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## 1 Implementation of Tracking Systems

### 1.1 Electricity Disclosure

Disclosure is regulated in Denmark by the "*Bekendtgørelse om deklaration af elektricitet til forbrugerne (Elmærkningsbekendtgørelsen)*" in its latest version from 30 November 2010. Guidelines for the calculation of both general (i.e. default) and individual electricity labels are available and annually updated by the Danish TSO energinet.dk, who acts as competent body for disclosure in Denmark. The Danish Energy Agency is responsible for preparing the legislation and must approve the "*technical guidelines*" prepared by Energinet.dk.

Fuels are broken down into coal, natural gas, wind/hydro/solar, waste/biomass/biogas,<sup>1</sup> oil and nuclear power. CHP is not explicitly distinguished. Disclosure information is annually updated.

Electricity trading companies in Denmark can either use a general electricity label (default) or an individual electricity label (used for explicit tracking). General labels are used for average electricity supplies (without specific claims). Energinet.dk prepares the general label. Companies can on voluntary basis market individual electricity products (e.g. green power). Labels for these products shall be prepared and documented in accordance with guidelines provided by Energinet.dk. Disclosure information showing the company portfolio is not used in Denmark currently, as this purpose is fulfilled by the "general label". Disclosure information always refers to calendar years.

As tracking instruments, both GO and "other adequate mechanisms" (bilateral contract information or other electronic certificates) are eligible. RES-E and HE-CHP may only be disclosed to consumers if they are tracked by Guarantees of Origin. Other adequate instruments (like contract based tracking) should on the other hand be used if a Danish electricity trading company, for instance, wish to market nuclear power.

The general electricity label is calculated by Energinet.dk as a residual mix according to the following methodology

- Available production attributes = Production (calendar year x) - issued GO in Denmark (based on production in calendar year x) + expired GO in the Danish registry (all expired GO issued for production in April year x-1 to March year x, and accordingly expired between April year x and March year x+1). The Danish residual mix calculation in principle also would take contract based tracking into account (electricity trading companies must inform Energinet.dk about the sale of these products and the attributes covered by contract based tracking in the previous year by 31 March). So far contract based tracking has not been used in Denmark however.
- In case of deficit in Denmark - i.e. available production attributes are less than the untracked consumption in Denmark - the European Attribute Mix is used for balancing.
- All GO which is meant to be used for the disclosure period of calendar year x should be cancelled before deadline of 31 March year x+1. GO which are not expired until this date can be used for disclosure for the calendar year x+1 instead.

Energinet.dk uses the results from RE-DISS for the European Attribute Mix (share of different fuel categories) directly. All other data inputs in the calculation are based on data collected from Energinet.dk.

The Association of Danish Electricity Traders has, together with others and Energinet.dk, developed a Danish standard for 'green' electricity products that is available on the website [www.elpristavlen.dk](http://www.elpristavlen.dk) (only available in Danish). This standard includes minimum demands in the description of the green products and what suppliers can claim in relation to climate effect. Three overall product types exist:

- CO2-reduction (e.g. cancellation of CO2 quotas)

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<sup>1</sup> The statement wind/hydro/solar means that the share of these energy sources is calculated and disclosed together. The same applies for waste/biomass/biogas.



- Contribution to new renewables (donations)
- Based on GO (production device not older than 2 years, not older than 10 years), no restrictions.

### 1.1.1 Disclosure Figures

The general disclosure figures are centrally available on the website of Energinet.dk.<sup>2</sup> For the year 2013, 2012 and 2011, the following figures have been published:

Table 1: Disclosure figures for the years 2013, 2012 and 2011

Fuel	Share in 2013 General Fuel Mix	Share in 2012 General Fuel Mix	Share in 2011 General Fuel Mix
Coal and Browncoal	54%	40%	44 %
Natural Gas	16%	21%	22 %
Wind, Hydro and Solar	10%	11%	13 %
Waste, Biomass and Biogas	7%	13%	13 %
Oil	1%	1%	1 %
Nuclear	12%	14%	7 %

Source: *Energinet.dk*

In 2013, the General Fuel Mix Statement (default mix for Denmark) has been used for 94 % of all electricity sales, while 6 % have been sold as specific products based on GO.

Table 2: Emissions to air in the declarations of 2013, 2012, 2011 and 2010

Emissions to air	Declaration 2013 [g/kWh]	Declaration 2012 [g/kWh]	Declaration 2011 [g/kWh]	Declaration 2010 [g/kWh]
CO <sub>2</sub>	482	410	446	473
CH <sub>4</sub>	0,15	0,21	0,24	0,24
N <sub>2</sub> O	0,005	0,005	0,005	0,006
Greenhouse Gas Emissions (CO <sub>2</sub> equivalents)	488	416	452	480
SO <sub>2</sub>	0,06	0,08	0,07	0,07
NO <sub>x</sub>	0,25	0,30	0,32	0,34
CO	0.10	0,15	0,15	0,15
NM VOC	0,03	0,04	0,05	0,05
Particles	0,02	0,01	0,01	0,01

Source: *Energinet.dk*

Table 3: Residuals in the declarations of 2013, 2012, 2011 and 2010

Residuals	Declaration 2013 [g/kWh]	Declaration 2012 [g/kWh]	Declaration 2011 [g/kWh]	Declaration 2010 [g/kWh]
Coal Fly Ash	16,4	12,9	15,6	14,5
Coal Slag	5,2	1,7	1,6	2,0
Desulfurisation Products	7,4	5,7	6,1	5,8
Slag	5,9	6,3	7,4	7,2
Flue Gas Waste	0,9	1,0	1,3	1,2

<sup>2</sup> <http://www.energinet.dk/DA/KLIMA-OG-MILJOE/Miljoedeklarationer/Til-elhandlere/Sider/Til-elhandlere.aspx>

Residuals	Declaration 2013 [g/kWh]	Declaration 2012 [g/kWh]	Declaration 2011 [g/kWh]	Declaration 2010 [g/kWh]
Biomass Ash	0,3	1,0	1,2	1,1
Radioactive waste [mg]	0,3	0,5	0,3	0,1

Source: *Energinet.dk*

### 1.1.2 Environmental Information

Danish legal regulations ask for a comprehensive list of attributes to be tracked for disclosure. Besides standard parameters like fuel mix and related emissions of CO<sub>2</sub> and radioactive waste this also includes individual emissions of CO<sub>2eq</sub>, CH<sub>4</sub>, N<sub>2</sub>O, SO<sub>2</sub>, NO<sub>x</sub> CO, NMVOC and particles as well as the residual products coal ash, coal slag, desulphurization products, waste slag, MSWI-ACP residues and bio ashes.<sup>3</sup>

Energinet.dk has developed guidelines on how the suppliers should calculate and provide their customers with disclosure information using explicit tracking, based on the direct emissions approach. Based on a calculation sheet, the suppliers can insert information about the amounts of electricity delivered from different energy sources based on GO and the relevant indicators are automatically calculated. Fuel specific emission factors are prepared each year by Energinet.dk for this purpose based on collected data from the Danish electricity generation.

### 1.1.3 Suppliers Fuel-Mix Calculations

Before 1<sup>st</sup> of July of the next year electricity suppliers need to provide disclosure information about the previous year. The general labels (default mix) are prepared and provided by Energinet.dk reflecting production statistics with corrections for physical import and export from/to neighbouring areas (see also description of residual mix calculation methodology above). Electricity Trading Companies must provide Energinet.dk with an annual statement on the usage both of contract-based tracking information and GOs by 31 March of year X+1. The final Danish Residual Mix is published by Energinet.dk on the 1<sup>st</sup> of June of year X+1.

For disclosure of energy volumes for which no attributes are available based on cancelled GO or based on other RTS, Denmark follows the Residual Mix calculation methodology proposed by RE-DISS.

### 1.1.4 Acceptance of GOs

As already referred, Denmark has a disclosure system in place which transposes the RES Directive, with an electronic register for the issuance, transfer and cancellation of issued GO. The GO system implemented in Denmark is an EECS system.

For recognising GO, the Danish rules only look at the GO and not the disclosure system in the production country. GO based on EECS can be used directly for disclosure in Denmark. The use of GO not based on EECS needs to be approved by Energinet.dk before 31 March (which is the case of specific approval).

As the GO system in place is based on EECS the acceptance of foreign GO for disclosure are the ones set up in EECS protocol.

These criteria are part of Danish guidelines/secondary legislation (of which the latest version is from 31st May 2011). These are transparently published in Denmark at: <http://www.energinet.dk/DA/KLIMA-OG-MILJOE/Miljoedeklarationer/Til-elhandlere/Sider/Individuel-deklaration.aspx> (in Danish only).

<sup>3</sup> Attributes which are specified directly in the legislation (minimum requirements): CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, SO<sub>2</sub>, NO<sub>x</sub>, coal ash, coal slag, radioactive waste

Other attributes which are added by Energinet.dk in accordance with the legislation:

Residual products: CO<sub>2</sub> equivalents, CO, NMVOC, particles, desulphurization products, waste slag, MSWI-ACP residues, bio ashes.

## 1.2 Guarantees of Origin for Electricity from Renewable Energy Sources and High-Efficient Cogeneration

### 1.2.1 RES-GO System

The RES-E GO scheme is operational already since 15 January 2004. Legal basis is the Executive Order on Guarantees of Origin for RES electricity called "*Bekendtgørelse om oprindelsesgaranti for VE-elektricitet*" (latest version on 30 November 2010). The national TSO Energinet.dk is appointed as Competent Body. Detailed regulation on GO has been laid out in the "*Retningslinjer for udstedelse af oprindelsesgarantier for VE-el*" (latest version on 1 January 2012).

RES-GO are issued for volumes of 1MWh for net production on a monthly basis. The GO are kept in the electronic EECS registry where they can be transferred and redeemed by the account holders who gain access via login and password. RES GO have a restricted lifetime of 12 months after the end of the production period.

All electricity production devices are subject to registration in Denmark. This is carried out by the Grid Companies. A production device owner wishing to receive RES-GO has to fill out a standard form - Energinet.dk creates the production declaration in the registry. All electricity production and exchange (import/export) is subject to measurement carried out by the Grid Company under regulation from Energinet.dk. The metered data are collected in the Balance Settlement System, which is used when issuing. Both plants and individual GO are specified by unique registration numbers, all transactions are being tracked in the electronic registry.

RES-GO can be issued both for unsupported as well as for supported electricity (market premium and feed-in). All GOs are freely transferable (both linked and de-linked) within Denmark and with cross-border transactions. No particular restrictions apply in terms of recognition of foreign GO, but Energinet.dk can decide to contact the issuing body to verify that the RES-GO is valid.

### 1.2.2 CHP-GO System

CHP is of high relevance in Danish electricity production.<sup>4</sup> National legislation has been passed with the Executive Order on Guarantees of Origin for high efficient CHP electricity called "*Bekendtgørelse om oprindelsesgaranti for elektricitet fra højeffektiv kraftvarmeproduktion*" (latest version on 16 February 2007). Like for RES-GO, the national TSO Energinet.dk is appointed by law as issuing body for CHP-GO. The scheme is operational since July 2007. Detailed rules and procedures are defined in the so-called "*Retningslinjer for udstedelse af oprindelsesgarantier for elektricitet fra højeffektiv kraftvarmeproduktion*" (latest version on 1 January 2012). The scheme is based on EECS. Alternatively to issuing within the EECS registry, CHP-GO could also be issued on paper with hologram. However, according to Danish regulation this would take place for units of MWh for net production and for periods of either 1, 3, 6 or 12 months.

All electricity producing devices are subject to registration in Denmark. This is carried out by the Grid Companies. All electricity production and exchange (import/export) is subject to measurement carried out by the Grid Company under regulation from Energinet.dk. The metered data are collected in the Balance Settlement System, which is used when issuing.

As for RES-GO, the only purpose of a CHP-GO is disclosure, for which cancellation of the respective GO is mandatory.

CHP can receive public support in form of a fixed yearly subsidy, whereas supported electricity still qualifies for issuing of tradable GO. Biomass CHP is generally eligible for both types of GO. The plant owner has to choose to obtain either a RES-GO or a CHP-GO as only one certificate can be issued for the same amount of electricity.

### 1.2.3 EECS

The GO scheme is operated according to the EECS provisions laid out in the national Danish GoO RES-E Certificates, RECS Certificates and Cog-GO Certificates Domain Protocol for Denmark Version 2.0 (published in December 2010). No other means of import or export exist, for Non-EECS-Domains ex-domain cancellations can apply.

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<sup>4</sup> In 2010 the CHP share of the Danish electricity production (excl. wind power) was 61 %.

#### 1.2.4 GO Statistics

RES-E GO statistics for 2013 based on EECS:

- Imports: 1,71 TWh
- Exports: 8,79 TWh
- Issued: 12,69 TWh
- Expiry: 0,94 TWh

### 1.3 RES-E Support Schemes

Denmark has a premium scheme in place for RES-E.<sup>5</sup> All RES-GO can be used for disclosure irrespective of whether support has been received or not. However, RES-GO for supported production are earmarked.

## 2 Proposals for Improvement of the Tracking System

The following proposals are made in accordance with the RE-DISS Best Practice Recommendations<sup>6</sup> (BPR), which have been agreed by the Participating Domains of the RE-DISS Project.

### 2.1 Proposals regarding Disclosure

- BPR [23] Other Reliable Tracking System should be defined based on criteria of added value, reliability and transparency;
- BPR [24] RTS can comprise, where applicable:
  - Homogeneous disclosure mixes for regulated market segments where no choice of supplier or different products exists,
  - Support systems whose interaction with disclosure requires a certain allocation of the attributes of supported generation (e.g. a pro-rata allocation to all consumers in a country where RES electricity is supported by a feed-in tariff),
  - Contract Based Tracking (CBT)
- BPR [29] As CBT is allowed in Denmark it should be clearly regulated.
- BPR [30] CBT regulations should ensure that:
  - The rules of the tracking system are transparent and comprehensive and are clearly understood by all participants in the system.
  - Double counting of attributes and loss of disclosure information is minimized within the contract based tracking scheme and also in the interaction of the contract based tracking scheme to GO and other RTS (if applicable). As a precondition for this, the CBT scheme should be able to provide comprehensive statistics about the volumes and types of electricity attributes which are tracked through it.
  - The relevant information for disclosure purposes should be available in time to meet the timing requirements. For that purpose, Denmark should assure that according information on contract based tracking is not only made available to Energinet.dk for calculation of the national residual mix, but that this information is also provided to RE-DISS and competent bodies of exporting countries in case that the contract covers an international transaction.

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<sup>5</sup> Detailed regulations for this premium scheme depend on a variety of factors such as energy source and the grid connection date. New wind turbines in general receive a fixed subsidy in addition to the market price for 22,000 full load hours. Some older wind turbines receive a subsidy that is adjusted in relation to the market price so that the total of the market price and the subsidy ensures wind turbine owners a fixed payment per 1 kWh.

<sup>6</sup> Version 2.2, 11 August 2014

## 2.2 Proposals regarding RE-GO and CHP-GO

The RES-GO system in place in Denmark is fully in line with the RES-Directive and the almost in line with the RE-DISS BPR. To be completely in line with the RE-DISS BPR the following recommendations should be implemented:

- BPR [4] 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 the GO.
- BPR [11a] Extend the GO system beyond RES and CHP to all types of electricity generation.
- BPR [11b] GOs should be issued for all electricity production, unless an RTS applies for that production, e.g. for the disclosure of supported electricity.
- BPR [11c] Competent bodies should consider to make the use of GOs mandatory for all electricity supplied to final consumers.
- BPR [15b] This GO should "ideally" combine the functionalities of a RES-GO and a high efficiency cogeneration GO.

## 2.3 Proposals regarding Acceptance of GO

Regarding acceptance of GO the following should be considered:

- Within the rules set by the respective Directives, Denmark should consider establishing their criteria for the acceptance of imported GO for purposes of disclosure:
  - These criteria should address imports at least from all EU member states, other members of the European Economic Area (EEA) and Switzerland. The parties to the Energy Community Treaty should be considered as well, as soon as GO imports from these countries become relevant.
  - The criteria should specify the electronic interfaces, specifying data format and contents of GO to be imported, which the respective country accepts for imports of GO (such as the EECS Hub and any other interfaces accepted).
- Conditions for the recognition of GO from other countries should be that they were issued based on Art. 15 of Directive 2009/28/EC or compatible national legislation, and that they meet the explicit requirements set in Art. 15, e.g. regarding the information content of the GO.
- The recognition of GO from other countries should be rejected in case that these countries have not implemented an electricity disclosure system.
- The recognition of GO from other countries should be rejected in case that the country which has issued the GO or the country which is exporting the GO have not implemented adequate measures which effectively avoid double counting of the attributes represented by the GO. Such adequate measures should ensure the exclusivity of the GO for representing the attributes of the underlying electricity generation, implement clear rules for disclosure, establish a proper Residual Mix or equivalent measures, and ensure their actual use. Furthermore, the adequate measures should ensure that attributes of exported GO are subtracted from the Residual Mix of the exporting country and cannot be used for disclosure at any time in the issuing or the exporting country by explicit mechanisms, unless the GO is re-imported and cancelled there.

Regarding acceptance of GO the following BPR should be implemented:

- BPR [21] Within the rules set by the respective Directives, Denmark should consider their criteria for the acceptance of imported GOs for purposes of disclosure.
  - These criteria should address imports at least from all EU member states, other members of the European Economic Area (EEA) and Switzerland. The parties to the Energy Community Treaty should be considered as well, as soon as GO imports from these countries become relevant.
  - The criteria should specify the electronic interfaces, specifying data format and contents of GOs to be imported, which the respective country accepts for imports of GOs (such as the EECS Hub and any other interfaces accepted).

## 2.4 Further proposals regarding Disclosure

- BPR [39b] 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” remaining product of the supplier. In Denmark only product mix is disclosed, but suppliers should also disclosed the company mix together with the product mix.

## 2.5 Matrix of disclosure related problems and country-specific proposals

Problem	Country-specific proposal
Possible double counting in different explicit tracking instruments	BPRs: [11a], [11b], [11c], [23], [24], [29], [30]
Double counting of attributes in implicit tracking mechanisms	BPRs: [11a], [11b], [11c], [23], [24], [29], [30]
Double counting within individual supplier's portfolio	BPRs: [39b]
Loss of disclosure information	BPRs: [11a], [15b]
Intransparency for consumers	BPRs: [11a], [11b], [11c], [23], [39b]
Leakage of attributes and/or arbitrage	
Unintended market barriers	BPR: [4], [11b], [11c], [21]

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