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1 Implementation of Tracking Systems

1.1 Electricity Disclosure

Electricity disclosure in Sweden is implemented by the law “Ellag - Electricity Act” (1997:857). The electricity disclosure became into force in its original form in 2005 and was updated on 1st December 2010. The competent body is the Energimarknadsinspektionen - Energy Market Inspectorate. The relevant ministry has in 21st October 2010 mandated the Energy Market Inspectorate (EI) to propose a sophisticated system for electricity disclosure in Sweden. The first outcome of this work was published in the fall of 2011: Energimarknadsinspektionen “Rapport EI R2011:10¹ Ursprungsmärkning av el” – Disclosure of electricity (only in Swedish). It is a comprehensive document, created in collaboration with an extensive reference group of key energy market stakeholders. The report is based on RE-DISS Best Practice Recommendations and the calculation methodology for residual mixes follows the BPR with the exception that it is still based on the Nordic instead of the national domain.

The EI Report doesn't explicitly mention which energy sources need to be disclosed. However, since it is strongly based on the recommendations of RE-DISS and on the previous disclosure guidelines “Vägledning angående ursprungsmärkning av el”² - Instructions for electricity disclosure (issued every year by Svensk Energi), it can be interpreted that the energy sources are fossil (including peat); nuclear; and renewables. The amount of CO₂ and radioactive waste must be included in disclosure, and the Swedish Energy Agency will deliver values for CO₂ and radioactive waste in the residual mix.

According to the EI report, Swedish residual mix will also in the future be the common Nordic residual mix. EI will try to influence other Nordic countries to adopt the Nordic residual mix, because there will be a common end-user market between the Nordic countries.

Until present, the Swedish residual mix has been given as a recommendation by Svensk Energi for market actors. From 2009, the calculation of the mix has been based on E-Track / RE-DISS recommendations, with the exception that it is Nordic instead of the national mix. According to the EI report, it is itself the responsible authority for delivering residual mix figures.

The EI Report doesn't give exact guidelines on what the supplier disclosure should look like and which mixes should be included, but these will be addressed in later versions of the report. Furthermore, the report does not regulate how fuel mix should be disclosed in the situation where a supplier acts as an electricity vendor in several countries.

1.1.1 Disclosure Figures

Supplier disclosure figures are not centrally collected in Sweden. The residual mix based on Nordic area has been calculated centrally by the energy market association (Svensk Energi, <http://www.svenskenergi.se>) starting from 2006. The calculation method has followed the main lines of the recommendations of E-Track project with few exceptions. Starting from 2009 Swedenergy started to publish the calculation produced by EPED and RE-DISS for the common Nordic area version.

1

http://www.ei.se/Documents/Publikationer/Rapporter%20och%20PM/Rapporter%202011/Ursprungsmarkning_av_el_%20EIR_2011_10.pdf

2

http://www.svenskenergi.se/upload/Vi%20arbetar%20med/Handel&Forsaljning/Filer/Ursprungsmarkning/Vagl%20ursprungsmarkning%20%202011_0829_inkl%20bilagor.pdf

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Table 1: Nordic production and residual mixes

| | Renewable % | Nuclear % | Fossil % |
|-----------------------------|-------------|-----------|----------|
| Nordic production mix 2006 | 53,4 % | 22,1 % | 24,5 % |
| Nordic residual mix 2006 | 52,6 % | 18,8 % | 28,6 % |
| Nordic production mix 2007 | 62,3 % | 21,8 % | 15,8 % |
| Nordic residual mix 2007 | 58,3 % | 19,8 % | 21,9 % |
| Nordic production mix 2008 | 65,6 % | 21,0 % | 13,5 % |
| Nordic residual mix 2008 | 59,9 % | 17,5 % | 22,6 % |
| Nordic production mix 2009 | 62,6 % | 19,6 % | 17,8 % |
| Nordic residual mix 2009 | 40,9 % | 20,5 % | 38,6 % |
| Nordic production mix 2010 | 61,5 % | 20,4 % | 18,1 % |
| Nordic residual mix 2010 | 25,3 % | 30,9 % | 43,8 % |
| (Swedish Residual mix 2010) | 38,8 % | 50,4 % | 10,8 % |
| Nordic production mix 2011 | 63,4 % | 21,4 % | 15,2 % |
| Nordic residual mix 2011 | 22,4 % | 34,6 % | 43,1 % |
| (Swedish Residual mix 2011) | 46,5 % | 45,4 % | 8,1 % |

1.1.2 Environmental Information

According to the originating law, the electricity vendors have to disclose the energy sources, produced carbon dioxide and radioactive waste. The industry recommendation advises to use the “best available data” and in the case of absence of this data, it provides reference values for:

- CO2 emission for electricity produced from fossil sources in g/kWh (293 g/kWh in 2011)
- Radioactive waste for electricity from nuclear sources in g/kWh (0,0014 g/kWh in 2011)

EI will in the future provide values for CO2 and radioactive waste content in the residual mix and these figures should be used by market actors in electricity disclosure.

1.1.3 Suppliers Fuel-Mix Calculations

The EI report sets clear guidelines for the timing of disclosure for electricity suppliers. If a production year X GO is cancelled before 31.3.X+1, it is included in year X disclosure. If a production year X GO is cancelled after 31.3.X+1, it is included in year X+1 disclosure. Production year X GOs which expire after 31.3.X, are included in the residual mix of year X+1 (note: in this case it should be taken care of that these attributes are removed from the year X residual mix).

It is also clear that according to the EI report GOs are the sole mechanism to deviate from the residual mix and to sell electricity from a specified energy source. Hence contract-based tracking will no longer be allowed from start of 2013.

However, as stated, the EI Report doesn't give exact guidelines on what the supplier disclosure should look like and which mixes should be included.

1.1.4 RE-GO and CHP-GO System

The guarantee of origin system in Sweden according to the directive 2009/28/EC is set forth by primary law “Lag om ursprungsgarantier för el - Act on guarantees of origin for electricity” (SFS 2010:601) and in secondary legislation by the government decree “Förordning om ursprungsgarantier för el - Decree on guarantee of origin for Electricity” (SFS 2010:853). The regulation entered into force on the 1st December 2010. Before the new law, GOs existed in law “Lag om ursprungsgarantier för högeffektiv kraftvärme och förnybar el – Act on Guarantees of Origin for highly efficient cogeneration of heat and

power and renewable electricity” (SFS 2006:329) that entered into force a 1st July 2006. Before that law, GO was set forth by an earlier version (without CHP-GO) that came into force in 2004 (SFS 2003:437)

The role of competent body is divided between two different organizations:

- The monitoring authority is Energimyndigheten – Swedish Energy Agency
- The account keeping authority is the TSO – Svenska Kraftnät

The monitoring authority is responsible for e.g. monitoring the implementation of the law, registering of production devices, determining to whom and according to which detailed rules the GOs are issued and making decisions on compliance issues. The account keeping authority is responsible for providing the central registry for GO e.g. issuance, transfer and cancellation.

Guarantees of origin in Sweden are issued in the national GO system (SE-GO), which is not EECS compliant. For 2011 production, approximately 50 TWh SE-GOs were issued; of which 40.6 TWh was RES, 7.6 NUC and 1.6 FOS. The central registry for Swedish national guarantees of origin can be found at: <http://ursprungsgarantier.svk.se>

The Swedish GO system is in line with the new RES directive article 15. Furthermore, GOs can be issued in Sweden for electricity production from all energy sources (not only renewable), which further enhances the reliability of disclosure. There can be only one GO per unit of electricity produced, so both RES-GO and CHP-GO are in the same electronic document and they cannot be separated.

The expiry of GOs in Sweden used to be set 12 months after the beginning of the production period of the GO, which was not in line with RE-DISS Best Practices. However this was changed to correspond RE-DISS BPR and currently GOs expire 12 months after the end of the related production period by an amendment EIFS 2012:1 issued on 21.6.2012 by the Energimarknadsinspektionen (http://ei.se/Documents/Publikationer/foreskrifter/EI/EI_foreskrifter_om_andring_i_EI_foreskrifter_och_all_manna_rad_EIFS%202011_4_om_%20ursprungsm%C3%A4rkning_av_el_EIFS_2012_1.pdf). The change is effective from 24.9.2012.

Conversion to EECS

The EECS issuing body is Grexel Systems Oy, a private company acting together with the Account keeping authority. The co-operation between the account keeping authority, TSO Svenska Kraftnät (SvK), and Grexel is based on an agreement facilitating the handover of national guarantees of origin issued by SvK to Grexel. Grexel uses the national GOs to issue EECS certificates. In this automatic process the original national GOs cease to exist and EECS certificates with identical data are created. These SE-GOs, which are “exported to EECS” can be used for disclosure in Sweden or exported to other EECS countries. However no EECS-GO can be converted into SE-GO even if this EECS-GO originated from a SE-GO. For 2011 production, to date (27.7.2012), 16,8 TWh's (100 % RES) of SE-GOs have been exported to EECS. Note that this is exactly the volume of 2011 EECS issuing, as no actual issuing takes place in the EECS system (from beginning of 2011 onwards), but the 16,8 TWh are merely transformed SE-GOs.

The central registry for Swedish EECS guarantees of origin can be found at: <http://www.cmo.grexel.com/>. Swedish GOs are widely traded and used; see Table 2. Note that figures include nuclear and fossil GOs.

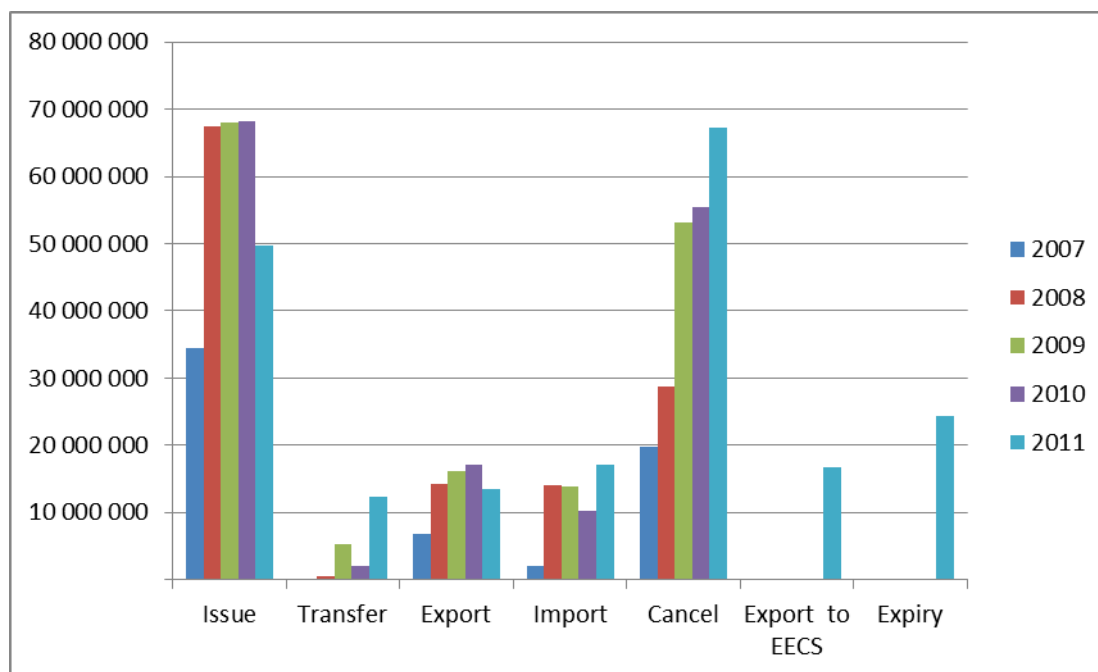
1.1.5 GO Statistics

Table 1: GO statistics 2007-2011

| | Issue | Transfer | Export | Import | Cancel | Expiry | Export to EECS |
|-----------|------------|-----------|------------|------------|------------|--------|----------------|
| 2007 | 34 358 895 | | 6 845 721 | 1 946 004 | 19 732 466 | | |
| 2008 | 67 433 903 | 446 209 | 14 165 120 | 14 104 488 | 28 749 478 | | |
| 2009 | 68 039 502 | 5 325 953 | 16 092 634 | 13 844 077 | 53 144 161 | | |
| 2010 EECS | 67 270 258 | 2 041 814 | 17 158 469 | 10 259 752 | 55 512 661 | | |

| | | | | | | | |
|-----------|------------|------------|------------|------------|------------|------------|------------|
| 2010 SEGO | 1 013 170 | | | | | | |
| 2011 EECS | 16 797 249 | 767 250 | 13 523 696 | 17 029 172 | 66 083 942 | 23 940 865 | |
| 2011 SEGO | 49 766 130 | 11 506 460 | | | 1 133 210 | 457 541 | 16 797 249 |

Figure 1: GO statistics 2007-2011



1.2 Other RES-E Relevant Support Schemes

The main support system for renewables in Sweden is a certificate based quota obligation system. In this system the quota is set to consumers excluding electricity intensive industries. The consumers or electricity suppliers on their behalf have to buy and cancel a certain amount of support certificates, elcertificates, to meet their obligation. The amount is a yearly changing share of their total electricity sales/consumption.

Elcertificates are freely tradable and they are considered as securities in Sweden. They are purely financial instruments used to allocate support and they cannot be used as a proof of origin or greenness of the electricity. A guarantee of origin can be issued for the same energy unit for which elcertificate has been issued. Statistical and price information of the elcertificate system can be found at <http://elcertifikat.svk.se/>. From the beginning of 2011, Norway and Sweden formed a joint support scheme based on elcertificates. The certificates can be freely exchanged between the two countries and used for quota compliance.

1.3 Other RES Scheme

2 Proposals for Improvement of the Tracking System

The EI report has significantly improved the Swedish tracking system in making it clear that GOs are the sole mechanism to sell electricity products and deviate from the residual mix. All following proposals are made in accordance with the RE-DISS Best Practice Recommendations, which have been agreed by the Participating Domains of the RE-DISS Project.

2.1 Proposals regarding general regulation on tracking systems

2.2 Proposals regarding Disclosure

The EI report clearly states that the Nordic residual mix should be used as the residual mix in Sweden. This practice is only reliable if all countries within the Nordic area (Denmark, Finland, Norway and Sweden) use this mix instead of their national mix. Currently Denmark and Norway use the national mix and even Finland is moving towards the national mix according to the current version of the law-draft regarding guarantees of origin and disclosure. So for the time being, it is recommended that Sweden uses the national mix and switches to Nordic mix only if all Nordic countries agree to this.

1. *As a default, the Residual Mix should be calculated on a national level. However, in case that electricity markets of several countries are closely integrated (e.g. in the Nordic region), a regional approach to the Residual Mix may be taken. This should only be done after an agreement has been concluded between all countries in this region which ensures a coordinated usage of the regional Residual Mix. (BPR [28])*

2.3 Proposals regarding GO

2.3.1 Proposals regarding the RE-GO System

The lifetime of GOs should be extendable in case of errors in issuing.

2. *“An extension to this lifetime can be granted if a GO could not be issued for more than [six] months after the end of the production period for reasons which were not fully under the control of the plant operator. In this case, the lifetime of the GO might be extended to [six] months after issuing of the GO.” (BPR [4])*

The detailed regulation of disclosure information given by suppliers to consumers is still lacking from the EI report. Therefore it is recommended that the disclosure information should always refer to the electricity product bought by the consumer or the residual mix of the supplier (national residual mix corrected with the GOs cancelled by the supplier for the purpose of its default mix). CO₂ emissions and radioactive waste should be disclosed on the supplier and product levels in direct relation to the fuel mix which is being disclosed. Furthermore, especially in the Nordic market, rules for supplier who sell electricity in several countries should be made clear.

3. *Suppliers offering two or more products which are differentiated regarding the origin of the energy should be required to give product-related disclosure information to all their customers, including those which are buying the “default” product of the supplier. (BPR [39])*
4. *In case that suppliers are serving final consumers in several countries rules must be developed and implemented consistently in the countries involved on whether the company disclosure mix of these suppliers should relate to all consumers or only to those in a single country. (BPR [42])*

Claims of additionality and low-carbon content of electricity should be regulated.

5. *There should be clear rules for the claims which suppliers of e.g. green power can make towards their consumers. There should be rules how the “additionality” of such products can be measured (the effect which the product has on actually reducing the environmental impact of power generation), and suppliers should be required to provide to consumers the rating of each product based on these rules. (BPR [40])*
6. *Claims made by suppliers and consumers of green or other low-carbon energy relating to carbon emissions or carbon reductions should also be regulated clearly. These regulations should avoid double counting of low-carbon energy in such claims. A decision needs to be taken whether such claims should adequately reflect whether the energy purchased was “additional” or not. (BPR [41])*

2.3.2 Proposals regarding the CHP-GO System

CHP-GO system is not yet implemented in practice in Sweden.

2.4 Matrix of disclosure related problems and country-specific proposals

| Problem | Country-specific proposal |
|--|---------------------------|
| Possible double counting in different explicit tracking instruments | |
| Double counting of attributes in explicit and implicit tracking mechanisms | 1 |
| Double counting within individual supplier's portfolio | 3,4 |
| Loss of disclosure information | |
| Intransparency for consumers | 5,6 |
| Leakage of attributes and/or arbitrage | 2 |
| Unintended market barriers | |