



An Coimisiún
um Rialáil Fóntas
**Commission for
Regulation of Utilities**

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Commission for Regulation of Utilities

Fuel Mix Disclosure and CO₂ Emissions 2021

Information Paper

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CRU Strategic Plan 2022 – 2024

The core elements of the CRU’s strategic plan 2022-24 are set out in the Table below.

<p>Our Mission</p> <p>Protecting the public interest in water, energy, and energy safety.</p>	<p>Our Strategic Priorities</p> <ul style="list-style-type: none">▪ Ensure Security of Supply▪ Drive a Low Carbon Future▪ Empower and Protect Customers▪ Enable our People and Organisational Capacity
<p>Our Vision</p> <p>Safe, secure, and sustainable supplies of energy and water, for the benefit of customer now and in the future.</p>	

Executive Summary

This information paper from the CRU sets out the 2021 fuel mix disclosure for electricity suppliers licensed in Ireland and operating in the All-Island Single Electricity Market (SEM). In addition, the average All-Island fuel mix for 2021 and on a year-on-year basis for the whole island of Ireland (including both jurisdictions – Northern Ireland (NI) and Republic of Ireland (ROI)) is presented.

Fuel mix disclosure presents reliable information regarding the sources of electricity, i.e., the fuel mix that suppliers have decided to meet their customers' demand and the related environmental impact. It does this by disclosing the fuel mix as the percentage of a supplier's demand that is met by various electricity sources and the associated carbon dioxide (CO₂) emissions intensity (gCO₂/kWh). Suppliers must present this data on their customer bills and in promotional material in the format detailed in Appendix 1.

The fuel mix and CO₂ emissions disclosures for 2021 allow electricity consumers to understand the recent environmental impact of the electricity that they buy and choose between suppliers on this basis, and to show how the individual supplier's fuel mix compares with the All-Island average.

Where a supplier tariff refers to 100% green electricity, this relates to contractual support for renewables; in other words, over the year, for every unit of electricity supplied, that supplier has given contractual support for a corresponding unit of electricity. It is worth noting that in any given moment that electricity supplied may or may not come from renewable sources (e.g., low wind and no solar at night), nevertheless as above the 100% green electricity is supported over the year.

It should be noted that the fuel mix of each supplier (outlined in this information paper) does not necessarily represent metered electricity generation in the All-Island SEM. Electricity suppliers licensed in Ireland and operating in the All-Island SEM are permitted to claim the attributes of renewable electricity through electronic certificates known as Guarantees of Origin (GOs). GOs can be both imported into the SEM or exported from the SEM to other European Economic Area (EEA) Member States, as they do not need to follow the physical flow of electricity. As such, suppliers of electricity in Ireland can purchase the renewable benefit of certain generators across Europe and include it in their total fuel mix. The net outcome is that a significant volume of GOs were imported into the SEM in 2021. In total, on an all-island basis, 17,350,039 GOs

were imported into Ireland in 2021, a 6% increase from the previous year.¹ **This means that the fuel mix presented on a bill by a supply company generally displays a higher percentage share of electricity derived from renewable sources than would otherwise be displayed if it was solely on the basis of the actual generated-in-Ireland renewable share of the supplied electricity. The CRU notes that the existence of GOs, and their application across the European Union (EU), is a long-established system, which has supported the addition of renewable generation across the EU. However, the CRU recognises that this approach is a slightly difficult process for electricity consumers in Ireland to understand. As such, the CRU will be proposing some changes to the approach for the 2022 fuel mix disclosure in order to provide greater transparency regarding GOs for Irish electricity consumers.**

The fuel mix and CO₂ figures, as published in this paper, are for a supplier's total customer base rather than on an individual customer basis. As such, they represent a supplier's average fuel mix and not that of a specific product that the supplier is selling. There is a responsibility (see Section 5 for details) on suppliers to explain the fuel mix of its individual products to customers as well as providing clear marketing information. For those suppliers operating in Ireland who offer specific "green products", but whose overall average fuel mix, to include all offered electricity products, is not 100% renewable, the CRU has a verification process² to ensure the accuracy of the green claims. The results for 2021 of this process are published in a separate ["Green Source Product Verification Report" \(CER/15/205\)](#).

The publication of the 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](#). It is the role of Single Electricity Market Operator (SEMO) to administer and calculate the fuel mix figures from the information provided by suppliers. The supplier fuel mix and associated environmental impact information (emissions intensity) is calculated by SEMO in accordance with the SEM Committee's methodology, found in "*Fuel Mix Disclosure in the Single Electricity Market: Calculation Methodology Decision Paper*" ([SEM/11/095](#)). Suppliers must make a submission to SEMO in order to have their own bespoke fuel mix calculated. If they choose not to make a declaration, they will be allocated³

¹ 1,132,539 of these were imported for cancellation for NI Supply companies. In total, NI supply companies cancelled 1,134,135 EU GOs for FMD 2021.

² Regulation of Green Source Products in the Electricity Retail Market: [CER/15/205](#)

³ In Ireland suppliers are allocated the residual mix less any PSO adjustment that they are entitled to.

to the residual fuel mix. The residual fuel mix is the fuel mix which is left over from the All-Island fuel mix after individual supplier's fuel mixes have been calculated.

Public Impact Statement

The fuel mix disclosure shows Irish electricity consumers the fuels which were used in the generation of the electricity they purchase from their suppliers. The main fuels or sources of energy used in the generation of electricity in Ireland are the following:

- Coal;
- Gas;
- Oil;
- Renewables;
- Biomass; and
- Peat.

This fuel mix disclosure by supply companies enables electricity consumers to distinguish between suppliers based on the fuel source of their electricity and the associated carbon dioxide (CO₂) emissions, and to compare it with the All-Island average.

Where a supplier tariff refers to 100% green electricity, this relates to contractual support for renewables; in other words, over the year, for every unit of electricity supplied, that supplier has given contractual support for a corresponding unit of electricity. It is worth noting that in any given moment that electricity supplied may or may not come from renewable sources (e.g., low wind and no solar at night), nevertheless as above the 100% green electricity is supported over the year.

The renewable generation supported by the supplier can be from anywhere in the European Economic Area (EEA) Member States and not just in Ireland.⁴

A supplier whose average overall fuel mix is not 100% renewable can still offer Green Source electricity products to its consumers. In these cases, the CRU's Green Source Product Verification (GSPV) process⁵ helps to ensure that such supply companies source enough electricity from renewables to meet the entire demand which corresponds to these Green Source products. The relevant paper is published alongside the Fuel Mix Disclosure [here](#).

⁴ The European Economic Area (EEA) is made up of the Member States in the EU and additionally Norway, Lichtenstein, and Iceland.

⁵ The CRU's Decision paper, [CER/15/205](#), on the "Regulation of Green Source Products in the Electricity Retail Market".

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Glossary of Abbreviations and Terms

Abbreviation or term	Definition or meaning
AIB	Association of Issuing Bodies
CRU	Commission for Regulation of Utilities
CO₂	Carbon dioxide
DAERA	Department of Agriculture, Environment and Rural Affairs
DfE	Department for the Economy
EEA	European Economic Area
EECS	European Energy Certificate System
EPA	Environmental Protection Agency
EU	European Union
FMD	Fuel Mix Disclosure
GB	Great Britain
GO	Guarantee of Origin
gCO₂/kWh	Grams of carbon dioxide per kilowatt hour
GSPV	Green Source Product Verification
kWh	Kilowatt hour
MWh	Megawatt hour
NI	Northern Ireland
NIRO	The Northern Ireland Renewables Obligation
PSO	Public Service Obligation
ROI	Republic of Ireland
SEM	Single Electricity Market
SEMO	Single Electricity Market Operator
UK	United Kingdom
UR	Utility Regulator

1. Introduction

1.1 Commission for Regulation of Utilities

The Commission for Regulation of Utilities (CRU) is Ireland's independent energy and water regulator. The CRU's mission is to protect the public interest in Water, Energy and Energy Safety. The work of the CRU impacts every Irish home and business. The sectors the CRU regulates underpin Irish economic competitiveness, investment, and growth, while also contributing to the CRU's international obligations to address climate change.

The CRU is committed to playing its role to help deliver a secure, low carbon future at the least possible cost, while ensuring energy is supplied safely, empowered, and protected customers pay reasonable prices, and the CRU delivers a sustainable, reliable, and efficient future for energy and water.

The CRU is guided by four strategic priorities that sit alongside the core activities the CRU undertakes to deliver on the public interest. These are:

- Deliver sustainable low-carbon solutions with well-regulated markets and networks.
- Ensure compliance and accountability through best regulatory practice.
- Develop effective communications to support customers and the regulatory process.
- Foster and maintain a high-performance culture and organisation to achieve the CRU's vision.

Further information on the CRU's role and relevant legislation can be found on the CRU's website at www.cru.ie.

1.2 Background

1.2.1 What is Fuel Mix Disclosure?

FMD is the annual publication of the mix of fuels involved in electricity production on a per-supplier basis, following an All-Island process ([SEM/11/095](#)). Fuel Mix Disclosure (FMD) calculations are carried out on a calendar year basis by SEMO on behalf of the CRU. In addition, the CRU publishes CO₂ emissions intensity data for each supplier, as calculated by SEMO. The verification of the data which forms the basis of each supplier's FMD is carried out independently, so consumers can be confident about the validity of the published FMD figures for each individual supply company.

The purpose of FMD is to provide electricity consumers with the information necessary to distinguish between electricity supply companies based on their individual fuel mix and their emissions data and as compared with the All-Island average.

The FMD calculation is the only way of independently verifying the source of electricity that suppliers claim to provide to their consumers, consequently enabling consumers to choose a company which is supplying low carbon-intensive energy or even zero emissions (when renewable Guarantees of Origin (GO) certificates are taken into account).

Licensed suppliers with retail customers should submit a fuel mix declaration to SEMO so that a representative fuel mix can be calculated and disclosed. Additionally, non-retail self-suppliers⁶ can also choose to make a declaration in order to have their individual fuel mix calculated if they wish.

All suppliers (with retail customers) are obliged to present FMD data on their bills and promotional materials even if they did not declare fuel mix data to SEMO for FMD calculation. Suppliers that did not submit declarations to SEMO, in accordance with SEMO's process, have to disclose the residual fuel mix, less any Public Service Obligation (PSO) adjustment that they are entitled to, i.e., what is left over after all the individual supplier fuel mixes are calculated.

1.2.2 All-Island Mix

The All-Island fuel mix is the mix of fuels involved in the generation of the electricity supplied to customers on the island of Ireland as a whole, to include both jurisdictions: Republic of Ireland (ROI) and Northern Ireland (NI).

In accordance with [SEM/11/095](#), the fuel mix figure for each supplier has been calculated on the basis of a combination of:

- non-renewable generation attributes;
- Guarantees of Origin (GOs);
- renewable generation attributes assigned to a supplier that are not included in the GO scheme; and

⁶ A self-supplier is a supply company which supplies electricity only to its own site and which does not compete to supply energy to any third party.

- the Residual Mix⁷ or European Union (EU) Residual Mix.

1.2.3 Residual Mix

The Residual Mix is calculated for ROI, for NI, and on an All-Island basis. Basically, it is the mix of all unclaimed electricity in the system. It is calculated as the sum of:

- Any generation attributes not assigned to, and submitted by, a supplier;
- Surplus GOs declared by suppliers; and
- Unused (deemed cancelled) certificates which expired in the relevant Disclosure Period⁸.

At a European level a residual mix is also calculated. The European Residual Mix is a combination of the residual fuel mixes from all the Member States and EEA Member States, such as Norway, which do not need to follow the physical flow of electricity.

If the All-Island demand is greater than the sum of all the suppliers' declarations plus the Residual Mix, the European Residual Mix would be applied to the remaining demand and included in the All-Island Residual Mix. In the case that demand is less than the sum of all the suppliers' declarations the surplus claimed generation attributes will be included in the European Residual Mix.

1.2.4 Fuel Sources

The electricity that is provided to homes and businesses to meet demand using a number of different fuel sources. It is these different fuel sources that make up the fuel mix.

The main fuel sources for electricity generation in Ireland are:

- Natural Gas;
- Renewables;
- Coal;
- Oil;
- Waste to Energy; and

⁷ The Residual Mix is the mix of all unclaimed electricity in the system. It is measured by taking the total metered generation both In-SEM and Out-of-SEM, and deducting from this the four categories of energy that can be claimed by a supplier, in the following order: Public Service Obligation (PSO) energy; Guarantees of Origin (GOs); Renewable Energy Guarantees of Origin (REGOs); Generator Attributes – total amount of non-renewable generation from a fossil-fuelled unit registered by a supplier to be tracked by the calculating body.

⁸ See Section 1.2.5 entitled "GOs" for details.

- Peat.

In the case of electricity generated from waste, the renewable portion (as is derived from the biomass content of the waste) is included under the “*Renewables*” fuel mix category. The non-renewable portion of electricity generated from burning municipal waste is categorised as “Non-Biodegradable Fraction of Waste”. However, in 2021, the contribution of both peat and waste to energy to the All-Island Mix are each below 1%, so for the purposes of this report they are grouped in the category labelled as “*Other*”.

Fuels categorised as “*Renewables*” are all those that comply with the list of fuels defined under the term “Energy from Renewable Sources” in [S.I. no.147 of 2011](#). These consist of:

- wind;
- solar;
- aerothermal;
- geothermal;
- hydrothermal and ocean energy;
- hydropower;
- biomass;
- landfill gas;
- sewage treatment plant gas; and
- biogases.

1.2.5 Guarantees of Origin (GOs)

As part of the fuel mix, suppliers may claim the attributes of renewable electricity generated outside of Ireland through electronic certificates known as Guarantees of Origin (GOs), which may be imported from other EEA Member States. The Association of Issuing Bodies ([AIB](#))⁹ operates a hub which tracks certificates traded between countries. AIB also ensures that electricity tracking does not lead to double counting. The hub allows suppliers to purchase (or sell) the renewable benefit of certain generators across Europe and include it in their total fuel mix. GOs are both exported from SEM and imported to SEM to/from the

⁹ The AIB promotes the use of a standardised system, known as the European Energy Certificate System (EECS) which is based on harmonised environment, structures, and procedures in order to ensure the reliable operation of international energy certificate systems.

rest of Europe. In total, on an all-island basis, 17,350,039 GOs were imported into Ireland in 2021, a 6% increase from the previous year (see Appendix 3 for details).¹⁰

GOs are electronic certificates issued for energy generated from renewable sources and are issued to renewable generators that are not in support schemes (such as the PSO in ROI)¹¹. Each GO unit represents one Megawatt hour (MWh) of generated electricity. These are financial certificates and rarely reflect the actual flow of the electricity which they represent. In ROI, SEMO is the body that issues GOs to generators and operates the registry which tracks the status of GOs. The inclusion of GOs means that the renewable share indicated in the FMD, of individual supply companies or nationally, does not only represent metered generation in Ireland but also includes GOs, which can be for renewable generation in ROI or can be imported.

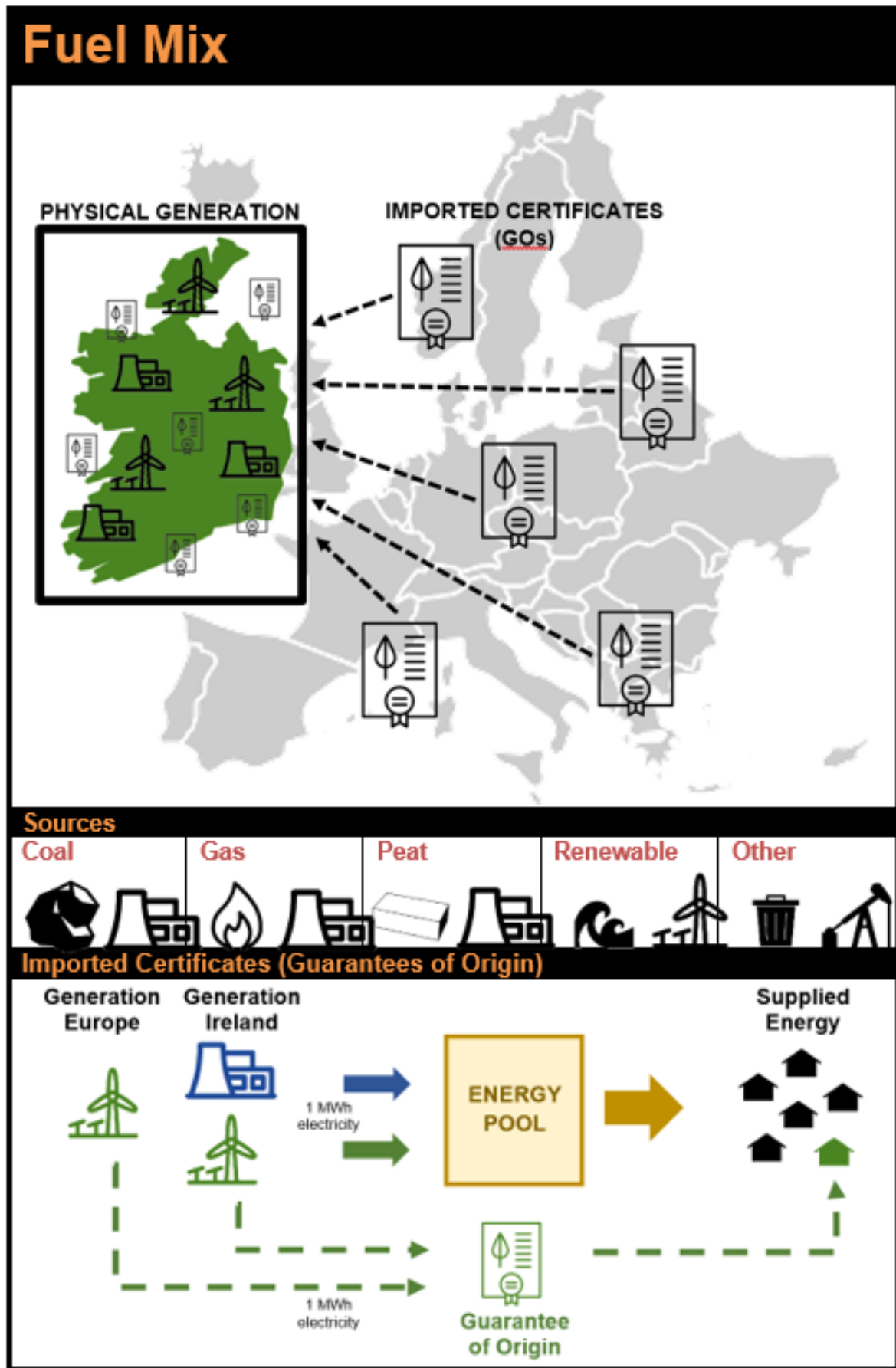
GO certificates automatically expire 12 months from the end of the month of production of electricity. Suppliers must cancel (i.e., use) GO certificates before they expire and declare what disclosure year the certificates are going to be used for. GO certificates can only be used for FMD for the year they were issued or the following disclosure year, i.e., GOs corresponding to production in January 2021 could have been used for the 2021 or 2022 FMD. Once a GO has been declared for a disclosure year, it is terminated and cannot be used again. Any GOs which were not used/withdrawn would have expired by the end of January 2022 and would have been included in the deemed cancelled GOs figures.

In general, Irish electricity suppliers buy a substantial quantity of GOs from other European countries. As such, the calculated overall FMD for ROI has a higher percentage share of the Renewable fuel source category than the share which would otherwise be indicated by the actual physical generation of renewable electricity in Ireland. The following graph depicts how the GO scheme works in Ireland and Europe. GOs can be freely traded between European countries in the EEA.

¹⁰ Note that 1,132,539 of these were imported for cancellation for NI Supply companies. In total, NI supply companies cancelled 1,134,135 EU GOs for FMD 2021.

¹¹ In NI generators who accredited for the Northern Ireland Renewables Obligation (NIRO) can also receive REGOs/GOs.

Figure 1: GO scheme arrangements in Ireland and Europe



1.3 Statutory Requirement

Fuel Mix Disclosure (FMD) is required by Article 3(9) of [Directive 2009/72/EC](#). The requirements in this Article is now repealed and is now recast as [Directive \(EU\) 2019/944](#).

The publication of the fuel mix of suppliers and the provision of information regarding the environmental impact of electricity produced from that fuel mix is required by Article 18(6) and point 5 of Annex I of [Directive \(EU\) 2019/944](#).

The transposing legislation in Ireland, [S.I. number 60 of 2005](#), requires the CRU to guarantee that electricity suppliers provide reliable fuel mix information on all bills and promotional materials issued to Irish electricity customers.

The SEM Committee Decision Paper ([SEM/11/095](#)) sets out the methodology for calculation of the fuel mix. Electricity suppliers publish their own fuel mix information, as well as the All-Island information, on all bills no later than two months from the publication of this Information Paper. This provides electricity consumers of Ireland with information on the recent environmental impact of electricity from their supplier compared with the All-Island average.

1.4 Purpose of Paper

This Information Paper sets out the electricity fuel mix and carbon dioxide (CO₂) emissions figures for 2021 on an All-Island (Republic of Ireland (ROI) and Northern Ireland (NI)) basis as well as by electricity supplier licensed in ROI and operating during 2021 in the All-Island Single Electricity Market (SEM). The fuel mix and CO₂ emissions data are taken from data provided to the CRU by the Single Electricity Market Operator (SEMO).

1.5 Related Documents

- [SEM/22/065](#): All-Island Fuel Mix Disclosure and CO₂ Emissions 2021.
- [SEM/11/095](#): Decision paper on the Fuel Mix Disclosure in the Single Electricity Market.
- [CER/11/824](#): Decision on Supervisory Framework for Administration of Guarantees of Origin.
- [CER/15/205](#): Regulation of Green Source Products in the Electricity Retail Market.

1.6 Structure of Paper

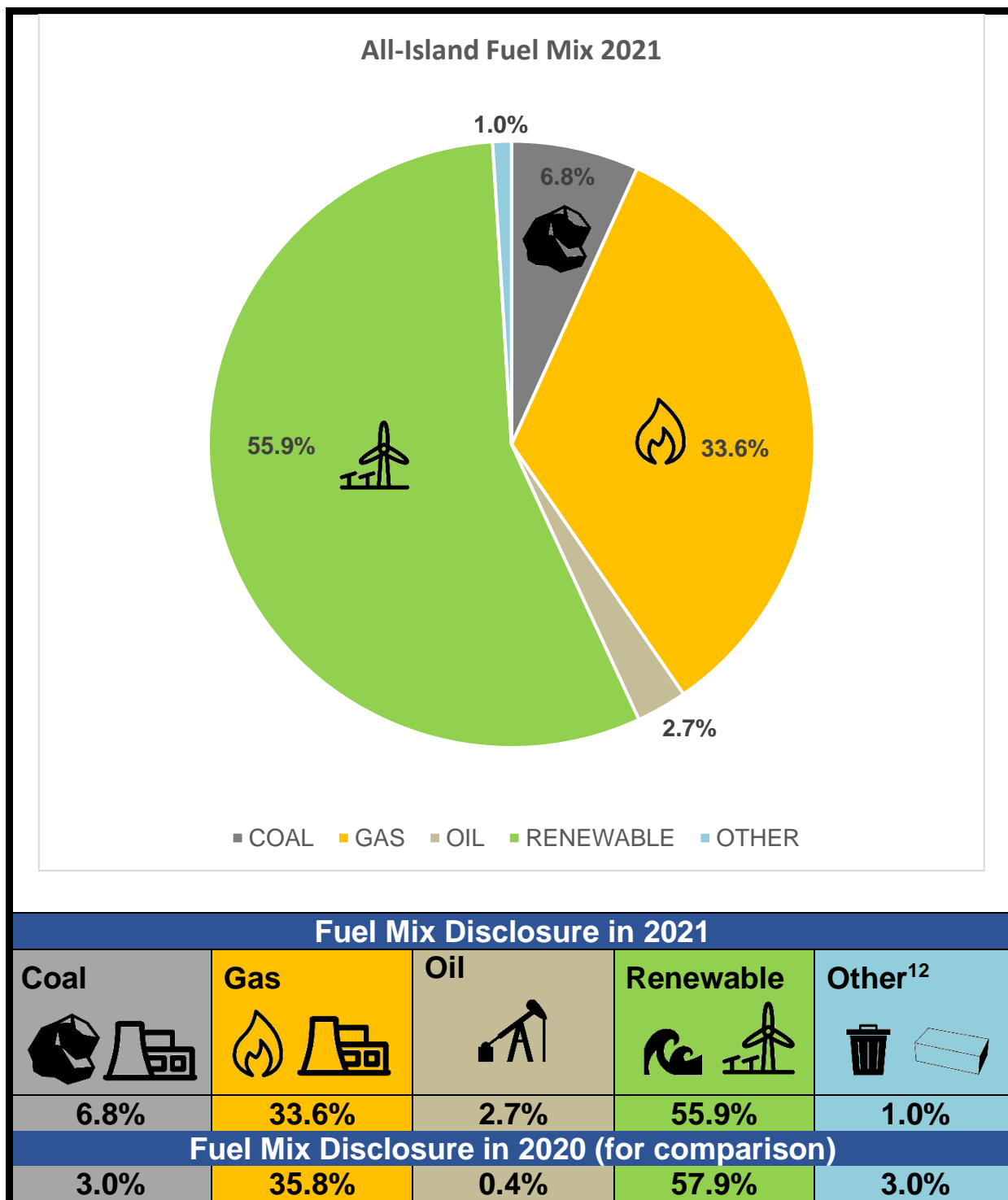
This information paper is structured as follows:

- **Section 1:** introduces the CRU and provides background to this information paper.
- **Section 2:** presents the All-Island Fuel Mix;
- **Section 3:** shows the average all-island CO₂ emissions;
- **Section 4:** presents the individual Fuel Mix of suppliers operating in Ireland; and
- **Section 5:** Outlines suppliers' obligations as relates to disclosing their fuel mix.

2. All-Island Mix

This section sets out the 2021 and year-on-year fuel mix for the all-island SEM, i.e., on average across the island.

Figure 2: All-Island Fuel Mix 2021

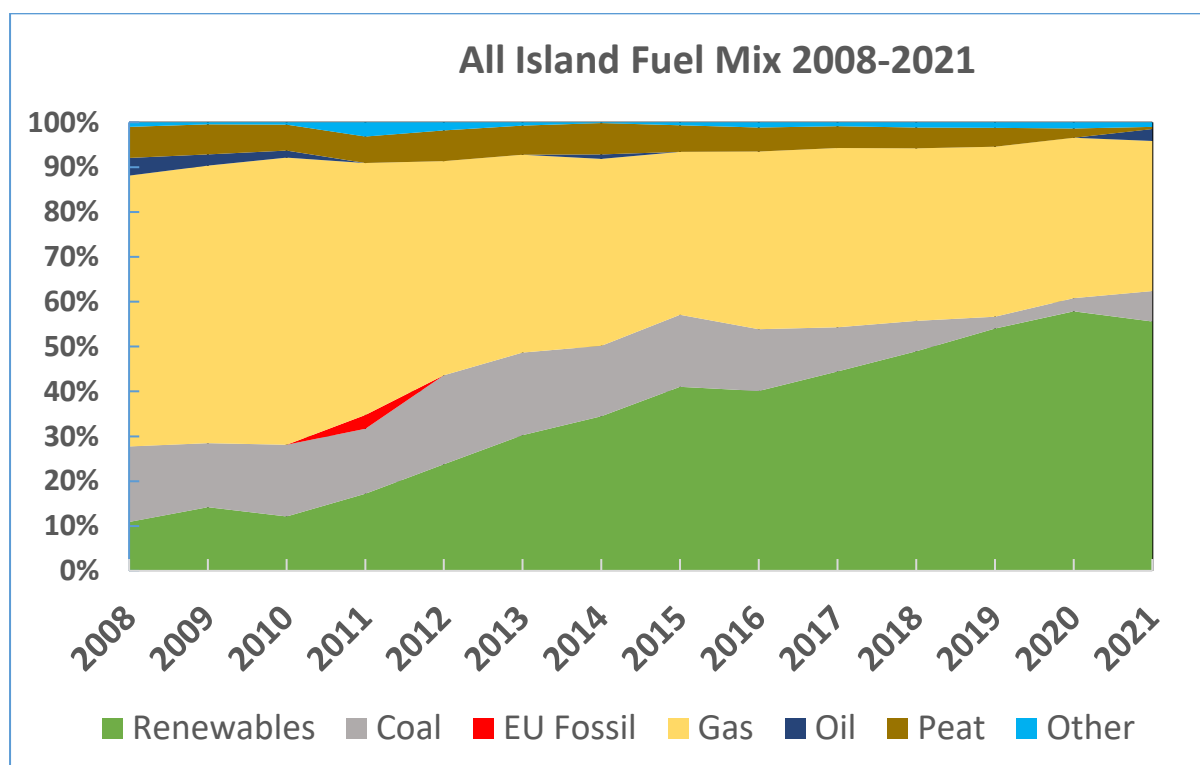


¹² For this report in 2021 Waste to Energy and Peat meet the criteria for inclusion in the “Other” category.

The SEM Committee decision paper [SEM/11/095](#) outlines the calculation methodology and assumptions that have been used to calculate the fuel mix and CO₂ emissions for 2021. It should be noted that all figures here include GOs and not only metered generation.¹³

For 2021, the predominant fuels in the final residual mix were gas, renewables, and coal. Coal has climbed back to near 2018 levels due to low wind speeds and power plant closures. Peat generation has decreased significantly since 2017.

Figure 3: All-Island Fuel Mix 2008-2021



The % Renewable for 2021 has decreased by 1.96% bringing it to 55.9%. A large proportion of these renewables were made up of imported GOs from outside of the SEM. In total, on an all-island basis, 17,350,039 GOs were imported into Ireland in 2021, a 6% increase from the previous year.¹⁴

In accordance with [SEM/11/095](#), the “Other” category consists of the aggregate of all fuels in a given year that individually represent less than 1% of the final overall generation. For this

¹³ See Section 1 above.

¹⁴ 1,132,539 of these were imported for cancellation for NI Supply companies. In total, NI supply companies cancelled 1,134,135 EU GOs for FMD 2021.

report in 2021 waste to energy (0.5%) and peat (0.5%) meet the criteria for inclusion in the “Other” category. Table 1 below compares the “Other” category by year.

The category labelled *EU Fossil* is related to the European Residual Mix. The EU Residual Mix is calculated based on the electricity that is generated within the EU but has not been claimed by suppliers or used to meet demand within a member state. It includes the categories of *EU fossil*, *Nuclear* and *Renewable*. The EU Residual Mix is used in the Fuel Mix Disclosure for those particular years where the electricity demand on the island of Ireland has not been met by the combination of supplier claims (i.e., generation attributes, GOs/REGOs, PSO-supported generation) and indigenous generation. 2011 was the last time that the EU Residual Mix was required to meet demand in the All-Island Fuel Mix. In 2021 there was no deficit hence the EU Residual Mix was not required for the All-Island Fuel Mix in 2021.

As a result of Brexit, REGOs from the United Kingdom (UK) are not acceptable as renewable certificates within EU Member States (including Ireland) since 1 January 2021. The following is from the notification from the European Commission¹⁵:

“Guarantees of origin that have been issued by designated bodies in the United Kingdom in accordance with Article 15(2) of Directive 2009/28/EC will no longer be recognised by the EU-27 Member States as of the withdrawal date.”

In November 2020, SEMO – in conjunction with the RAs - provided an update on fuel mix disclosure¹⁶. This is summarised as follows:

- **For Suppliers licensed in Northern Ireland:** Until such time as the United Kingdom (UK) reviews the continuation of eligibility of EU GOs, they are accepted for import or cancellation in Northern Ireland. Ofgem has stated that:

‘[UK] Government has indicated its intention to review this in 2021 so that, longer term, domestic recognition of Guarantees of Origin issued in EU countries will take place only on a reciprocal basis’.

¹⁵ [Notification](#) from the European Commission, issued on 7 March 2018.

¹⁶ <https://www.sem-o.com/market-messages/message/index.xml?message=3026>

- **For Suppliers licensed in Ireland:** From 1 January 2021, UK Renewable Energy Guarantees of Origin (REGOs) are not accepted for import or cancellation for FMD in Ireland.

The above arrangement is still in place, should subsequent communications or agreements from either the EU or UK authorities indicate a change in this position, both RAs in conjunction with SEMO, will provide market participants with an update on any changes to FMD processes.

Additionally, there may be changes to the approach for the 2022 FMD as a result of consultations that are ongoing by the Department for Business, Energy & Industrial Strategy (BEIS) and Ofgem in Great Britain (GB), or the Department for the Economy (DfE) in NI¹⁷. Any changes will be reflected in future FMD processes.

¹⁷ [Revocation of EU Guarantees of Origin \(GoOs\) and Combined Heat and Power GoOs | Department for the Economy \(economy-ni.gov.uk\)](https://www.economy-ni.gov.uk)

3. CO₂ Emissions

Emissions data for each generator in the SEM is supplied annually to SEMO by the EPA (Environmental Protection Agency) for Ireland and the DAERA (Department of Agriculture, Environment and Rural Affairs) for Northern Ireland.

The emission figures are grouped according to fuel type and divided by metered generation to give specific emission factors for each fuel. These values are then used in the calculation of the average All-Island CO₂ emissions intensity and in each individual supplier's CO₂ emissions intensity which consider both indigenous generation in the SEM and supplier claims (i.e., generation attributes, GOs/REGOs and PSO-supported generation).

Note that the unit of measure for emissions intensity in this information paper is g/kWh. The use of g/kWh is consistent with the reporting of emissions intensity by other authorities and the unit Kilowatt hour (kWh) is the unit used on customers' bills. To calculate the emissions (measured in grams of CO₂), multiply the emissions intensity (in g/kWh) by the electricity supplied (in kWh).¹⁸

The CRU notes that CO₂ intensity in the FMD does not reflect the CO₂ intensity of the Irish electricity sector in practice. This difference is a result of the GO legislative framework created at EU level. As noted elsewhere, the GO framework has supported investment in renewable technologies across the EU since its introduction. Moreover, it allows Irish electricity suppliers to offset the emissions from the electricity their customers consume, through payments to renewable generators across the EEA.

Under recent Irish legislation, the Irish electricity sector is required to reduce its carbon emissions by up to 81% by 2030. [The Climate Action Plan 2021](#) provides a framework for delivering the Government's target of a 51% reduction in greenhouse gas emissions by 2030.

The average All-Island CO₂ emissions per kWh of electricity has increased by 9.3% between 2020 and 2021, from 236 g/kWh in 2020 to 258 g/kWh in 2021.¹⁹ While partly this is a function of lower wind speeds and power plant closures in 2021, it is also a function of the level of demand growth on the electricity system. As demand potentially rises, more conventional generation will be required to supplement renewables technology. Due to the

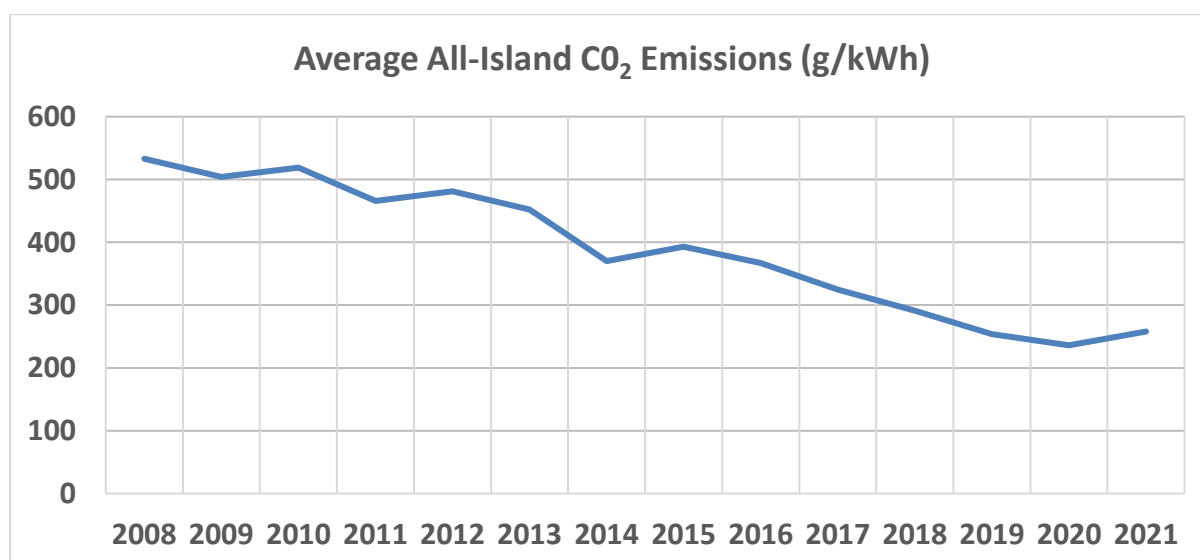
¹⁸ This is also the Unit shown the table "Default Presentation of Information" in Appendix 1.

¹⁹ These figures are net of GOs.

small size of the Irish system, renewables' output is regularly reduced to accommodate larger dispatchable units. The trajectory of emissions in the Irish electricity sector, reflected in this paper, and reflected in the emissions intensity when GOs are removed, reflect a challenging situation for Ireland's binding emissions ceilings. The CO₂ intensity of the Irish electricity sector net of GOs is 345.8 g/kWh.²⁰

Further, with electricity demand across the island of Ireland forecasted to grow rapidly, as reflected in the recently published [Generation Capacity Statement 2022](#), achieving these national emissions ceiling targets without an unprecedented ramp-up of renewable generation, or a reduction in total demand, will be extremely challenging for Ireland.

Figure 4: Average All-Island CO₂ Emissions (inclusive of GOs)



²⁰ <https://www.seai.ie/data-and-insights/seai-statistics/conversion-factors/>.

4. Individual Supplier's Fuel Mix

This section sets out the fuel mix and CO₂ emissions for each individual electricity supply company to meet demand in ROI. These are divided into three groups:

1. Supply companies which made a declaration²¹ of the data needed for the calculation of fuel mix;
2. Supply companies which did not make a declaration by March 2022 for the 2021 fuel mix disclosure period;
3. Self-suppliers who chose to make declarations for the purposes of fuel mix disclosure.

Two self-suppliers²² made declarations for the purposes of fuel mix disclosure. Their fuel mix has been included at the end of the table.²³ Submissions received from self-suppliers have been included in this report due to the low volumes of such submissions received for the 2021 disclosure period. However, if the number of these increase in subsequent reports, then their inclusion may be reviewed as it is considered that they may not be best placed for inclusion in this report.

The fuel mix calculation is carried out on an individual supplier licence basis. Where a supplier operates as a single company but holds separate licences (such as a supplier that operates in Ireland and Northern Ireland) any excess generation attributes from one licence can be allocated to the other licence. This paper is only displaying the Fuel Mix Disclosures for suppliers licenced in ROI.²⁴


²¹ Declarations were required to be submitted to SEMO by March 2022 for the 2021 disclosure period.

²² A self-supplier is a supplier which supplies electricity only to its own site which does not compete to supply energy to any third party, and which does not use Market Messages to support their operations.

²³ It should be noted that the purpose of this paper is to provide information to customers on the fuel mix of their electricity supply. Only suppliers serving electricity customers are required to disclose their assigned fuel mix.

²⁴ The Fuel Mix Disclosure information for suppliers operating in Northern Ireland is published separately and can be found in the Utility Regulator's report "*All Island Fuel Mix and CO₂ Emissions 2021*".

Figure 5: Fuel Mix Disclosures for suppliers licenced in ROI

Suppliers making declarations	Coal	Gas	Oil	Renewable	Other	Total	gCO ₂ /kWh
 All-Island Fuel Mix	6.8%	33.6%	2.7%	55.9%	1.0%	100%	258
Bord Gais Energy	11.5%	41.1%	4.5%	41.1%	1.8%	100%	363
Electric Ireland	2.4%	31.0%	0.9%	65.3%	0.4%	100%	179
Energia	0.0%	0.0%	0.0%	100.0%	0.0%	100%	0
Go Power ²⁵	0.0%	0.0%	0.0%	100.0%	0.0%	100%	0
Panda Power	0.0%	0.0%	0.0%	100.0%	0.0%	100%	0
SSE Airtricity	0.0%	0.0%	0.0%	100.0%	0.0%	100%	0
Pinergy	0.0%	0.0%	0.0%	100.0%	0.0%	100%	0
Iberdrola Ireland	0.0%	0.0%	0.0%	100.0%	0.0%	100%	0
Flogas Natural Gas	0.0%	0.0%	0.0%	100.0%	0.0%	100%	0
Arden Energy	0.0%	0.0%	0.0%	100.0%	0.0%	100%	0
Orsted Ireland Green Energy ²⁶	0.0%	0.0%	0.0%	100.0%	0.0%	100%	0
Captured Carbon	0.0%	0.0%	0.0%	100.0%	0.0%	100%	0
Cenergise Trading	0.0%	0.0%	0.0%	100.0%	0.0%	100%	0
Ecopower	0.0%	0.0%	0.0%	100.0%	0.0%	100%	0
ESB Customer Supply	6.1%	54.5%	2.4%	36.0%	0.9%	100%	342

²⁵ LCC ROI and NI are branded as GO Power.

²⁶ BRI Green Energy was bought by Orsted and now go by the name Orsted Ireland Green Energy.

Flogas Enterprise Solutions²⁷	0.0%	0.0%	0.0%	100.0%	0.0%	100%	0
ESB (ROI Independent Energy and CS) combined	2.8%	25.2%	1.1%	70.5%	0.4%	100%	158
Community Power	13.0%	40.2%	5.0%	39.8%	2.0%	100%	381
ElectroRoute Energy Supply	0.0%	0.0%	0.0%	100.0%	0.0%	100%	0
ESB Independent Energy	0.0%	0.0%	0.0%	100.0%	0.0%	100%	0

Figure 6: Suppliers assigned the Residual Mix in 2021

Suppliers not making declarations	Coal	Gas	Oil	Renewable	Other	Total	gCO₂/kWh
Glowpower	16.9%	52.6%	6.6%	21.3%	2.6%	100%	498
PrePay Power	16.9%	52.6%	6.6%	21.3%	2.6%	100%	498
Waterpower Engineering	16.9%	52.6%	6.6%	21.3%	2.6%	100%	498

Figure 7: Self-Suppliers' Fuel Mix by Fuel Type in 2021²⁸

Self-Supplier	Coal	Gas	Peat	Renewable	Other	Total	gCO₂/kWh
Axpo UK	0.0%	0.0%	0.0%	100.0%	0.0%	100%	0
Statkraft Markets GmbH	0.0%	0.0%	0.0%	100.0%	0.0%	100%	0

²⁷ Naturgy has rebranded as Flogas Enterprise Solutions NI and ROI. This is different again from Flogas Natural Gas Limited.

²⁸ Killoween Gas originally submitted a request for inclusion in FMD as a self-supplier, but after the submission requested to be removed as they had no demand on supply unit.

5. Disclosure of Fuel Mix

A supplier's fuel mix information must be presented on bills in accordance with [SEM/11/095](#) (see Appendix 1 for details). This must observe the following points:

- Where fuel mix information is presented on the back of a consumer bill, reference must be made to it on the front of the bill;
- Radioactive waste information is required by [Directive 2009/72/EC](#) and [S.I. No. 60 of 2005](#). This figure is 0.000 g/kWh for all suppliers in 2021 and therefore need not be included with the 2021 fuel mix disclosure information on bills (See Appendix 1);
- To ensure consistency across suppliers, percentages should be rounded to one decimal place;
- CO₂ information should be given in the units of grams of CO₂ per kWh (g/kWh);
- In addition to the fuel mix disclosure requirements, section 3.5.3 of the CRU's decision paper on the Regulation of Green Source Products in the Electricity Retail Market, [CER/15/205](#), governs the display of fuel mix information for suppliers who offer green source products.

In relation to advertising and promotion of products, suppliers should also follow the [*Code of Practice on Marketing and Advertising*](#) from the Supplier Handbook and General Clarifications as may be published from time to time by the CRU, including the following:

- [CRU20083](#) – General Clarification on the Advertisement of Green Products;
- [CRU19071](#) - General Clarification on the Code of Practice on Marketing and Advertising; and
- SEMO's internal business process for Interim GSPV²⁹.

The 2021 fuel mix information must be presented on all customer bills within two months of the publication of this paper.

²⁹ For information refer to Interim Process on SEMO's GSPV webpage: <https://www.sem-o.com/markets/green-source-product-veri/>

Appendix 1: Presentation of Information on Bills

Default Presentation of Information³⁰:

The fuel mix information should be presented on electricity bills in accordance with [SEM/11/095](#). For this purpose, a template from this decision paper is reproduced below.³¹

SUPPLIER Z Fuel Mix Disclosure		
Applicable Period: January 2021 to December 2021		
Electricity supplied has been sourced from the following fuels:	% of total	
	Electricity Supplied by SUPPLIER Z	Average for All-Island Market (for comparison)
Renewable	X %	X %
Natural Gas	X %	X %
Peat	X %	X %
Coal	X %	X %
Oil	X %	X %
Nuclear	X %	X %
EU Fossil	X %	X %
Other	X %	X %
Total	100 %	100 %
Environmental Impact		
CO ₂ Emissions	X g/kWh	X g/kWh
Your specific fuel mix may differ to the fuel mix shown because SUPPLIER Z offers green source products. For information on your fuel mix and on the environmental impact of your electricity supply visit www.SUPPLIERZ.ie or, for further details call 00XXX X XXX XXXXX		

³⁰ For the purpose of illustration, the supply company is given the name "SUPPLIER Z"

³¹ Please refer to Section 1.7 of [SEM/11/095](#) for further details.

³² Suppliers who offer green source products in Ireland should refer to Section 3.5.3 of the CRU's Decision paper, [CER/15/205](#), on the "Regulation of Green Source Products in the Electricity Retail Market".

Appendix 2: All-Island Fuel Mix 2005 - 2021

Fuel Mix 2005-2021 (Percentage share of total)

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Coal %	24.00	19.00	18.00	17.00	14.24	15.98	14.44	19.89	18.42	15.71	16.02	13.76	9.83	6.77	2.63	2.98	6.80
EU Fossil %	0.00	0.00	0.00	0.00	0.00	0.00	3.12	0.00	0.00	0.00	0.00	0.00	0.00	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	41.6	36.36	39.66	39.9	38.51	37.86	35.75	33.60
Oil %	12.00	9.00	6.00	4.00	2.53	1.59	0.00	0.00	0.00	1.06	0.00	0.00	0.00	0.00	0.00	0.00	2.70
Renewables %	9.00	11.00	11.00	11.00	14.23	12.11	17.21	23.74	30.24	34.46	41.06	40.09	44.47	48.95	54.04	57.86	55.90
Peat %	8.00	7.00	6.00	7.00	6.70	5.78	5.88	6.86	6.49	6.95	5.90	5.35	4.86	4.63	4.25	2.07	0.00
Other %	1.00	4.00	4.00	1.00	0.45	0.48	3.18	1.77	0.75	0.17	0.65	1.14	0.88	1.15	1.22	1.34	1.00

Note:

- Figures from 2005 to 2007 relate to Ireland-only and calculations are based on a pre-SEM methodology.
- Figures for 2008, 2009 and 2010 relate to Ireland and Northern Ireland and are based on the Interim Arrangements Methodology ([SEM/09/081](#)).
- 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 the Related Documents section of this paper.
- The “Other” category consists of oil (only for those years in which it is below the 1% threshold), Non-Biodegradable Fraction of Waste (NBDFW), and EU Fossil (only for 2011).

Appendix 3: GOs Imported/Exported

Note: Each GO unit corresponds to one MWh of electricity generated from a renewable source.

1. GO imports to Ireland by country of origin (2017-2021)

Country	2017	2018	2019	2020	2021
UK	7,209,276	6,499,980	4,590,300	3,059,134	-
Norway	300,681	2,702,943	1,802,970	12,703,498	10,521,464
Italy	109,778	15,000	1,637,040	-	-
Spain	200,000	-	907,181	-	-
Belgium	-	-	-	203,912	322,822
Greece	-	-	-	200,000	-
Sweden	-	-	-	-	797,112
Finland	-	-	-	-	552,042
France	-	-	-	-	1,724,700
Austria	-	-	-	-	429,309
Portugal	-	-	-	-	664,549
Other ³³	454,688	307,001	1,533,201	226,651	266,492
TOTAL IMPORTS	8,274,423	9,524,924	10,470,692	16,393,195	15,278,490³⁴

³³ Sum of imported GOs where import from a country is less than 200,000.

³⁴ In total, 15,278,490 GOs were imported into Ireland in 2021. As Ireland no longer accepts REGOs due to Brexit, this volume is a 16% increase in EU GOs from the previous year's volume of 13,134,061.

2. GO exports from Ireland by country of destination (2017-2021)

Country	2017	2018	2019	2020	2021
Norway	493,606	612,401	349,018	1,303,951	457,076
Belgium	-	9,140	-	3,912	18,761
Netherlands	-	13,115	-	47,123	88,626
UK	-	-	-	244,779	1,596
Austria	-	-	-	-	9
Finland	-	-	-	-	5,000
TOTAL EXPORTS	493,606	634,656	349,018	1,599,765	571,068