SEM Committee Paper

All-Island Fuel Mix Disclosure and CO2 Emissions 2015

Information Paper

SEM-16-055

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Contents

'The SEM Committee is established in Ireland and Northern Ireland by virtue of section 8A of the Electricity Regulation Act 1999 and Article 6 (1) of the Electricity (Single Wholesale Market) (Northern Ireland) Order 2007 respectively. The SEM Committee is a Committee of both CER and NIAUR (together the Regulatory Authorities) that, on behalf of the Regulatory Authorities, takes any decision as to the exercise of a relevant function of CER or NIAUR in relation to an SEM matter.'

1. INTRODUCTION

1.1 The purpose of this paper is to set out the updated fuel mix and CO2 emissions figures for suppliers operating in the SEM. The fuel mix and CO2 emissions data is taken from data provided to the CER by SEMO. The disclosures are based on the 2015 calendar year data and must be published on bills no later than two months from the publication of this paper.

1.2 It is the role of the Single Electricity Market Operator (the SEMO) to administer and calculate the fuel mix figures from the information provided by the electricity suppliers. Due to the nature of the certificate based methodology it is important to note that there is no connection between the SEMO calculation for the purposes of the fuel mix disclosure and Ireland's national renewable energy targets under the 2009 Renewable Energy Directive.

1.3 The fuel mix of suppliers and associated environmental impact information (emissions) is calculated for the period from January to December by the SEMO in accordance with the SEM Committee's decisions. This calculation is completed at the end of the second quarter of each year.

1.4 The publication of fuel mix of suppliers and the provision of information regarding the environmental impact of electricity produced from that fuel mix is required by Article 3(9) of Directive 2009/72/EC. The methodology used to calculate the fuel mix disclosure figures for 2008, 2009 and 2010 can be found in the SEM Committee[1] Decision Paper *Interim Arrangements: Fuel Mix Disclosure in the SEM* (SEM-09-081).

[1] The SEM Committee is a Committee of the CER, the UR and an independent member which, on behalf of the Regulatory Authorities, takes decisions on SEM matters.

1.5 This methodology was superseded in 2011 and replaced by SEM Committee Decision Paper *Fuel Mix Disclosure in the Single Electricity Market: Calculation Methodology Decision Paper (*SEM-11-095).

1.6 At a high level, and in accordance with SEM-11-095, the fuel mix figure for a supplier consists of non-renewable generation attributes, Guarantees of Origin and renewable generation attributes assigned to a supplier that are not included in the Guarantees of Origin scheme and the Residual Mix or EU Residual Mix.

1.7 The purpose of the Fuel Mix Disclosure is to provide consumers with information to allow them to understand the environmental impact of the electricity that they buy and choose between suppliers based on their fuel mix and emissions information. The fuel mix of each supplier outlined in this report does not necessarily represent metered generation for the same calendar period, as suppliers may claim the attributes of electricity generated outside of the Single Electricity Market, along with Guarantees of Origin (GOs), which can be imported from other countries and do not need to follow the flow of electricity.

1.8 Guarantees of Origin are electronic certificates issued for energy generated from renewable sources and are issued to renewable generators that are not in support schemes per MWh of generation. These are tradeable instruments and do not need to follow the flow of energy. Guarantees of Origin Certificates are traded at a European level. The Association of Issuing Bodies (AIB) operates a hub where such certificates can be traded between countries. This allows suppliers to purchase the renewable benefit of certain generators across Europe and include it in their total fuel mix. Guarantees of Origin are both imported and exported between Ireland and the rest of Europe.

1.9 Renewable generators that are signed up to the Guarantees of Origin scheme are issued GOs per MWh of generation which can then be transferred to suppliers to use in their fuel

mix disclosure. Each year, suppliers submit a fuel mix declaration form to the Single Electricity Market Operator (SEMO), which performs the fuel mix calculation on behalf of the Regulatory Authorities.

1.10 Attention is drawn to the following when considering the fuel mix and emissions set out in this document.

- Firstly, the Guarantees of Origin scheme permits transfer of Guarantees of Origin between EU Member States which, depending on the quantity of Guarantees of Origin imported or exported from Ireland in a given period, has the potential to vary significantly from the actual renewable generation produced within the jurisdiction[2]. The sole function of the GO is to prove that a given share of quantity of energy was produced from renewable source. Only one GO will be issued per MWh of electricity generated and this one GO can only be used once for the purposes of the fuel mix disclosure. Therefore there is no double counting of the same unit of electricity in the fuel mix disclosure.

- Secondly in the event that there is a deficit of generation attributes to meet overall all-Island demand, the European Residual will be used to meet the deficit. This to a lesser extent has the ability to lead to a fuel mix that differs from actual metered generation. Therefore for these reasons the fuel mix disclosure figures may not necessarily be representative of the actual metered generation output on an all-island basis for a given disclosure period.

[2] There were 9,582,554 imported Guarantees of Origin declared by suppliers for disclosure in the 2015 fuel mix. One Guarantee of Origin represents 1MWh of electricity produced from a renewable source. The 9,582,554 imported contributed to approximately 54.66% % of the overall renewable figure of 17,532,513.11 MWh.

1.11 The disclosures in this paper are based on the 2015 calendar year data and must be published on bills no later than two months from the publication of this paper.

1.12 The fuel mix information should be presented on bills in accordance with SEM/11/095. A template for this purpose is reproduced in the Appendix of this paper. In particular the Regulatory Authorities would like to remind suppliers of the following:

- Where fuel mix information is on the back of bills reference must be made to it on the front of the bill.
- While radioactive waste information is required by the Directive, this figure is 0.000 t/MWh for all suppliers in 2015 and therefore need not be included with the 2015 fuel mix disclosure information on bills.
- To ensure consistency across suppliers, percentages should be rounded to one decimal place.
- CO_2 information should be given in the units tonnes of CO_2 per MWh (t/MWh).
- Where separate products associated with a particular fuel mix are offered to certain customers, all the supplier's customers should receive information, on request, regarding the fuel mix associated with their electricity (not simply the supplier's average fuel mix) in accordance with SEM/11/095.
- The 2015 fuel mix information must be on all bills within two months of the publication of this paper.

2. All-Island Fuel Mix 2015

2.1 This section sets out the fuel mix for the all island market as a whole. The SEM Committee decision paper SEM-11-095 outlines the calculation methodology which has been used to calculate the fuel mix and CO2 emissions for 2015.

2.2 Figure 1 sets out the all-island fuel mix for 2015, which shows the following:

- Renewables made the largest contribution to the all-island's electricity supply at 41.06% (up from 34.46% in 2014).
- Gas decreased to 36.36% (down from 41.66% in 2014).
- Coal increased to 16.02% (up from 15.71% in 2014).
- The "other" category at 0.7% includes Oil and the Non-Biodegradable Fraction of Waste (NDBFW).

2.3 Relative to 2012, renewables contributed more to the fuel mix in 2013, 2014 and 2015. There are a number of contributing factors to this increased figure.

- Firstly, and primarily, there was a significant amount of GO certificates imported from Europe and the UK by suppliers for use in their fuel mix figures. The number of GOs imported increased from circa 5M in 2014 to 9.6M in 2015[3].

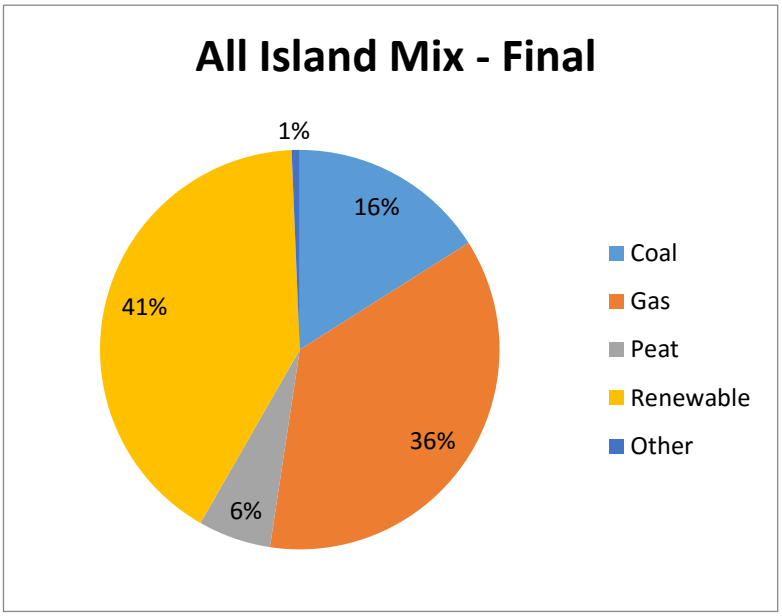
[3]SEMO source data

- Secondly, there was an increase in installed capacity of wind. An EirGrid report[4] shows that the installed capacity had increased over the years: 2,990 MW in 2015, 2,787 MW in 2014 and 2,451 MW in 2013.
- Over the years the wind capacity factor has also increased: it was 32.3% in 2015, 28.5% in 2014 and 30.6% in 2013.

2.4 In accordance with SEM-11-095, the "other" category consists of all fuels, in a given year that represent less than 1% of the final overall generation. Since Oil has decreased to 0.5% in 2015, it now contributes to the 'other' figure (with Non-Biodegradable waste).

2.5 The below Figure shows the all island fuel mix 2015.

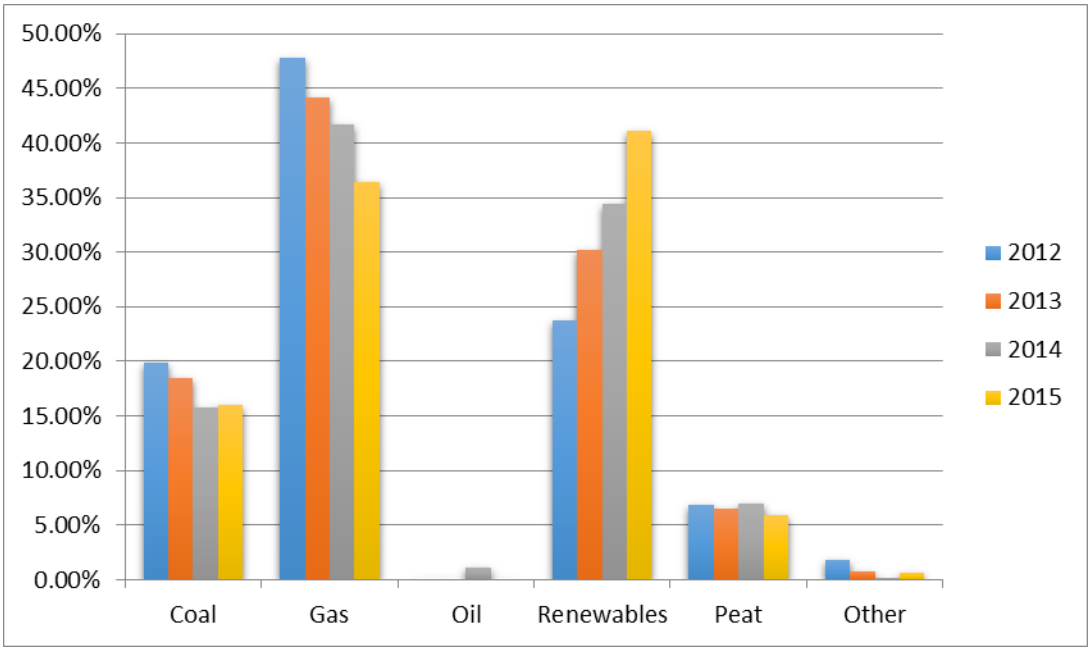
Figure 1 All Island Fuel Mix



[4] http://www.eirgridgroup.com/site-files/library/EirGrid/Annual-Renewable-Constraint-and-Curtailment-Report-2015-v1.0.pdf

2.6 The below Figure compares the all island fuel mix for the years 2012 to 2015.

Figure 2 Fuel Mix Comparison 2012 – 2015



2.7 The below table presents the all island fuel mix for each year from 2008 to 2015.

Table 1 All-Island Fuel Mix 2008-2015

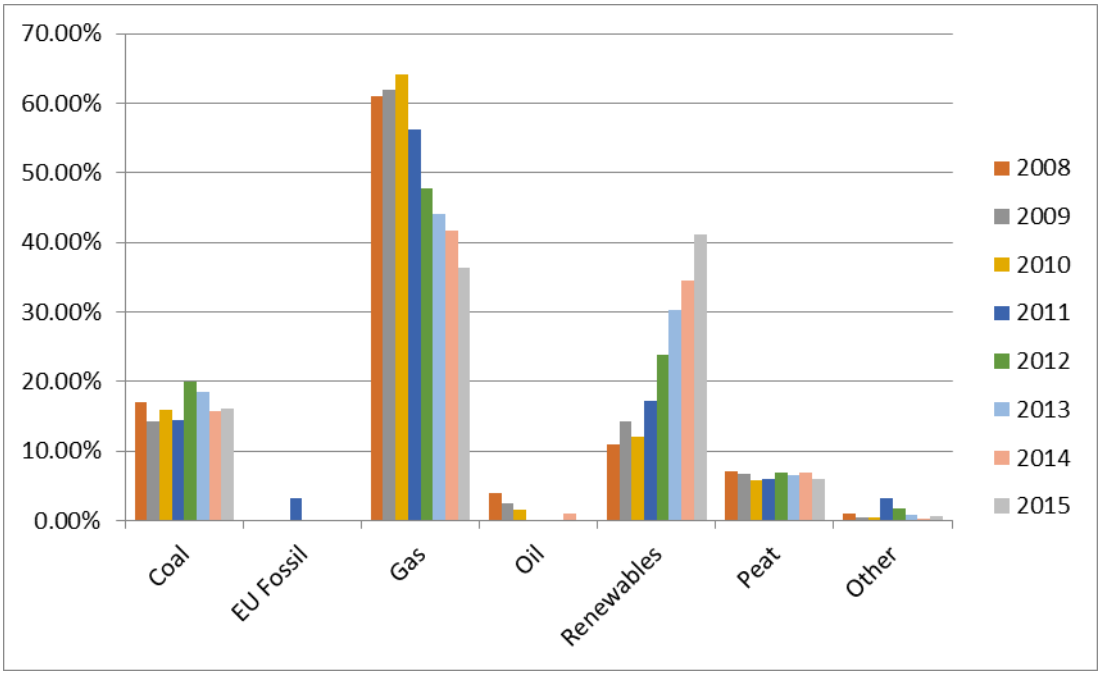
Fuel-Mix 2005-2015											
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Coal	24.00%	19.00%	18.00%	17.00%	14.24%	15.98%	14.44%	19.89%	18.42%	15.71%	16.02%
EU Fossil	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.12%	0.00%	0.00%	0.00%	0.00%
Gas	46.00%	50.00%	55.00%	61.00%	61.85%	64.06%	56.16%	47.74%	44.09%	41.66%	36.36%
Oil	12.00%	9.00%	6.00%	4.00%	2.53%	1.59%	0.00%	0.00%	0.00%	1.06%	0.00%
Renewables	9.00%	11.00%	11.00%	11.00%	14.23%	12.11%	17.21%	23.74%	30.24%	34.46%	41.06%
Peat	8.00%	7.00%	6.00%	7.00%	6.70%	5.78%	5.88%	6.86%	6.49%	6.95%	5.90%
Other	1.00%	4.00%	4.00%	1.00%	0.45%	0.48%	3.18%	1.77%	0.75%	0.17%	0.65%

Note:

- Figures from 2007 relate to Ireland only and calculations are based on pre-SEM methodology,
- Figures for 2008, 2009 and 2010 relate to Ireland and Northern Ireland and are based on the Interim Arrangements methodology referenced in this paper.
- Figures for 2011 onwards relate to Ireland and Northern Ireland and are based on the SEM Committee Decision Paper Fuel Mix Disclosure in the Single Electricity Market: Calculation Methodology Decision Paper (SEM-11-095) referenced in this paper.
- The “Other” category consists of all fuels which represent less than 1% of the final overall generation in the calculation. For 2015 this consists of Oil and the Non-Biodegradable Fraction of Waste (NBDFW).

2.8 The below Figure presents the data from Table 1 in graphical form and shows the all island fuel mix for each year from 2008 to 2015.

Figure 3 Fuel Mix Comparison 2008 - 2015



3. CO2 EMISSIONS

3.1 The average carbon dioxide emissions per MWh of electricity changed from 0.370 t/MWh in 2014 to 0.393 t/MWh in 2015 for the island [Table 2]. The slight increase in the % of coal in the fuel mix year on year from 15.71% in 2014 to 16.02% in 2015, has contributed to this increase.

3.2 To calculate this, emissions figures are supplied by the Environmental Protection Agency (EPA) and Department of Agriculture, Environment and Rural Affairs (DAERA) annually to the SEMO for each conventional generator in the SEM.

3.3 These emission figures are totalled according to fuel type and divided by the metered generation to give specific emission factors of a given fuel. All emissions factors are then grouped together and each fuel's emissions factor is multiplied by the corresponding percentage in the All Island Mix. The resulting values are then summed to give a Final All Island emissions factor. This process is repeated for each Supplier, using their individual mix, to arrive at their individual Supplier emissions factor.

Table 2 Average CO_2 Emissions (t/MWh)

2008	0.533
2009	0.504
2010	0.519
2011	0.466
2012	0.481
2013	0.452
2014	0.370
2015	0.393

4. SUPPLIERS' FUEL MIX AND CO_2 EMISSIONS 2014

4.1 Following the presentation in section 2 of the fuel mix and section 3 on the CO2 emissions data on an All Island basis, this section sets out the fuel mix and CO2 emissions for each supplier.

4.2 The fuel mix calculation for suppliers is carried out on an individual licence basis. When calculating the fuel mix, where a supplier operates as a single company but holds separate licences (such as a supplier that operates in both jurisdictions) those licences that have excess generation attributes are distributed among the licences with excess demand within the single company prior to using the Residual Mix.

4.3 The below table shows the individual fuel mixes of each supplier and provides the All island fuel mix for reference.

Table 3 Suppliers' Fuel Mix by Fuel Type in 2015

Supplier Fuel Mix by type 2015					
Supplier	**Coal**	**Gas**	**Peat**	**Renewable**	**Other**
All-Island	16.0	36.4	5.9	41.1	0.7
Airtricity (Ireland)	0.0	0.0	0.0	100.0	0.0
Airtricity (Northern Ireland)	0.0	63.7	0.0	36.3	0.0
Airtricity (All-Island)	0.0	17.5	0.0	82.5	0.0
Bord Gais (Ireland)	5.1	72.4	1.9	20.4	0.2
Bord Gais (Northern Ireland)	40.7	25.0	15.0	17.7	1.6
Bord Gais (All-Island)	5.4	72.0	2.0	20.4	0.2
Electric Ireland (Ireland)	17.9	50.4	6.6	24.4	0.7
Electric Ireland (Northern Ireland)	0.0	73.4	0.0	26.6	0.0
Electric Ireland(All-Island)	16.5	52.2	6.1	24.6	0.7
Energia (Ireland)	0.0	0.0	0.0	100.0	0.0
Energia (Northern Ireland)	0.0	96.8	0.0	3.2	0.0
Energia (All-Island)	0.0	16.1	0.0	83.9	0.0
Vayu (Ireland)	0.0	0.0	0.0	100.0	0.0
Vayu (Northern Ireland)	0.0	0.0	0.0	100.0	0.0
Vayu (All-Island)	0.0	0.0	0.0	100.0	0.0
Panda Power (Ireland)	0.0	0.0	0.0	100.0	0.0
Power NI (Northern Ireland)	20.5	56.7	7.5	14.5	0.8
LCC Power Limited t/a Go Power (Ireland)	0.0	0.0	0.0	100.0	0.0
LCC Power Limited t/a Go Power (Northern Ireland)	39.7	24.4	14.6	19.7	1.6
LCC Power Limited t/a Go Power (All-Island)	34.6	21.3	12.7	30.0	1.4

Note: The fuel mix calculation is carried out on an individual licence basis. When calculating the fuel mix, where a supplier operates as a single company but holds separate licences (such as a supplier that operates in both jurisdictions) those licences that have excess generation attributes are distributed among the licences with excess demand within the single company prior to using the Residual Mix. Where a supplier does not submit a fuel mix disclosure declaration the residual mix is assigned (set out in Appendix 2).

4.4 Table 4 shows the carbon dioxide emissions per MWh of electricity per supplier.

Table 4 Suppliers' CO2 Emissions for 2015

Supplier	tCO2/MWh
All-island	0.393
Airtricity (Ireland)	0.000
Airtricity (All-Island)	0.085
Bord Gais (Ireland)	0.421
Bord Gais (All-Island)	0.423
Electric Ireland (Ireland)	0.486
Electric Ireland (All-Island)	0.476
Energia (Ireland)	0.000
Energia (All-Island)	0.078
Vayu (Ireland)	0.000
Vayu (All-Island)	0.000
Panda Power (Ireland)	0.000
LCC Power Limited t/a Go Power (Ireland)	0.000
LCC Power Limited t/a Go Power (All-Island)	0.571

APPENDIX 1 BILL PRESENATION OF INFORMATION

Default Presentation of Information[5].

Supplier Z Disclosure Label **Applicable Period: January 2015 to December 2015**		
Electricity supplied has been sourced from the following fuels:	**% of total**	
	Electricity Supplied by Supplier Z	**Average for All Island Market (for comparison)**
Coal	X %	X %
Natural Gas	X %	X %
Nuclear	X %	X %
Renewable	X %	X %
Peat	X %	X %
Oil	X %	X %
EU Fossil	X %	X %
Other	X %	X %
Total	100 %	100 %
Environmental Impact		
CO_2 Emissions	X t/MWh	X t/MWh
For more information on the environmental impact of your electricity supply visit www.SupplierZ.ie or call 00XXX X XXX XXXX		

[5] Please refer to SEM-11-095 for further detail on presentation requirements. Note that the fuel categories used each year can vary.

APPENDIX 2 ALL ISLAND RESIDUAL FUEL MIX

The All-Island Residual Fuel Mix is as follows:

Fuel	Percentage
Coal	40.7%
Gas	25.0%
Peat	15.0%
Renewable	17.7%
Other	1.7%

This does not include a PSO adjustment value.