

AN GHNÍOMHAIREACHT CHÚLTACA OLA NÁISIÚNTA THE NATIONAL OIL RESERVES AGENCY



THE BIOFUELS OBLIGATION SCHEME ANNUAL REPORT 2018

A report on how the scheme has been implemented to date and an assessment of the level of compliance by obligated parties during the 2018 obligation period.

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The National Oil Reserves Agency



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GLOSSARY OF TERMS

AFID	Alternative Fuels Infrastructure Directive (2014/94)
BÓC	Byrne Ó Cléirigh
BOS	Biofuel Obligation Scheme
BOS Act	Energy (Biofuels Obligations and Miscellaneous Provisions) Act 2010
BOS Team	Personnel from NORA, BÓC and S&W
BOSOS	BOS Online System
CNG	Compressed Natural Gas
DCCAE	Department of Communications, Climate Action and Environment
EV	Electric vehicle
FBS	Fuel Baseline Standard (94.1 gCO _{2eq} /MJ)
FQD	Fuel Quality Directive (2009/30/EC)
gCO _{2eq}	Grams of CO ₂ equivalent
GHG	Greenhouse gas
ILUC	Indirect Land Use Change Directive (2015/1513)
IPIA	Irish Petroleum Industry Association
ISCC	International Sustainability and Carbon Certification (a voluntary scheme)
LNG	Liquefied Natural Gas
LPG	Liquefied Petroleum Gas
MJ	Mega Joule
NORA	National Oil Reserves Agency
NORA Act	National Oil Reserves Agency Act (2007)
OLA	Online Levy Assessment (a reporting system for obligated parties)
PJ	Peta Joule
POME	Palm Oil Mill Effluent
RED	Renewable Energy Directive (2009/28/EC)
S&W	Smith & Williamson
SBE	Spent Bleached Earth
SI	Statutory Instrument
UCO	Used Cooking Oil
UERs	Upstream Emission Reductions
WTW	Well-to-wheel

EXECUTIVE SUMMARY

The Biofuel Obligation Scheme (BOS) is one of the measures introduced by the Irish Government to assist with complying with the requirement imposed on all EU Member States by the Renewable Energy Directive (RED) to ensure that, by 2020, at least 10% of the final consumption of energy in transport is from renewable sources. NORA was appointed under the Energy (Biofuel Obligation and Miscellaneous Provisions) Act 2010 to administer the Scheme and the Agency appointed a consortium of Byrne Ó Cléirigh and Smith & Williamson to assist with its administration. A project team (the BOS Team) was subsequently established with personnel from NORA and members of the consortium. This Team has drafted and implemented a comprehensive set of systems and procedures for implementing and administering the scheme.

Under the scheme, the oil companies and large oil consumers that are currently obliged to pay the NORA Levy (the obligated parties) are required to ensure that a specified amount of their total relevant disposal of road transport fuel is in the form of biofuel. For 2018, this amount was 8%.

They must also pay a levy of €0.02 per litre on their biofuel disposals and may then apply to NORA for one biofuel obligation certificate (BOS Cert) in respect of each litre. In the case of biofuel produced from wastes and residues, two BOS Certs per litre may be awarded. At the end of each obligation period (the calendar year) obligated parties are required to surrender to NORA sufficient Certs to match their obligation. Failure to surrender sufficient Certs incurs a liability to pay a buy-out charge which is set at €0.45 per litre.

In 2017, SI 160 (2) transposed Article 7a of the Fuel Quality Directive (FQD) (1). It designates NORA as the administrator of fuel suppliers' compliance with a carbon intensity reduction target of 6% in 2020. It requires fuel suppliers to achieve a 6% reduction in the greenhouse gas (GHG) intensity of fuels used in road vehicles, and non-road mobile machinery, agricultural and forestry tractors, and recreational craft relative to a fuel baseline standard (94.1 gCO_{2eq}/MJ). The BOS has been modified to cater for administering the requirements of SI 160 so applications for BOS Cert are now combined applications for Certs and carbon savings.

Companies that produce or supply biofuels may also open a BOS account and apply to NORA for BOS Certs and carbon savings on their relevant disposals. Account holders may also obtain BOS Certs and carbon savings by arranging with other account holders to have Certs/carbon savings transferred to their accounts. Following the 2018 reconciliation period, there were ten BOS obligated parties and four companies that produce or supply biofuels registered as BOS account holders.

In total, for the 2018 obligation period, c. 216m litres of biofuel was placed on the Irish market and 384m Certs were awarded in respect of those disposals along with 517 kt of carbon savings. At the end of the period, including those Certs that were carried forward from previous periods (75m), account holders were in possession of c. 459m BOS Certs; the 2018 biofuel obligation was c. 390m Certs. All the obligated parties were in possession of sufficient BOS Certs to satisfy their respective biofuel obligations and approximately 69m

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BOS Certs have been carried forward into the 2019 obligation period. For the 2019 obligation period, the biofuel obligation has increased to 10%.

All the biodiesel placed on the market was eligible for two BOS Certs per litre on account of it being produced from a waste or residue (this was the same in 2016 and 2017). Approximately 10% of the bioethanol placed on the market was double counted. There were ten different biofuel feedstocks reported in the BOS Sustainability Statements.

Bioethanol	Biodiesel	BioLPG
EC corn	Category 1 tallow	Palm oil
Non-EC corn	Used cooking oil	
Sugar beet	Spent bleached earth	
Wheat	Palm oil mill effluent	
Whey permeate		

The feedstocks were reported to have originated from fifty-eight different countries, including Ireland. The single largest source of biofuel feedstock was China (21.5%) followed by Spain (15.1%); approximately 11.3% of the feedstock originated from Ireland.

Almost 62% of all the biofuel placed on the market in Ireland was produced from used cooking oil (UCO) which was sourced from fifty-two different countries. The majority was sourced from China (34.7%), followed by Spain (18.8%). Virtually all the biofuel placed on the Irish market was reported as being ISCC certified – ISCC was the only Voluntary Scheme reported.

A central requirement of the RED and the Sustainability Regulations is that biofuels achieve a 50% reduction in carbon intensity (GHG emissions) in comparison to fossil fuels. The average litre of biofuel placed on the market in Ireland in 2018 had a carbon intensity of c. 14.5 gCO_{2eq} / MJ, which represents an 83% reduction in carbon intensity in comparison to road transport fossil fuel.

While the 6% carbon intensity reduction target of SI 160 is not a requirement until 2020, the BOS maintains data on progress towards the target. On average, fuel suppliers achieved a carbon intensity reduction of 2.7% in 2018. There was no carbon savings from electricity consumed in EVs or UERs claimed during 2018. Based on the 2018 data, achieving the 6% carbon intensity reduction in 2020 will require over 1,000kt of carbon savings which could be generated by placing approximately 400m litres of biofuel on the market (in 2018, 216m litres were supplied). To achieve the 11% biofuel obligation in 2020, approximately 250m to 280m litres of biofuel will be required¹. This is substantially short of the 400m litres required to achieve the 6% reduction target and would result in a carbon intensity reduction of approximately 4%.

¹ This is an estimate – it will depend on, *inter alia*, the quantity of biofuel double-counted, and the quantity of Certs carried forward and set-off against the 2020 obligation.

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The annual audit of BOS account holders was carried out during 2018. The programme included a plenary audit of all the levy returns' data, four on-site audits and several desk-based audits. While there were no material errors found in the Sustainability Statements during the desk-based audits or the on-site audits, incorrect OLA reporting resulted a Levy underpayment of €95k on diesel and a Levy overpayment of €58k on gasoil.

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1 BACKGROUND

Article 3 of the Renewable Energy Directive (1) sets out mandatory national overall targets and measures for the use of energy from renewable sources for all EU Member States. Ireland’s target for the share of its gross final consumption of energy to come from renewable sources, by 2020, is 16%.

Figure 1: Renewable Energy Targets



Although Member States may set individual targets for heat (RES-H) and electricity (RES-E), item 4 of Article 3 places the following obligation on all Member States:

Each Member State shall ensure that the share of energy from renewable sources in all forms of transport in 2020 is at least 10 % of the final consumption of energy in transport in that Member State.

It is in the context of this obligation that Ireland has implemented the Biofuels Obligation Scheme (BOS) which was given effect in law by the Energy (Biofuel Obligation and Miscellaneous Provisions) Act 2010 (2). The scheme is one aspect of a twin approach in meeting the EU target for the use of renewable energy in transport; the second is to encourage the accelerated development and usage of electric vehicles (EVs). In 2008, an ambitious national target of having EVs account for 10% of the vehicle fleet by 2020 (about 230,000 vehicles) was set. This was subsequently reduced to 50,000 in the 2015 Energy White Paper. More recent projections from SEAI anticipate that the total number of EVs will be 10,000 by 2020. The AFID National Policy Framework (required under the Alternative

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Fuels Infrastructure Directive (5)) estimates that there will be 8,000 EVs by 2020, if all current policy measures and incentives remain in place.

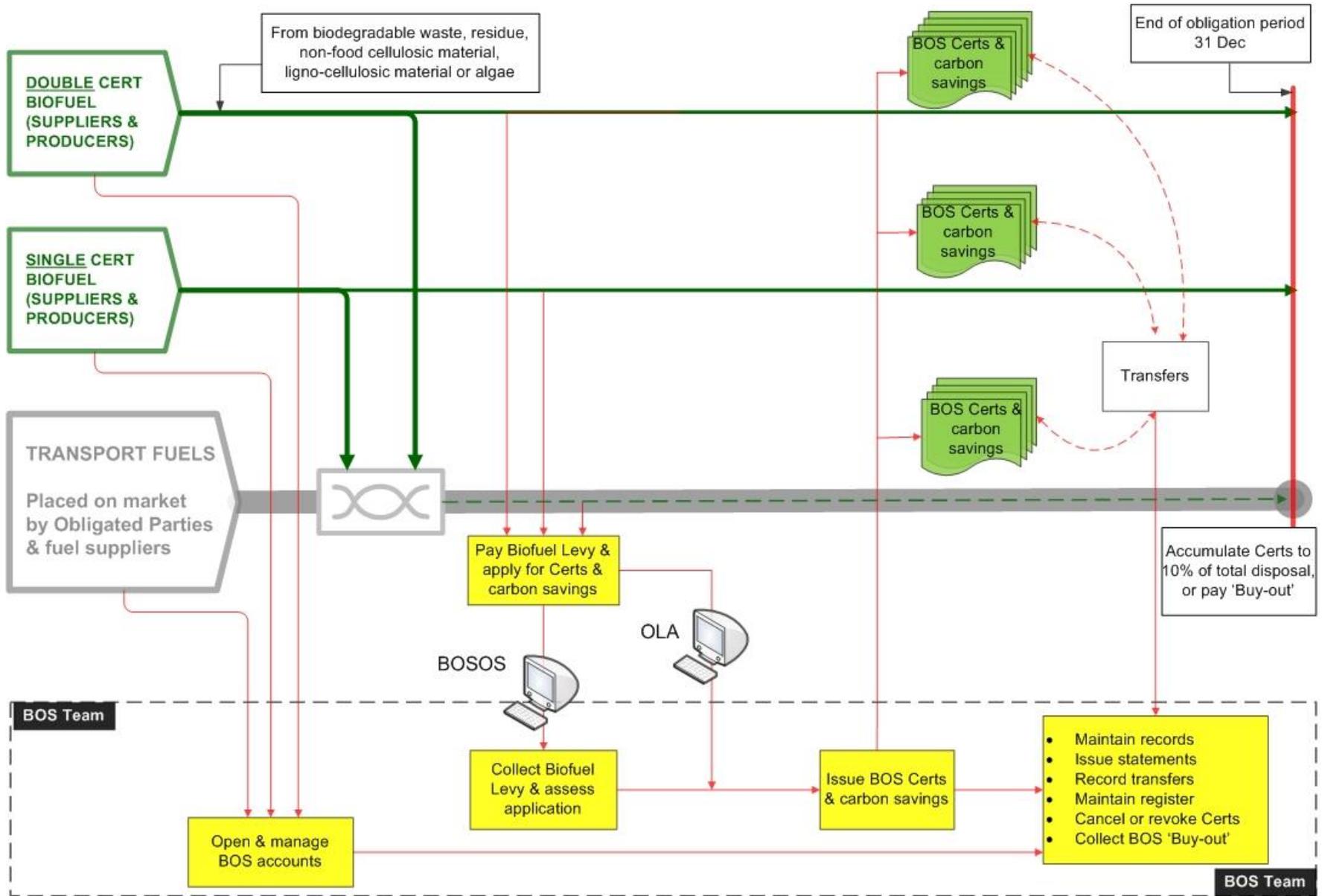
Under the BOS Act, the National Oil Reserves Agency (NORA) is the body charged with administering the BOS. In June 2010, following an open tendering process, a consortium of Byrne Ó Cléirigh and LHM Casey McGrath (now Smith & Williamson) (BÓC-SW) was appointed to assist NORA with implementing and administering the BOS. The consortium was re-appointed in 2015. Throughout this report, the individuals from BÓC-SW and NORA who collaborate with implementing and administering the scheme are referred to as the BOS Team.

This document provides an overview of the BOS and describes how it was implemented throughout the 2018 obligation period. It also illustrates the extent to which the overall biofuel obligation was met and how each individual obligated party performed.

In 2017, SI 160 (2) transposed Article 7a of the Fuel Quality Directive (FQD) (1). It designates NORA as the administrator of fuel suppliers' compliance with a carbon intensity reduction target of 6% in 2020. It requires fuel suppliers to achieve a 6% reduction in the greenhouse gas (GHG) intensity of fuels used in road vehicles, and non-road mobile machinery, agricultural and forestry tractors, and recreational craft relative to Fuel Baseline Standard (FBS) of 94.1 gCO_{2eq}/MJ. It is anticipated that most of this target will be reached by substituting biofuel for fossil fuel. The regulations require biofuels to satisfy the same sustainability criteria as the BOS, if they are to be counted towards the 6% target. Thus, there is a significant overlap in how the BOS and SI 160 will achieve their respective targets, i.e. both require significant volumes of sustainable biofuel to be placed on the market. The BOS has been modified to cater for administering the requirements of SI 160.

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Figure 2: Overview of Biofuel Obligation Scheme



2 AN OVERVIEW OF THE BIOFUELS OBLIGATION SCHEME

Figure 2 provides an overview of the BOS. The principal features are described below.

2.1 BOS ESSENTIALS

- The BOS obliges all oil companies and oil consumers (obligated parties) that make relevant disposals of road transport fuels to ensure that a specific percentage of their total disposals, in a given obligation period, is biofuel.
- The first obligation period was from July to December 2010, inclusive. The 2018 obligation period ran from January to December 2018, inclusive.
- The 2018 obligation was 8% by volume and this corresponds to 8.696% of the petroleum-based disposal. The obligation will increase to 10% for 2019; it is planned to increase it again in 2020 to 11%. Obligated parties meet their obligations by disposing of biofuel (which can be a liquid or a gas). They may also meet the obligation by purchasing BOS Certs from other BOS account holders or by paying the buy-out charge.
- Obligated parties are awarded biofuel obligation certificates (BOS Certs) at the rate of one for each litre of biofuel they place on the market. For certain biofuels – those manufactured from biodegradable waste, residue, non-food cellulosic material, ligno-cellulosic material or algae – two BOS Certs per litre may be claimed.
- Obligated parties discharge their obligation by surrendering the appropriate number of BOS Certs to NORA at the end of the obligation period. BOS Certs may be transferred between parties – NORA has no role in negotiating transfers.
- A Biofuel Levy (currently €0.02 per litre) is payable on all disposals of biofuels. This levy is payable to NORA.
- An obligated party that has not collected sufficient BOS Certs to meet its obligation in a given obligation period is liable to pay a buy-out charge which is currently set at €0.45 per litre. This charge is collected by NORA but is payable to the Exchequer.
- NORA is responsible for assessing applications for BOS Certs, for issuing Certs, for recording all transactions and for facilitating transfers of BOS Certs between account holders.
- All biofuel placed on the market must be sustainable. Sustainability is determined in accordance with the BOS Application and Sustainability Procedure (3).
- Under certain circumstances, BOS Certs may be cancelled or revoked.
- BOS Certs may be carried forward for a period of two years from the end of the obligation period in which they were initially issued. However, no more than 25% of a party's obligation, in a given obligation period, may be met from BOS Certs that have been brought forward in this manner. In a Biofuels Obligation Scheme Policy Statement (4) issued by the DCCAE, it is stated that this allowance will reduce to 15% in 2020.

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The BOS also incorporates administering the requirements of SI 160 of 2017. The following describes the essential features of SI 160 and how NORA has incorporated them into the BOS.

- Fuel suppliers are required to reduce the life cycle greenhouse gas emissions per unit of energy from fuel and energy supplied by 6% relative to a Fuel Baseline Standard (FBS) of 94.1 gCO_{2eq}/MJ – the requirement only applies in 2020. There are no obligations on fuel suppliers in 2018 or 2019 – the data provided in the BOSOS in these years is for illustrative purposes only.
- The carbon intensity reduction requirement applies to fuels used to propel road vehicles, non-road mobile machinery (including inland waterway vessels when not at sea), agricultural and forestry tractors, recreational craft when not at sea and electricity for road vehicles.
- An application for BOS Certs is also an application for carbon savings. The carbon savings are calculated using data supplied in Sustainability Statement submitted with an application.
- The same sustainability criteria and verification requirements apply for claiming carbon savings as for claiming BOS Certs.
- Monthly fossil fuel data is reported via OLA to the DCCAE in the Levy Returns. The relevant data is then supplied to the BOSOS by OLA. Carbon emissions and savings from fossil fuels are calculated in the BOSOS. Fossil fuels with a carbon intensity lower than 94.1 gCO_{2eq}/MJ will generate carbon savings, e.g. gasoline has a carbon intensity of 93.3 gCO_{2eq}/MJ and thus generates a carbon intensity saving of 0.85%.
- Carbon savings can be transferred between BOS account holders.
- Unlike the BOS, there is no provision for suppliers to buy-out of the requirements of SI 160 of 2017 and there is no carry-over of carbon savings from previous years.
- In addition to placing biofuels and lower carbon intensity fossil fuels on the market, carbon savings can also be generated by applying for carbon savings from electricity consumed in EVs and from upstream emission reductions (UERs).

2.2 IMPORTANT DATES

The following important dates are specified in legislation and by NORA.

- The BOS obligation period for 2018 commenced on the 1st of January and ended on the 31st of December.
- It is a legal requirement to submit quarterly applications for BOS Certs on the following dates.

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Reporting Period	Closing Date
1 January to 31 March	15 May
1 April to 30 June	14 August
1 July to 30 September	14 November
1 October to 31 December	14 February

- The date by which NORA is obliged to inform BOS account holders of the extent of their biofuel obligations for the previous obligation period and the number of BOS Certs held on their account in respect of that period is the 14th of March.
- The deadline date for transferring BOS Certs is 22nd March.
- The final date by which obligated parties must inform NORA of which BOS Certs are to be set off against their obligation is the 13th of April.
- The 27th of April is the date by which NORA is obliged to raise invoices for any buy-out charges that may be payable by an obligated party. They may be raised sooner, if desired.
- The buy-out charge must be paid within 28 days from the date of the invoice.

2.3 BOS PARTICIPANTS

Entities participating in the BOS can be obligated parties or producers/suppliers of biofuels that have applied to NORA for a biofuel obligation account. Participants may also be companies designated by NORA as fuel suppliers under SI 160 of 2017. In most cases, fuel suppliers are obligated parties or biofuel producers.

2.3.1 Obligated Parties

An obligated party is any oil company or oil consumer liable to pay the NORA Levy; the biofuel obligation applies to its relevant disposals of road transport fuel in the obligation period. It applies whether or not the NORA Levy was paid and, in the case of an oil consumer, whether or not the oil consumer is exempt from or has claimed an exemption from the NORA Levy.

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At the start of the 2018 obligation period, the following companies were identified as obligated parties under the BOS:

1. Valero Energy (Ireland) Ltd
2. Irving Oil Whitegate Refinery Ltd (formerly P66)
3. Inver Energy Ltd
4. Irish Rail
5. John Kelly Fuels (Ireland)
6. Lissan Coal Company Ltd (LCC)
7. Maxol Ltd
8. Nicholl (Fuel Oils)
9. Tedcastle Oil Products (TOP)
10. Circle K Ireland Ltd

2.3.2 Biofuel Producers and Suppliers

In addition to the ten obligated parties, there were four biofuel producers/suppliers at the start of 2018:

1. Green Biofuels Ireland (GBI)
2. Agri Energy
3. Calor Teoranta
4. Carberry Food Ingredients

These companies previously applied for and were granted BOS accounts. Each company reports its disposals of biofuel to the DCCAE via the OLA system², pays the Biofuel Levy and claims BOS Certs on those disposals. None of these account holders incur a biofuel obligation as they do not place diesel or gasoline on the market.

2.3.3 Fuel Suppliers

In most cases, fuel suppliers will be either obligated parties or biofuel producers and suppliers. However, there may be fuel suppliers placing fuels on the transport market that are not subject to the NORA Levy. CNG is an example of a fuel that is not Levy liable and a supplier of CNG to the transport market may not be an obligated party. CNG supplied to road vehicles falls under the scope of SI 160 of 2017. NORA is responsible for designating such fuel suppliers.

2.4 ENGAGEMENT WITH BOS PARTICIPANTS

Throughout the 2018 obligation period, and during the weeks following the end-of-period reconciliation, the BOS Team maintained regular contact with all BOS participants by email and phone.

² The Online Levy Application (OLA) reporting system is used by Obligated Parties to report monthly disposals of oil products to the DCCAE.

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NORA's website is used to host all BOS documents (procedures, guidance notes, application forms, etc.) that are likely to be required by the BOS participants.

From the outset of the BOS, the Team has used dedicated email accounts for receiving and issuing all email communications with the BOS participants (bos@nora.ie & bosaccounts@nora.ie).

During 2018, audits were carried out on account holders by members of the BOS Team to determine the level of compliance with the requirements of the BOS Act. The audit process and the findings are discussed in more detail in Section 4.8 of this report.

The BOS Team held two briefing sessions during the year. The first was held in April and the second in November. Both sessions were attended by nearly all account holders and followed a similar agenda.

1. Provide an update on BOS performance.
2. Highlight any recurring problems with BOS Cert applications or the data contained therein (the problems and data are anonymised).
3. Set out any planned changes to the BOS systems.
4. Identify and summarise new legislation that will impact on the BOS.
5. Provide an update on legislative changes (by the DCCAE).
6. Provide an update on industry's perspective.

The sessions are relatively informal and provide a forum for open discussion, which is welcomed and encouraged. Briefing sessions will be held during 2019.

3 BIOFUEL OBLIGATION ACCOUNTS

This section explains how NORA met the principal obligations and responsibilities that were placed on the Agency to implement and administer the BOS, and the requirements of SI 160, over the 2018 obligation period.

3.1 ACCOUNT SET UP & CLOSURE

There were no BOS accounts opened or closed during 2018.

3.2 MANAGING BIOFUEL OBLIGATION ACCOUNTS

All the account files maintained for BOS account holders employ a standard file-breakdown-structure (FBS) so that any of the matters referred to in Section 44E(2) of the legislation can be properly recorded. Account files are held electronically on Byrne Ó Cléirigh's server. Encrypted back-up copies are made daily to a secure off-site data center.

The Control and Reconciliation spreadsheet (4) acts as the overall control document for recording BOS transactions. Data on disposals of petroleum-based road transport fuels and biofuels are transferred to this spreadsheet from the monthly returns made by BOS account holders³. Data on disposals are also transferred to the BOS Online System (BOSOS). The BOSOS is a web-based platform through which account holders submit applications for BOS Certs and transfer Certs between accounts. As part of the application process, the BOSOS accepts and stores the sustainability statements and independent verification reports. Sustainability statements are submitted in csv format⁴ and stored in a database. The system also provides account holders with data on their BOS obligation, the number of BOS Certs held in their respective account and progress towards the 6% carbon intensity reduction target. It also enables them to view interim and final statements of account, as required under the BOS Act.

The BOSOS and OLA will be modified in 2019 to capture data on disposals of other fossil fuels and renewable fuels consumed in transport:

- CNG and bioCNG;
- Biomethanol;
- Gasoil and biogasoil;
- LPG;
- LNG and bioLNG.

Gathering data on gasoil will be challenging as the obligated parties are typically not aware how the gasoil is consumed.

³ Returns made to DCCAIE via the OLA system.

⁴ CSV: Comma-separated Value. It is a common file type which can be opened by many different programmes.

3.3 ISSUING BIOFUEL OBLIGATION CERTIFICATES

There is a standard procedure in place for issuing BOS Certs (3). There is also a comprehensive guidance document to accompany the procedure (5). A standard template is used by the BOS Team when checking all applications for BOS Certs and for recording NORA's authorisation or refusal of such Certs. Applications for BOS Certs also include applications for carbon savings. The procedure and guidance has not yet been updated to reflect this because the applicant does not have to supply any additional information to apply for carbon savings.

Under Section 44G of the legislation, NORA is required to issue *"... 2 Certificates in the case of such biofuels as the Agency may from time to time determine, in accordance with this section, are so eligible having satisfied itself that the material used to produce the biofuels concerned can be considered to be a biodegradable waste, residue, non-food cellulosic material, ligno-cellulosic material or algae ... and one Certificate in the case of all other biofuels"*. The BOS Team maintain a further set of procedures and guidance documents in order to meet this requirement.

Details of the number of applications for BOS Certs and carbon savings received by NORA and of the number of Certs issued and transferred are provided in Section 4. Section 5 reports on compliance with SI 160 of 2017.

In 2018, applications for two BOS Certs per litre were received in respect of five materials: Used Cooking Oil (UCO), Category 1 Tallow, Palm Oil Mill Effluent (POME), Spent Bleached Earth (SBE) and Whey Permeate. Determinations were previously made for all five feedstocks.

3.4 CANCELLING BIOFUEL OBLIGATION CERTIFICATES

Section 44L of the BOS legislation places an obligation on any BOS account holder to whom a BOS Cert was issued in respect of a specific litre of biofuel, to make an application to NORA to cancel such Certs, if the biofuel is subsequently exported from the State. This obligation remains even if the biofuel has been sold to another party and/or the BOS Cert has been transferred to another obligated party. No such request was received by NORA in respect of the 2018 obligation period.

3.5 REVOKING BIOFUEL OBLIGATION CERTIFICATES

Section 44M allows for NORA to revoke a BOS Cert in certain circumstances. Approximately, 42,700 BOS Certs were revoked because of an error in an account holder's OLA returns in May, June, July and August.

3.6 OUT OF DATE CERTIFICATES

All the BOS Certs carried forward from 2016 into 2018 were discharged against the 2018 obligation. Thus, no BOS Certs were rendered invalid as a consequence of being out of date.

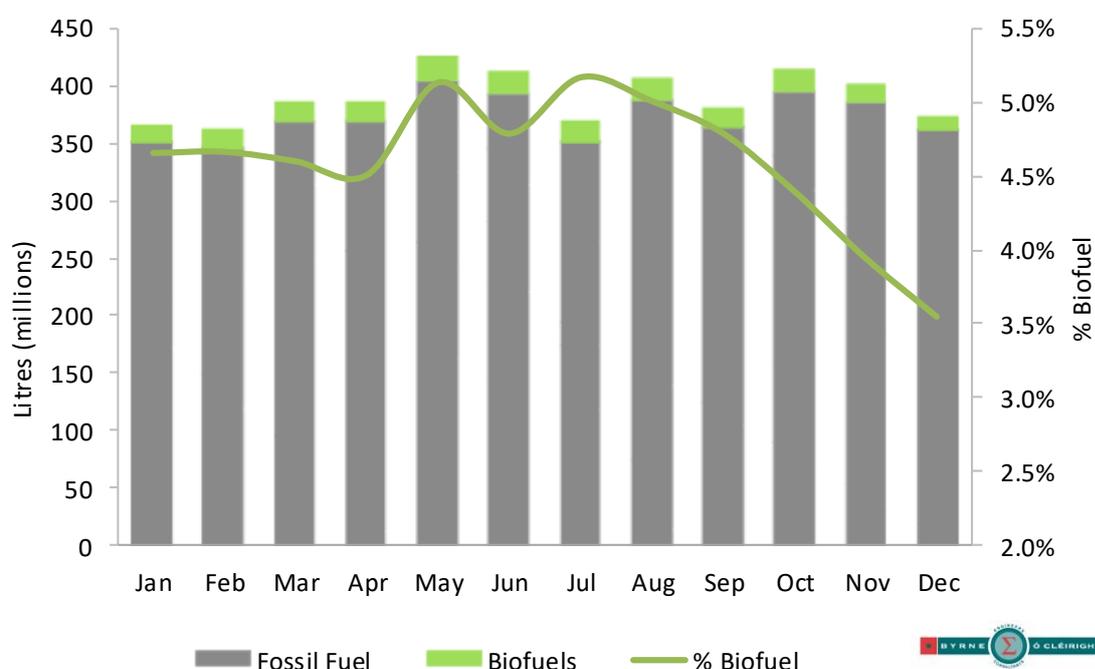
4 COMPLIANCE WITH BOS OBLIGATION

This section of the report analyses the magnitude of the obligation and the level of compliance that was achieved by the obligated parties in respect of the 2018 obligation period. Only the total figures for all BOS participants are shown as otherwise it would be necessary to divulge data that may be commercially sensitive to individual companies. Where the performances of individual participants are illustrated, no identification is provided.

4.1 RELEVANT DISPOSALS

According to the returns made by obligated parties throughout the obligation period – January to December 2018 – the total quantity of road transport fuel disposed of was 4.7 billion litres. Accordingly, the biofuel obligation amounted to 389.9m litres. The distribution of these disposals over the period is illustrated in Figure 3.

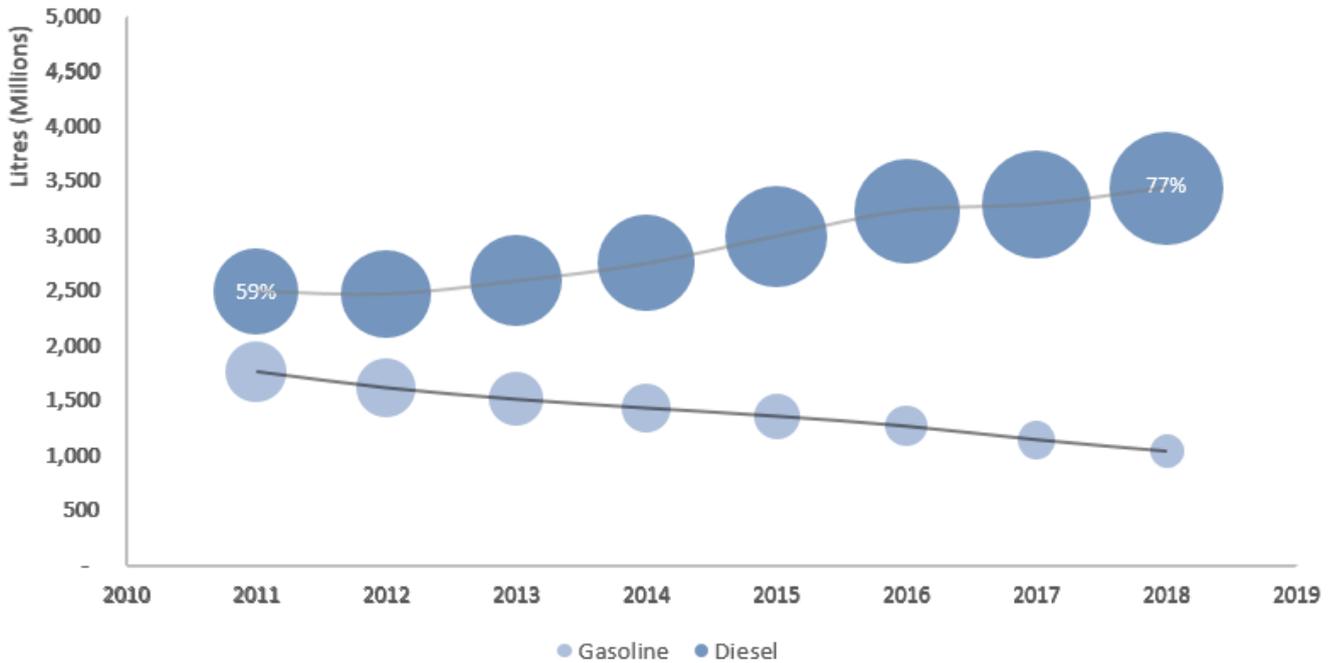
Figure 3: Monthly Disposals of Road Transport Fuel



Average monthly sales of road transport fuels for the 2018 period were approximately 392m litres. This was an increase of approximately 1% in comparison to the average monthly sales in 2017.

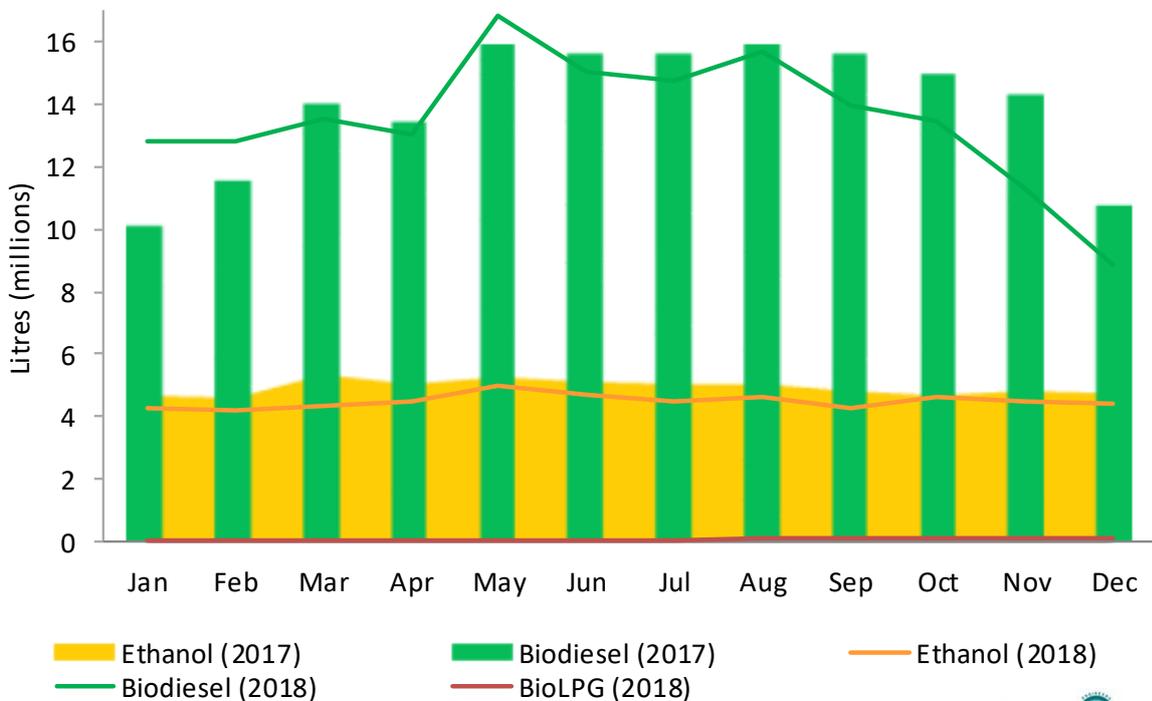
Figure 4 illustrates the trend in the fossil fuel sales since 2011 and the increasing share of diesel in the transport market (illustrated by the size of the circle).

Figure 4: Fossil fuel Sales (2010 – 2018)



The following plot illustrates the breakdown between the monthly disposals of biodiesel and bioethanol for the 2017 and 2018 periods. In total, 216m litres of biofuel were placed on the market in 2018, which was a decrease of 4% in comparison to 2017.

Figure 5: Monthly Disposals of Biofuel



On average over the 2018 period, biodiesel sales represented 75% of the total biofuel sales while bioethanol accounted for 25% (it was 74% biodiesel and 26% bioethanol in 2017) – bioLPG accounted for 0.2% of biofuel disposals in 2018.

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There were some fluctuations in the percentage of biodiesel placed in the market, ranging from a monthly maximum of 5.3% in July to a minimum of 3.1% in December; over the year, the average was 4.5%⁵. The equivalent figure for the 2017 period was 4.8%.

The trend over time for bioethanol and biodiesel disposals, and their relative share of the biofuel market (illustrated by the size of the circles), is shown in Figure 6.

Figure 6: Bioethanol and biodiesel disposals

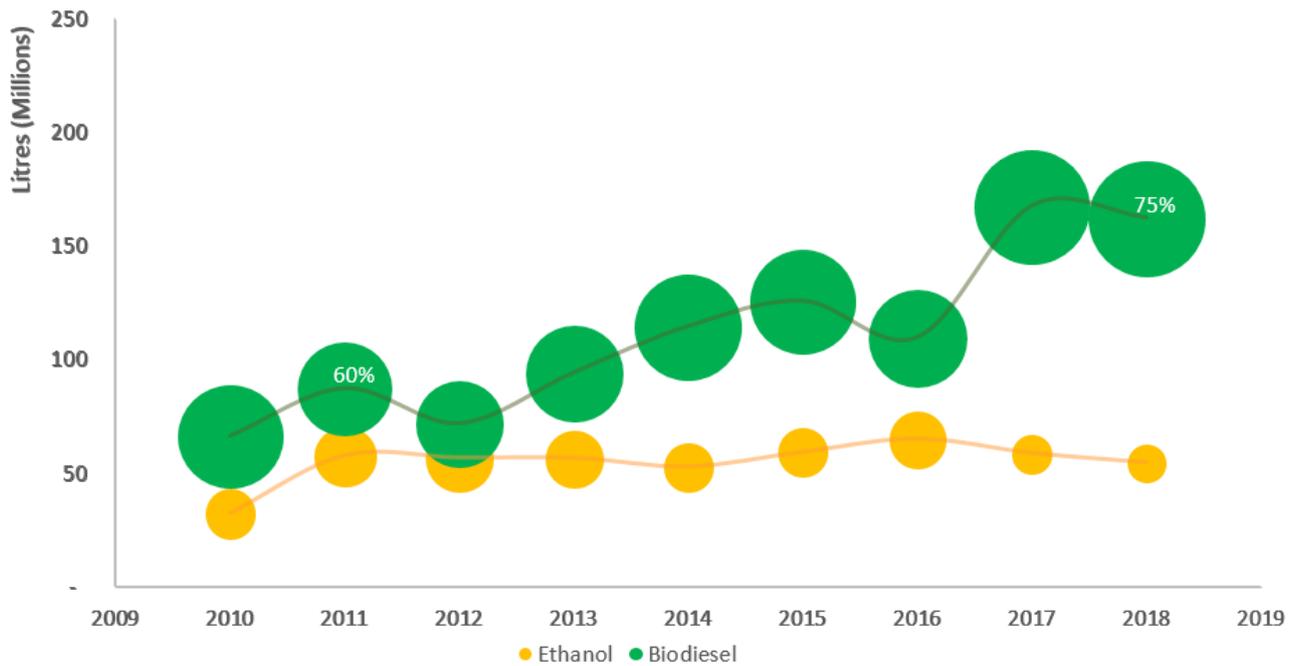


Table 1 provides the data on which Figure 4, Figure 5 and Figure 6 are based.

⁵ As a percentage of the total volume of diesel and biodiesel placed on the market.

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Table 1: Breakdown of disposals, by volume

Year	% Fossil		% Biofuel			% of disposals		
	Diesel	Gasoline	Biodiesel	Bioethanol	BioLPG	Diesel & biodiesel	Gasoline & bioethanol	BioLPG
2011	59	41	60	40		59	40	
2012	60	40	56	44		60	40	
2013	63	37	63	37		63	37	
2014	66	34	69	31		66	34	
2015	69	31	68	32		69	31	
2016	72	28	63	37		71	29	
2017	74	26	74	26		74	26	
2018	76.7	23.3	74.9	24.9	0.2	76.7	23.3	0.01

Since 2011, the first full year of the BOS, the volume of biodiesel placed on the market has increased by 86% and diesel by 37%. While the volume of bioethanol placed on the market has remained relatively static, gasoline disposals have reduced by 41%. This is the first year bioLPG has been placed on the market.

Because gasoline and bioethanol have a lower calorific value (i.e. contain less energy per litre) than diesel and biodiesel, when the breakdown between diesel and gasoline is examined on an energy basis, the reliance on diesel is more pronounced. The annual breakdown is shown in Table 2 for the overall blend.

Table 2: Breakdown of disposals, by energy

Year	% Diesel & biodiesel	% Gasoline & bioethanol
2012	63	37
2013	66	34
2014	69	31
2015	71	29
2016	74	26
2017	77	23
2018	79	21

4.2 BIOFUEL OBLIGATION CERTIFICATES

During the 2018 obligation period, almost 384m Certs were awarded in respect of disposals of 216.5m litres of biofuels. Approximately 162m litres of biodiesel were placed on the market and all of it was awarded two Certs per litre because the feedstock was categorised as a waste or residue.

The Biofuels Obligation Scheme 2018

Of the biodiesel that was double counted, c. 134m litres was produced from UCO (82.6%), 26m litres from Category 1 Tallow (16.1%) and the remainder from Palm Oil Mill Effluent (POME) and Spent Bleached Earth (SBE).

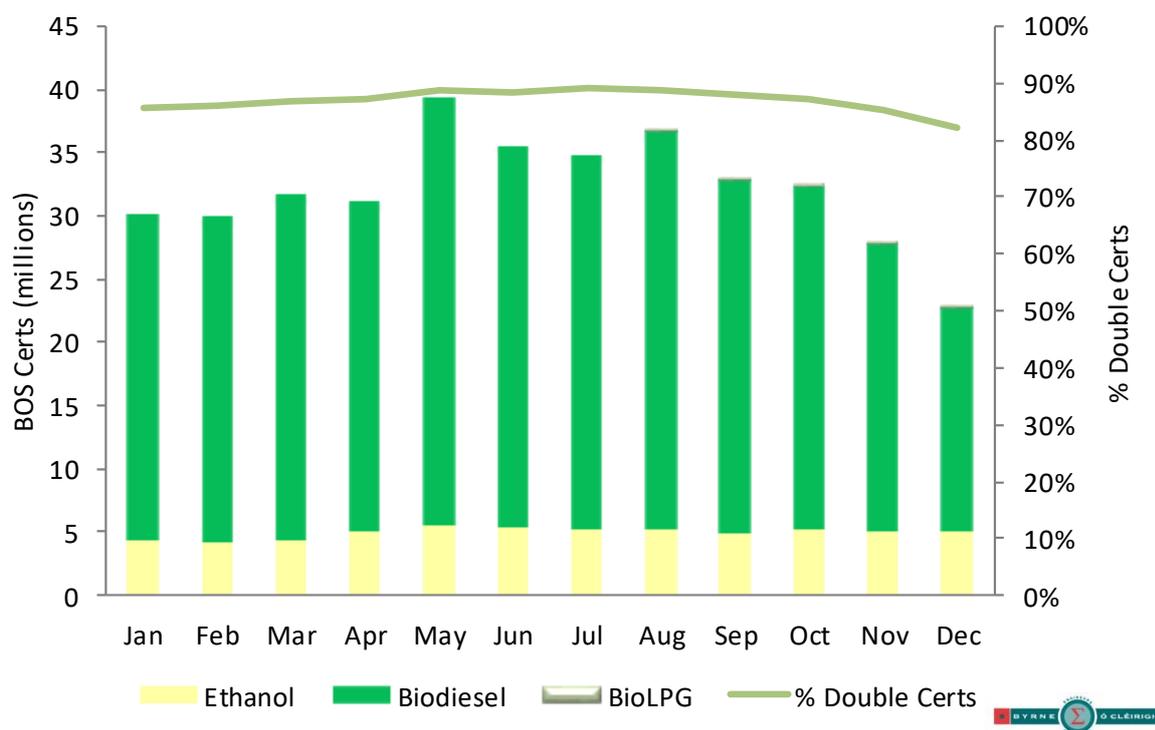
Biodiesel accounted for 75% of the biofuel supplied to the market with bioethanol accounting for 25% – in 2017, the market split was 74% biodiesel and 26% bioethanol. As a consequence of all the biodiesel being awarded two BOS Certs per litre, 84% of BOS Certs awarded in 2018 were in respect of biodiesel disposals.

There was approximately 54m litres of bioethanol placed on the market and 5.3m litres of it was awarded two BOS Certs per litre. All double-counted bioethanol was produced from Whey Permeate.

There was approximately 0.5m litres of bioLPG placed on the market and it was all awarded one BOS Cert per litre as it was all produced from palm oil.

The number of BOS Certs awarded each month is illustrated in Figure 7 (the bioLPG quantities are too small to be displayed on the plot).

Figure 7: No. of BOS Certs Awarded



4.3 BOS ACCOUNT HOLDER POSITION

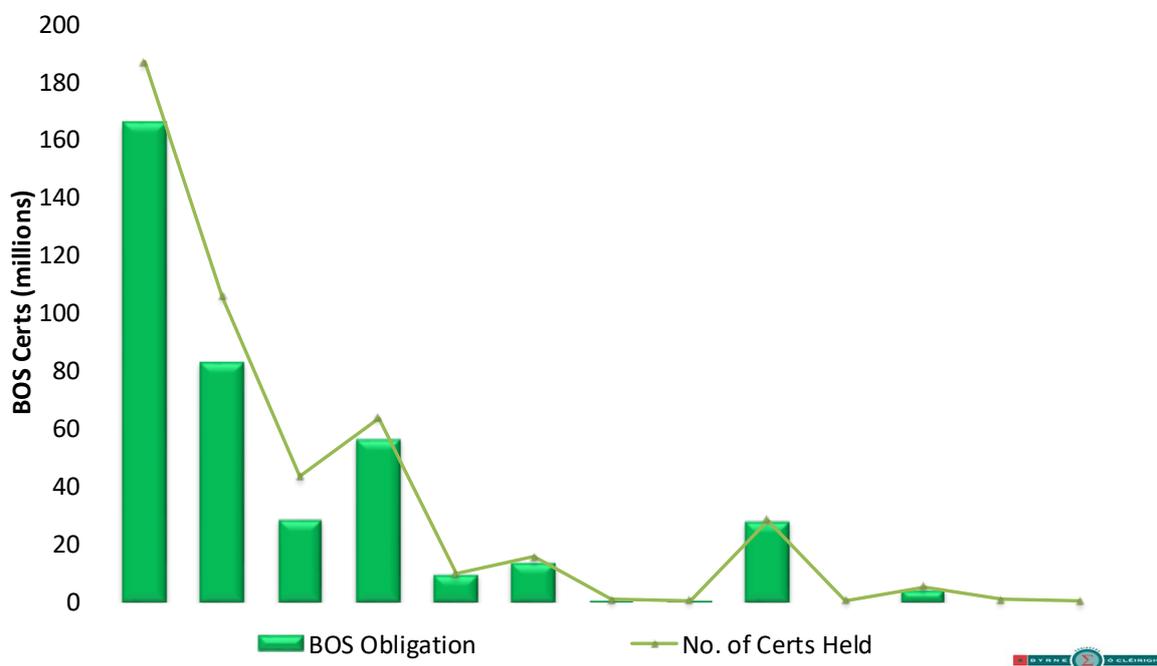
There were fourteen open BOS accounts at the start of 2018: ten were held by obligated parties and four by biofuel producers.

The Biofuels Obligation Scheme 2018

The number of BOS Certs held by each account holder at the time of discharge and their respective obligations are illustrated in Figure 8. The party with the largest biofuel obligation was required to surrender approximately 166m Certs.

Companies that chose to participate in the BOS because they are producers or suppliers of biofuels do not have a biofuel obligation as they are not liable for the NORA Levy on fossil fuel disposals. If they wish to claim the BOS Certs in their own name, they must pay the Biofuel Levy. Between them, the four biofuel producers / suppliers paid the Levy on approximately 10m litres of biofuel and were awarded 19.4m Certs; this represents 5% of BOS Certs awarded in 2018.

Figure 8: 2018 Biofuel Obligation

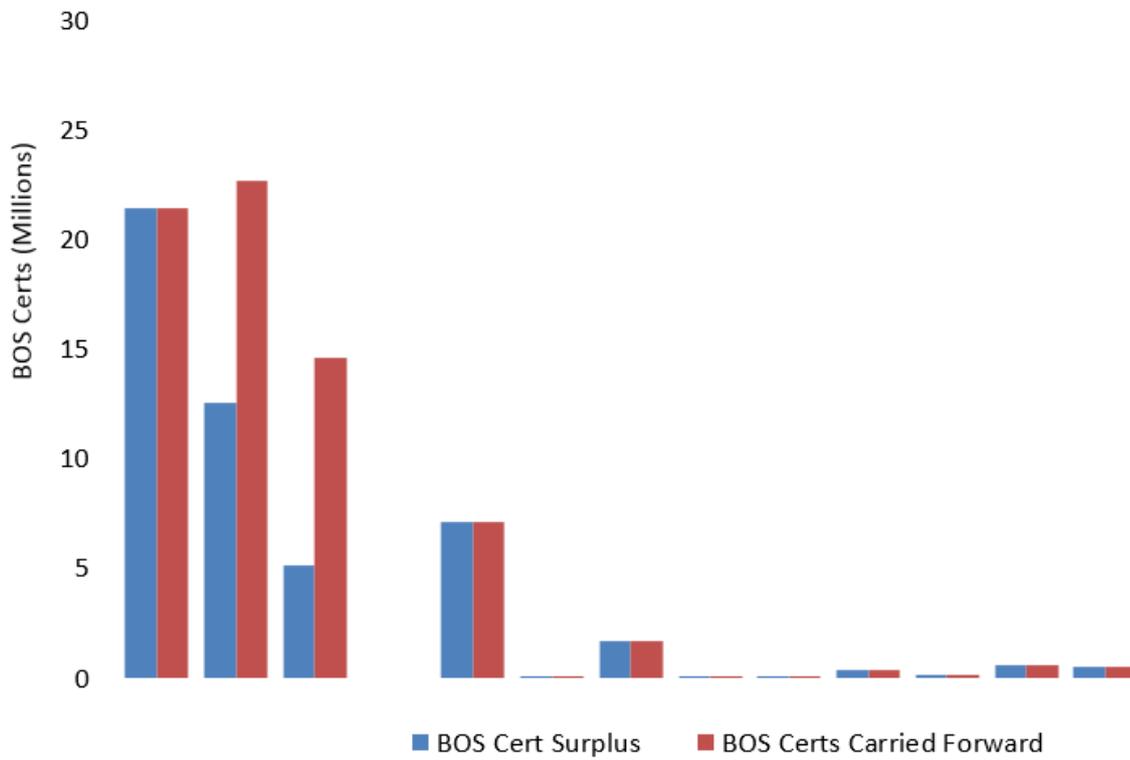


There were approximately 75m Certs carried forward to the 2018 obligation period, of which 20m were from the 2016 period and 55m from the 2017 period. Certs from previous periods represented 16% of all Certs held at the end of the 2018 period. All the 2016 Certs were discharged against the 2018 obligation.

Figure 9 shows the surplus positions for each account holder and the number of BOS Certs carried forward to the 2019 obligation period. The surplus represents the Certs held in excess of the biofuel obligation less those Certs that could not be discharged because of the 25% limit – the Certs carried forward includes those Certs held in excess of the 25% limit.

The Biofuels Obligation Scheme 2018

Figure 9: BOS Cert Surplus & Carried Forward



No account holder was in a deficit position. There were three companies in particular that carried over significant quantities of BOS Certs, accounting for 85% of all the Certs carried forward.

4.4 OVERALL PERFORMANCE AGAINST OBLIGATION

Table 3 provides a breakdown of the key BOS metrics.

Table 3: BOS Metrics

Description	Unit	Value
Total disposal of petroleum-based, road transport fuel*	litres	4,484,063,282
<i>Gasoline</i>	litres	1,041,376,950
<i>Diesel</i>	litres	3,442,686,332
Total disposal of biofuel**	litres	216,491,980
<i>biofuel as bioethanol</i>	litres	53,868,503
<i>biofuel as biodiesel</i>	litres	162,101,602
<i>bioLPG</i>	litres	521,875
Volume of biofuel for which one BOS Cert per litre was issued	litres	49,107,671
Volume of biofuel for which two BOS Certs per litre were issued	litres	167,395,424
Volume of biofuel for which BOS Certs were rejected	litres	0
No. of BOS Certs Revoked	Certs	42,764
Volume of biofuel (levy-paid) for which BOS Certs went unclaimed	litres	10,249
Number of BOS Certs required to meet obligation	Certs	389,889,302
Total number of BOS Certs issued during 2018	Certs	383,855,755
Number of BOS Certs carried forward from previous period	Certs	75,088,661
Surplus of BOS Certs***	Certs	49,466,210
Liability for Buy-out Charge	€	0
Number of BOS Certs no longer valid	Certs	0
Number of valid BOS Certs carried forward to 2019 period	Certs	69,055,114
<p>* This is the quantity on which the NORA Levy was paid.</p> <p>** This is the quantity on which the Biofuel Levy was paid.</p> <p>*** This does not include those Certs that could not be discharged because an account holder exceeded the 25% limit.</p>		

The volume of biofuel produced from biodegradable waste, residue, non-food cellulosic material, ligno-cellulosic material or algae, i.e. wastes and residues, represented 77% of the biofuel supplied to the market during the 2018 period. When the biofuel produced from wastes and residues is counted twice, the amount of biofuel placed on the market as a percentage of petroleum-based road transport fuels was 8.56%. When the BOS Certs carried forward from the 2016 and 2017 periods are included, this value increases to 10.24%. Against this, the obligation was 8.695%. Consequently, c.69m BOS Certs have been carried forward to the 2019 period.

4.5 BIOFUEL FEEDSTOCK

Table 4 overleaf provides a breakdown of all the biofuel feedstocks reported in the sustainability statements and their country of origin. Most of the feedstocks are sourced from Europe (63%). The country to supply the greatest quantity of feedstocks for biofuels placed on the Irish market was China (21.5%); 11.3% was sourced from Ireland.

It is also worth noting that almost 62% of all the biofuel placed on the market in Ireland is produced from UCO.

Figure 10 on page 21 illustrates the locations from which the biofuel feedstocks are sourced and the proportion that comes from those locations.

The Biofuels Obligation Scheme 2018

Table 4: Breakdown of Source of Biofuel Feedstocks

Country of Origin	Bioethanol										Biodiesel						Total					
	EC Corn		Non-EC Corn		Sugar Beet		Wheat		Whey Permeate ¹		UCO ¹		Cat 1 Tallow ²		POME		SBE ¹		BioLPG			
	ECCORN		NECCOR		SBEET		WHEAT		WHEYP		UCO		TALL1		POME		SBE		PALM			
	(l)	%	(l)	%	(l)	%	(l)	%	(l)	%	(l)	%	(l)	%	(l)	%	(l)	%	(l)	%		
United Arab Emirates	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	385,787	0.3%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	385,787	0.2%
Argentina	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	330,111	0.2%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	330,111	0.2%
Australia	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	373,641	0.3%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	373,641	0.2%
Austria	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	4,658	0.0%	73,245	0.3%	-	0.0%	-	0.0%	-	0.0%	77,903	0.0%
Belgium	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	229,087	0.2%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	229,087	0.1%
Bulgaria	-	0.0%	-	0.0%	-	0.0%	369	0.0%	-	0.0%	1,666,009	1.2%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	1,666,378	0.8%
Bahrain	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	12,217	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	12,217	0.0%
Canada	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	233,499	0.2%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	233,499	0.1%
Switzerland	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	72,317	0.3%	-	0.0%	-	0.0%	-	0.0%	72,317	0.0%
Chile	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	350,107	0.3%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	350,107	0.2%
China	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	46,423,049	34.7%	25,551	0.1%	-	0.0%	-	0.0%	-	0.0%	46,448,600	21.5%
Colombia	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	1,337,608	1.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	1,337,608	0.6%
Czech Republic	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	206,339	0.8%	-	0.0%	-	0.0%	-	0.0%	206,339	0.1%
Cyprus	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	15,814	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	15,814	0.0%
Germany	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	1,240,980	0.9%	2,278,121	8.7%	-	0.0%	-	0.0%	-	0.0%	3,519,101	1.6%
Denmark	-	0.0%	-	0.0%	-	0.0%	2,549,358	18.5%	-	0.0%	33,879	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	2,583,237	1.2%
Ecuador	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	23,851	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	23,851	0.0%
Egypt	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	488,046	0.4%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	488,046	0.2%
Spain	7,368,569	36.4%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	25,150,071	18.8%	229,293	0.9%	-	0.0%	-	0.0%	-	0.0%	32,747,933	15.1%
France	5,807,284	28.7%	-	0.0%	1,760,106	100.0%	11,047,518	80.0%	-	0.0%	1,326,784	1.0%	608,974	2.3%	-	0.0%	-	0.0%	-	0.0%	20,550,666	9.5%
United Kingdom	-	0.0%	-	0.0%	-	0.0%	207,012	1.5%	-	0.0%	6,231,507	4.7%	6,582,175	25.2%	-	0.0%	-	0.0%	-	0.0%	13,020,694	6.0%
Greece	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	5,417,348	4.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	5,417,348	2.5%
Hong Kong	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	2,511,800	1.9%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	2,511,800	1.2%
Hungary	499,531	2.5%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	499,531	0.2%
Indonesia	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	273,237	0.2%	-	0.0%	1,290,711	69.5%	-	0.0%	-	0.0%	1,563,948	0.7%
Ireland	-	0.0%	-	0.0%	-	0.0%	-	0.0%	5,272,430	100.0%	4,506,583	3.4%	14,744,561	56.5%	-	0.0%	-	0.0%	-	0.0%	24,523,574	11.3%
Israel	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	449	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	449	0.0%
Italy	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	33	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	33	0.0%
Jordan	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	500	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	500	0.0%
Japan	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	16,768	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	16,768	0.0%
Cambodia	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	13,716	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	13,716	0.0%
Kuwait	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	207,976	0.2%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	207,976	0.1%
Lebanon	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	4,725	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	4,725	0.0%
Lithuania	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	97,198	0.4%	-	0.0%	-	0.0%	-	0.0%	97,198	0.0%
Luxembourg	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	77,697	0.1%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	77,697	0.0%
Morocco	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	577	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	577	0.0%
Malaysia	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	2,636,017	2.0%	-	0.0%	567,597	30.5%	269,898	100.0%	521,857	100.0%	3,995,369	1.8%
Netherlands	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	4,672,725	3.5%	404,766	1.6%	-	0.0%	-	0.0%	-	0.0%	5,077,491	2.3%
Peru	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	73,916	0.1%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	73,916	0.0%
Poland	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	706,665	2.7%	-	0.0%	-	0.0%	-	0.0%	706,665	0.3%
Puerto Rico	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	257,915	0.2%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	257,915	0.1%
Portugal	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	312,221	0.2%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	312,221	0.1%
Qatar	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	1,068	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	1,068	0.0%
Romania	6,589,385	32.5%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	1,673,231	1.2%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	8,262,616	3.8%
Russia	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	8,356	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	8,356	0.0%
Saudi Arabia	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	1,435,059	1.1%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	1,435,059	0.7%
Singapore	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	353,726	0.3%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	353,726	0.2%
Slovakia	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	3,959,180	3.0%	52,890	0.2%	-	0.0%	-	0.0%	-	0.0%	4,012,070	1.9%
Sweden	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	73	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	73	0.0%
Thailand	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	172,319	0.1%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	172,319	0.1%
Trinidad & Tobago	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	188,484	0.1%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	188,484	0.1%
Tunisia	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	159,115	0.1%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	159,115	0.1%
Turkey	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	48,570	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	48,570	0.0%
Taiwan	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	8,427,624	6.3%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	8,427,624	3.9%
Ukraine	2,508	0.0%	12,754,169	100.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	12,756,677	5.9%
United States	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	10,334,914	7.7%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	10,334,914	4.8%
Viet Nam	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	216,495	0.2%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	216,495	0.1%
South Africa	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	93,571	0.1%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	93,571	0.0%
TOTAL	20,267,277	9.4%	12,754,169	5.9%	1,760,106	0.8%	13,804,257	6.4%	5,272,430	2.4%	133,912,693	61.9%	26,082,095	12.0%	1,858,308	0.9%	269,898	0.1%	521,857	0.0%	216,503,090	100%

1. Eligible for double counting

4.6 VOLUNTARY SCHEMES

While there are currently 14 EU approved Voluntary Schemes in operation, biofuel from only one Voluntary Scheme was reported in BOS Sustainability Statements: ISCC (International Sustainability and Carbon Certification).

With the exception of a very small quantity of biodiesel produced from UCO, all of the biofuel placed on the Irish market was covered by ISCC.

4.7 GHG SAVINGS

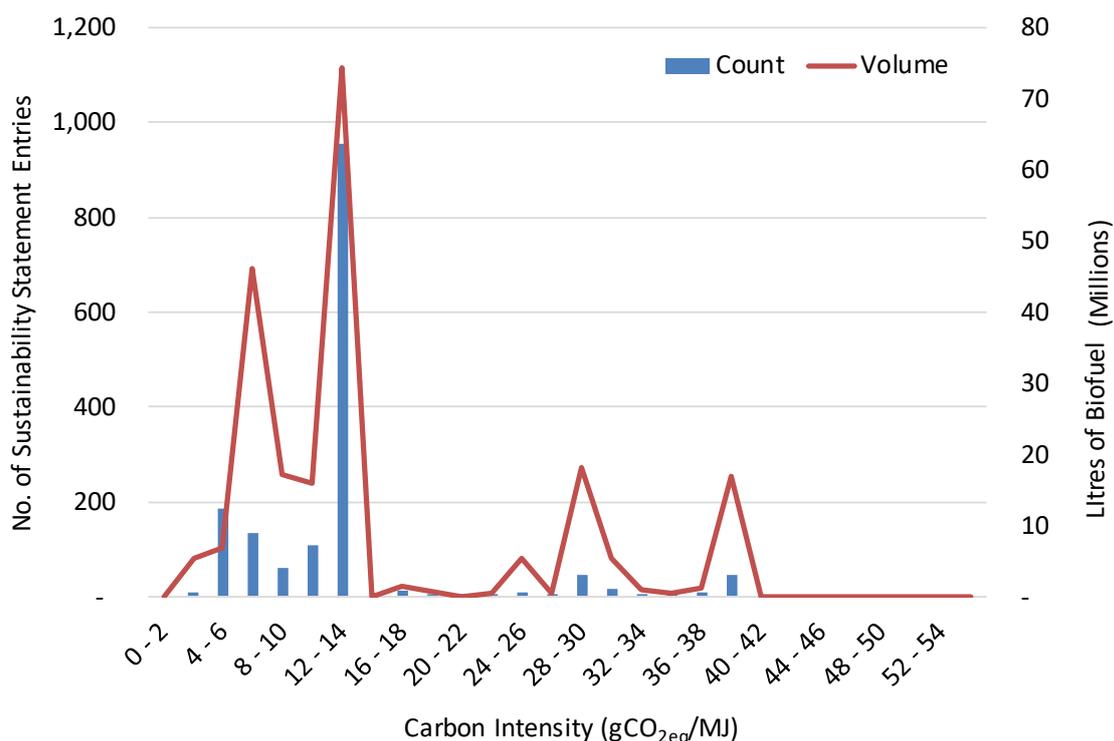
4.7.1 Overview

A central requirement of the RED and the Sustainability Regulations is that biofuels achieve a 50% reduction in carbon intensity (GHG emissions) in comparison to fossil fuels⁶. The average litre of biofuel placed on the market in Ireland in 2018 had a life cycle carbon intensity of c. 14.5 gCO_{2eq} / MJ, which represents an 83% reduction in comparison to road transport fossil fuel.

There was c.1,600 individual consignments (entries) reported in the sustainability statements. The volume reported in each entry ranged from of a single litre of biofuel to over three million litres. The following plot illustrates the range of carbon intensity values reported and how those in the 12 – 14 gCO_{2eq} / MJ range dominate. (The bar chart represents the number of entries; the line represents the volume of biofuel.)

⁶ A baseline carbon intensity of 83.8 gCO_{2eq} / MJ for petrol and diesel is specified in Annex V of the RED. The GHG savings requirement was increased to 50% for 2018.

Figure 11: Profile of Carbon Intensities



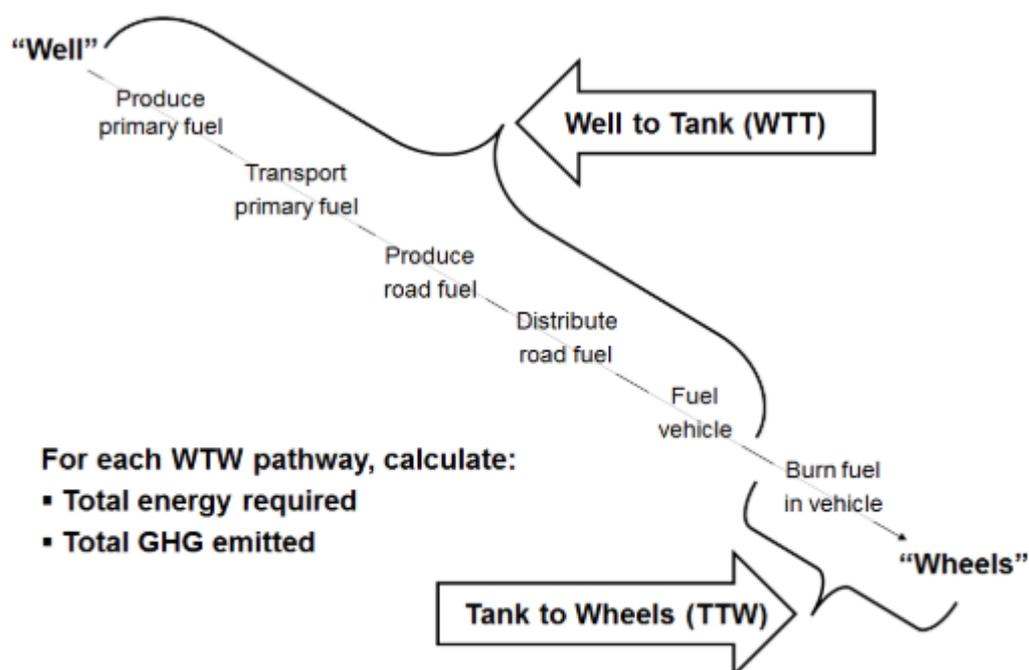
There is no methodology provided in the RED for calculating the national GHG savings. In previous Annual Reports, the BOS Team’s approach has been to calculate the GHG emissions from the biofuels placed on the market and compare that to the total GHG emissions that would have been emitted from the road transport sector⁷ had there been no biofuels consumed. Taking into account the lower calorific content of biofuel in comparison to fossil fuel⁸, c. 184m litres of fossil fuel were displaced by biofuel as a consequence of placing 216m litres of biofuel on the market. Based on an average biofuel carbon intensity of 14 gCO_{2eq} / MJ and using the fossil fuel comparator provided in Annex V of the RED (83.8 gCO_{2eq}/MJ), substituting fossil fuel with biofuel resulted in a reduction of c. 451k tonnes of CO_{2eq} emissions.

This equates to an overall saving of 3.3 % in GHG emissions from the road transport sector as a consequence of achieving a biofuel penetration rate of 4.6%, by volume. It is worth noting that these emission savings are over the life cycle of the fuel, which includes, *inter alia*, feedstock extraction and cultivation, fuel production, transportation and consumption – the calculation methodology is set out in Annex V of the RED. For biofuels, the emissions from using the fuel are assumed to be zero. The concept is illustrated in Figure 12 and is different from tailpipe, or tank-to-wheel, emissions.

⁷ While the RED requires energy consumed in road and rail to be taken into account, the BOS only applies to road transport.

⁸ 32 & 36 MJ/litre for gasoline and diesel versus 21 & 33 MJ/litre for bioethanol and biodiesel, respectively. The calorific value of bioLPG is 26 MJ/litre.

Figure 12: Well-to-wheel (WTW) illustration



Graphic representation of Well-to-Wheels Analysis

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The Fuel Quality Directive (FQD) (6), which also applies to road transport fuel, requires a 6% reduction in carbon intensity by 2020, and does not permit double counting. The FQD specifies a method for calculating the reduction in carbon intensity in order to demonstrate compliance with the FQD⁹. For 2018, a 2.7 % reduction in carbon intensity was calculated using the FQD methodology, which is a decrease on the 2.9% reduction achieved in 2017. Compliance with the FQD is described further in Section 5.

4.7.2 Analysis of Sustainability Statements

Article 17 of the RED specifies that a biofuel must achieve a 50% reduction in carbon intensity, which equates to a maximum carbon intensity value of 41.9 gCO_{2eq} / MJ. There were no instances found in the sustainability statements of biofuels with carbon intensities above 41.9 gCO_{2eq} / MJ. The following tables illustrate the range of carbon intensities of the fuel types (Table 6) and the feedstocks (Table 7) that were reported in the sustainability statements in 2018.

⁹ Directive 2015/652, published in April 2015, specifies the calculation method. Article 7a of the FQD was transposed into Irish law by SI 160 of 2017.

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Table 5: Range of carbon intensity reported in sustainability statements, by fuel type

Fuel Type	Description	Carbon Intensity (g CO _{2eq} /MJ)			Default Values ¹⁰
		Min	Avg	Max	
ME	Methyl Ester ¹¹ (Biodiesel)	4	12	27	14.2 ¹²
EtOH	Bioethanol	12	29.9	40	-
BioLPG	LPG produced from biomass	17			-

Table 6: Range of Carbon Intensity Reported in Sustainability Statements, by Feedstock

Fuel Type	Feedstock	Description	Carbon Intensity (g CO _{2eq} /MJ)			Default Values
			Min	Avg	Max	
Bioethanol	ECCORN	Corn – EC	22	30.5	31	42.7
	NECCOR	Corn – Non EC	24	30.9	38	-
	WHEAT	Wheat	25	38.2	40	-
	WHEYP	Whey permeate	12	13.1	17	-
	SBEET	Sugar Beet	27	38.1	40	40.2
Biodiesel	UCO ¹³	Used Cooking Oil	4	11.7	14	14.2
	TALL1	Tallow – Category 1	8	13.5	14	14.2
	SBE	Spent Bleached Earth	8			-
	POME	Palm Oil Mill Effluent	8	13.4	27	-
BioLPG	PALM	Palm Oil	17			-

The following table lists those biofuel feedstocks for which *actual* carbon intensity values were reported for the entire fuel supply chain or the cultivation step, as opposed to reporting the default values from Annex V of the RED.

¹⁰ The Default Values from Annex V of the RED are reported where available.

¹¹ Aka Fatty Acid Methyl Ester, or FAME

¹² The default value from Annex V of the RED is 14.2 gCO_{2e} / MJ (17% of fossil fuel comparator (83.8 gCO_{2eq} / MJ)). The UK & Ireland carbon calculator default value for waste animal or vegetable oil (i.e. UCO or Tallow) is 14 gCO_{2eq} / MJ

¹³ UCO is classified at both the Fuel Type level and at the Feedstock level. For example, an account holder may choose 'Biodiesel ME' as the fuel type and 'UCO' as the Feedstock.

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Table 7: Breakdown of actual carbon intensity values reported, by feedstock

Fuel Type	Feedstock	Description	Total Volume (l)	Volume Reported as Actual Values* (l)	Volume Reported as Actual Values (%)
Bioethanol	ECCORN	Corn – EC	20,267,277	20,267,277	100
	NECCOR	Corn – Non EC	12,754,169	12,754,169	100
	WHEAT	Wheat	13,804,257	13,597,245	98.5
	SBEET	Sugar Beet	1,760,106	135,243	7.7
	WHEYP	Whey permeate	5,272,430	5,272,430	100
Biodiesel	UCO	Used Cooking Oil	133,912,693	77,516,315	57.9
	TALL1	Tallow – Category 1	26,082,095	3,318,283	12.7
	SBE	Spent Bleached Earth	269,898	269,898	100
	POME	Palm Oil Mill Effluent	1,858,308	1,858,308	100
BioLPG	PALM	Palm Oil	512,857	512,857	100
*Actual values were used for the entire fuel chain or for the cultivation step.					

In all cases where actual carbon intensity values were reported, a Voluntary Scheme was also reported. This is significant because under Article 18 (7) of the RED, once an account holder provides proof that the data submitted in a Sustainability Statement is covered under a Voluntary Scheme, the Member State is not entitled to investigate further the provenance of the biofuel¹⁴.

4.8 AUDITING COMPLIANCE WITH THE BOS ACT

Auditing of compliance by oil companies, oil consumers and biofuel producers with the biofuel obligations under the BOS Act 2010 was carried out in Q2 and Q3 2018.

The Summary Audit Report (9) describes the findings from the plenary, desk-based audit and the on-site audits, and contains recommendations on what actions could be undertaken to rectify any errors that were found. It also makes recommendations on what improvements could be made to the systems and procedures for submitting and processing the levy returns and applications for BOS Certs.

The audit reconciliation showed that, even though the magnitude of the discrepancies were relatively small, there were still inconsistencies between the purchases and sales values reported. These inconsistencies were examined further during the on-site audits which were carried out on four account holders.

¹⁴ In fact the wording of the RED is more restrictive as it expressly **prohibits** Member States from requiring economic operators (account holders) to provide further evidence of compliance with the Sustainability Criteria, if the economic operator can provide proof that the biofuel is covered by a Voluntary Scheme that was approved by the Commission.

The audit team also carried out desk-based investigations on several discrepancies that were identified in the plenary audit.

In most cases, the BOS account holders were well prepared for the audits and were able to substantiate the data contained in the Levy Return and in the applications for BOS Certs. However, one account holder inadvertently reported selling the same quantity of diesel twice and, because the sale was on a levy-unpaid basis, there was a Levy underpayment of c. €95k. The audit team also examined a complicated commercial and reporting arrangement between three companies which gave rise to a Levy overpayment of c. €58k on gasoil.

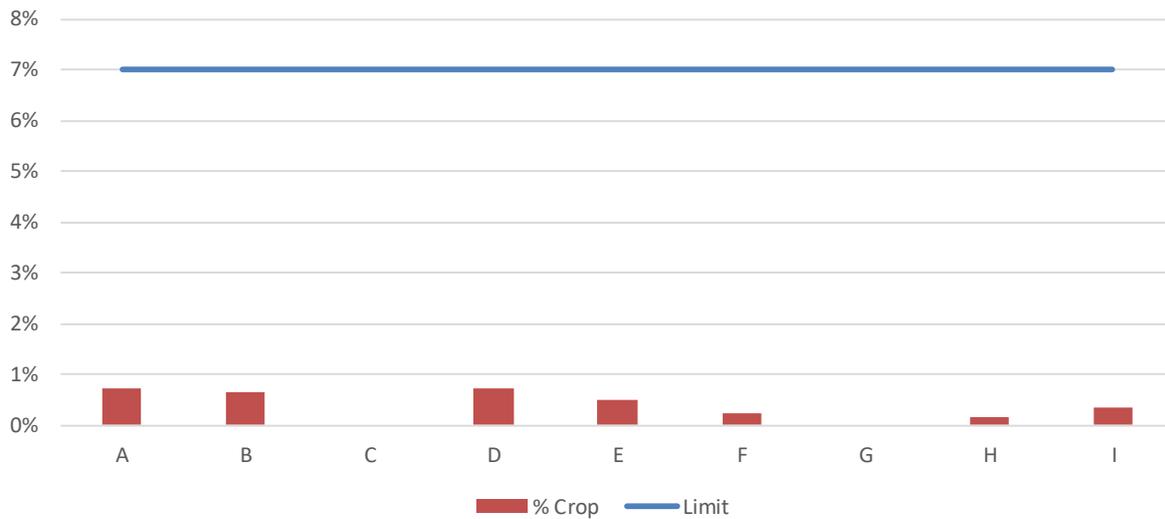
4.9 CROP CAP

The ILUC Directive limits the contribution from biofuels produced from *cereal and other starch-rich crops, sugars and oil crops and from crops grown as main crops primarily for energy purposes on agricultural land* to 7% of final energy consumption in transport in 2020. This limit was transposed into Irish law by SI 169 of 2018. The limit is not, however, imposed on fuel suppliers, i.e. fuel suppliers may rely on all crop-based biofuels placed on the market to meet their BOS obligations.

Total energy consumption in road transport in 2018 was 163.7 PJ. There were 49.1m litres of crop-based biofuels placed on the market in 2018 (shown in Table 7), which equates to approximately 1 PJ. Thus, crop-based biofuels contributed <1% towards final energy consumption in road transport – if the energy consumed in rail was also included, the contribution of crop-based biofuels would reduce marginally.

For illustrative purposes, crop-based biofuels are awarded Red Certs in the BOSOS. This categorisation of Certs by feedstock allows account holders to readily identify the type of biofuel being placed on the market and prepares them for when a crop cap will likely become a fuel supplier obligation post-2020. Figure 13 shows the performance of the account holders in 2018.

Figure 13: Performance against crop cap



4.10 ADVANCED BIOFUEL TARGET

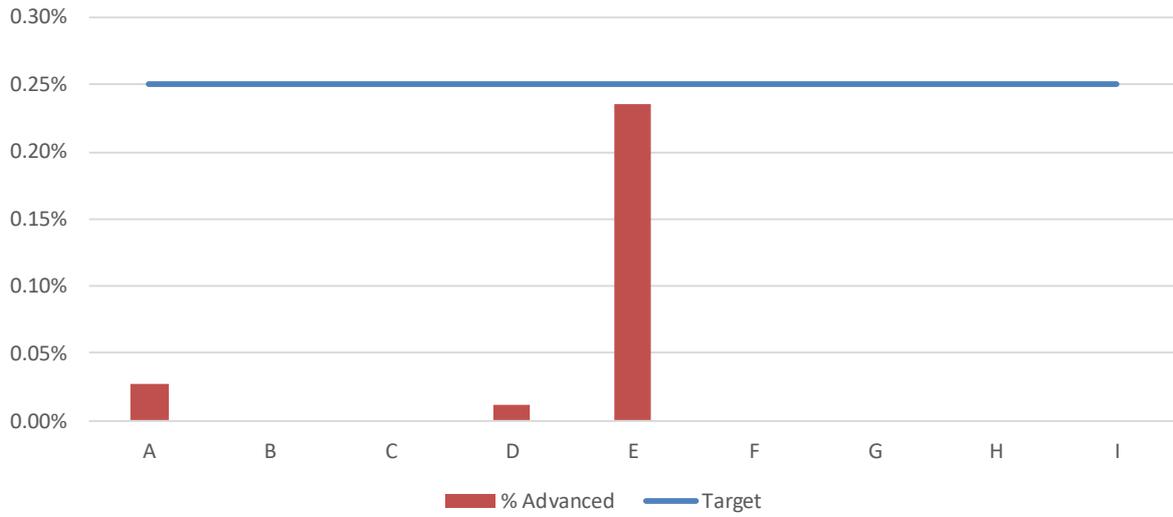
The ILUC Directive set a target of 0.5% for Member States for biofuels produced from Annex IX Part A feedstocks – the so-called ‘advanced biofuel target’. SI 169 of 2018 transposed this requirement, but set a lower national target of 0.25%, which is facilitated by the Directive under certain circumstances. As is the case with the crop cap, the advanced biofuel target is not imposed on fuel suppliers, i.e. fuel suppliers are not required to place biofuels produced from Annex IX Part A feedstocks on the market in order to meet a 0.25% target.

Total energy consumption in road transport in 2018 was 163.7 PJ. There were 2.1m litres of advanced biofuels placed on the market in 2018 (POME and SBE, shown in Table 7), which equates to approximately 0.08 PJ after double counting. Thus, advanced biofuels contributed approximately 0.05% towards final energy consumption in road transport – if the energy consumed in rail was also included, the contribution of advanced biofuels would reduce marginally.

For illustrative purposes, advanced biofuels are awarded Green Certs in the BOSOS. Figure 14 shows the performance of the account holders in 2018.

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Figure 14: Performance against advanced biofuel target



5 COMPLIANCE WITH FQD

5.1 OVERVIEW

Article 7a of the FQD was transposed into Irish law in April 2017 by SI 160. It requires fuel suppliers to achieve a 6% reduction in the greenhouse gas (GHG) intensity of fuels used in road vehicles, and non-road mobile machinery, agricultural and forestry tractors, and recreational craft, in 2020. It is anticipated that most of this target will be reached by substituting biofuel for fossil fuel. The FQD requires biofuels to satisfy the same sustainability criteria as the RED, if they are to be counted towards the 6% target. Thus, there is a significant overlap in how the FQD and RED will achieve their respective targets, i.e. both require significant volumes of sustainable biofuel to be placed on the market.

The BOS is the primary means by which Ireland has implemented the 10% RED target for renewable energy in the transport sector; it is now also used to administer compliance with the 6% FQD target. The fuel suppliers responsible for complying with SI 160 of 2017 are, in general, the same companies responsible for complying with the BOS. The BOSOS has been modified to cater for reporting and administering compliance with the FQD. Applications for BOS Certs are now a combined BOS Cert and carbon savings application. The BOSOS also accepts applications for carbon savings from electricity used in electric vehicle (EVs) and upstream emission reductions (UERs).

The carbon intensity reduction target for each fuel supplier is 6% in 2020 – there is no target for 2018 or 2019. As is the case with the BOS where Certs can be transferred between account holders, fuel suppliers can trade carbon savings to assist with meeting the 6% target. However, unlike the BOS, there is no double counting provisions contained in SI 160 for complying with the 6% target and there is no mechanism for buying-out an obligation.

5.2 PROGRESS TOWARDS TARGET

While there is no 2018 target, companies achieved between 85% and -1.1% carbon intensity reductions over the 2018 period.

Negative savings arise where companies place predominately diesel on the market and little or no biofuel or gasoline. The methodology for calculating compliance with the 6% target uses the Fuel Baseline Standard (FBS) of 94.1 gCO_{2eq}/MJ as the comparator against which progress is measured. The carbon intensity of diesel is 95.1 gCO_{2eq}/MJ; thus, relative to the FBS, diesel generates a negative saving of 1.1%.

While the FQD is a fuel supplier obligation, if all the suppliers are considered as one, a carbon intensity reduction of 2.7% was achieved in 2018. There was no carbon savings from electricity consumed in EVs or UERs claimed in 2018. If data on gasoil consumed in non-road mobile machinery, agricultural and forestry tractors, and recreational craft were included, the carbon intensity reduction achieved would be less.

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Data on gasoil and diesel consumption in non-road mobile machinery, agricultural and forestry tractors, and recreational craft are also included in the scope of the FQD 6% reduction target. While these data are not yet captured in OLA or the BOSOS, work is underway to modify both systems to gather it.

Based on the 2018 data, achieving the 6% carbon intensity reduction in 2020 will require an additional 500 kt of carbon savings which could be generated by placing approximately 400m litres of biofuel on the market (in 2018, 216m litres were supplied). To achieve the 11% BOS obligation, approximately 250m to 280m litres of biofuel will be required¹⁵. This is substantially short of the 400m litres required to achieve the 6% reduction target and would result in a carbon intensity reduction of approximately 4%. In the absence of biofuels, carbon savings can be generated by claiming for electricity consumed in EVs and UERs.

¹⁵ This is an estimate – it will depend on, *inter alia*, the quantity of biofuel double-counted, and the quantity of Certs carried forward and set-off against the 2020 obligation.

6 OBSERVATIONS ON OPERATING BOS

Overall, the BOS functioned as designed during 2018: applications for BOS Certs and carbon savings were submitted on time on a quarterly basis; account holders achieved their obligations; and changes to the systems were implemented in accordance with the legislation.

6.1 CHANGES DURING 2018

There were several changes made to the BOS during 2017 and 2018 which manifest in a modified BOSOS being launched in May 2018. There were two fundamental aspects to the changes:

1. BOS Certs are now categorised as Green, Orange or Red;
2. The BOSOS caters for compliance with SI 160 of 2017.

These changes were communicated at BOS briefing sessions and via various notices issued in advance of the modifications taking effect. The purpose of item 1 is to prepare the systems for future RED II requirements for new crop-based biofuel limits and advanced biofuel targets, and to prepare account holders for these new requirements. Categorising Certs has caused some confusion among account holders, primarily because the limits and sub-targets are not in effect at present and progress towards the limits and targets are for illustrative purposes only.

Because the 6% carbon intensity reduction required by SI 160 only applies in 2020, there has been no transfers of carbon savings, or applications for carbon savings from electricity consumed in EVs or UERs. Complying with the 6% carbon intensity reduction target will present a significant challenge for fuel suppliers.

6.2 UPCOMING CHANGES

6.2.1 *Biofuel Obligate Rate Change*

The biofuel obligation was 8% in 2018 and has increased to 10% for 2019; it will increase again in 2020 to 11%. The legislative requirement will be 12.359%, i.e. for every 89 litres of fossil fuel that is placed on the road transport market, an obligated party must have 11 certificates.

6.2.2 *Additional Fuels*

To facilitate SI 160 of 2017, additional fuels will need to be reported to the BOSOS via OLA. SI 160 encompasses fuels used in road vehicles, and non-road mobile machinery, agricultural and forestry tractors, and recreational craft – the BOS includes for diesel and gasoline used in road vehicles only. Therefore, OLA will be expanded to facilitate reporting

of, *inter alia*, gasoil used for transport, CNG used for transport, LPG used for transport and other renewable fuels that come on the market, such as biomethanol.

6.2.3 RED II

A revised Renewable Energy Directive (RED II) setting new targets for renewable energy sources was published in December 2018. RED II builds upon the approach and the concepts contained in the RED; ultimately its objective is to put in place measures to assist the EU with reducing greenhouse gas emissions, in compliance with the Union's commitment under the 2015 Paris Agreement on Climate Change and the Union 2030 energy and climate framework. Other elements of overarching importance are developing renewable heating and cooling, and renewable transport fuels. RED II sets a 14% target for renewable energy in transport by 2030. There are various sub-targets and constraints that are designed to transition the biofuel market away from crop-based biofuels, and from UCO and tallow derived biofuels, to advanced biofuels (i.e. those predominately produced from wastes and residues). From an administrative perspective, RED II will impact the operation of the BOS and it will require changes to its systems and procedures. While the extent of the operational changes required appear to be relatively modest, until the Directive is transposed into national law, this is not certain.

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