



Disclosure of Information to Final Customers by Suppliers

Consultation Paper

13th March 2007

AIP/SEM/07/46

Executive Summary

Under Article 3(6) of Directive 2003/54/EC Member States are required to ensure that electricity suppliers specify in or with bills and in promotional materials made available to final customers the contribution of each energy source to the overall fuel mix of the supplier over the previous year. In addition, suppliers are required to provide at least a reference to existing sources of information regarding the environmental impact resulting from the electricity produced by the fuel mix of the supplier in question over the same period. The Commission for Energy Regulation (the CER) and the Northern Ireland Authority for Energy Regulation (NIAER), the Regulatory Authorities, must determine how the above requirement can be met in the Single Electricity Market (the SEM).

Section 2 of this paper sets out the legislative background to this issue and section 4 presents a number of options for the implementation of the fuel mix disclosure requirement which the Regulatory Authorities have considered. The preferred option of the Regulatory Authorities is set out in section 4.

Comments are requested from interested parties on the matters raised in this paper, specifically the options discussed and the Regulatory Authorities preferred option. Comments on this paper should be submitted by close of business (5 pm) on **2nd of April 2007** to acrowe@cer.ie and tadhg.obriain@ofregni.gov.uk.

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1 Introduction

Under Article 3(6) of Directive 2003/54/EC Member States are required to ensure that electricity suppliers specify in or with bills and in promotional materials made available to final customers the contribution of each energy source to the overall fuel mix of the supplier over the previous year. In addition, suppliers are required to provide at least a reference to existing sources of information regarding the environmental impact resulting from the electricity produced by the fuel mix of the supplier in question over the same period. The CER and NIAER, the Regulatory Authorities, must determine how the above requirement can be met in the SEM, commencing with calculation of the required information in 2009 for the calendar year 2008..

This paper sets out the background to this issue and sets out a number of options for the implementation of the fuel mix disclosure requirement which the Regulatory Authorities have considered. Having considered these options the Regulatory Authorities have identified a preferred approach for the implementation of the disclosure requirement.

Comments are requested from interested parties on the matters raised in this paper, specifically the options discussed and the Regulatory Authorities preferred approach. Comments on this paper should be submitted by close of business (5 pm) on **2nd of April 2007** to acrowe@cer.ie and tadhg.obriain@ofregni.gov.uk.

2 Legislative Background

This section of the paper sets out the legislative background to this issue. The requirements of Directive 2003/54/EC are presented as is member state legislation regarding disclosure. In addition, an overview of associated legal matters such as the definition of renewables and legislation in relation to guarantees of origin is provided.

2.1 EU Legislative Requirements

Article 3(6) of EU Directive 2003/54/EC requires Member States to “ensure that electricity suppliers specify in or with 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 steps to ensure that the information provided by suppliers to their customers pursuant to this Article is reliable.

2.2 Member State Disclosure Legislation

Article 3(6) of the Electricity Directive (2003/54/EC) has been transposed into national legislation in Ireland under Regulation 25 of S.I. 60 of 2005. Here, the CER is required to ensure that all suppliers provide reliable information on all bills/promotional materials sent to customers regarding the contribution of each energy source to the overall fuel mix of the supplier concerned over the preceding year.

Regulation 25.1 of S.I. No. 60 of 2005 states as follows:

25. (1) The Commission shall ensure that the public electricity supplier and all licensed suppliers furnish reliable information on or in bills or promotional materials sent to final customers as respects:

- (a) the contribution of each energy source, expressed in accordance with Article 3.6 of the Directive to the overall fuel mix of the supplier concerned over the preceding year;*
- (b) details of any existing and publicly available reference sources which contain information on the environmental impact, at least in terms of carbon dioxide emission, and the radioactive waste resulting from the electricity produced by such overall fuel mix over the preceding year.*

The Commission may direct holders of a licence under section 14 of the Electricity Regulation Act 1999 to provide it with information relating to the matter referred to in paragraph 1.

There is at present no requirement in Northern Ireland (NI) for electricity suppliers to specify their fuel mix to customers nor is there a requirement for electricity suppliers to publish specific information on the environmental impact of the fuel mix. However, this issue was included in a consultation paper by the Department of Enterprise Trade and Industry (DETINI).¹ In that paper DETINI stated that it considers that suppliers should be required to:

- provide information on the fuel mix via an electricity label with a specific content and design;

¹ REF: <http://www.detini.gov.uk/cgi-bin/downutildoc?id=866>

- distribute this to their customers,
- verify the accuracy of this information.

In order to address these issues, Article 11A (7)(a) of the Electricity Order, inserted by Regulation 6, provides for the requisite conditions to be imposed on supply licence holders. This will be supported by the appropriate licence modifications to ensure the detailed objectives in respect of this Article are achieved (see draft Condition 17 Part IV D (Labelling Requirements) of the NIE licence and draft Condition 25 of the second tier supply licence).

DETINI also states in its consultation paper that fuel mix information should be made available on demand to prospective customers and be included in promotional material. The decision as to whether the electricity label should be provided directly to customers on their bills or as a separate document with the bill will be at the discretion of the supplier. Suppliers may also determine whether information on the environmental impact of the fuel mix should be provided on the electricity label or via a reference to another source where this information can be obtained. Finally, DETINI considers that the accuracy and reliability of the information provided in the electricity label will be the responsibility of suppliers who are also required to provide reasoned comments on the accuracy of the labels.

2.3 Guarantees of Origin

Article 5 of Directive 2001/77/EC provides that Member States shall ensure that the origin of electricity produced from renewable energy sources can be guaranteed as such within the meaning of the Directive according to objective, transparent and non-discriminatory criteria laid down by each Member State. In addition, the Directive distinguishes between guarantees of origin (GoOs) and exchangeable green certificates and states that Member States are not required to recognise the purchase of GoOs from other Member States or the corresponding purchase of electricity as a contribution to the fulfilment of a national quota obligation.

In Northern Ireland Article 54 of the Energy (Northern Ireland) Order 2003 provides that an order under Article 52 may provide that the Authority may issue 'green certificates' from time to time in accordance with criteria as specified in that order. This is further provided for in paragraphs 14 to 21 of the Renewables Order (Northern Ireland) 2006.

The above Article has not been transposed into national legislation in Ireland. where renewable energy technologies are supported by bilateral contracts between qualifying electricity generators and a named retail electricity supplier. The necessary reassurance that the product purchased by the supplier was from renewable sources in these case is the metered output from each contracted station.

Fuel mix disclosure to final consumers does not require the use of Guarantees of origin. The RAs consider that the implementation option proposed in section 4.1.2 of this paper is the most appropriate methodology to meet fuel mix disclosure requirements in the SEM.

3 Current Practice

In Ireland, the transitional trading arrangements provide for bi-lateral, physical trading between participants. The CER has provided for the implementation of the disclosure requirement as per Article 3(6) and S.I. No. 60 as above in this market.² Here, the calculation of the fuel mix for each supplier is based on the principle that total metered generation equals total consumption for each defined fuel source for all energy seen by the Ex-Post Unconstrained Schedule (the EPUS). The mathematical formulation as set out in the Trading and Settlement Code determines the fuel mix ratios for all participants in the market and requires the solving of a system of linear equations for every settlement period in a year. This calculation is based on generation, bilateral trades, top up, spill, imports, exports and demand. The calculation of the fuel mix for suppliers is carried out by the Settlement System Administrator (the SSA) in Ireland at present. This ensures that one methodology is used to calculate the fuel mix for all suppliers. A methodology for the calculation of the associated environmental impacts as required under the Directive has also been developed. Under this methodology, the CO₂ emissions associated with the various fuel types are calculated based on information regarding the mass of each fuel combusted and energy produced from each energy source as provided by generators, and country specific net calorific values, fuel factors and oxidation factors provided by the Environmental Protection Agency. This methodology is similar to that used in Great Britain to determine the environmental impacts of these various fuels under fuel disclosure and is set out in Appendix 2 of the CER's decision paper on disclosure.³

The disclosure requirement shall be imposed on suppliers in Ireland through their supply licence and will be included in the upcoming review of Supply Licence conditions. The methodology for the calculation of the fuel mix information will be included in the Trading and Settlement Code and, therefore, is auditable as part of the annual market audit. Prior to the completion of the necessary modifications to the Supply Licence and the Trading and Settlement Code, suppliers are required to provide accurate information in accordance with any directions issued by the Commission regarding the provision of such information and/or the format of such information under Regulation 25 of S.I. No. 60 of 2005.

In Northern Ireland the implementation of the disclosure requirement has not been provided for to date. However, as set out in section 2.2 above DETINI has consulted on this issue and Article 11A (7)(a) of the Electricity Order, inserted by Regulation 6 provides for the requisite conditions to be imposed on supply licence holders.

² Please refer to CER/06/117 for the Commission's decision regarding the implementation of disclosure in the transitional market.

³ Disclosure of Information to Final Customers by Suppliers: Direction and Responses to Comments Received, CER/06/117, June 30th 2006

4 SEM Requirements

4.1 Disclosure of Fuel Mix

Under the SEM, suppliers will not have physical contracts for power with generators. All electricity generated by generating stations above the de minimis level of 10MW will be bought and sold through the pool.⁴ Participants may enter into financial contracts to hedge their position in the market. Therefore, the methodology in Ireland currently in place to provide for disclosure cannot be rolled out for the island post the introduction of the SEM and an alternative approach must be found.

The Regulatory Authorities require that a methodology be put in place that:

- takes account of the differing definitions of renewables that are in place in legislation north and south should this difference be maintained;⁵
- ensures compliance with governing legislation;
- facilitates ease of comparison by customers on the island of information provided by suppliers in accordance with the disclosure requirement;
- is implemented in a manner that minimises costs to market participants and final customers;
- is compatible with existing renewable support mechanisms in Ireland and Northern Ireland; and
- is compatible with the other functions and duties of the Regulatory Authorities.

It should be noted that the requirement to disclosure information regarding fuel mix and associated environmental impacts is separate and distinct from the compiling of statistics for the purpose of reporting on renewables targets by Member States. The implementation options set out below should be read with this in mind. In addition, note that the requirement pertains to disclosure of information ex post for the previous year. Therefore, calculation using the methodology decided upon following this consultation process will take place in 2009 for the calendar year 2008.

4.1.1 High Level Implementation Options

The Regulatory Authorities consider that there are three high level options for implementation of disclosure of fuel mix associated with energy supplied to final

⁴ Parties below the de minimis may opt to trade outside the pool and where this is preferred, physical contracts may be entered into. In addition, parties that avail of the intermediary option as provided for in the SEM Trading and Settlement Code, as approved by the Regulatory Authorities, may maintain existing physical contracts.

⁵ Electricity Regulation Act 1999 and Regulation 52 (7) of the Energy (Northern Ireland) Order 2003 refer. The issue of differing definitions is being examined under the SEM legal requirements workstream.

customers. These options, along with the associated advantages and disadvantages, are outlined below.

Option 1 – Average Pool Fuel Mix

Under this option, the fuel mix for the pool is calculated based on generator output for generation that is seen in the trading systems. If required, suppliers could request that energy traded outside of the pool as provided for in the SEM Trading and Settlement Code be added to their fuel mix. Points to be noted regarding this option are as follows:

- accurately reflects the SEM market design as, here, all suppliers will purchase physical energy from the pool⁶ and, therefore, all customers will purchase energy produced from the average pool fuel mix;
- straight forward as regards implementation as all that is required is the central calculation of the generation seen in the central systems (plus additions as above) for the calendar year in question;
- implementation costs and timelines should be minimal relative to other options given the above;
- does not facilitate suppliers who wish to market themselves as ‘green’ or ‘CHP’ as all suppliers would have a similar fuel mix;
- conflicts with the operation of a ROCs scheme insofar as all suppliers will be deemed to have purchased the pool percentage of renewable energy.

Option 2 – Financial Contracts

Under this option, financial contracts are accepted as a proxy for proof of purchase of energy produced from defined fuel sources. Here, evidence that a supplier has entered into a financial contract(s) is produced and the supplier’s fuel mix calculated on that basis. The residual, average pool fuel mix would still be calculated and would be attributed to unhedged purchases from the pool by suppliers. The average fuel mix of ESB Power Generations plant portfolio would be used for energy purchases associated with directed contracts. Under this option suppliers would be required to submit evidence regarding financial contracts that supports the use of certain fuel mixes for energy purchases associated with those contracts, to the satisfaction of the Regulatory Authorities. In this regard, suppliers must provide satisfactory evidence that the generator that is counterparty to the contract has generated at least the relevant volumes. Evidence regarding purchases outside of the pool as permitted under the SEM Trading and Settlement Code can be submitted by suppliers to the RAs for approval for addition to their fuel mixes. Points to be noted regarding this option are as follows:

- implementation requirements include the central calculation of the generation seen in the central systems (plus additions as above) for the calendar year in question as under option one for the average fuel mix plus computation of the individual suppliers remaining fuel mix based on evidence of financial contracts submitted;
- facilitates suppliers who wish to market themselves as green or CHP;
- does not necessarily reflect the physical flow of energy as accurately as Option 1 as, under the SEM, all suppliers will purchase physical energy from the pool and, therefore, all customers will purchase energy produced from the average pool fuel mix ;

⁶ Suppliers may also purchase physical energy outside of the pool as provided for under the SEM Trading and Settlement Code.

- can be viewed as most consistent with the transition of current bilateral contracts to contracts for difference as part of the SEM ;
- the treatment of financial contracts that are made available by parties other than generators (eg, financial institutions) in regard to disclosure merits further consideration ;

Option 3 – Certification of Fuel Types

Under this option certificates are issued for output generated from specified fuel types. This would extend to all relevant fuel types including non renewable sources such as gas and coal. Such certificates would have to be generated for all power traded in the pool. Purchases outside the pool as permitted under the SEM Trading and Settlement Code could be submitted by suppliers to the RAs for approval for addition to their fuel mix. Points to be noted regarding this option are as follows:

- does not necessarily reflect the physical flow of energy as accurately as Option 1 as, under the SEM, all suppliers will purchase physical energy from the pool and, therefore, all customers will purchase energy produced from the average pool fuel mix;
- requires a system for the generation of certificates for *all* fuel types;
- requires a system for the issue, tracking and redemption of certificates to ensure the accuracy of the calculation of the fuel mixes for suppliers. This will result in costs which will ultimately be recovered from final customers. The fact that Ofgem currently issues GoOs for Northern Irish renewable generation may serve to increase the costs of certification;
- requires legislation to support implementation.

4.1.2 Recommended Approach

The Regulatory Authorities have considered the above options in light of their objectives as set out in section 4.1 and the existing legal framework. The Regulatory Authorities consider that Option 2 (Financial Contracts) is the most appropriate one to meet requirements. Whilst Option 1 is the least burdensome from an administrative and cost point of view,, it does not facilitate suppliers in differentiating their offerings to customers on the basis of fuel type of energy supplied. It may be argued that this option is not consistent with the spirit of the Directive in this regard. The third option, which relies on certification of fuel types, requires the establishment of an administrative process to issue, track and redeem certificates. The costs associated with this may be increased due to the fact that Ofgem is currently the issuing body for GoOs for Northern Irish renewable generation. In addition, there is no legal provision for certification in Ireland. Option 2 serves to facilitate suppliers who wish to differentiate their offerings to customers on the basis of fuel types, in a manner that minimises costs and is consistent with the existing legal framework. It may also be viewed as the implementation option that is most consistent with the transition of current bilateral contracts to contracts for difference as part of the SEM. Given the above, the Regulatory Authorities recommend that Option 2 is implemented to support disclosure of fuel mix by suppliers to final customers in the SEM.

4.2 Disclosure of Environmental Impact Information

Article 3(6) of EU Directive 2003/54/EC as set out in section 2.1 above requires Member States to ensure that electricity suppliers specify in or on bills and in promotional materials made available to final customers certain information regarding the environmental impact resulting from the overall fuel mix of the supplier in the preceding year or reference to existing sources where that information is available. The Directive notes emissions of CO₂ and radioactive wastes in particular in this regard.

4.2.1 Recommended Approach

The Regulatory Authorities propose to adopt a similar approach to the disclosure of environmental impact information as that used in Ireland.⁷ This is in turn based on the approach adopted in Great Britain.⁸ Under the proposed methodology standardised emissions factors will be adopted which are provided to suppliers. These factors are calculated based on total emissions per fuel type for the year in question divided by the total associated output. Suppliers then multiply their fuel disclosure percentage per fuel type by the associated factor to give the required information, i.e. CO₂ emissions in g/kWh, by fuel type. The sum of this across all fuel types is required. The methodology adopted in Ireland is set out in Appendix A. A worked example of how this is done in Great Britain is provided in Appendix B for review.

The Regulatory Authorities note that the information provided pertains to direct emissions associated with the various fuel types and, therefore, does not capture indirect emissions associated with the fuel mix supplied to final customers.

5 Request for Comment

Comments are invited from interested parties on the proposals set out in this paper, specifically the options discussed and the Regulatory Authorities preferred

⁷ Ref: Disclosure of Information to Final Customers by Suppliers: Direction and Responses to Comments Received, CER/06/117, June 30th 2006, Appendix 2 <http://www.cer.ie/en/renewables-decision-documents.aspx?article=0b434865-35a0-451f-a3a7-81bf6bd95263>

⁸Ref: Fuel Mix Disclosure by Electricity Suppliers in Great Britain: Guidelines, December 2005

http://www.ofgem.gov.uk/temp/ofgem/cache/cmsattach/13216_282_05.pdf?wtfrom=/ofgem/w-hats-new/archive.jsp

options for the implementation of the disclosure of fuel mixes and associated environmental impacts. Comments on this paper should be submitted by close of business (5 pm) on **2nd of April 2007** to acrowe@cer.ie and tadhg.obriain@ofregni.gov.uk

Appendix A

Methodology for the Determination of Environmental Impact Data for Disclosure Purposes

Extract from Disclosure of Information to Final Customers by Suppliers : Direction and Responses to Comments Received CER/06/117, 30th June 2006, Appendix 2

Determination of Environmental Impact Data for Disclosure Purposes

In order to determine the environmental impact data associated with each energy source the following data with respect to the 2005 and 2006 calendar year for Ireland will be used:

- the total mass of each fuel combusted in the production of electricity;
- the total energy (in volume terms) produced from each energy source in question.

The total mass as above is then multiplied by the appropriate net calorific value (TJ/kt) as provided by the EPA. With regard to the net calorific value of Natural Gas, this is based on information obtained from Bord Gáis Éireann acting as the Network Operator, as approved by the Commission (please refer to the subsequent paragraph). The resulting figure is multiplied by the appropriate fuel factor (tCO₂/TJ) as modified by the associated oxidation factor. The net calorific values, fuel factors and oxidation factors are those provided by the EPA, refer to Table 1.

Please note that Table 1 states that the net calorific value for Natural Gas is “Not required” and stipulates to use those values stated on “BGE Bills”. In this regard the Commission has decided, for the purpose of determining the required environmental impact information, that an average net calorific value for Natural Gas based on the combined mean daily average net calorific value associated with the entry points onto the Irish Transmission System, i.e. the Moffat and Inch Entry Points, weighted with respect to the volumetric flow of Natural Gas through these entry points will be used (refer to Table 2). For coal, site specific values will be used for the net calorific value and the fuel factor as provided by the EPA, refer to Table 2.

With regard to said energy production data such data will be with respect to the interface with the transmission system. All energy production data will be adjusted by an average weighted transmission loss factor (subject to the approval of the Commission). The resultant CO₂ emission factors (g/kWh) are to be determined by dividing the CO₂ emissions (in mass terms) associated with the production of electricity from each aforementioned energy sources by the respective loss factor adjusted energy data. These resultant CO₂ emission factors will be provided to suppliers by the SSA. Suppliers will multiply these CO₂ emission factors by their associated fuel mix disclosure percentages per fuel type as provided by the SSA. Suppliers shall summate the above values and include this value in the row entitled CO₂ emissions under the Environmental Impact section of the Disclosure Label to be placed on bills as well as any such information placed on promotional materials inline with the requirements as outlined in this Direction.

Table 1: Country Specific Net Calorific Values and CO₂ Emission Factors for use in the Annual Installation Emissions Report (2005)

(Source: <http://www.epa.ie/Licensing/EmissionsTrading/HowtoApply/FileUpload,3426,en.pdf>)

Version 1- 26 October 2005

Country Specific Net Calorific Values and CO₂ Emission Factors for use in the Annual Installation Emissions Report

Subject to revision, the following factors may be used for calculating CO₂ emissions for 2005 only. They are based on Ireland's Specific Emission Factors used in the 2003 National Inventory reported to UNFCCC, unless otherwise stated. Please note that this table may be updated at anytime as new information becomes available. The fuel factor does not include an oxidation factor; this must be applied separately (except for cement kilns where combustion is assumed to be practically 100%). The operator must ensure that the most recent version of this table is used when calculating CO₂ emissions for submission in the verified Annual Installation Emissions Report.

Fuel Factors

Fuel	t CO ₂ /TJ
Coal	Site specific
Kerosene	71.76
HFO/RFO	76.38
LPG	64.13*
Diesel / Gas Oil	73.67
Natural Gas	57.26**
Pet Coke	100.8***
Crude Oil	Site specific

*Source: Flogas Ireland Ltd. analysis data for commercial propane (LPG).

**Source: Average for 2000-2003 only, from EPA weighted average of BGE analysis of Interconnector and Kinsale gas.

*** IPCC 1996.

Net Calorific Values

Fuel	NCV (TJ/kt)
Coal	Site specific
Kerosene	44.20
HFO/RFO	41.24
LPG	46.68*
Diesel / Gas Oil	43.31
Natural Gas	Not required, use bills**
Pet Coke	31.00***
Crude Oil	Site specific

*Source: Flogas Ireland Ltd. analysis data for commercial propane (LPG).

**Note BGE Gas bills show kWh based on Gross Calorific Value - convert to Net Calorific Value by multiplying by 0.903 and then convert to TJ by multiplying by 3.6 x 10⁻⁶

*** Source IPCC 1996.

Tier 1 Oxidation Factors to be applied for all combustion (except cement kilns)

Fuel	Oxidation factor
Coal	0.99
Kerosene	0.995
HFO/RFO	0.995
LPG	0.995
Diesel / Gas Oil	0.995
Natural Gas	0.995
Pet Coke	0.99
Crude Oil	0.995

(From Annex II of the Monitoring and Reporting Guidelines, Commission Decision 2004/156/EC)

Table 2: Net Calorific Values (NCV) for Natural Gas and Coal.

Site Specific Values	
Fuel	NCV
Natural Gas	0.000039 (TJ/m ³) ⁹
Coal	25.5 (TJ/ktonne) ¹⁰

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The average net calorific value for Natural Gas was based on the combined mean daily average net calorific value associated with the entry points onto the Irish Transmission System, i.e. the Moffat and Inch Entry Points, weighted with respect to the volumetric flow of Natural Gas through these entry points. The data utilised for the above calculation was provided by Bord Gáis Éireann acting as the Network operator.

¹⁰ Value obtained from the Annual Installation Emissions Report submitted to the EPA with regard to the Moneypoint generating Station. Please note that the Moneypoint generating station is the only generating station utilising Coal as a primary energy input.

Appendix B

Environmental Impact Calculation – Worked Example
Extract from Fuel Mix Disclosure by Suppliers in Great Britain' Draft Guidelines
OFGEM , June 2005, (146/05) Ref:
http://www.ofgem.gov.uk/temp/ofgem/cache/cmsattach/11669_14605.pdf

Appendix 2 Sample fuel mix disclosure data table

A2.1 This set of data tables is to be provided on an annual basis by the DTI for use in the calculation of fuel mix and environmental information. The actual figures will be calculated each year from official sources. The numbers shown in this table are for illustrative purposes only and are not based on official figures. They are, however, used in the calculation of the worked example in Appendix 5.

Sample Fuel Mix Disclosure Data Table

1. Residual fuel mix for apportioning electricity for which the licensee does not hold evidence as set out in paragraph 9.

Fuel	Percentage
Coal	33
Natural gas	37
Nuclear	25
Renewable	2
Other	3

2. Grams per kWh of carbon dioxide emitted in the production of electricity of each fuel to be used in the calculation of average carbon dioxide emissions as set out in paragraph 10 (a).

Fuel	g/kWh
Coal	1,000
Natural gas	380
Nuclear	0
Renewable	0
Other	750

3. Grams per kWh of radioactive waste, being fuel burnt in the reactor to be subsequently discharged as spent fuel, to be used in the calculation of average generation of radioactive waste as set out in paragraph 10 (a).

Fuel	g/kWh
Nuclear	0.012

4. GB average fuel mix (for comparison)

Fuel	Percentage
Coal	33
Natural gas	37
Nuclear	25
Renewable	2
Other	3

5. Losses factor: 1.09
(not to be applied to all supply from embedded generation)

Appendix 5 Worked example

A5.1 To illustrate how the figures in a supplier's fuel mix table are derived a worked example is provided in this appendix. Step 1 shows a fictional supplier's data for a disclosure period. Step 2 shows how the residual fuel source data is combined with the evidenced fuel source data to reach the percentage of each energy source in the total supplied by the licensee in the disclosure period. Step 3 shows how the carbon dioxide emissions are calculated and step 4 shows a completed fuel mix disclosure table.

Step 1

Amount supplied

Total supplied as determined under renewables obligation orders: = 1000 MWh
of which embedded generation: = 100 MWh
Losses factor: = 1.09
Total purchased for supply = $(900 \times 1.09) + 100$ = 1081 MWh

Evidence held on 1 July

REGOs:		50	MWh
Generator declarations	Coal:	300	MWh
	Gas:	350	MWh
	Nuclear:	160	MWh
	Renewable:	10	MWh
	Other:	40	MWh

Residual

Residual $[1081 - (50 + 300 + 350 + 160 + 10 + 40)] = 171$ MWh

Step 2

In the table below the first column shows the fuel, the second column shows the amount of electricity supplied that has been evidenced through REGOs and generator declarations. The third column shows the residual amount of electricity (171 MWh) which is apportioned according to the percentages in the fuel mix disclosure data table published by DTI. For example, to calculate the residual amount for coal multiply 0.33 by 171 which equals 56.4. This is repeated for each fuel type. Column 4 is the sum of columns 2 and 3. Column 5 gives the percentages for column 4.

Fuel	MWh with evidence	Residual	Total	Percentage
Coal	300	56.4	356.4	33
Gas	350	63.3	413.3	38
Nuclear	160	42.8	202.8	19
Renewables	60	3.4	63.4	6
Other	40	5.1	45.1	4
Total	910	171	1081	100