little confusion as possible, the range of different types of instruments on offer must be small and standardised. For each MWh of electricity produced, there should be one electricity certificate/guarantee of origin. This guarantee of origin can be formulated to hold different types of information depending on the installation, for example, for cogeneration electricity where the information requirement is set somewhat higher. We do not understand the point of having different guarantees of origin, one renewable and one for cogeneration electricity, even if the EU directives provide scope for such an interpretation. The EU directives should be seen as a minimum level. In the E-TRACK project in which we have participated, this loophole in the regulations has been discovered, too. The problem with introducing parallel guarantees of origin is in part the confusion this leads to, and in part that the standard that the E-TRACK project proposed could not be fully implemented, since a parallel system for guarantees of origin is seen as double counting. We support the idea of a unique guarantee of origin per MWh produced.

*Östkraft Energihandel AB:* In a wholly Swedish system, there could be two registries: one for electricity certificates and one for guarantees of origin. They can see that there are advantages and disadvantages of two registries over one joint registry. None of these outweigh the others. They purchase guarantees of origin in order to take action on the issue of the environment, to increase their proportion of renewable electricity in the purchase mix, and to improve the company's image as environmentally responsible. They prefer one guarantee of origin per MWh that refers to both renewable electricity and cogeneration electricity. This guarantee of origin must have two "flags". They do not want to specify "of which X % is from high-efficiency cogeneration" in the information they provide to customers.

*Jämtkraft AB:* Jämtkraft does not use guarantees of origin in PDF format. A problem today is that the same green value can be sold in different forms. There is no overarching control over how the green value is used and the customer cannot assure him/herself that other interested parties are not paying for the same green value. Svenska Kraftnät's registry system is a well proven system that electricity traders are familiar with. If possible, it would be good if guarantees of origin could get their own accounts in the system as two separate documents.

*Scandem:* It should be ensured that any changes that will be introduced will not present obstacles to the opportunities that the market players use today to trade in the green value. All players want to be able to trade their electricity and in parallel be able to trade in the green value without the trade in one affecting the other. Today, trade in the green value is through the transfer of the green value via bilateral agreements. Part of the agreement is proof of origin, that is, the proof that can be generated at Svenska Kraftnät. A good solution would be if the producer was permitted to apply for one more account to get guarantees of origin and that the buyers got an equivalent account where guarantees of origin could be cancelled when they themselves had used the green value. Such a system is important for credibility, since it reduces the possibilities of a party selling the same guarantee of origin more than once.

*Svensk kraftmäklare*: The guarantee of origin is a financial instrument on the electricity market for trading with the origin, separate from the physical electricity and should be the basis for origin labelling. Therefore it should not be possible for there to be more MWh of guarantees of origin than electricity production. The guarantee of origin serves to permit electricity consumers to demand or be informed about a certain kind of electricity. If there is demand, guarantees of origin acquire an economic value for the producer and thus comprise a regulatory signal from the market. This value can be traded and it is the green value of the electricity production. The guarantee of origin is not primarily data to serve the government's need to gather statistics, but rather to serve electricity consumers as a reliable instrument with respect to the green value.

The goals of the EU's energy policy are focused on security of supply, an internal electricity market, efficient energy use, increasing the proportion of renewable energy, and decreasing emissions of greenhouse gases. There are many directives for the implementation of this policy that target different aspects. However some of these directives support several of these goals, for example, the high-efficiency cogeneration and renewables directive. Concerning the question of one or two guarantees of origin for high-efficiency cogeneration, the proposed amendment ought not to be formulated narrowly on the basis of each individual directive without sufficient consideration for the overarching goal of a functioning market, which is achieved with only one guarantee of origin for high-efficiency cogeneration. It would amount to double counting if one MWh can have more than one guarantee of origin: one for high-efficiency cogeneration and one for renewable electricity, where both can be used for origin labelling. Taking the extreme case of 100 % high-efficiency cogeneration in Sweden, we would then have double the number of guarantees of origin in relation to physical electricity production. Or the case of 50 % high-efficiency cogeneration in Sweden, in which case we could label the origin of all electricity as 100 % high-efficiency.

Electricity certificates and guarantees of origin should be managed separately from each other. They are traded separately from each other, and they have very different economic values. One is a voluntary market and the other a legislated quota obligation. From the trade point of view, these should not be mixed together. It should not either be a problem in the case of internationalisation if it is clear that it is the guarantee of origin that is the bearer of the green value. The fulfilment of national targets with respect to burden sharing of the proportion of renewable electricity can then be based on cancelled electricity certificates instead of produced.

*Svensk Energi*: With its starting point as origin labelling, Svensk Energi has issued a set of guidelines for its members. These guidelines have now been revised primarily with updated figures. Svensk Energi is positive to the idea of guarantees of origin being used for the purposes of origin labelling. This would be good for reliability. Origin labelling ought to be the bearer of the green value – not the electricity certificate.

*E.ON Försäljnings AB:* Credibility is the most important factor in the relationship to the final customer. The regulatory framework must be clear and unambiguous. Guarantees of origin and origin labelling must be connected to each other. A system similar to the electricity certificate system with electronic guarantees of origin that can be cancelled would be desirable. Today they do not use GOs to any great extent, awaiting clarity/confidence in the scheme.

*EGL Sverige AB:* Origin labelling in relation to the final customer can be an effective way of speeding up the transition to a more sustainable electricity production system. For origin labelling to be effective throughout the entire chain (producer, trade, electricity supplier) requires a guarantee of origin system where guarantees of origin are a separate financial instrument, disengaged from the physical electricity supply. Would prefer an international solution (covering at least the Nordic countries, preferably the entire EU). With a certificate system, all production should get a guarantee of origin; a common classification of different production types is required. Guarantees of origin should be issued in the form of one for each MWh and the guarantee of origin should refer to the energy source.

Electricity certificates are a support scheme for investment; it is important to keep separate the various instruments. Guarantees of origin should be kept separate.

*Svensk Fjärrvärme:* Of the view that there should be a joint guarantee of origin that is issued for high-efficiency cogeneration and renewable electricity and which contains information about the origin of the electricity. Today guarantees of origin are issued for renewable electricity which specify that it comes from solar, wind or hydro power and biofuels, thus all that is needed is to add information about PES<sup>32</sup> and CO2 emissions. In the longer term, Svensk Fjärrvärme could consider labelling the origin of all electricity so that trade in electricity from nuclear power or coal liquefaction can also occur. Since a large proportion of all electricity will then be specified, cross-border trade can be managed more effectively, and it will be easier to keep track of the remaining electricity.

Electricity certificates and guarantees of origin should be separate systems.

## **8.2 The Swedish Environmental Management Council**

There is a demand among contracting entities to be able to choose electricity from different energy sources. It is therefore very important that it is possible to verify the origin of the electricity that you purchase in a cost-effective, clear and reliable manner. This becomes possible if guarantees of origin exist as unique, electronic documents. There should be only one guarantee of origin per, for example, MWh produced. This means that, for example, 1 MWh of high-efficiency cogeneration electricity from renewable fuel must not be worth two guarantees of origin. The risk of double counting is minimised. There should be guarantees of origin for all energy sources, even for non-renewable sources if possible, since it will then be clear for the customer where the electricity purchased comes from, and in addition it will permit reliable counting towards targets.

---

<sup>32</sup> Stands for Primary Energy Savings.

### 8.3 Swedish Society for Nature Conservation (SNF)

Guarantees of origin are an instrument for the EU to support the voluntary market for renewable energy. Therefore it is important that this document is credible and ensures that it does not guarantee the origin of the same electrical energy to more than one customer. The guarantee of origin is also an important document for guaranteeing the origin of the electrical energy in origin labelling. SNF does not see guarantees of origin for high-efficiency cogeneration electricity as an instrument for the consumer, but more as a certificate for various market instruments and support schemes. It is important that it can be ensured that guarantees of origin for high-efficiency cogeneration electricity are not permitted to be used to guarantee the origin of a fraction of energy. The purchase of guarantees of origin is an entirely voluntary measure. If electricity certificates and guarantees of origin are combined, this would, if anything, confuse the consumer. Those who want to meet their quota obligation, but at the same time purchase renewable energy, will be forced to buy up electricity certificates for their entire consumption.

In summary, the Swedish Society for Nature Conservation is of the opinion that:

- Electricity certificates and guarantees of origin must be managed in two separate systems. Electricity certificates ought to remain as solely a support scheme, and cannot guarantee the origin or kind of electricity. Guarantees of origin become necessary in the case of environmental claims in conjunction with electrical energy and must therefore be transferable.
- A system with electronic guarantees of origin should be introduced with cancellation of the kind of electricity similar to the electricity certificate system. If products are sold, their guarantees of origin must be attached in order to ensure that double counting does not occur. Guarantees of origin ought to be introduced in accordance with the E-TRACK standard.
- Regulations covering origin labelling ought to be put in place as soon as possible, where the guarantees of origin are deducted from an established Swedish electricity mix including import and export.
- In the longer term, guarantees of origin ought to be issued for all types of electricity production to minimise the statistical value in origin labelling, but also to be able to better analyse the effects of various support schemes, market mechanisms, investments, etc.
- The Swedish Energy Agency ought to develop standard values for different types of production as soon as possible so that the guarantee of origin can also state the climate impact, etc.

## **8.4 Elforsk report, *Ursprungsmärkning av el i de nordiska länderna* (Origin labelling of electrical power in the Nordic countries)**

In its report *Ursprungsmärkning av el i de nordiska länderna*, Elforsk report 07:10 (Origin labelling of electricity in the Nordic countries), Elforsk (a company jointly owned by Svensk Energi AB (Swedenergy) and Svenska Kraftnät (the Swedish National Grid) with the aim of coordinating the industry's research and development) describes a preliminary study that it has conducted regarding origin labelling of electricity. The purpose of this study was *inter alia* to provide a general overview of the solutions employed by the Nordic countries for origin labelling of electricity, and to analyse the consequences of these at the national and Nordic levels; and furthermore to propose alternative models that could potentially be used jointly in the Nordic countries and the consequences of these.

Origin labelling is applied differently in each of the Nordic countries, and consequently the systems applied in the Nordic countries cannot be easily combined.

Double counting occurs at both the national and Nordic level, which means that the green value of the same electricity is counted multiple times. Double counting of the Nordic level is due in part to double counting occurring at the national level and in part because different types of tracking systems are used. In addition, different rules for import and export are applied and not all countries make a correct deduction from the residual, and because the residual is sometimes calculated on the basis of the national electricity mix and sometimes on the basis of the Nordic electricity mix.

The report has arrived at the conclusion that only one certificate model meets the necessary criteria. The necessary criteria have been judged to be the EU directive, the Note from EU DG TREN, and the Nordic legislation in the area. Another essential criteria is that the functioning of the electricity market should not be impacted negatively.

The proposal provided in the report is that the Nordic countries together investigate the possibilities of implementing a joint system for origin labelling of electricity in the longer term.

For Sweden, regulations ought to be developed, and the issue of who is to be responsible for the Swedish system ought to be resolved soon. The Swedish system ought to be a certificate model where the residual is calculated on the basis of the Swedish electricity mix. Regulations for such a system are deemed to be essential in order for the requirement with respect to reliability in the EU's electricity market directive to be deemed to be met, and to increase the benefit for customers. By calculating the residual on the basis of the Swedish electricity mix, double counting of the Nordic level would be reduced.

## 9. Conclusions and proposals for changes to the regulatory framework

The original idea of guarantees of origin according to the renewables directive and the cogeneration directive, and in the legislative history of the Swedish legislation, was not that ownership of guarantees of origin would be transferred. Despite this, the Swedish Energy Agency in its work on this report has been able to conclude that ownership of guarantees of origin is being transferred both in Sweden and abroad. This is thus something that has developed spontaneously in the market. Statements have been made by the Commission that lend support to a change in attitude in relation to guarantees of origin since the directives came into force. This development demonstrates that guarantees of origin have come to have a greater significance than could have been anticipated at the time of the legislation coming into force. If guarantees of origin are to have any function to fill with respect to generation attributes, origin labelling or national targets, it is probable that it must be possible for guarantees of origin to be transferable.

In its Note, the Commission has stated that guarantees of origin can be used for origin labelling. There has also been discussion about the possibility of using guarantees of origin in meeting national targets for renewable electricity. Irrespective of their area of application, the guarantees of origin that are issued must meet the requirements under the directive with respect to being accurate and reliable.

Players in the electricity market have stated that there is an increased demand for generation attributes such as *Bra miljöval*, *SERO-el*, self declarations and guarantees of origin in accordance with the EECS standard. The products on sale are counted towards national targets in different ways. It is often the case that auditors check that the electricity supplier has not sold the green value more than once. However there is insufficient scope within the formulation of the mandate that resulted in this report for describing this process.

There is an awareness among customers as a group that their choice of type of electricity can make a difference – that it will impact positively for the environment in the longer term. To give credibility to an informed and active choice by a customer demands that there are reliable verification instruments in place that can guarantee that the electricity the customer has chosen (renewable) is not sold to other customers. Unique electronic guarantees of origin could function for all products and could thus simplify and ensure the reliability of counting by electricity suppliers. A guarantee of origin can be used for any generation attribute and after use the guarantee of origin should be cancelled. The cancellation ensures that the same guarantee of origin is not used on multiple occasions.

On the basis of what has been stated in the legislative history of the purpose of the Guarantees of Origin Act, guarantees of origin are issued in PDF format. Guarantees of origin were intended to be used only as proof for the producer in marketing the produced electricity, and the guarantee of origin in itself was not intended to be transferable. A guarantee of origin contains information about how much electricity has been produced in the installation during a specific month and can be issued an unlimited number of times for the same MWh of electricity. The development that has occurred since the possibility of receiving guarantees of origin arose however has been such that a guarantee of origin in PDF format can no longer be seen as fulfilling the requirements in the renewables directive and the cogeneration directive with respect to accuracy and reliability. As long as guarantees of origin are used only as proof for the producer to be able to show which type of electricity they are selling in their marketing, it has not been a problem that guarantees of origin are issued in PDF format. But now a market for guarantees of origin has been created where ownership of these is being transferred in some instances without any connection to the purchase of electricity. An electricity supplier can choose to purchase electricity from a producer and then purchase guarantees of origin from another producer. The guarantee of origin in PDF format is not a unique document, since it is possible to request the issue of guarantees of origin for the same MWh of electricity on multiple occasions, and to copy the guarantee of origin.

Currently as far as is known, there is no separate market for guarantees of origin covering high-efficiency cogeneration electricity. In Sweden, all existing cogeneration electricity production is largely already high-efficiency. There is thus no demand for high-efficiency cogeneration electricity from the generation attribute or origin labelling perspectives. Very few countries have implemented the cogeneration directive in the rest of Europe. The Commission is working on guidelines covering how the calculations in the cogeneration directive are to be applied to different types of cogeneration plants and circumstances, which have not yet been decided on. There are therefore limited possibilities for requesting guarantees of origin for high-efficiency cogeneration electricity. However in the opinion of the Swedish Energy Agency, it is not out of the question that a market will develop in Sweden or internationally.

A guarantee of origin is issued to the producer as proof that the electricity produced by them is renewable, for example. When the electricity is then sold to an electricity supplier for distribution and delivery to final customers, the electricity supplier is required to label the origin of the electricity supply. Part of origin labelling is specifying the energy source of the supplied electricity. Guarantees of origin could function as the basis for being able to guarantee that the customer gets the type of the electricity they have demanded where the consumer has made an active choice. However, this presupposes that guarantees of origin are unique electronic documents that are cancelled when they are used for the purposes of origin labelling.

In the case of an international market for electricity certificates or guarantees of origin in the future, the Swedish Energy Agency is of the opinion that questions linked to transfer of ownership ought to be investigated further in order to be able to take up a position on how the Member States can meet their targets with electricity certificates, guarantees of origin or in some other way through a joint solution.

*Proposals for changes to the regulatory framework*

The Swedish Energy Agency can see that there is a need for certain changes in SFS 2006:329 *lag om ursprungsgarantier för högeffektiv kraftvärmel och förnybar el* (the Guarantees of Origin for High-Efficiency Cogeneration and Renewable Electricity Act). The changes proposed are such that they will mean that guarantees of origin can be used for this purpose – to guarantee the origin of the electricity – and can make it possible for guarantees of origin for renewable electricity to be used for generation attributes, origin labelling of electricity and potentially also for counting towards national targets. The proposals given below in some instances require changes in both the Act and the Ordinance.

If guarantees of origin are to be used for generation attributes, origin labelling or counting towards national targets, they must be unique in order to avoid double counting. For these areas of application, Sweden's Guarantees of Origin Act does not meet the requirements in the renewables directive and the cogeneration directive concerning accuracy and reliability. This means that the market for such guarantees of origin, if not rendered entirely impossible, is in any case drastically curtailed. The solution is to create unique electronic guarantees of origin in a closed electronic registry. The Act should then state clearly that a guarantee of origin is a unique electronic document.

A guarantee of origin today covers the amount of electricity that is produced in a specific installation during the month for which the producer has requested the guarantee of origin. The Swedish Energy Agency proposes instead that a guarantee of origin is to be proof that one MWh of renewable electricity and/or one MWh of high-efficiency cogeneration electricity has been produced in a specific installation. This would result in it being easier to manage in an electronic registry, and in addition the producer can request the number of MWh that corresponds exactly to the quantity of electricity that the producer will market.

The Swedish Energy Agency proposes that it should only be possible to get a guarantee of origin for each MWh of electricity produced. As is the case now, getting a guarantee of origin for both renewable electricity and high-efficiency cogeneration electricity for the same MWh of electricity produced in a specific installation would then no longer be possible. Because only one guarantee of origin is issued for the same MWh of electricity, it contains all the available information about the origin of the electricity.

This is also what appears to be the trend within the EU.

Provisions concerning a closed electronic registry for guarantees of origin are needed. The registry would most appropriately be managed by Svenska Kraftnät. The establishment of such a registry would also mean that changes must be made in

the law to the effect that it is evident who has the right to have an account in this registry, how guarantees of origin are to be registered to the account, how transfers of ownership are to be registered, what other registrations are to be possible on the account (right of pledge, bankruptcy, etc), and concerning correction of information registered in the account. In this regard, the provisions that apply to the electricity certificate register could be considered as providing guidance. The registry should also contain a cancellation function in order to minimise the risk of a guarantee of origin corresponding to the same MWh of electricity being counted multiple times.

As a consequence of the changes proposed above, Svenska Kraftnät should instead be designated the registry holder in the Act. Changes are also probably required in the Ordinance if *inter alia* the changes are implemented such that one guarantee of origin is issued per megawatt hour. As a consequence of the amendments to the Electricity Certificate Act of 1 January 2007 with the effect that production installations are allocated electricity certificates only for a limited period, additional amendments to the law may be required. An installation that produces renewable electricity but has been phased out of the system should still have the possibility of being able to request guarantees of origin.

In order to clarify that electricity certificates and guarantees of origin are to be seen as two quite separate systems, it should be clear that only guarantees of origin are bearers of the green value. By green value, it is understood that the customer is willing to pay extra to obtain a certain type of electricity. This could be something that is clear in the legislative history of the Act rather than in the Act itself.

Since guarantees of origin already have significance and may acquire additional significance when it comes to guaranteeing the origin of the electricity, it could also be considered whether or not there is a need to review the available sanctions and the tools that the Swedish Energy Agency has at its disposal to use in exercising its regulatory authority.

Svenska Kraftnät has stated that if an amendment to the Act is implemented that means that Svenska Kraftnät is to issue guarantees of origin in the form of a unique electronic document that can be transferred and cancelled, Svenska Kraftnät will be required to develop an IT support system. The cost of the IT system and the new management that the amendment will occasion is to be financed by fees, by way of suggestion, through Svenska Kraftnät being given the opportunity to charge a fee for issuing guarantees of origin.

## 10 List of acronyms and terms

AIB	Association of Issuing Bodies. The system operator for EECS certificates.
Bilateral trade	Direct agreements between purchasers and sellers without intermediaries similar to the stock exchange and brokers.
Bra miljöval	<i>Bra miljöval</i> (Good Environmental Choice) is a Swedish eco-label and trademark owned by the Swedish Society for Nature Conservation that complies with the requirements in ISO 14024.
EECS	European Energy Certificate System, the European system for a common standard for different types of energy certificates. The certificates are unique, transferable and contain standard information.
The PRO	The Principles and Rules of Operation for EECS.
GREXCMO	A registry database for Swedish and Finnish RES-GO and Renewable Energy Certificate System (RECS) certificates. The database is managed by Finnish company Grexel Systems Ltd.
Green value	In this report, green value is defined as the value that the consumer is prepared to pay for in order to get their electricity from a certain source/origin, for example, electricity from wind power or hydroelectric power.
Broker	An intermediary between buyer and seller.
Nord Pool	The Nordic exchange for electricity, electricity certificates and emissions trading rights <a href="http://www.nordpool.no">www.nordpool.no</a> .
RECS	Renewable Energy Certificate System, an international system for certifying that energy has been produced from renewable energy sources.
RECS certificate	Certificate issued under the EECS standard for an international voluntary market for trade in energy produced by renewable energy sources.

RECS I	RECS International Association – a group of electricity market players in Europe who trade in certificates from renewable energy sources.
RES-GO	Electronic guarantees of origin for renewable electricity under the EECs standard.
Residual	The electricity mix that remains after electricity sold with various generation attributes, for example, wind power, <i>Bra Miljöval</i> (Good Environmental Choice), has been deducted.
SERO-el	An environmental choice for wind power and small-scale hydroelectric power up to 1 500 kW. Licences are issued to producers and electricity suppliers by <i>Sveriges Energiföreningars RiksOrganisation</i> (SERO) – Sweden’s National Federation of Energy Associations.
Self declarations	Self declarations are based on bilateral agreements that specify the origin of the electrical power without any connection to an official system that can guarantee the accuracy of such claims.
Electricity tracking	Tracking that specifies the electricity’s origin. Statistical data (Swedish mix, Nordic mix) can be used for tracking, or at the supplier level. Electricity tracking can also be done using certificates. Documents entitled to certificates can be guarantees of origin or <i>Bra Miljöval</i> licenses.
Guarantee of origin in PDF format	Guarantees of origin that the producer requests to be issued by going into Svenska Kraftnät’s registry and creating a PDF file containing information about the production in an installation. The guarantee of origin (the PDF file) contains information about the production in the installation during a period of one month. The PDF file can be saved and printed out on paper as proof in unlimited quantities. The PDF file can be generated an unlimited number of times.
Guarantee of origin in electronic format	Guarantees of origin that are issued for each one MWh of electricity produced. Guarantees of origin are registered in an ACCOUNT and can be transferred between buyer and seller.

# 11 References

## **Statutes etc.**

*Lag (2003:437) om ursprungsgarantier avseende förnybar el* (the Renewable Electricity Guarantee of Origin Act)

*Lag (2006:329) om ursprungsgarantier för högeffektiv kraftvärmeel och förnybar el* (the High-Efficiency Cogeneration and Renewable Electricity Guarantee of Origin Act)

*Lag (2003:113) om elcertifikat* (the Electricity Certificate Act)  
Electricity Act (1997:857)

*Förordning (2006:331) om ursprungsgarantier för högeffektiv kraftvärmeel och förnybar el* (Ordinance on high-efficiency cogeneration and renewable electricity guarantee of origin)

*Förordning 2003:120 om elcertifikat* (Ordinance on electricity certificates)

## **Swedish parliament publications**

Bill 2002/03:85      *Vissa elmarknadsfrågor* (Some electricity market issues)

Bill 2004/05:62      *Genomförande av EG:s direktiv om gemensamma regler för de inre marknaderna för el och naturgas m.m.*  
(Implementation of the EC Directive concerning common rules for the internal markets for electricity and natural gas, etc), page 69

Bill 2005/06:27      *Leveranssäkra elnät* (Reliable mains supply)

Bill 2005/06:83      *Ursprungsgarantier för högeffektiv kraftvärme el m.m.*  
(Guarantees of origin for high-efficiency cogeneration electricity, etc).

## **Materials from the EU**

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

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

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

EU DG TREN: Note of DG Energy and Transport on Directives 2003/54 and 2003/55 on the Internal Market in Electricity and Natural Gas, Labelling provision in Directive 2003/54/EC.

Communication from the Commission to the Council and the European Parliament - The share of renewable energy in the EU - Commission Report in accordance with Article 3 of Directive 2001/77/EC, evaluation of the effect of legislative instruments and other Community policies on the development of the contribution of renewable energy sources in the EU and proposals for concrete actions {SEC(2004) 547}, Brussels, 26.5.2004 COM/2004/366 final.

Communication from the Commission - The support of electricity from renewable energy sources {SEC(2005) 1571}, Brussels 7.12.2005.  
COM/2005/0627 final.

European Commission, Committee on cogeneration (Article 14, Directive 2004/8/EC), Brussels 3 July 2006 Summary record.

### **Literature and other material**

The Swedish Energy Agency's appropriation directions 2007

Christof Timpe, Herbert Ritter, Chris Pooley, Dominik Seebach, Diane Lescot, Mike Sandford, The E-TRACK Standard, Version 1.0, 2 March 2007.

Elforsk report, *Ursprungsmärkning av el i de nordiska länderna* (Origin labelling of electrical power in the Nordic countries) January 2007.

Svensk Energi, *Vägledning angående ursprungsmärkning av el* (Guidance on origin labelling of electricity), revised 25 June 2007.

Union of the Electricity Industry – Eurelectric; Implementation of the new fuel mix provisions in the EU Electricity Directive, EURELECTRIC SG Fuel Mix, Final report, October 2003.

### **Other references**

*Information has also been sourced from the following websites:*

[www.grexel.com](http://www.grexel.com)

[www.recs.org](http://www.recs.org)

[www.aib-net.org](http://www.aib-net.org)

[www.e-track-project.org](http://www.e-track-project.org)

[www.snf.se](http://www.snf.se)

[www.sero.se](http://www.sero.se)

### *Databases:*

Statistics have been sourced from Svenska Kraftnät's registry for electricity certificates and guarantees of origin, CESAR. Statistics have been sourced from the Swedish Energy Agency's IT support for the electricity certificates system.

### *Personal contacts:*

Marko Lethovaara, Grexel Systems Ltd

Thomas Lindblom, Fortum Markets

Johan Kling, Swedish Society for Nature Conservation

Olof Karlsson, *Sveriges Energiföreningars RiksOrganisation* (SERO) –

Sweden's National Federation of Energy Associations

Claes Hedenström, Vattenfall AB

# Annex Guarantee of origin in PDF format

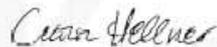
## Ursprungsgaranti för produktion från förnybar energikälla

*I enlighet med Europaparlamentets och rådets direktiv 2001/77/EG av den 27 september 2001 om främjande av el producerad från förnybara energikällor på den inre marknaden för el utfärdas härmed följande ursprungsgaranti.*

**Denna ursprungsgaranti omfattar  
276 MWh**

<b>Anläggning:</b>	Vindkraftverk 1
<b>Producent:</b>	Vindproducenten AB
<b>Ägarandel:</b>	100%
<b>Datum:</b>	2007-01-01 - 2007-01-31
<b>Energislag:</b>	Vind landbaserad
<b>Installerad effekt:</b>	850 kW
<b>Total produktion:</b>	276.044 MWh
<b>Produktion berättigad för ursprungsgaranti:</b>	276 MWh

Utfärdad den 23 augusti 2007



Cecilia Hellner  
Marknadschef, Svenska Kraftnät

Svenska Kraftnät, Box 526, 162 15 Vällingby, Telefon växel 08-7397800, Telefax 08-378405

---

Key to above graphic

**Guarantee of origin for  
production from  
renewable energy  
sources**

Pursuant to Directive 2001/77/EC of the European Parliament and of the Council of 27 September 2001 on the promotion of electricity produced from renewable energy sources in the internal electricity market, the following guarantee of origin is hereby issued.

**This guarantee of origin is for 276 MWh**

Installation:	Wind power station 1 -
Producer:	Wind Power Producer Pty Ltd
Ownership:	100 %
Date:	1 January 2007 to 31 January 2007
Energy type:	Wind, land-based
Installed effective output:	850 kW
Total production:	276.044 MWh
Production entitled to guarantee of origin:	276 MWh

Issued on 23 August 2007

(signature)  
Cecilia Hellner  
Marketing Manager, Svenska Kraftnät

Svenska Kraftnät, Box 526, SE-162 15 Vällingby. Telephone switchboard +46(0)8-7397800, Telefax +46(0)8-378405