

Some key issues regarding Electricity Disclosure and the voluntary green power market

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1. Background

This paper suggests improvements in EU legislation for integration in the imminent Renewables Directive regarding public communications on the green content of electricity delivered to consumers.¹

EU legislation requires suppliers to provide information to consumers on the fuel mix on which the electricity they deliver is based. Communicating a high “green” content, where “green” stands for “produced from renewable energy sources” may have marketing value to suppliers. Moreover, in some Member States a large green power market has emerged. Compared to the price of “grey” electricity without a special green tariff, green power is often sold at a small premium, at parity, or even at a discount price to customers with an explicit demand for green power. Many customers are concerned whether the product they buy is really green indeed: does their choice for a green tariff really reduce the environmental footprint of their power consumption? Other customers may just aim to buy ‘green’ on the cheap for a green image. Sometimes sellers of green products suggest in commercial messages that by buying their green products polluting emissions such as notably greenhouse gases are being reduced, the icebergs in Greenland will melt at a slower pace, etc.

A major requirement for a well-functioning EU electricity market is that electricity consumers can trust that product information provided along with the delivery of the product is true indeed. This should not only hold for the contract price, contractual terms, supply quality and security but certainly also for information on electricity generation attributes. Key questions regarding the latter information are:

- Does the choice of electricity supplier based on the greenness of the fuel mix matter for “the environment”?
- Does the choice of a specialty green power product matter for “the environment”?
- How can consumers be communicated the environmental value of the electricity delivered to consumers most effectively and understandably in a way that the consumers can rely upon it that the information is true?

This paper sets out to address these questions.

2. What is additionality in the context of disclosing energy generation attributes?

The discussion about environmental additionality can be made very complex and confusing to the average customer of European electricity suppliers. We propose to simplify this issue in a credible way keeping in mind:

- The key challenge of the Renewables Directive, i.e. to stimulate renewables

¹ Koen Schoots gave useful comments to the previous draft. Responsibility for this paper including any remaining error(s) rests with the author personally.

- The dominant expectation the average consumer has about environmentally sustainable electricity generation, i.e. that it is based on renewable sources
- The socio-economic efficiency of clear focus: it is not efficient to use one instrument (legally mandated disclosure of electricity generation attributes) for several environmental objectives at the same time
- The transparency to consumers of clear focus.

Many (notably non-household) electricity users would like to offset their carbon footprint by proof of using green electricity. Yet, electricity generators of a certain size, that possess the bulk of RES-E (renewable electricity) generation assets, are subjected to the EU Emissions Trading system. Moreover, Member States have to comply with GHG targets. Hence, (changes in) fuel mixes in the electricity sector cannot be expected to impact on GHG emissions. Hence, greening the electricity sector cannot be equated to reducing the overall carbon footprint.

The key objective of the imminent RES (renewables) Directive is to substantially increase the share of green energy (energy from renewable sources) in the overall fuel mix of *total energy use* in the EU to 20% by year 2020. This has a range of public merits over and above mitigating GHG emissions, including industrial innovation towards a sustainable future and supply security of energy services. Greening the fuel mix of *electricity use* will greatly help to meet the aforementioned key objective. Electricity is the key energy carrier for most, and a further increasing number, of modern society's energy services. Member States are demanded to specify specific RES-E (renewable electricity) targets in their Implementation Action Plans. This can be done by expanding green electricity generation on the one hand and restraining electricity use on the other. Energy efficiency improvement and energy conservation are covered by other EU legislation. Hence, the focus of the RES Directive is to stimulate green electricity generation. In the context of the RES Directive we propose to focus environmental additionality entirely on green generation. Consuming a certain quantity of renewable electricity has additionality when it incentivises generators to increase the volume of renewable electricity over and above what is stimulated by support systems enshrined in national law.

Note that this does not necessarily imply that the voluntary green market does NOT have additional impacts when a Member State does not comply with the targets set to be specified the RES Directive. RES Directive negotiators appear to have agreed upon a legal separation of Electricity Disclosure - with Guarantees of Origin as a key accounting instrument - and Target Accounting. Besides, in spite of the threat of stringent infringement procedures, several Member States may not entirely comply with set (ambitious) RES targets. If and where this is to be the case, the voluntary green electricity market can certainly produce green generation benefits over and above what is stimulated by support systems required by national law. Such a situation may well trigger a national discussion in the non-compliant state concerned that will raise internal pressure upon a non-compliant Member State government to step up RES policy intensification efforts. Hence pressure from socially concerned consumers through deliberate choices for green electricity could raise the *internal* political clout needed for enabling a Member State government to meet his targets.

How would additionality work in practice? Currently there is a large excess of surplus of Renewable Electricity Guarantees of Origin (GO) hanging over European green

electricity markets. The three key factors contributing to the current oversupply of GO for disclosure purposes in the market place are:

- Poor GO accounting infrastructures and absence of single national (or regional) competent authorities, which fails to mitigate multiple counting problems
- Use of GO representing renewable electricity that benefited from a Member State support scheme
- Use of GO representing renewable electricity produced by means of fully commercially mature technology such as, importantly, Large Hydro.

Hereafter we propose how to address these deficiencies by new European legislation. But for now let's assume that this will be implemented indeed and that the excess supply of GO that are eligible for use as proof of the delivery of green electricity will dwindle. Then, the purchase of green electricity will raise the price of eligible GO. In first instance, operators of existing *non-supported* green power installations are incentivised to use their installations more intensively and to run non-subsidised multi-fuel installations more on renewables (especially biomass). Moreover, as marginal revenues of non-subsidised green power increase on account of higher GO prices, operators are incentivised to extend the operating life beyond initial planning. In second instance, *if* confidence of electricity producers grows that the firming GO prices of unsubsidized green power will endure they will invest *extra* (above investments stimulated by support schemes) in new unsubsidized green production capacity.

Generators with new installations tend to prefer the certain benefits of Member State support systems over volatile GO prices destined for the voluntary market. Hence they will demand a large surcharge over the competing benefit level offered by support systems by controlling the supply of GO to the voluntary market. Hence, additional conditionality with regard to a minimum share for renewable electricity originating from new installations is set to lead to surging prices for corresponding GO. This, in turn, will strangle the development of the voluntary market *with adverse consequences* for the evolution of additional renewable electricity triggered by the voluntary market.

In conclusion, it is economically most efficient NOT to bias new regulation towards expansion of green power production through investment in new capacity over and above the existing installations route. Market forces can determine what is most effective and efficient much better than legislators.

3. Proposed legal remedies to some key weaknesses of current implementation practices

Need for a solid technical GO accounting infrastructure. In several Member States no unified electronic accounting system (registry) for tracking a GO (Guaranty of Origin) during its entire life cycle nor a single national or regional competent authority is in place to prevent the issuing of more than one GO for the same unit (MWh) of electricity. Moreover the end of the GO's life cycle should be defined after which they will be taken out of circulation by the competent authority and put on a

“redemption” or “cancellation” account. The registry should be capable of reproducing an audit trail for verification purposes for every GO on every registry account. *These design features for unified electronic GO accounting by a single competent authority should be mandated by the upcoming RES Directive. Consumers should not need to bother about the verification system for green electricity claims but be sure that the system is reliable and integer.*²

Need for separation of the voluntary market from support schemes. The green feature is counted/ acknowledged when benefits from a member state’s support system are granted. In several member states the green feature of the same quantity of green electricity may well be counted again when the local law does not forbid that it is used again by a supplier for selling a green electricity product to his customers. In such instances, it is sometimes claimed that the support system is just financial and that financial support is not necessarily sufficient. However, RES targets will be mandatory. *Hence, Member States can only make sure to stimulate RES-E effectively by ensuring that their support scheme(s) cover the full cost gap to make a certain renewable technology competitive in the market place and that existing permitting and grid integration barriers are being removed.*³ When one Member State allows the transfer of a GO for a certain quantity of *supported* green electricity, this will not only compromise the integrity of its own green electricity market but also the green markets in other Member States though cross-border trade of such GO. *Therefore, it is clearly proportionate to forbid the transfer of GO for a unit of energy for the production or marketing of which benefits from a Member State’s support scheme were received.*

Need for proving the delivery of the green part of the fuel mix. A supplier is mandated to present to his customers the fuel mix of his deliveries in the last calendar year. As the green part has the highest sales value, *a supplier should prove the green part of his fuel mix - by submission of GO or evidence of assignment of supported green electricity as mandated by the Member State concerned - to the competent authority of the Member State within (xxx) months after the calendar year of delivery. Moreover, a supplier delivering a green power product should ex ante communicate the green part to his ‘green’ customers and provide evidence of delivery of the communicated green electricity by submission of sufficient GO to the competent authority of the Member State concerned within (xxx) months after the calendar year of delivery. A €(xxx)/ MWh penalty is to be imposed by the competent authority for non-delivered green electricity. A supplier’s fuel mix is to be based on the residual mix which excludes green electricity sold by special green electricity products.*⁴

Need for a mandatory fuel mix quality labeling system for the electricity delivered by a supplier. So far the information presented to customers about the fuel mix quality of the electricity delivered is not generally standardized and lacks

² The Final Report of the ETRACK project provides further elaborations and background. See: <http://www.e-track-project.org>

³ Member States having transposed Directive 2001/77/EC into their national law are mandated to effectively address permitting and grid access barriers to (potential) RES-E investors. This is crucial to the purposes of the new RES Directive. Therefore, early remedial infringement procedures by the Commission against Member States that have made inadequate progress on this score seem warranted.

⁴ See the Final Report of ETRACK for the recommended method to determine the residual mix.

transparency for customers to make comparisons between suppliers or between electricity products. *From a public perspective of well-functioning electricity markets, there is a strong need for offering consumers easily understandable and trustworthy information about the fuel mix quality of the electricity delivered by his supplier. The information is to be expressed in an A (highest quality) to G (lowest quality) scale. Category D has a neutral status, whereas E, F and G indicate that the electricity delivered has a substandard green content. Only electricity products with an A, B, or C label are allowed to be sold as green electricity products. Before concluding a delivery contract for a special green power product, the supplier has to communicate to the customer the fuel mix quality label along with the green part of the fuel mix ex ante. Moreover, whenever companies in the electricity sector or the business sector in general make public marketing claims that their delivery or use of electricity is/was green, they should use the correct mandatory fuel mix quality label and be able to prove such claims after the fact.*

Fuel mix quality labels should provide incentives to the electricity supply sector to expand the production of green electricity over and above such expansion as triggered by support systems of the Member States. Therefore, it is proposed to assign:

- a neutral score to renewable energy generated by technologies, which are already fully commercial without receiving benefits from Member State support systems
- a positive score to renewable energy generated by technologies, which are not fully commercial without receiving benefits from Member State support systems; the magnitude of the positive score would reflect the cost gap that has to be bridged for the renewable energy concerned to become fully competitive
- a uniform negative score for non-green electricity, with a score to be scaled dynamically based on the evolution of the relevant target in the Member State concerned.

The most notable neutral technology as defined above is Large Hydro. Hence, the part in a fuel mix regarding Large Hydro would not make a positive contribution for an electricity product towards qualifying as a green power product. This feature, the technical robustness of the GO tracking system and the ban on the use of GO over electricity that benefited from a support scheme will shift the demand for GO for electricity disclosure to serve voluntary green power markets to those GO that refer to renewable electricity:

- produced by (eligible) technologies that are not fully commercial
- whose production did not benefit from a Member State support system.

These features eliminate the three prime causes for the current over-supply of GO. This, in turn, will lower substantially the threshold quantity of green electricity demand in excess of which additional green electricity is incentivised by additional revenues from the sales of GO destined for the voluntary market.

The proposed basics of the proposed mandatory method for determining and verifying quality labels are explained in Annex I.

4. Integration of CHP GO and High Efficient CHP disclosure

In current legislation no adequate safeguards are present to prevent the double counting of GO for electricity from renewable sources (notably biomass) produced by a high efficient CHP (combined heat and power plant). *It is proposed to mandate the integration of the national accounting systems for GO of electricity from renewable sources and GO of electricity from a high efficient CHP installation.* The single national GO system for electricity from a renewable source or from a HE-CHP installation has the following advantages:

- a more robust technical infrastructure preventing double counting of one MWh from eligible sources or plants
- cost efficiency: running two parallel systems at the same time cost much more.

In several Member States implementation of the national CHP GO system is lagging as CHP electricity producers have no financial incentive to request CHP GO. *It is proposed to consider to assign higher value to co-generated electricity (together with power) in a high efficient way in the mandated method to determine the green quality label for electricity delivered to end users.* In Annex I it is demonstrated how the voluntary market can create value to CHP GO through introduction of a mandatory fuel mix quality label.

Annex I Methodology for determining the fuel mix quality label

It is proposed to assign:

- a neutral score to renewable energy generated by technologies, which are already fully commercial without receiving benefits from Member State support systems
- a positive score to renewable energy generated by technologies, which are not fully commercial without receiving benefits from Member State support systems; the magnitude of the positive score would reflect the cost gap that has to be bridged for the renewable energy concerned to become fully competitive
- a uniform negative score for non-green electricity, with a score to be scaled dynamically based on the evolution of the relevant target in the Member State concerned.

We explain the proposed methodology based on a fictitious, simplified example. For the sake of exposition we assume that all recommendations in the main text have been implemented and that only three prevalent renewable electricity technology options are available.⁵

Suppose that the fuel mix of inland electricity consumption in the previous calendar year was determined ex post as follows:

Non-renewable: 85%
Large Hydro: 10%
Onshore Wind: 3%
Biomass: 2%

Furthermore suppose that the RES-E target for the current calendar year as elaborated in the RES Action Plan and approved by the Commission is 20%. We assume that the Member State projects a constant share for Large Hydro and that other prevalent RES-E technologies will expand at an equal percentage points rate. Hence the MS has presented in its RES Action Plan the following overall fuel mix for the current calendar year:

Non-renewable: 80%
Large Hydro: 10%
Onshore Wind: 6%
Biomass: 4%

Assume that the Member State government estimates the following cost gap to be bridged for RES-E to become fully competitive in the market:

Large Hydro: 0
Onshore Wind: 25 €/ MWh
Biomass: 50 €/ MWh

⁵ The method works the same for real situations with many more RES-E technology options and sub-categories.

The additional cost of this target fuel mix⁶ is: $0.06*25 + 0.04*50 = 3.5 \text{ €/ MWh} \rightarrow$
 The negative score per MWh of non-renewable electricity is determined to be: $- 3.5 / (1 - \text{RES-E target share}) = - 3.5 / 0.80 = -4.375 \text{ €/ MWh}$

Now suppose a vendor of a green electricity product in a certain calendar year communicates to his green power customer the following fuel mix of his product:

Non-renewable 50% (Coal: 20%; Natural gas: 20%; Nuclear: 10%)
 Large Hydro: 20%
 Onshore Wind: 20%
 Biomass: 10%

The score of the green power product under review in terms of €/ MWh can now be determined as follows:

$$- 0.50*4.375 + 0.20*25 + 0.10*50 = 7.8125 \text{ €/ MWh}$$

If we include a certain stimulation in the scoring rules of biomass-based HE-CHP electricity⁷, the full score range of any conceivable fuel mix in the Member State concerned would range from **-4.375 €/ MWh** (100% non-renewable electricity) to **62.5 €/ MWh** (100% biomass-based HE-CHP electricity). Subject to further investigations and negotiations, a green quality label scores classification scheme could look as follows:

Score interval (€/ MWh)	Green/Neutral/Red fuel mix quality label
$S > 40$	A (dark green)
$15 < S \leq 40$	B (medium green)
$5 < S \leq 15$	C (light green)
$-0.5 < S \leq 5$	D
$-1 < S \leq -0.5$	E
$-2 < S \leq -1$	F
$S < -2$	G

According to these score classification rules the green electricity product reviewed by the example above would be assigned the green power quality label C (light green).

⁶ Additional cost of the *whole* target share for renewable electricity, compared to the commodity cost of electricity as revealed on the (wholesale) market place. In our proposed scoring rule these cost are allocated uniformly to non-renewable electricity. Reason: the average additional cost over the *whole* target range indicate the efforts needed to achieve the RES-E target.

⁷ In order to stimulate High Efficiency CHP power based on a non-renewable source, for the non-renewable HE CHP electricity category this score could be multiplied by a HE-CHP discount factor in between 0 and 1, e.g., 0.8. The latter category would then be assigned a score of: $0.8 * -4.375 \text{ €/ MWh} = -3.5 \text{ €/ MWh}$. Likewise, the value of High Efficient CHP power from a renewable source (notably biomass), could be defined by the additional cost of biomass-based power from a dedicated power installation (50 €/ MWh), multiplied by a biomass HE-CHP premium factor, e.g. 1.25. Then, the biomass-based HE-CHP electricity would be valued at **62.5 €/MWh**.

The general guidelines for establishing the fuel mix quality labeling scheme are:

Previous calendar year

- **Define all RES-E technology options**
- **Project the cost gap evolution for RES-E installations starting operations in the relevant year(s)**
- **For a previous calendar year: determine the realized fuel mix of inland electricity use**
- **Calculate the additional costs of the green part of this mix**
- **Spread out these cost over the non-renewable part to calculate the negative value to be assigned to a MWh of non-green electricity in any disclosed supplier's fuel mix over the last calendar year**
- **Establish the score range and define score intervals per label**

Current and next calendar years

- **For a current year: determine the fuel mix the Member State would need to meet the RES-E target share as stated in its Renewables Action Plan**
- **Calculate the additional costs of the green part of this target mix**
- **Spread out these cost over the non-renewable part to calculate the negative value to be assigned to a MWh of non-green electricity in the fuel mix of any electricity product a supplier offers in the current calendar year**
- **Establish the score range and define score intervals per label**
- **Same procedure for electricity offerings in the next calendar year.**