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Implementation of the new fuel mix provisions in the EU Electricity Directive

EURELECTRIC SG Fuel Mix

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Implementation of the new fuel mix provisions in the EU Electricity Directive

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Executive summary

Background

1. The new Electricity Directive 2003/54/EC has as its main objective the further development of the liberalisation process in the EU. As part of this process it places an obligation on electricity suppliers to provide customers with information on the fuel mix they supply as well as on the emissions resulting from the production of electricity.

2. EURELECTRIC agrees customers should have access to this information since this is one of the factors customers may want to take into consideration when purchasing electricity. A number of options for fuel-mix disclosure are under consideration and these must be critically analysed before formal adoption by Member States.

3. It is important to emphasise that the main objective of the Directive is to give information to customers; it is not necessarily to promote or penalise certain technologies - other EU policy initiatives exist or may emerge that will do this driven by environment, security of supply, and other considerations.

Customer perspectives

4. There are a number of electricity attributes customers consider when making their choice of provider including price, reliability and security of supply, and reputation and quality of service. The Directive places considerable emphasis on price, through promotion of liberalised markets, and fuel-mix disclosure, but the other attributes are of equal importance to the customer.

5. Evidence suggests that EU customers have tended to remain with their existing electricity suppliers (although some have negotiated better deals). For example the UK, the most successful in this context, has seen just 30% of the customers switch (and some of these are repeats); the Nordic countries have seen 10-25% switching while Germany and Austria have seen less than 10% of customers switch supplier.

6. There is some evidence from existing, mostly voluntary schemes, that customers need fuel-mix information that is understandable and based on a reliable system. Environmentally aware customers often prefer clearly certified renewable energy. Any fuel-mix disclosure system must be sympathetic to these customers needs.

Existing initiatives

7. Existing mandatory initiatives at the member state level are restricted to Austria and more recently Belgium. The former requires suppliers to provide fuel-mix information for eleven categories, six of which are renewables. For Belgium the number of categories is fewer (five, with renewables considered together). The information disclosed in both countries is for the preceding calendar or financial year.

8. Companies have voluntary initiatives in a number of countries. Examples include NUON in Holland, Vattenfall in Sweden and EDF in France. The overall approach is broadly similar to that proposed by the Directive although the level of detail differs from one company to another. Internationally recognised systems, such as ISO 14025, already exist to provide a framework for further voluntary disclosure. It is important that innovative practice at the company level must be allowed to flourish within the general framework proposed by the EC.

Options for implementation

Implementation based on pure estimation

9. It is possible to estimate the fuel mix at the company, national level or regional level. In many cases this information is already available to the consumer, based on the generation statistics, and provided by industry and public bodies. It may not however provide the consumer with the degree of differentiation needed.

Certificate-based implementation

10. Certificate-based system separates the environmental or other attributes from the electricity and these are then traded in a separate market. It's supporters suggest this concept is entirely consistent with market development, and is already being used for so called 'green' (or renewable) electricity. However, the purpose of fuel-mix disclosure should not be confused with the purpose of 'green' certificates.

11. EURELECTRIC believes that all-encompassing, detailed certificate-based systems are very costly and difficult to put in place in a comprehensive way. It is not clear how a certificate-based system might be implemented *in practice* for technologies other than renewable (i.e. for the fossils gas, coal and oil, and nuclear). And even if it were possible, a 100% certificate system would be very complicated and could lead to a highly fragmented certificates market with much reduced liquidity.

Contract-based implementation

12. Contract-based approaches work best in a monopoly market or a market with a low degree of separation and exchanges. In this market environment it would be relatively simple to provide the required fuel-mix data since the generation mix is very similar to the supply mix.

13. Therefore, the provision of fuel-mix information is consistent with a market of vertically integrated players and a relatively low interaction in the value chain from production to supply. This is however no longer the case in most parts of the EU and the next phase of the liberalisation process described in the new Electricity Directive will make this option increasingly less attractive and even impossible to implement alone.

Implementation based on 'best available information' ('hybrid')

14. An approach that uses best available information has a number of major advantages the most important being that it is the simplest to implement and the most feasible on the time-scale involved. It builds on information much of which exists, and can provide disclosure with adequate accuracy and simplicity to the final customer.

15. However, there are concerns with such a provision particularly in fully liberalised markets where electricity is routinely traded on a portfolio basis and with traders, several times both through power exchanges and bilaterally, and in many cases across national boundaries. Some information sources simply do not exist (including aggregate figures held by power exchanges) and it is not possible to develop the requisite systems in respect of such forward trades within the philosophy of a liberalised market in a homogenous commodity, which is why substitute data provisions remain necessary.

16. This approach is essentially "hybrid" because it provides information based on:
    - own generation (if any);
    - generation of known fuel source, contracted on long term
    - in the case of traded electricity or electricity of unknown origin, the supplier refers to a suitable regional/national mix;
    - in addition, information on green certificates can be used.

Ranking of options

17. The following principles are important when developing options for implementing the Directive:

    a) Any fuel-mix disclosure system proposed must be compatible with prevailing and emerging electricity markets
    b) The system should be simple for companies to implement
    c) The information provided to customers must be relevant
    d) It must be feasible to deliver the system on the time-scales required; it must also be possible to deliver the annual fuel-mix information in a timely fashion
    e) The system should be cost-effective
    f) The approach adopted promotes good environmental performance

18. The option based on "best available information" is with today's experience the best overall when judged against each of the criteria: simplicity; compatibility with existing markets; feasibility; and cost effectiveness. This option already exhibits a degree of harmonisation across member states.

19. All four approaches would provide the information needed to satisfy the directive, and provide a suitable driver for improved environmental performance.

Practical considerations for implementation

20. There are a number of practical considerations for implementation of the fuel-mix disclosure provisions of the Directive.

On the system and procedures

- Member States must have the freedom to choose a system so long as it conforms to the minimum requirements of the Directive
- The system to derive the information must not be bureaucratic or time consuming, rather it should be simple and practical
- The information should refer to the previous calendar year
- The first six-month period (July to December 2004) should be considered a pilot phase in which estimates are allowed.
- *Ex-post* verification of the fuel-mix, when appropriate, at Member State level
- Penalties should be limited to cases of proven misconduct of a supplier misleading consumers

On the fuel-mix-information

- The fuel-mix provision must allow differentiated electricity products
- Fuel-mix information could be harmonised to include five technology classes: renewables, gas, coal and other fossil fuel, nuclear and 'other'
- Harmonised labelling of electricity across the EU, or common metrics beyond the minimum requirement, is premature
- Fuel-mix information can be given on the bill or on a separate leaflet
- The information should be given at least once a year
- Presentation of the fuel-mix information can vary so long as it is clear

21. These will not only ensure compliance with the requirements of the Directive, they may encourage additional voluntary action by companies in this important area. Fuel-mix disclosure will evolve in the future through adopting a 'learning-by-doing' approach.

1. Background

The European Union is accelerating the process of liberalising the electricity and gas markets by adopting new electricity and gas directives (2003/54/EC and 2003/55/EC respectively). All non-household customers will be able to freely choose their electricity and gas supplier from 1 July 2004 and this is extended to all customers no later than 1 July 2007. In reality however, progress towards full liberalisation may develop faster, with markets in several EU Member States already open to all customers.

In addition to speeding up the market opening (the so-called quantitative measures) the newly adopted revision of the Electricity Market Directive also establishes qualitative measures to ensure full liberalisation. This includes legal unbundling of network businesses, regulated third-party access, sector-specific regulatory functions and reinforced public service obligations, including provisions on fuel mix disclosure by the supplier to its customers.

1.1. The fuel mix disclosure provisions

As an element of the qualitative provisions, the new directive establishes an obligation on all electricity suppliers to provide their customers with information on their fuel mix and on the environmental impact of the electricity supplied. (Please see Annex 1. for relevant part of the final text of the Article 3.6 of the Directive.) This information must refer to the previous year and must be sent in or with the bills to all final customers. It is worth noting that this obligation is placed on the supplier and not on the generator. In liberalised electricity markets this means that information generators inherently dispose of now has to be transferred to suppliers who may obtain their electricity from various sources.

In addition, the Directive establishes principles for treating the information for power bought from power exchanges and the amount of electricity imported. The Directive also stipulates that Member States must put in place systems to verify that the information presented by the suppliers is correct.

The above provisions can contribute to better information being given to customers, which is a natural prerequisite in liberalised markets. It must however be borne in mind that fuel mix information systems must be designed in cost-efficient and simple way. This will enable rapid adoption of the Directive by the Member States and, crucially by the companies that will have to implement the measures proposed.

1.2. Principles of a good fuel mix information scheme

The newly adopted revision of the Electricity Market Directive establishes an obligation on all electricity suppliers to provide their customers with information on their fuel mix as well as on the environmental impact resulting from the production of electricity.

In a monopoly market or a market with a low degree of separation and exchanges it would be relatively easy to provide the required data since the generation mix is very similar to the supply mix. Therefore, provision of fuel mix information is consistent with, and easy to apply in a market of vertically integrated players where there is a relatively low interaction in the value chain from production to supply.

However, there are several issues of concern with such a provision in a fully liberalised EU market where electricity is traded several times (through power exchanges and/or OTC-markets), often across national boundaries, and where suppliers may thus purchase their electricity from various sources. The information on generation mix, which generators possess, must be transferred to suppliers in a simple and cost-efficient way in order for the supplier to be able to disclose this information to its customers.

It is important to make clear that the purpose of the fuel mix information is to provide information to customers on the various primary fuels used to generate the electricity supplied - it is not necessarily to promote or penalise certain technologies, other EU policy initiatives exist or may emerge that will do this driven by environment, security of supply, and other considerations. Fuel mix information can help facilitate an informed choice by the customer.

EURELECTRIC thinks that the implemented EU-level system should comply with the following two sets of principles:

- **Simplicity.** The system should be easy for customers to understand and companies to implement. Simplicity will ensure fast results and improvements can then be made subsequently.
- **Compatibility with markets.** The system must be fully compatible with liberalised energy markets, in order to ensure liquidity of these markets.
- **Feasibility.** The system should be easy to implement within the strict time limit that the new directives set.
- **Cost-effectiveness.** The costs of setting up fuel mix disclosure schemes, both in producing the needed information and in verifying it, must be proportionate to the value of the information to the final customer, who will pay for this information at the end.
- **Relevance of information.** The information provided must be relevant to the final customers.
- **Driver for environmental performance.** This in turn can become a driver to electricity suppliers to offer products with good environmental performance.

1.3. Customer perspectives

In liberalised markets customers make the choice about their electricity supplier based on a number of criteria. The most important factor is price; other criteria include reliability and security of supply[1], quality of service, reputation of supplier and specific criteria concerning the supplied power, including environmental criteria and fuel mix information.

[1] Customers may consider security of supply as one criterion when deciding on a supplier, even if it is essentially a distribution-related issue; quality of service can relate to both distribution and supply.

To date, customer switching has developed unevenly in the liberalised markets i.e. the number of customers having switched their supplier varies significantly from one country to another. One can perhaps only state that at present the numbers are in general more likely to be rather small than large, with the notable exception of the UK where close to 30% of customers have switched their supplier. The respective figures are typically between 10% and 25% in the Nordic countries and well below 10% in the German and Austrian markets. It is worth noting that many customers have negotiated better deals with their current supplier.

It is our understanding that the aim at the European level is to develop free, fair and transparent markets in which customers are given the opportunity to choose their electricity supplier freely, for whatever reason. To ensure this, simple and reliable information on the fuel mix, and on the environmental profile associated with that mix, will be given to the market in a cost-effective manner.

As consumers learn to embrace the opportunities of multiple suppliers, the usefulness of fuel mix information will increase. This fact can be recognised and anticipated, even if the actual evidence for this is not readily apparent. Price remains the most important reason for customers to switch their supplier. This is confirmed by a recent study undertaken on behalf of the Commission concerning services of general economic interest which has provided an interesting analysis on the attitude of electricity consumers. There is a clear indication that price plays a major role but that reliability of electricity supply and the quality of service -notably quick repair in case of power cuts- are two other key issues for the customers. Environmental concerns seem to be more often mentioned by customers but they still have a relatively minor impact when it comes to customer switching[2].

In those countries where voluntary or mandatory fuel mix information disclosure already exists, experience has shown that the fuel mix information should be understandable and based on a reliable system. Thus, suppliers must have some documentary evidence on the fuel mix they offer and that these are not only estimates. As regards renewables for example, caution should be taken that it has not been sold twice and thus accounted twice in the calculation of the fuel mix.

Customers with environmental awareness often prefer to choose a certain certified green electricity product. In most cases these green products are calculated based on the energy sold to the customer, whereas in most cases the overall fuel-mix information refers to the general production and/or the trading portfolio of the supplier. Any mandatory fuel-mix information must therefore be compatible with the existing voluntary product-based data.

All in all, a number of studies and surveys exist today, which shows a high degree of customer satisfaction concerning electricity supply. EUROBAROMETER publishes an annual assessment, which has demonstrated that among several services of general economic interest, electricity utilities consistently rank first together with postal services.

[2] Study on services of general economic interest in the 15 EU countries, contract: PRS/2001/B5-3001/SANCO/A/53

2. Existing Schemes

Electricity generators have tended to generate information on their fuel and generation mix as good practice. In a large majority of cases this information has been disclosed in the annual reports or environmental reports of the companies. In the new Electricity Directive, the obligation to provide fuel mix information is on the supplier. This makes it necessary to build a system to transfer this information from generators to suppliers in a free market where a supplier can source its electricity needs from various sources.

Examples of existing fuel mix disclosure systems are given below. This summary does not aim to give an exhaustive picture of the situations in all EU member states but rather intends to set out the general trends concerning fuel mix disclosure. Existing mandatory initiatives at the member state level are restricted to Austria and more recently to Belgium.

2.1. Austria

The Austrian Eco-electricity law (*Ökostromgesetz*) was enacted in August 2002. Article 8 stipulates that grid operators must, upon request, issue a guarantee of origin to the operator of a renewable energy sources facility. This certificate has to cover the amount of electricity generated, the type and maximum capacity of the facility, the time period and place of the facility, and the type of energy source used. In cases where renewable electricity is imported from countries of the EU, or any other country, those guarantees of origin as referred to in the EU Directive (Article 5) have to be applied.

Article 45 of the Austrian Law refers to labelling of electricity supplied by electricity traders or other suppliers to final customers. The supplier has to provide information on a percentage basis of the following primary energy forms:

- solid or liquid biomass,
- biogas,
- deposit gas,
- geothermal energy,
- wind and solar energy,
- hydropower,
- natural gas,
- crude oil and its derivatives,
- coal,
- nuclear energy and
- others.

This information is based on the fuel mix structure of the preceding calendar or financial year. In cases where the primary energy source in not identifiable, the UCTE mix has to be applied. Traders have to document/provide information on the basis of calculation given on the label. An example of existing fuel mix disclosure model is shown in Figure 1 below.

As intended in the Upper Austrian Current Marking Regulation intended, we inform you about the primary energy carriers, which (are appropriate for) underlie our supplies of electricity.

Overview according to regulation of the Upper Austrian Federal State Government.

Labelling	
Generated (%)	**Primary energy**
0,9%	Renewables
63,9%	Hydro
0,5%	Natural gas
0,1%	Fuel oil or derivatives
16,5%	Coal
0,0%	Nuclear
10,8%	Others*
7,3%	European Mix (UCTE):
	1,1% **Hydro**
	2,5% **Nuclear**
	3,7% **Conventional Thermal**
100,0%	Total

* 5,0% coal, fuel oil, gas
0,3% Waste
5,5% coal, Waste

Figure 1. Example of an existing Austrian fuel mix 'label'

2.2. Belgium

Belgium is a Federal State, made of three Regions (Flemish Region; Walloon Region and Brussels-Capital). Regulations have recently been issued both at Federal level and in Flanders and in Wallonia concerning fuel mix information.

On Federal level, The Royal decree of 3 April 2003 concerning the supply bills for electricity and gas provides that starting from 1 July 2003, the regularisation bill (= annual closing bill) sent to the final customers has to mention several items. Among others, it has to mention the energy sources used to produce the electricity supplied (annual average of the primary energy sources used the preceding year).
This Royal decree concerns bills sent to final customers connected to the low voltage grid with a consumption of maximum 60 MWh/year.

The Royal decree refers to the following categories of energy sources: RES, natural gas, other fossil fuels, nuclear and unknown sources; these last ones can only account for 5% of the mentioned sources.

In Flanders, this issue is covered by the Flemish decree of 29 March 2002 concerning the public service obligations for the promotion of the rational use of energy. It stipulated that starting from 1 June 2002, each bill or each supply has to mention the origin of the electricity supplied.

As from 1 February of the pending year, the supplier refers to the direct or indirect agreements concluded with the electricity producers who have supplied him with electricity in the preceding calendar year. The origin of electricity is determined taking into account the global production park of a producer with whom there is an agreement.

The following categories of energy sources apply: RES, Quality CHP, Fossil fuels, nuclear and unknown sources. The classification "unknown" is allowed only for a fraction of less than 5% or in case the supplier can demonstrate that the origin of electricity cannot be traced. To do so the supplier asks for the approval of the regulator (VREG). The supplier has also to send annually to the regulator (VREG) a report on the origin of the electricity supplied during the preceding year.

In the Walloon Region, the decree of 10 April 2003 concerning the public service obligations in the electricity market provides that at least once a year, the supplier sends to its final customers a balance bill (*facture bilan*) which has to mention several items, including sources of the primary energy used on an annual basis to produce the electricity supplied, in a graph or in percentage figures.

Starting from 1st February of the year in consideration, the supplier refers to the contracts he has concluded in the preceding civil year with producer(s) for the supply of its customers. If the contract does not relate to a specific plant, the primary energy sources are established on the basis of the global production park of the concerned producer.

If the supplier is supplied by wholesaler(s) (*intermédiaire(s)*) without a contract related to specific plants, there will be a reference to the average of the primary energy sources used to produce the electricity purchased by the wholesaler. If the supplier buys its electricity on an electricity exchange, without a specific contract with a producer, the reference will be the average of the primary energy sources used to produce the electricity being exchanged on the electricity exchange.

Sources of primary energy are the same as those indicated earlier. Every year, suppliers provide to the regulator (CWAPE) a report on the sources of primary energy used to produce electricity during the preceding year. Once again, without a formal approval of the regulator (CWAPE), the part of the "unknown sources" cannot exceed 5 %.

Even if at present there is no regulation on this issue in Brussels-Capital Region, bills sent to consumers of the Brussels-Capital Region do already mention the origin of electricity, in line with the Flemish requirements.

2.3. The Netherlands

Legislation was proposed in 2001 by the Green Party to introduce an obligation to producers and suppliers of electricity to make information available on the fuel mix of the produced or supplied electricity. The proposed legislation consisted of an *ex-post*, portfolio based electricity label with a certificate based verification system. In reaction to this proposal, the Ministry of Economic Affairs made a promise to develop a system for labelling of electricity, to be introduced in 2002 and implemented when the choice of supplier is open to the whole market (1 January 2004).

This process has been delayed due to the uncertain political environment of the last year: elections in May 2002, the fall of the government in the autumn of 2002, the new elections of January 2003 and the formation of a new cabinet.

The ministry of economic affairs requested a study by SKM[3] on the feasibility and the implications of the introduction of an electricity labelling system within the EU. The conclusions of the SKM report can be summarised as follows:

- The labelling system should be ex-ante and product based;
- An ex-ante verification system based on certificates is required; the design of a contract-based ex-ante verification system is extremely difficult;
- An electricity labelling system introduced in the Netherlands alone will be very fragile. An EU-wide system would the best alternative.

The Ministry of Economic Affairs endorsed the conclusions of the SKM report. However, since mid 2002 there have been no new initiatives from the Dutch government to come up with proposals for new legislation.

The most notable voluntary fuel mix disclosure initiative in the Dutch market is the initiative of NUON, one of the largest energy distribution companies in the Netherlands. In a press report in December 2002 NUON disclosed the fuel mix of 2001 (ex-post / portfolio-based). In a press report in April 2003 NUON disclosed the fuel mix of 2002.

In association with KPMG, NUON has developed a protocol to determine the fuel mix based on best available information. Own generation, purchase and sale of electricity, and certificates trading are taken into account. The protocol has not been written specifically for NUON, as shown in Figure 2. It has been set up in such a way that all electricity companies in the Netherlands can eventually make use of it.

[3] SKM Energy Consulting, Electricity labelling: requirements for establishing a reliable well functioning system within the EU, June 26th 2002

In recent press releases Essent and ENECO Energie, the two other large energy distribution companies in the Netherlands, stated that they advocate the introduction of electricity labelling in the future but that at this moment they will wait until the disclosure provision in the new Electricity Directive will be transposed in national legislation.

Fuel mix	%
Solar-energy	0.01
Wind	1.5
Small hydro power	12.4
Biomass	1.8
Waste (not-organic)	1.0
Gas – CHP	9.8
Gas	42.1
Coal	26.6
Oil	0.1
Nuclear energy	4.7

Figure 2: Fuel mix NUON 2001

2.4. Sweden

There is no legally binding fuel mix disclosure scheme in Sweden, but a certificate system for green power has recently been enacted.

The Swedish electricity certificate system is structured in the same way as the RECS system, on national level. The 'green' declaration is, however, a self-declaration. The two systems are integrated in the sense that an electricity certificate can be transferred to a RECS certificate for export purposes. RECS certificates cannot, however be transferred to national Swedish electricity certificates.

Registration is free. The account cost per quarter is 0.30 SEK/MWh and the transfer cost is 0.05 SEK/MWh. As a comparison the Dutch certificate system has certificate costs of 0.10 Euro/MWh for issuance, 0.02 Euro/MWh for transfer, and 0.10 Euro/MWh for redemption.

Figure 3 below displays the voluntary environmental information disclosure developed by Vattenfall. The same information can also be found at:
http://www.vattenfall.se/om_vattenfall/var_verksamhet/var_produktion/miljosnurra/pop_up_eng.htm

2.5. Switzerland

Switzerland will have a mandatory fuel mix disclosure scheme in place during the second half of 2004. To date no referendum against the new Nuclear Energy Act has been taken. As a consequence the Energy Act (*Energiegesetz*) will be reversed and the Article 5 concerning electricity disclosure and guarantee of origin will be integrated.

The disclosure will ***not*** include environmental impact information (radioactive waste and CO2 emissions as a result from the energy produced) like the new EU 2003/54/EC Directive stipulates. An expert team will investigate different solutions and prepare a recommendation to the Swiss Federal Office of Energy. Mandatory electricity disclosure, including guarantee of origin, will come into force as of 1 October 2004.

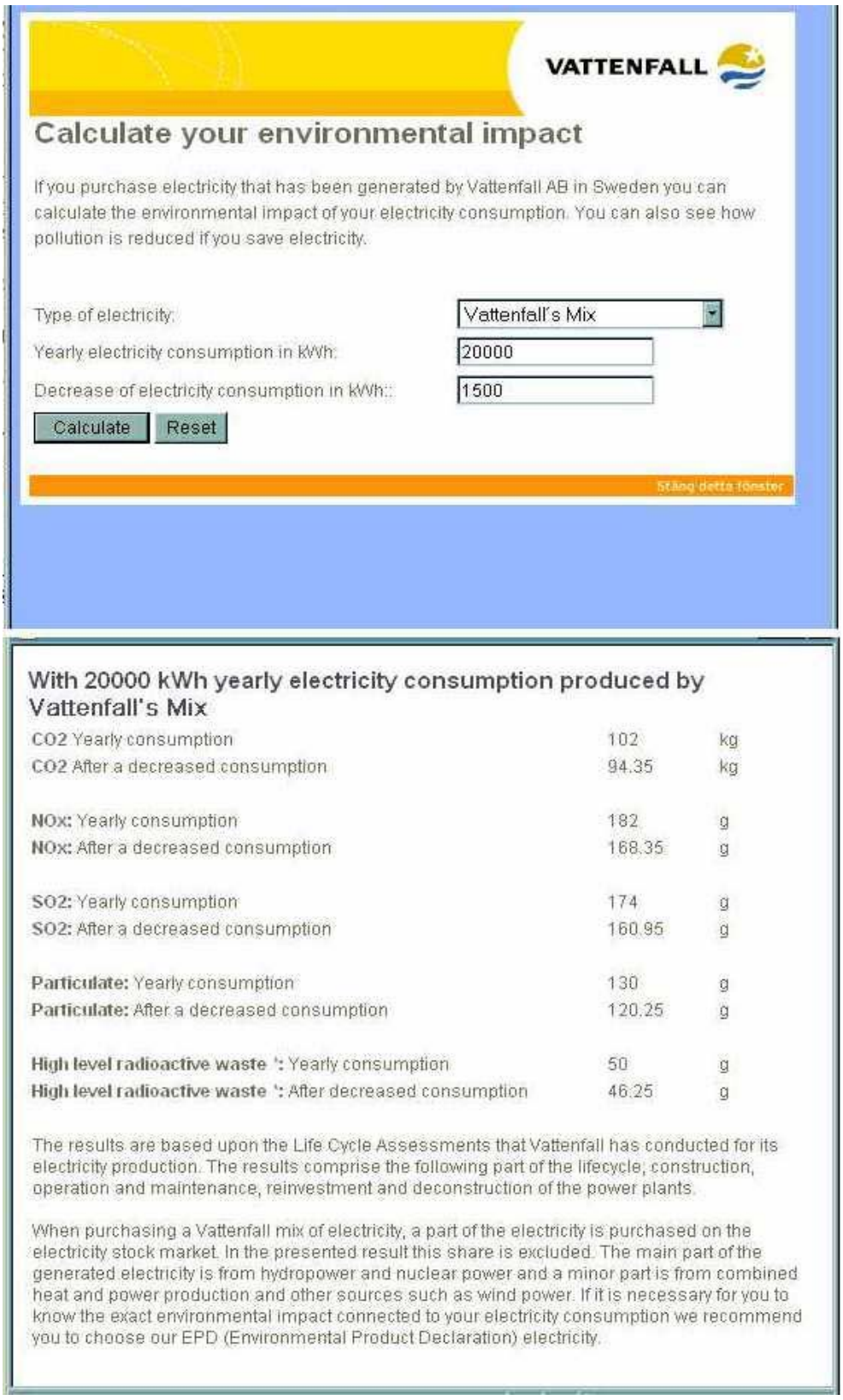


Figure 3. Example of disclosure by Vattenfall, Sweden

2.6. Spain

There have been no concrete proposals to introduce a mechanism to inform the customers about the supplier's fuel mix in Spain before the new Directive. However, the generation mix of the whole Spanish power system, including the balance of renewable energies, is known a month after consumption, which in principle allows fuel mix reporting.

2.7. Germany

Some companies in Germany disclose fuel mix information on a voluntary basis, but there is no legal obligation at the moment to do so. Even if green products are available, customers have been slow in changing supplier for environmental reasons.

2.8. United Kingdom

The UK has no overall operational scheme of fuel labelling at the moment. However a number of suppliers do sell green products, which are invariably backed by certificates in respect of the output of renewables plant. The take-up has been limited and is well below 100,000 customers out of 22 million at present.

2.9. Denmark

There is no mandatory fuel mix information system in Denmark but the companies are obliged to give some similar information on their bills on the priority production (wind, biomass, CHP, solar). Suppliers also have to differentiate between energy and network charges.

2.10. France

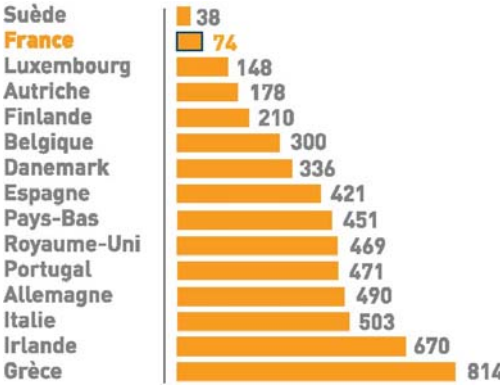
There is no mandatory scheme, but EDF displays fuel mix information in its annual report and also sends information to final customers on the environmental impact of their products. An example of the fuel mix information provided by EDF is shown in the Figure 4 below.

2.11. International scheme – Renewable Energy Certificate System (RECS)

There are three steps in the life cycle of a certificate: issuance, transfer and redemption. Within RECS, the minimum set of criteria for the certificate process is stated in the Basic Commitment (BC). The Association of Issuing Bodies (AIB) for RECS, formed by the national issuing bodies, is responsible for the maintenance and the development of the BC. The national issuing bodies are responsible for the so-called Domain Protocol (DP), which is the adjustment of the BC to national conditions. The DP must be reviewed and approved by the AIB.

Each plant must be declared as a renewable plant, going through a Renewable Energy Declaration. For biomass-based generation, a so-called declaration of used biomass fuels has to be sent to the Issuing Body as well. After 12 months of operation, a verification of the generation has to be carried out.

Emissions de gaz carbonique pour le secteur de l'électricité et de la chaleur dans les pays de l'UE



En gramme par kWh, source : Agence internationale de l'énergie (2000)

Production d'électricité EDF maison mère

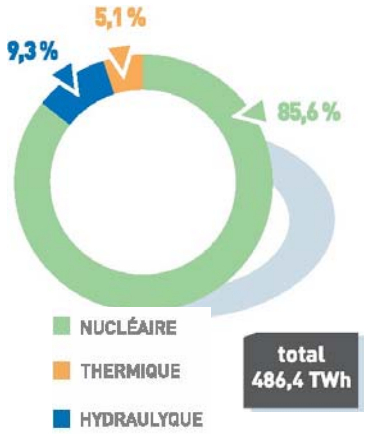


Figure 4. Examples of disclosure by EDF. 2002 Annual Report, EDF Group, France.

The national issuing body is responsible for the registration, collection of metered values, issuance of certificates (only electronic certificates), an electronic account system for the certificates and for keeping records of transfer and redemption of certificates. On the European level, the market players are organised in an association called RECS International. Each market player can transfer certificates to other players in the system, nationally or internationally, and redeem certificates within the account system maintained by the issuing body.

On a national level, the national issuing body and the market players (e.g. generators, brokers) are organised in a national team.

2.12. Environmental Product Declarations (EPD)

The ISO 14025 system for Type III environmental product declarations, EPD, is a system that can be applied for all types of products. It is a Life Cycle Assessment (LCA) based system. The interest for the system is growing and there is an advantage in its international characteristics and its applicability to all types of products.

As an example, this system has been used for electricity in Sweden by Vattenfall and Sydkraft and for heat production by Gothenburg Energy. Further information on the Swedish system as well as some international systems can be found at www.environdec.com. Vattenfall, Sydkraft and Gothenburg Energy use their declarations when communicating environmental performance with customers. There is also an interest in the IPP process to include life cycle based information like that given by EPD.

There is also work being carried out to test the system in Italy for a broad spectrum of products, among them electricity. ENEL is currently preparing an EPD for its wind energy.

3. Options for Implementation

Now that the text of the new Electricity Directive has been finalised, it is important to consider the various options for implementation of the provisions. The Directive provides a framework of general rules, but still leaves the practical questions to be solved by Member States and implemented by industry.

The European Commission is working on implementation guidelines, which they will present to the Member States in autumn of 2003. The Commission has contracted an academic consortium, the 4CE group[4], to provide preliminary research on possible implementation options. The 4CE consortium has undertaken an in-depth analysis of the potential models needed to transpose the fuel mix provision while at the same investigating customers needs. This has resulted in a comprehensive and in-depth study, which will become a reference document in the discussions on the fuel mix disclosure. However, the objectivity shown by the consortium has appeared in a number of cases to be less than required of an independent study. This lack of impartiality needs to be taken into account when assessing the value of the 4CE work.

Before getting into the investigation of the different fuel mix models, it is important to clarify at the outset that the fuel mix provision only requires the suppliers to disclose information on the fuel mix and a very limited number of environmental impacts. The Directive does not set out the format this information should be displayed, and leaves the Member States to take appropriate implementation measures.

A number of possible implementation models are presented and discussed in the following sections. At the end, conclusions are drawn on the feasibility of the different approaches and the one preferred by industry is presented.

3.1. Implementation based on pure estimates

The simplest option to implement the Directive is based on estimation. It is possible to estimate the fuel mix at the company, national or regional level with sufficient accuracy. In many cases this information is already available to the consumer, based on the generation statistics, provided by electricity generators and suppliers, transmission system operators and public bodies.

Estimates would represent a quick option for implementation. However, with the estimates being in some cases based on figures derived from the national or regional level, this approach may not provide the degree of differentiation needed to engender consumer confidence in the information provided.

[4] The 4CE group: Environmental Change Institute, University of Oxford (UK), Central European University (HU), Energieverwentungsagentur (AT), IT Power (UK), Oeko-Institut (DE), Stockholm Environment Institute (SE)

3.2. Contract-based approach

In contract-based models, the supplied electricity would be 'traced' through its physical contract path down to generating plant level[5]. Following a series of bilateral contracts would, in an ideal world, allow an accurate contractual fuel mix to be established. This type of arrangement might work in monopolistic systems, which has a limited number of generator-suppliers. In certain cases where long-term contracts still occupy a large share of the market (as occurs, for example, in the New England pool model), contract-based systems could perhaps work.

It is clear however, that contract-based approaches would go contrary to the goals of the liberalisation process and would seriously hamper market development. These models would represent considerable difficulties for European electricity markets, increasingly based on free trading of electricity in liquid and anonymous wholesale markets. Liquid wholesale markets are at the core of the liberalisation process - without them the benefits of liberalisation to the economy and society would be seriously compromised. They enable efficient price formation and provide a platform where electricity can be bought and sold.

A 'pure' contract-based system is impossible to put in place in a liberalised market environment. Firstly, the companies that supply electricity are not necessarily generators themselves and can thus purchase their electricity from various sources on the markets. Secondly, an increasing portion of the supplied electricity is traded through anonymous power exchanges and/or OTC markets. The volumes traded are often larger than the volumes supplied, which means that the supplied electricity is many cases bought and sold several times before final delivery[6]. This makes it very difficult and costly[7] to trace the supply contracts up to the generator-level.

Finally, a contract-based system would at the end create one single contract for each individual fuel mix, and this would destroy the liquidity of the market. This is due to the importance of a limited number of types of traded contracts as a base for creating liquidity. Too many types of contracts will spread the liquidity and the turnover, and the confidence in the forward market would decrease.

One can note however that contract-based approach can constitute a part of the overall fuel mix information system, since many suppliers have parts of their supply mix contracted on long term.

3.3. Certificate-based approach

In certificate-based markets the "grey" commodity is separated from its attributes and two separate markets are developed, one for the commodity and one for the attributes.

There are examples of trading in 'green' certificates, where the certified 'green' electricity generator sells the electricity in a 'grey' electricity market and then sells the certificates in a separate certificate market.

[5] This reference is to physical as opposed to financial contracts. In addition to physical contracts, various financial contracts (derivatives) are also traded in modern power markets.
[6] For example under the UK NETA system, more than 10 000 trades are recorded daily.
[7] In absence of exact cost figures, it can however be estimated that it would cost hundreds of millions of euro to develop a reliable system on European level based solely on contract tracking.

The amount of certificates for sale is limited to the generator's annual production, and thus the 'correct' marketing premium will be achieved for the 'green' product, and passed back to the generator.

In theory certificates may have a number of advantages in free markets. In general they may not fragment the 'grey' forwards market. Certificates can also overcome difficulties in liberalised markets where a high proportion of forward contracts are between portfolio players, with no reasonable way of attaching fuel mix information to the trades. In practice, if certificates trading is undertaken as an annual auction, to synchronise with fuel-mix disclosure, this may involve a limited number of transactions (each representing the sale of annual output of a particular-fuelled generator) – reducing cost and complexity.

However, the purpose of fuel-mix disclosure should not be confused with the purpose of 'green' certificates. *The fuel-mix provisions in the Directive aim to provide information to consumers. By contrast, green certificates exist to subsidise the generation of electricity based on renewable sources.* Green certificates can be bought voluntarily (marketing or image related premium), but in most cases governments place an obligation on suppliers to purchase a certain amount of green certificates, with the political objective of boosting renewables.

All-encompassing, detailed certificate-based systems are very costly and difficult to put in place in a comprehensive way. It would necessitate the certification of tens of thousands of power plants all over Europe. It is also not clear how a certificate-based system could be meaningfully implemented in practice for technologies other than renewable (i.e. for the fossils gas, coal and oil, and nuclear). And even if it were possible, a 100% certificate system would become very complicated and lead to a fragmented certificates market with reduced liquidity.

New trading instruments (agreements or contracts) to allow trading of non-green certificates would need to be developed, as they do not currently exist. The consumers may, if attempts are made to make them aware of the basis of the green product, find the certificates approach difficult to grasp.

The costs and especially the complexity involved must not overshadow the aim of any proposed system, which is to provide simple and reliable fuel mix information to the customers.

3.4. Implementation based on best available information ('hybrid')

None of the generic approaches discussed above (pure estimates, contract-based or certificates-based) can provide the necessary basis for the provision of fuel mix information *alone*.

Therefore, a method that would comply with the requirements of the new Directive includes information from a number of sources. In this method the supplier establishes the fuel mix information from the best available information, including:

- Own generation (if any);
- Generation of known fuel source, through, for example, long-term contracts;
- The supplier refers to a suitable regional/national system mix in the case of traded electricity or electricity of unknown origin;
- Information based on (green) certificates can be used.

Such *'hybrid'* models have a number of advantages. They can provide portfolio disclosure with adequate accuracy and simplicity to the final customer. They are in general relatively straightforward to implement, due to pragmatic approach in deriving the needed information. They are also the least costly models available if one disregards pure estimation.

The disadvantage with this approach is that the fuel mix information is less accurate than it would be for example with a full contract-based model, because it includes aggregated statistical data. The level of accuracy can however be fully adequate in order to give the customers reliable information on the supplier's mix. As indicated earlier, the costs associated must not overshadow the needs for the system.

Information from traded wholesale markets can be problematic because power exchanges do not have the information on the fuel sources used to generate the power traded in those markets. Trading of a homogenous commodity on power exchanges is based on anonymity. Furthermore, in some cases power exchanges represent only a small part of the liquid wholesale markets, the larger part of contracts traded in the OTC markets. Therefore, some statistical information must be used to describe wholesale markets. Information on the overall national or regional system held by the TSOs could perhaps be used as a proxy to describe the wholesale market fuel mix. Figure 5 below illustrates the various categories and levels of accuracy of information in this method.

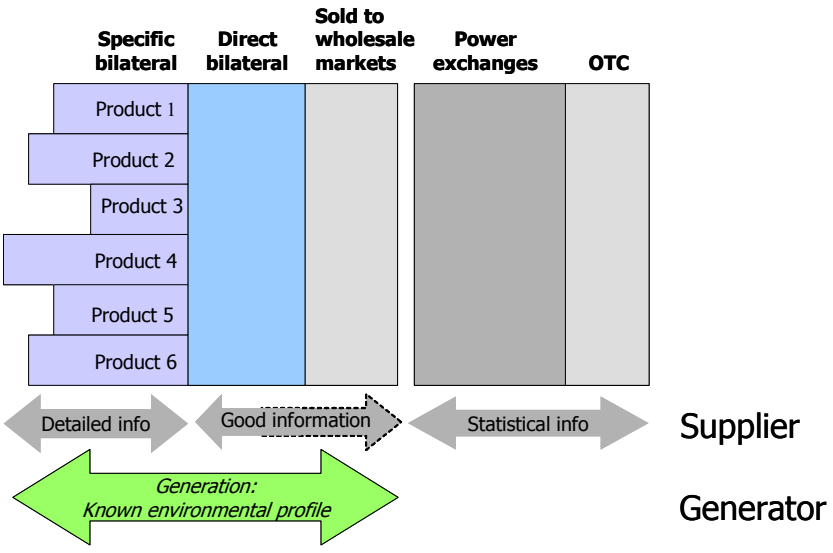


Figure 5. Information on fuel sources in liberalised electricity markets.

3.5. Evaluation of different approaches against key criteria

EURELECTRIC thinks that the implemented EU-level system should be developed with a number of criteria in mind and these were discussed in section 1.2. The different options of implementing the fuel mix disclosure discussed above can be evaluated and a preference order established against these criteria. It is necessary to keep in mind the requirements of the Directive when carrying out the evaluation shown in Figure 6 below.

	Estimation	Contract-based	Certificate-based	Best available information
Simplicity	**5**	**1**	**3**	**5**
Compatibility w. markets	**5**	**1**	**3**	**5**
Feasibility	**5**	**1**	**2**	**5**
Cost-effectiveness	**5**	**1**	**3**	**5**
Relevance of information	**2**	**4**	**4**	**4**
Driver of env. Performance	**3**	**5**	**5**	**4**

5 = good performance; 1 = poor performance

Figure 6: Evaluation of different approaches against key criteria

Accuracy of data is the main driver of the costs in implementing the fuel mix disclosure schemes. Very good results can be attained with relatively low costs if the method based on best available information is chosen with sufficient flexibility for national implementation.

A pure contract-based approach is not a realistic option for, and in fact runs counter to, liberalised electricity markets and therefore it should not be considered. It is also hard to visualise how a pure certificate-based model would work with anything other but 'green' certificates.

In the light of the above criteria, EURELECTRIC supports the model based on 'best available information', in which certain elements of contract-based models (generation of known source contracted on long term) and certificate-based models (green certificates), when applicable, can be combined.

4. Practical considerations for implementation

EURELECTRIC agrees that customers should have access to information on the fuel mix. This was clearly stated in EURELECTRIC's Position Paper of April 2002 *Latest Developments on the Draft Electricity Directive*.
We recognise that this is one of the factors customers may want to take into consideration when purchasing electricity. At the same time however, EURELECTRIC believes that any proposal must be feasible and reasonable, and not involve excessive costs to industry and the consumers**.**

In the following sections EURELECTRIC presents a number of practical considerations for implementation of the fuel mix disclosure provisions. The following approach will ensure compliance with the requirements of the directive, while at the same time it allows companies to go beyond the legal requirements.

4.1 How to derive the fuel mix information

4.1.1 The system to derive the information must be simple and practical

Fuel mix disclosure should be based on 'best available information', derived and collected in a feasible and cost effective way. In the short term, we believe that in a simple model the suppliers provide the information in section 3.4.

In the case of long term purchase contracts, the supplier will rely on information provided by the generator (based for example on the generator's overall fuel mix of the preceding year or other verifiable figures). For the power purchased through power exchanges or other traded markets, the supplier can refer to a national or regional generation mix provided either by the power exchange (in some cases) or by the TSO (in large majority of cases).

In the longer-term alternative models currently being developed in different markets might be appropriate for widespread adoption. Furthermore, this option establishes a degree of harmonisation across member states.

4.1.2 The information should refer to the previous calendar year

The reference in the new Directive to information from the 'previous year' allows room for interpretation of time-scales. It would be best if the fuel mix information is updated once a year and the figures of the previous calendar year (i.e. between the 1 January and 31 December) are given. The companies may then decide how often to disclose this information, once a year being the Directive requirement. The first full reference year could be 2003, *provided that a method based on 'best available information' is employed.* In fact, this is the sole method which can ensure implementation by 1 July 2004. Companies should be required to update their fuel mix information on the 1 July of the following year at the latest.

4.1.3 The mandated portfolio fuel mix provision must allow product-based disclosure

Various types of differentiated electricity products are already being marketed and sold by numerous supplies all over Europe. These products are constantly developing and give customers the possibility to choose for example eco-labelled electricity and pay the associated 'green' premium. It is vital that the mandated fuel mix disclosure, which will refer to the supplier's overall (portfolio) mix, does not hamper the existence or development of product differentiation or product certification.

4.2 How to present the fuel mix information

4.2.1 The list of generic primary fuels

Suppliers should present fuel mix disclosure with a breakdown based on the below five generic classes of primary energy:

- renewables,
- natural gas,
- coal and other fossil fuels,
- nuclear,
- other(s).

If customers ask for more detailed information, companies can move further and find their optimal approach in providing a breakdown of the various renewable and fossil fuel categories. This flexibility is needed to take account of differences between the various national fuel mixes.

4.2.2 The Directive does not mandate harmonised labelling of electricity

As stated above, a model based on 'best available information' with a display of data based on five standard generic classes appears to be the best option and provides a degree of harmonisation across member states.

Further harmonisation across Europe is not necessary at this time - indeed harmonisation of 'labels', for example, would have more disadvantages than benefits. First of all, the Directive does not mandate harmonised solutions, but leaves the actual design of the information disclosure to subsidiarity. Secondly, it is not clear how consumers at the EU-level would benefit from harmonised display of this information. As long as consumers do not have the needed 'mobility of choice' in electricity markets that are on the whole, national in nature, uniform labelling makes no sense. This could eventually be debated at the national level but in the first stages of implementation the design of the 'label' should be left to companies.

It must be noted however that various electricity labels already exist; for example companies are marketing eco-labelled electricity. This is however a different development and should not be hampered by the implementation of the new Directive. In the long term, compatibility of national schemes is a reasonable goal, in order to enable cross-border trade.

4.2.3 Fuel mix information can be given on the bill or on a separate leaflet

There are different ways of displaying the information mandated by the directive. The practical choice is between displaying the information on bills or on separate leaflets sent with the bills to the final consumer. There is no uniform approach to displaying the information. Bills, separate leaflets or both should be accepted, as long as the information is consistent with the requirements of the directive and subsequent national laws.

4.2.4 Fuel mix information should be given once a year

The frequency of disclosing information can vary but once a year is a sufficient mandatory requirement. If companies wish to send information more frequently, they should be free to do so.

4.2.5 The way of presenting fuel mix information must be clear but can vary

Suppliers should be required to present the fuel mix information in a clear way, so customers can easily read and understand the information provided. Whether the information is shown in pie charts, tables or in simple text should be left to the companies to decide, as long as they disclose the required information. In general, text and tables are easier to implement than charts. Redesigning bills is potentially costly and this should be taken into account when implementing the fuel mix disclosure provision.

4.3 How to verify the fuel mix information disclosed

4.3.1 Verification must be based on ex-post tests

It would be unnecessarily burdensome to verify the information that companies aim to disclose *ex-ante*. Member states must have the resources to check and comment on the information disclosed by the supplier *ex-post*, if complaints arise.

Appendix 1. Relevant parts of the final text of the new Electricity Directive 2003/54/EC

Recital 25

The Commission has indicated its intention to take initiatives especially as regards the scope of the labelling provision and notably on the manner in which the information on the environmental impact in terms of at least emissions of CO2 and the radioactive waste resulting from electricity production from different energy sources, could be made available in a transparent, easily accessible and comparable manner throughout the European Union and on the manner in which the measures taken in the Member States to control the accuracy of the information provided by suppliers could be streamlined.

Article 3.6

6. Member States shall ensure that electricity suppliers specify in or with the bills and in promotional materials made available to final customers:

(a) the contribution of each energy source to the overall fuel mix of the supplier over the preceding year;

(b) at least the reference to existing reference sources, such as web-pages, where information on the environmental impact, in terms of at least emissions of CO2 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.

Member States shall take the necessary measures to ensure that the information provided by suppliers to their customers pusuant to this Article is reliable.

Article 28

1. The Commission shall monitor and review the application of this Directive and submit an overall progress report to the European Parliament and the Council before the end of the first year following the entry into force of this Directive, and thereafter on an annual basis. The report shall cover at least:

***

(h) the manner in which Member States have implemented in practice the requirements regarding energy labelling contained in Article 3(6), and the manner in which any Commission Recommendations on this issue have been taken into account.

Where appropriate, this report may include recommendations especially as regards the scope and modalities of labelling provisions including e.g. the way in which reference is made to existing reference sources and the content of these sources, and notably on the manner in which the information on the environmental impact in terms of at least emissions of CO2 and the radioactive waste resulting from the electricity production from different energy sources could be made available in a transparent, easily accessible and comparable manner throughout the European Union and on the manner in which the measures taken by the Member States to control the accuracy of the information provided by suppliers could be streamlined, and measures to counteract negative effects of market dominance and market concentration.

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