Department for Transport

Renewable Transport Fuel Obligation Annual Report

2023

CP 1300

April 2025

Renewable Transport Fuel Obligation Annual Report 2023

Presented to Parliament by the Secretary of State for Transport by Command of His Majesty

April 2025

CP 1300

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Executive summary

Introduction

1. This report has been produced to ensure transparency in the financial reporting of the Renewable Transport Fuel Obligation (RTFO). As the RTFO is classified as an imputed tax and spending measure, it is not reported within the Department for Transport's Annual Report and Accounts.
2. The RTFO is one of the Government's main policies for reducing greenhouse gas (GHG) emissions from transport in the UK. It requires that a certain percentage of UK road and non-road transport fuel supplied is renewable and that it meets the sustainability criteria.

Outturn for 2023

3. The total value of the RTFO, which comprises an imputed tax for 2023, is **£2,165.2 million**. This is calculated as the difference between the cost of renewable fuels supplied and the fossil fuels they have replaced, combined with the cost of buyouts from suppliers who did not meet their main obligation, development fuel obligation, or both. See section 4 for more details.

Forecasts

4. The forecast total value of the RTFO for 2024 is **£2,036.5 million**. The driver for the decrease in the outturn is a fall in fuel price spreads (the price difference between a renewable fuel and a fossil fuel alternative). See section 5 for more details.

Scheme outcomes

5. In 2023, the average GHG saving from the renewable fuels supplied under the RTFO was 81.5% compared to fossil fuels, representing a total saving of 7.9 million tonnes of CO_2e (equivalent)[1, 2].

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[1] https://www.gov.uk/government/statistics/renewable-fuel-statistics-2023-final-report

[2] These greenhouse gas estimates reflect well-to-wheel (fuel lifecycle) emissions and as a result differ to UK carbon budget reporting accounting. This includes Scope 1 (the emissions of combustion), Scope 2 emissions from electricity, Scope 3 (emissions from feedstock cultivation, fuel production, transport and distribution, etc). More complete detail can be found in the published RTFO Compliance Guidance.

6. The RTFO is meeting its objective of reducing GHG emissions from UK transport fuel. To be eligible for reward under the RTFO, renewable fuels must meet mandatory sustainability criteria. The RTFO is designed and managed to ensure a high level of compliance with its requirements. For more details on the outcomes of the scheme, see section 6.

Signature and assurance review

7. This report is signed by the Second Permanent Secretary, Department for Transport (section 2). The outturn figure for 2023 has been subjected to an assurance review (see section 3) by the National Audit Office (NAO) on behalf of the Comptroller and Auditor General, in line with the Direction issued by HM Treasury.

1. Introduction

Purpose of this report

1.1 This report has been produced to ensure transparency in the financial reporting of the Renewable Transport Fuel Obligation (RTFO). The transactions generated by the RTFO are not income or expenditure attributable to the Department for Transport (DfT) and the RTFO is not reported within the Department's Annual Report and Accounts as its inclusion would not be compliant with the Government's Financial Reporting Manual.

1.2 This report gives an outturn figure for the value of the RTFO for the 2023 Obligation year (January to December) alongside the outcomes for the scheme. A forecast is also given for the 2024 RTFO year. The National Audit Office (NAO) on behalf of the Comptroller and Auditor General has subjected the 2023 outturn data within this report to an assurance review: the assurance report is included on page 12.

1.3 The RTFO obligation applies to fuel supplied on a calendar year basis (1 January – 31 December). Fuel suppliers have until 15 September the following year to redeem RTFCs for the fuel supplied during the previous calendar year. This means that for the 2023 obligation year, suppliers could redeem certificates against their obligation until 15 September 2024. After this deadline buyout values are calculated for any unmet obligation and the reporting year is essentially closed. Following the closure of the reporting year, final statistics for the 2023 compliance year were compiled and published in November 2024. These statistics are used to inform this annual report, which are reviewed by the NAO prior to publication in spring the following year (2025).

The RTFO

1.4 The RTFO is one of the Government's main policies for reducing greenhouse gas (GHG) emissions from transport in the UK, supporting the Government to meet its future carbon budget targets[3].

[3] https://www.gov.uk/guidance/carbon-budgets

1.5 The RTFO requires that a certain percentage of UK road and non-road transport fuel is renewable and provides a valuable incentive for the renewable transport fuel industry which contributes towards meeting this obligation. The scheme started in 2008 and has been amended over the years to strengthen sustainability provisions, increase targets and introduce greater incentives for certain feedstocks and fuel types.

1.6 For the 2023 obligation year, fossil and renewable fuels used in road transport and non-road transports (such as non-road mobile machinery, or NRMM) were covered by the RTFO, as well as renewable fuels used in aircraft and renewable fuels of non-biological origin used in maritime (see paragraph 1.18).

1.7 The RTFO operates with tradable certificates. These are called Renewable Transport Fuel Certificates (RTFCs) and are awarded to suppliers of renewable transport fuel that meet the sustainability requirements. To be awarded, suppliers must provide evidence to the Administrator demonstrating that their fuel is sustainable.

1.8 All applications for RTFCs must be independently verified and most fuel supplied is produced in supply chains which are also certified by voluntary schemes (96.1% in 2023). To provide an additional check on compliance, the Administrator performs a series of random and risk-based checks on applications, including in-depth investigations where necessary.

1.9 Obligated fuel suppliers to the UK market[4] are required to demonstrate that renewable transport fuel has been supplied for a set proportion of their total obligated fuel supply. For the 2023 obligation year, fuel suppliers were required to demonstrate this by redeeming RTFCs equivalent to 13.078% of the volume of fossil and unsustainable renewable fuel supplied. Suppliers could meet this obligation by redeeming certificates that they received from supplying renewable transport fuels or by redeeming certificates that they bought from other suppliers of renewable transport fuel.

1.10 A crop cap[5] was introduced from 15 April 2018 to reduce the potential effects of indirect land use change (ILUC), a knock-on effect on expansion of agricultural land use resulting from the cultivation of biofuel feedstocks. From 1st January 2019 onwards, a target was introduced for a specific sub-set of advanced fuels termed 'development fuels' which are awarded separate development fuel RTFCs (dRTFCs).

1.11 The development fuel target takes into account the fuel type, production pathway and feedstock, and aims to incentivise those fuel pathways which need greater support and fit the UK's long-term strategic needs. Eligible fuels include aviation fuel, drop in fuels, hydrogen and synthetic natural gas. This target requires that obligated suppliers provide a proportion of their total obligated fuel supply as development fuels. For 2023 this proportion was 1.142%.

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[4] Those supplying at least 450,000 litres per year.

[5] The crop cap sets an upper limit, by volume, on the contribution that crop-derived biofuels, excluding dedicated energy crops, can make towards discharging a supplier's obligation. The crop cap decreases year on year and in 2023 was 3.50% of the total fuel supplied by a given fuel supplier.

1.12 If suppliers do not have sufficient certificates to discharge their obligation, they are required to buy-out of their obligation, paying 50 pence per litre of renewable transport fuel for which they have not redeemed an RTFC, or 80 pence per litre for the development fuel target. This protects consumers from excessive increases in fuel prices by setting a maximum value for RTFCs. Any receipts from suppliers that buy-out are surrendered by the Department to the Exchequer, in line with HM Treasury rules. Buy-out receipts are not hypothecated.

1.13 Fuel suppliers can meet up to 25% of their obligation with certificates issued in the previous year. This reduces the impact of unexpected events and provides some protection against year-to-year volatility of fuel prices.

1.14 The RTFO guidance[6] sets out information on complying, reporting, and verifying with the RTFO process for renewable and fossil fuel suppliers as well as independent verifiers.

1.15 Figure To ensure the scheme meets its objectives, it is important to ensure compliance risks are mitigated. The RTFO's assurance regime 1.8uses a combination of third-party verification, voluntary scheme certification, and Administrator checks to provide assurance over the sustainability and traceability of fuels supplied under the RTFO. This combination of third-party verification, voluntary scheme certification and admin checks are designed to provide a level of assurance over the sustainability and traceability of fuels supplied under the RTFO judged to be reasonable in the context of the risks to and objectives of the Scheme. If non-compliance is found after certificates have been rewarded, this can result in the revocation of certificates. The RTFO also have the power issue civil penalties for non-compliance in reporting, failing to meet deadlines or make buyout payments. The Administrator also works proactively with other regulators and assurance/certification entities to address emerging issues and concerns.

1.16 DfT publishes data relating to the RTFO in regular renewable fuel statistics releases[7]. These reports are prepared and published following the Code of Practice for statistics[8]. The reports contain wide-ranging information on the renewable fuels supplied under the RTFO such as fuel type, feedstock, country of origin, and GHG savings achieved. Section 6 of this Annual Report provides a summary of this information.

1.17 The Government Internal Audit Agency (GIAA) periodically audits the RTFO scheme processes. The most recent audit, completed on 12 September 2023 assessed how effectively the RTFO scheme utilises voluntary schemes, in the context of third-party assurance. The audit examined control processes in place for using such schemes and evaluated the level(s) of assurance provided by certifying bodies. Previous internal audits include one in December 2020, which reviewed the role of certifying bodies working on behalf of voluntary schemes, and another in 2018, which focused on the RTFO Unit's approach to risks and risk scoring. All recommendations from

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[6] https://www.gov.uk/government/publications/renewable-transport-fuel-obligation-rtfo-compliance-reporting-and-verification

[7] https://www.gov.uk/government/collections/renewable-fuel-statistics

[8] https://code.statisticsauthority.gov.uk/

these audits have been addressed and incorporated into the standard operating procedures.

Recent Updates to the RTFO

1.18 Updates to the RTFO were introduced from January 2022. This included a 5.0% increase in the main obligation between 2021 and 2032 with an immediate 1.5% increase in 2022. The land criteria were strengthened to protect highly biodiverse wooded land and new criteria were established to address the impacts of biofuels made from forest biomass and to manage soil carbon impacts associated with using agricultural residues in biofuel production. The amendments also expanded the eligible transport modes from January 2022 so that renewable fuels of non-biological origin used in maritime as well as in fuel cell powered trains and other alternatively powered non-road vehicles are eligible for support in the form of RTFCs.

1.19 E10 petrol, which contains between 5.5% and 10% bioethanol, was introduced in UK forecourts from September 2021, replacing E5 as the standard blend of petrol. This change enables greater quantities of bioethanol to be used in transport helping suppliers to meet increased obligations and increasing overall GHG savings.

2. Sign-off of report

2.1 As an Accounting Officer for the Department for Transport I am responsible for ensuring that there is a high standard of financial management, including a sound system of internal control and effective financial systems. This responsibility includes the Renewable Transport Fuel Obligation (RTFO). I am content that appropriate financial controls over the RTFO are in place and that sufficient checks and reviews have been made to produce accurate and reliable financial data within Section 4 of this report, based on the most up-to-date data available at the time of producing the report. The assurance review by the National Audit Office, on behalf of the Comptroller and Auditor General, relates to the 2023 outturn. I have taken all reasonable steps to be aware of and provide necessary information to the auditors and I am not aware of any additional relevant information.

Jo Shanmugalingam

7 April 2025

Second Permanent Secretary

Department for Transport

Great Minster House

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3. Assurance report

Renewable Transport Fuel Obligation Order (2007) Annual Report - Assurance Report 2023

INDEPENDENT ASSURANCE REPORT TO THE SECRETARY OF STATE FOR TRANSPORT IN RELATION TO THE DISCLOSURE OF THE ADDITIONAL COST OF RENEWABLE TRANSPORT FUEL SUPPLIED UNDER THE RENEWABLE TRANSPORT FUEL OBLIGATION

I have evaluated through a reasonable assurance engagement, the disclosure of the outturn related to the additional cost of renewable transport fuel supplied under the Renewable Transport Fuel Obligation (RTFO) included as Section 4. Outturn for 2023 (Subject to an assurance review) in the Renewable Transport Fuel Obligation Scheme Annual Report for the year ended 31 December 2023.

Subject matter, criteria and limitations

3.1 The Secretary of State for Transport is required by a direction issued by HM Treasury, as an imputed tax and spend measure, to prepare an annual report in respect of the RTFO scheme established under the Renewable Transport Fuel Obligations Order 2007 (as amended). Included within this report at Section 4, the outturn for 2023 (Subject to an assurance review), is a disclosure of the outturn related to the additional cost of renewable transport fuel supplied under the RTFO scheme for the period 1 January 2023 to 31 December 2023. This disclosure is derived from a model designed by the Department for Transport, with observable inputs.

3.2 I have reviewed the output of the model and considered the adequacy with which the model derives a figure for the additional cost of renewable transport fuel supplied under the RTFO scheme. I have considered whether the disclosure has been properly prepared in accordance with HM Treasury direction.

3.3 My review extended only to providing reasonable assurance on the disclosures made for the period 1 January 2023 to 31 December 2023 and confirming that they have been prepared in accordance with the HM Treasury direction. My historic evaluation is not relevant to future periods due to the risk that the model may become inadequate because of changes in conditions.

Specific purpose of this assurance report

3.4 This report has been prepared to provide the Secretary of State with reasonable assurance that Section 4, Outturn for 2023 (Subject to an assurance review), shows the outturn related to the additional cost of renewable transport fuel supplied under RTFO scheme for the period 1 January 2023 to 31 December 2023 is both fairly stated and properly prepared in accordance with the HM Treasury direction.

Responsibilities

3.5 The Second Permanent Secretary on behalf of the appointed administrator, the Secretary of State for Transport, is responsible for:

- preparing Section 4, Outturn for 2023 (subject to an assurance review), the outturn related to the additional cost of renewable transport fuel supplied under RTFO, and for being satisfied this note is fairly stated;
- providing the auditor with access to all information of which management is aware that is relevant to the preparation of the RTFO Annual Report such as records, documentation and other matters;
- providing the auditor with additional information and explanations needed for the assurance engagement;
- providing the auditor with unrestricted access to persons involved in preparation of the RTFO Annual Report from whom the auditor determines it necessary to obtain audit evidence; and
- ensuring such internal controls are in place as deemed necessary to enable the preparation of the RTFO Annual Report to be free from material misstatement, whether due to fraud or error.

3.6 My responsibility is to gather appropriate evidence to support an opinion on Section 4, Outturn for 2023 (Subject to an assurance review), the outturn related to the additional cost of renewable transport fuel supplied under RTFO, in accordance with *International Standards on Assurance Engagements (UK) 3000*, Assurance Engagements Other than Audits or Reviews of Historical Financial Information.

Performance of the engagement in accordance with *International Standards on Assurance Engagements (UK) 3000*, Assurance Engagements Other than Audits or Reviews of Historical Financial Information

3.7 I performed a reasonable assurance engagement in accordance with International Standards on Assurance Engagements (UK) 3000, Assurance Engagements Other than Audits or Reviews of Historical Financial Information issued by the Financial Reporting Council. The objective of a reasonable assurance engagement is to perform such procedures as to obtain information and explanations which I consider necessary in order to provide me with sufficient appropriate evidence to express a

positive conclusion on the disclosure. No other section of the annual report has been evaluated under this engagement.

Quality control and compliance with ethical standards

3.8 I apply *International Standards on Quality Management (UK)* and in particular, *International Standard on Quality Management (UK) 1, Quality Management for Firms that perform audits or reviews of Financial Statements, or other Assurance and Related Service Engagements*. Accordingly, I maintain a comprehensive system of quality management. The system of quality management includes assessing risk against our quality objectives and implementing suitable controls and responses to management these identified risks including documented policies and procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirements.

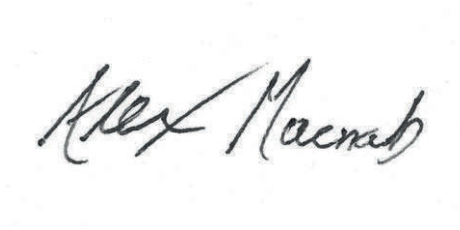
3.9 I have complied with the Financial Reporting Council's *Revised Ethical Standard 2024*, which is founded on fundamental principles of integrity, objectivity, professional competence and due care, confidentiality and professional behaviour. I am independent of the Department for Transport in accordance with the ethical requirements that are relevant this assurance engagement in the UK.

Summary of work performed

3.10 The additional cost of renewable transport fuel is estimated using a cost model. My assurance work included an examination of this cost model, to confirm that this is consistent with its intended function and that its inputs are consistent with the underlying source data. I also made enquiries with management as to the controls surrounding the collection of data where it was from internal sources.

Conclusion

3.11 In my opinion, Section 4, Outturn for 2023 (Subject to an assurance review) of the RTFO annual report, showing the outturn related to the additional cost of renewable transport fuel supplied under the RTFO scheme for the period 1 January 2023 to 31 December 2023, is both fairly stated and properly prepared in accordance with HM Treasury direction.



Alex Macnab **09 April 2025**

Director

National Audit Office

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4. Outturn for 2023 (subjected to an assurance review)

RTFO outturn	
RTFO outturn for 2023	**£ 2,165.2 million**

Table 1 RTFO outturn 2023

Cost estimation methodology and data sources

4.1 The RTFO requires that a certain percentage of UK road and non-road transport fuel supplied is renewable. The majority of fuels deployed through this mechanism are biodiesel (39.3% of renewable fuel supply in 2023, when including biodiesel methyl ester (ME) and off-road biodiesel), which is typically blended into fossil diesel and bioethanol (38.1% of renewable fuel supply in 2023), which is typically blended into fossil petrol.

4.2 Renewable fuels have historically been more expensive than fossil fuels. Fuel suppliers/retailers are likely to pass some of these additional costs onto the final consumer. Renewable fuels also tend to have lower energy content per litre, so the use of renewable fuels increases the cost of motoring.

4.3 This price difference between fossil fuels and renewable fuels can be observed in the market. The Department receives renewable fuels market price data that is produced weekly by 'Argus Media', a leading global provider of market data[9].

4.4 We have estimated the cost imposed by the RTFO using monthly volumes of renewable fuels as reported through the RTFO statistics[10] and price differentials as reported through Argus Media's market reports. To take account of the lower energy content of renewable fuels, we compare fuel costs in terms of £/MJ and not £/litre,

[9] https://www.argusmedia.com/en
[10] https://www.gov.uk/government/collections/renewable fuels-statistics

based on energy density factors quoted in the RTFO Standard Data[11]. The outturn also includes the cost of buy-outs required to meet the main and development fuel obligation.

4.5 Since the biodiesel price varies depending on the feedstock, we have generated separate estimates for biodiesel from different feedstocks. For bioethanol, there is just one market price and no distinction between feedstocks. For the remaining renewable fuels that are not bioethanol or biodiesel, pricing information is not readily available. We have used proxies for these small-volume fuels, based on their closest substitute fuels.

4.6 The outturn for 2023 (£2,165.2 million) is significantly lower than the outturn for 2022 (£2,701.2 million). The largest factor driving this is the decrease in the price differential, as the price of renewable fuels relative to fossil fuels has decreased on average across the year. With an increasing development obligation target and supply over time, this has resulted in a higher absolute buy-out (£331.2m in 2023 versus £281.0m in 2022). This has partly offset the decrease in scheme costs caused by the decreased in the price differential. The buy-outs as a proportion of the total scheme cost has increased from 10.4% in 2022 to 15.3% in 2023, both because in absolute terms the price differential is lower, and because the development fuel buy-outs are larger.

4.7 The 2023 report has been conducted on an annual basis, in line with all previous reports but differing from the 2018 RTFO reporting year which ran from 15th April 2018 to 31st December 2018.

[11] https://www.gov.uk/government/publications/renewable-transport-fuel-obligation-rtfo-compliance-reporting-and-verification

5. Forecasts

Future RTFO value	
RTFO forecast for 2024	**£ 2,036.5 million**

Table 2 Future RTFO value forecast

Cost estimation methodology and data sources

RTFO Forecast for 2024

5.1 The forecast for 2024 (£2,036.5 million) has been modelled using the same methodology and data sources as the outturn for 2023:

- Data was extracted in November 2024, at which point fuel supply volumes were available from January to October. For this forecast, volumes are taken from January to July due to a lag in certified data for the August-October period. At this point, RTFCs had been issued to 72.2% of the renewable fuel so far supplied. Detailed feedstock information is unavailable until RTFCs have been awarded. To increase the reliability of the data for January to July 2024, we have estimated what the fuel supply looks like by mapping uncertified fuel supplied volumes onto the 72.2% of fuels already certified, assuming most of the fuel already supplied will eventually become certified (historically nearly 100% of fuel supplied is certified). The supply for the remaining months of the year (August – December 2024) was assumed to be the monthly average of fuel supplied from January to 14th July 2024.
- Actual price data, extracted from Argus Media, was available from January to November 2024. December 2024 data had not been fully observed when the analysis was produced, so is assumed to be equal to November 2024.
- The forecast for 2024 includes the cost of buy-outs required to meet the development fuel obligation for forecasted fossil fuel supply, whilst assuming that enough certificates will be carried over to cover the main obligation. Whilst we assume more development fuels are supplied in 2024 compared to 2023, the development fuel obligation increases more, leading to higher assumed buy-out in 2024 than 2023.

5.2 The main driver for the forecasted decrease in 2024 from 2023 is the anticipated fall in price spread (the price differential of a renewable fuel to a fossil fuel alternative) compared to 2023. This can be seen in Figure 1 whereby fuel supplied by month has been similar to the 2023 year but in Figure 2 the cost has decreased.

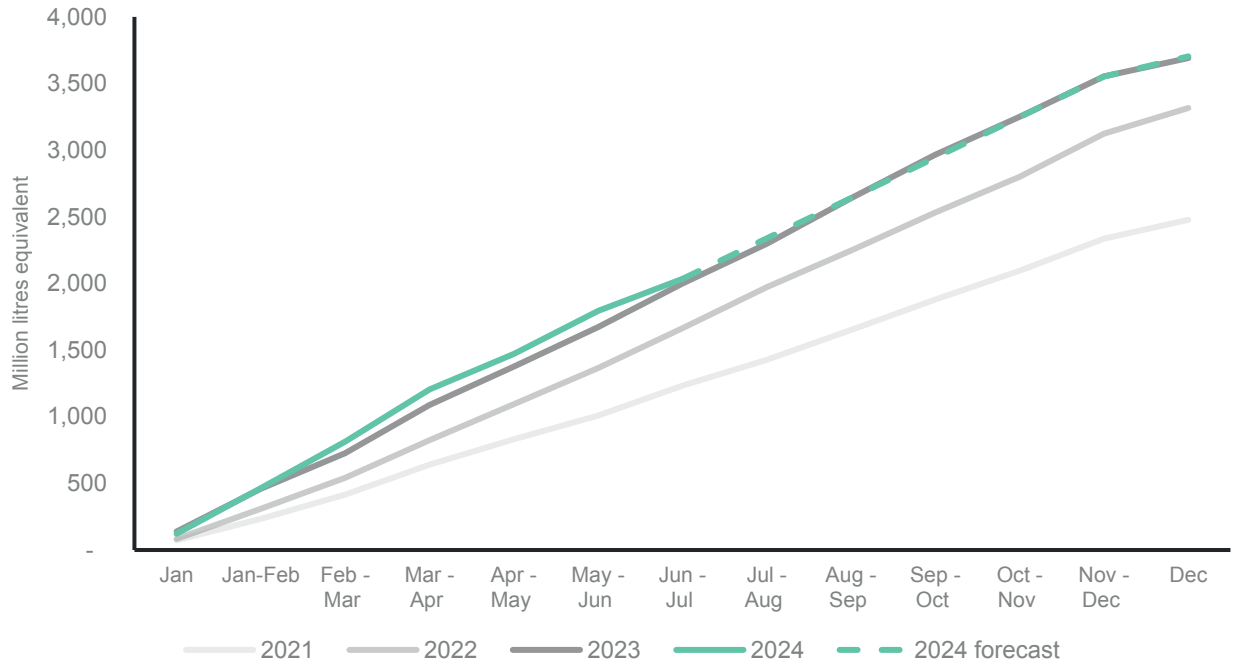


Figure 1 Cumulative renewable fuel supplied to the UK by month and year, with the year 2024 highlighted. Dotted lines indicate a linear extrapolation from the 2024 data which has been received to date. Please note that all "months" run from the 15th of one month to the 14th of the next (Jan - Feb covers 15th January to 14th February), apart from Jan (which runs from 1st January to 14th January) and Dec (which runs from 15th December to 31st December)

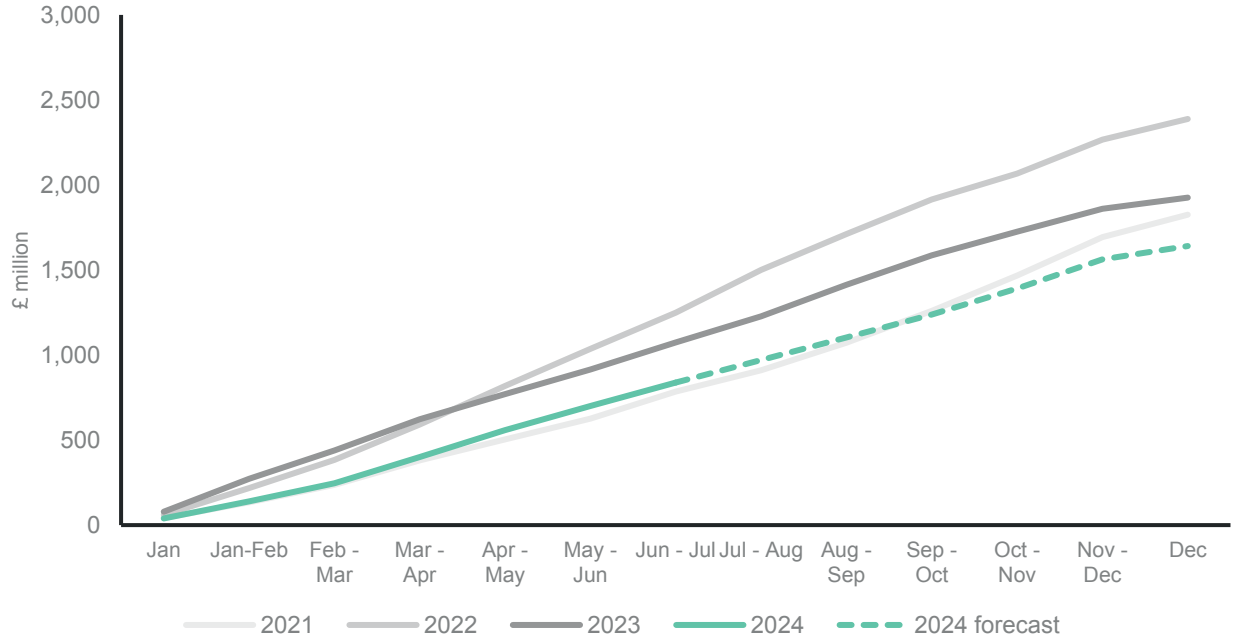


Figure 2 Cumulative cost of renewable fuel supplied for use in the UK by month and year in million pounds, with the year 2024 highlighted. Dotted lines indicate a linear extrapolation from the 2024 data which has

been received to date. Please note that all "months" run from the 15th of one month to the 14th of the next, apart from Jan (which runs from 1st January to 14th January) and Dec (which runs from 15th December to 31st December)

5.3 Thirdly, the expectation for buy-outs in 2024 is £395.4m, increasing as a proportion of the overall scheme in 2024 (see Figure 3). This is due to the increase in development obligation compared to the assumed increase in production of development fuel during the 2024 reporting period.

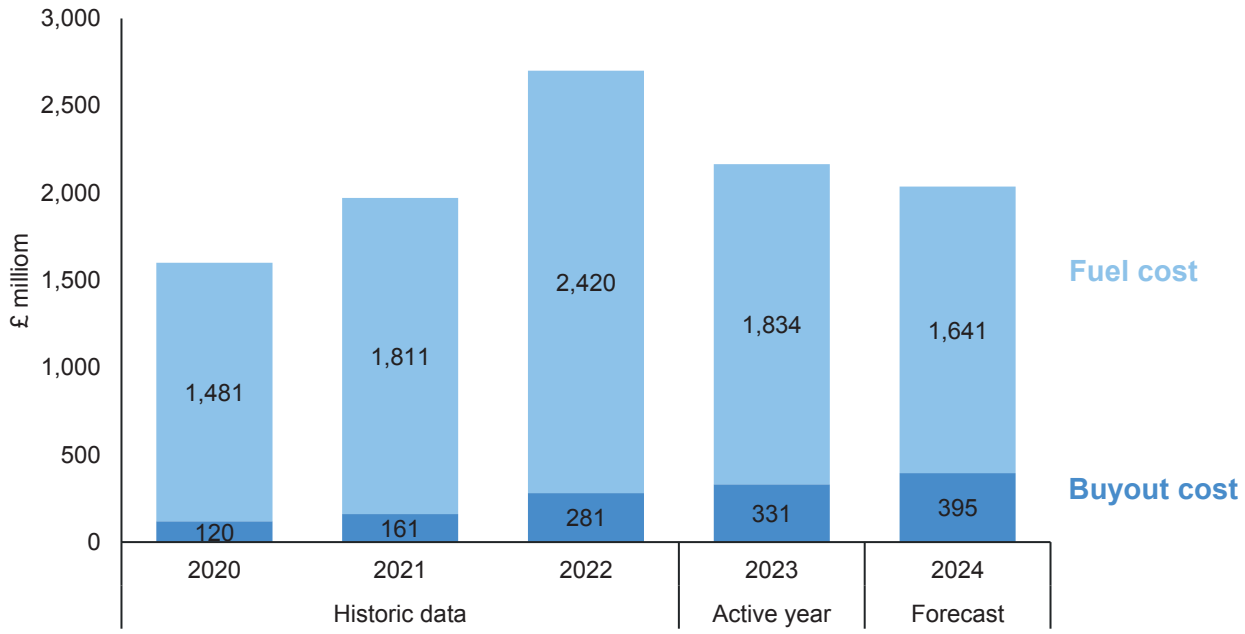


Figure 3 Nominal Cost (in £million) of the RTFO over time, by the cost of the fuel and buy-out shown. 'Buyout cost' is defined as the value of obligation required by fuel suppliers minus the value of renewable fuel certificates redeemed. 55% of buyout in 2020 was from the main obligation, 45% was from the development obligation; each year thereafter has been solely from the development obligation.

6. Scheme outcomes

Introduction

6.1 The RTFO is intended to reduce GHG emissions from transport. It requires that a certain percentage of UK road and non-road transport fuel is renewable and meets minimum GHG sustainability criteria.

6.2 This section summarises the key outcomes of the RTFO in 2023. Further data on the RTFO can be found in the final statistical report for 2023[12].

Greenhouse gas savings

6.3 In 2023, renewable fuels constituted a greater share of total fuel (7.5%, 3,699.9 million litres equivalent supplied) compared to 2022 (6.8%, 3,325.2 million litres equivalent supplied, reflecting a positive long-term trend (see Figure 4, Figure 5, and Figure 6).

6.4 The total renewable fuel supplied includes 3,560.2 million litres of liquid fuel and a smaller volume (74.2 million kg, or 139.8 million litres eq.) of biogases (biomethane, biopropane, or biobutane). There was also a small volume of hydrogen (23,210.0 kg, or 106,301.8 litres eq.). Biodiesel (including Biodiesel ME and Off-road biodiesel) and bioethanol represented 39.3% and 38.1% of the total volume of renewable fuels, respectively, with other fuels accounting for the remaining 22.6%. The increased proportion of bioethanol is likely to be driven by the introduction of E10 in late 2021, a biofuel made up of at least 90% regular unleaded and up to 10% ethanol. The introduction of E10 in late 2021 has led to a more pronounced growth in bioethanol use, resulting in a proportional decrease in biodiesel.

6.5 In 2023, the average GHG saving from the renewable fuels supplied under the RTFO was 81.5% compared to fossil fuels (excluding indirect land use change – see paragraph 6.8). This represents a total saving of 7.9 million tonnes of CO_2e.[13],

[12] https://www.gov.uk/government/statistics/renewable-fuel-statistics-2023-final-report

[13] These greenhouse gas estimates reflect well-to-wheel (fuel lifecycle) emissions and as a result differ to UK carbon budget reporting accounting. This includes Scope 1 (the emissions of combustion), Scope 2 emissions from electricity, Scope 3 (emissions from feedstock cultivation, fuel production, transport and distribution, etc). More complete detail can be found in the published RTFO Compliance Guidance.

equivalent to the emissions produced from using 3.9 million petrol cars or 2.8 million diesel cars for the whole of 2023[14]. This is an increase in GHG savings compared to 2022 (7.2 million tonnes of CO_2e.).

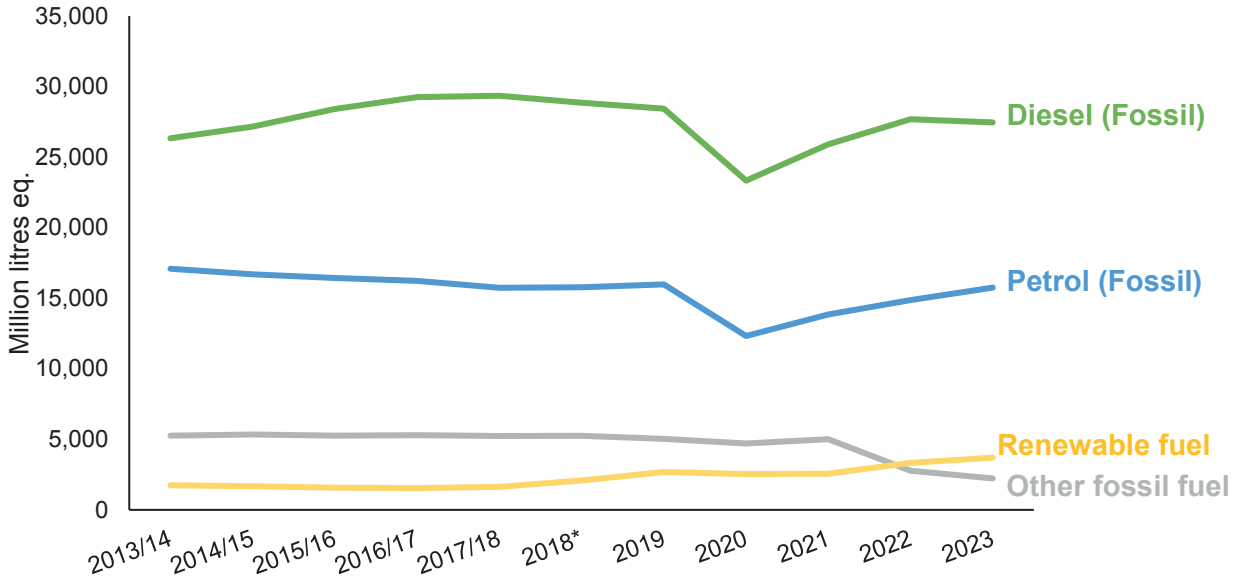


Figure 4 Road and non-road transport fuel supplied for use in the UK (* The 2018 short year has been extrapolated to represent a full calendar year), financial year ending 2014 to calendar year 2023.

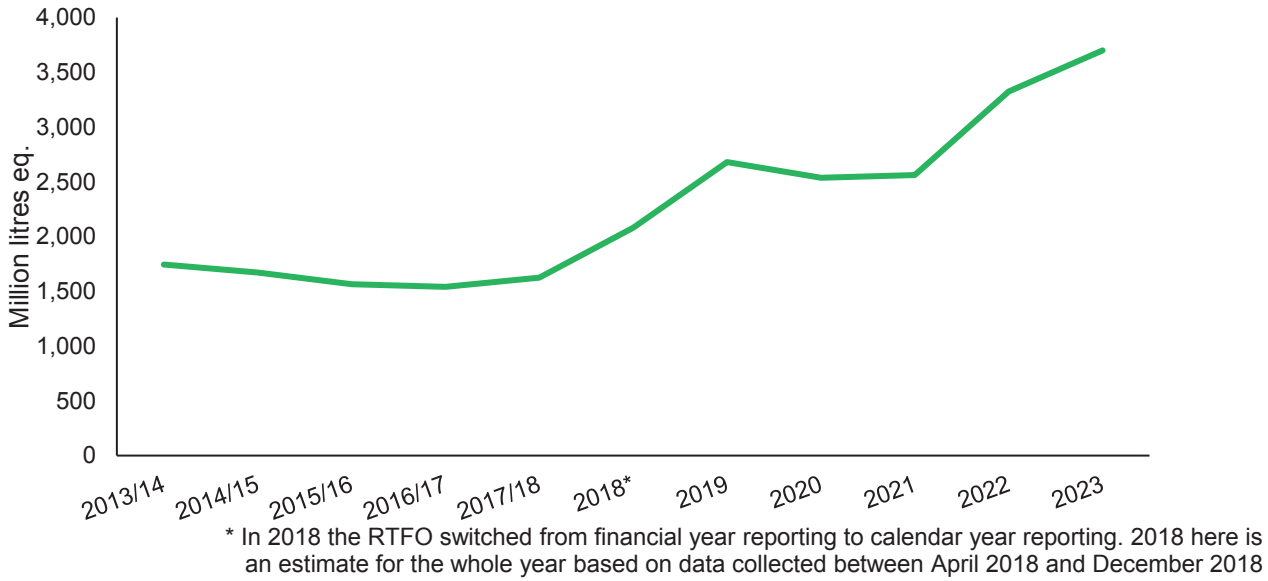


Figure 5 Renewable fuel supplied to UK transport, financial year ending 2014 to calendar year 2023.

[14] This calculation was produced by multiplying average annual milage data from the National Travel Survey with passenger vehicle conversion factors to get the average annual emissions per car, followed by dividing the RTFO emissions savings by the annual emissions per car.

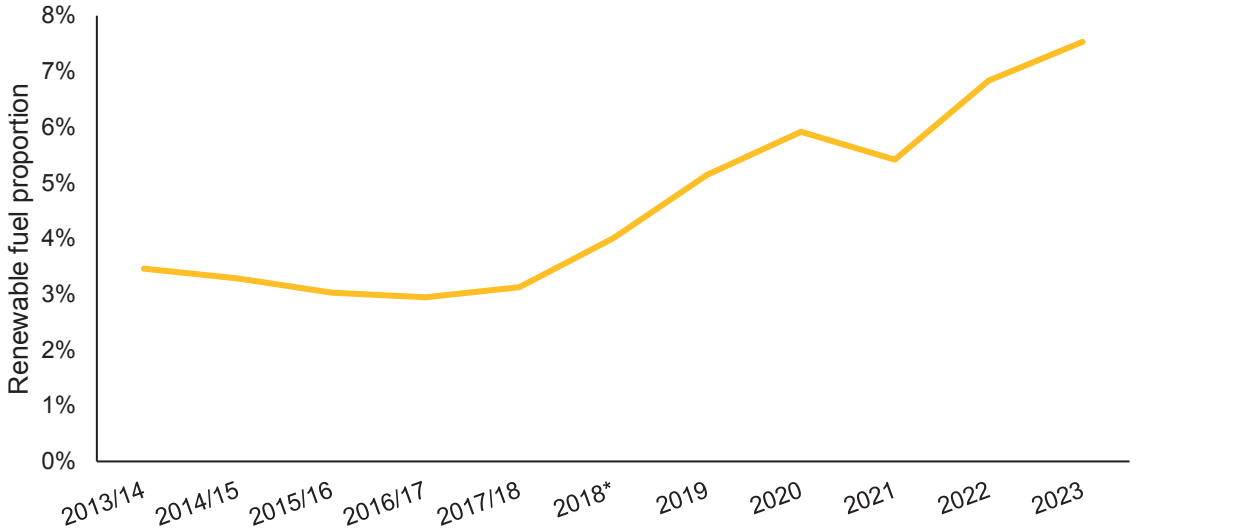


Figure 6 Percentage of road and non-road transport fuel made up of renewable components, financial year ending 2014 to calendar year 2023.

6.6 In recent years total GHG savings (million tonnes of CO_2e) have mostly increased as the percentage of CO_2e emitted from renewable fuels has fallen compared to the fossil fuels they replaced. This overall positive trend in GHG savings is primarily driven by the greater proportion of waste-derived renewable fuels. In 2023, the proportion of waste-derived renewable fuels increased to 72.3% from 65.8% in 2022. The increase in waste-derived renewable fuel was largely due to an increase in bioethanol produced from unrefined liquid dextrose ultrafiltration retentate (ULDUR) and biodiesel produced from palm oil mill effluent (POME). The RTFO awards double RTFCs to waste-derived renewable fuels as they do not have indirect land use change (ILUC – see paragraph 6.8) implications and generally have greater GHG emissions savings than crop-derived renewable fuel.

6.7 The increase in the amount of renewable fuel supplied from 3,325.2 million litres-equivalent in 2022, to 3,699.9 million litres-equivalent supplied in 2023 resulted in a greater total mass of CO_2e saved (Figure 7).

Indirect land use change

6.8 When agricultural land is used to grow a feedstock for renewable fuel production, there may be a 'knock-on' effect from the expansion of agricultural land use into other areas. This is called ‘indirect land use change’ (ILUC). ILUC may involve expansion onto areas of high carbon stock which leads to additional GHG emissions. The RTFO accounts for these GHG emissions.

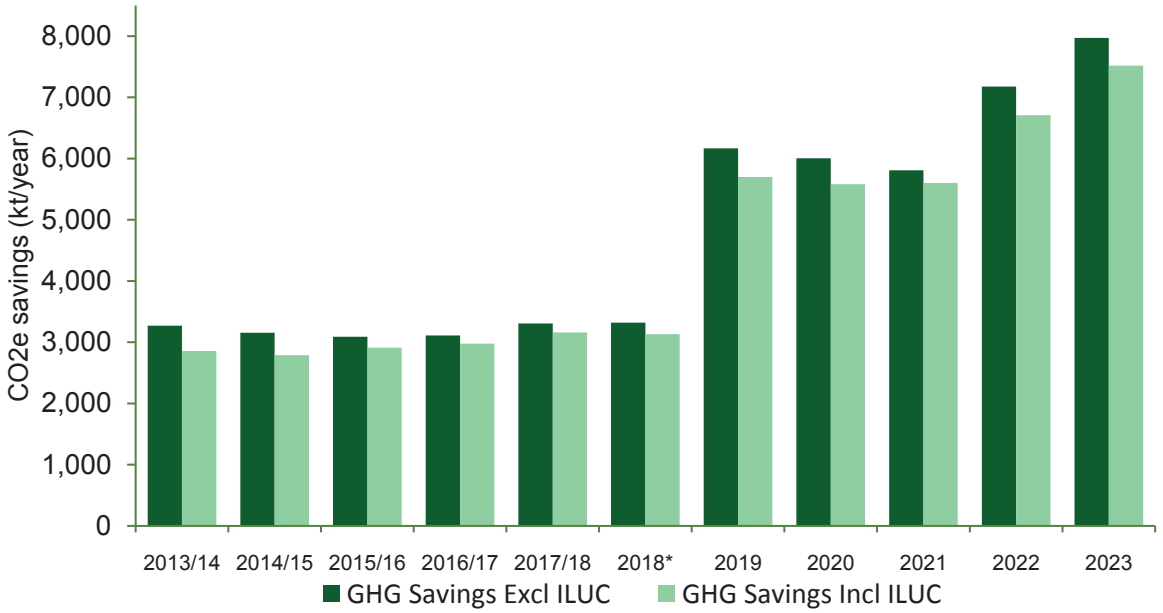


Figure 7 RTFO GHG savings excluding and including ILUC per obligation year (* The GHG savings for the 2018 short year was extrapolated to represent a full calendar year).

6.9 After accounting for ILUC, in 2023, the total GHG saving from the RTFO was 7.5 million tonnes of CO_2e (Figure 7). This is an increase from the total GHG savings in 2022 including ILUC (6.7 million tonnes of CO_2e).[15]

6.10 In 2023, volumes of sustainably certified crop-based feedstocks accounted for 27.7% (1,020.6 million litres) of all supplied renewable fuel.

Renewable transport fuel sustainability and sources

6.11 To receive RTFCs, suppliers must be able to provide evidence that their renewable fuels meet the sustainability requirements. For 2023, relative to the fossil fuel comparator of 94 gCO_2e/MJ, renewable fuels must meet a minimum GHG saving of 55% if the installation in which they were produced was operating on or before 5 October 2015, and 65% if produced in an installation that was in operation after that date.

6.12 Suppliers must ensure that growing crops as a feedstock for renewable fuels does not lead to a loss of biodiversity or loss of high-carbon stock land such as forest or peatland. In 2023, these sustainability requirements were met for 100% of the renewable transport fuel supplied for use in the UK.

6.13 A total of 52 different feedstocks made up the renewable fuel supply in 2023, 41 of which were wastes or agricultural residue. Table 3 shows the main feedstocks from

[15] These greenhouse gas estimates reflect well-to-wheel (fuel lifecycle) emissions and as a result differ to UK carbon budget reporting accounting. This includes Scope 1 (the emissions of combustion), Scope 2 emissions from electricity, Scope 3 (emissions from feedstock cultivation, fuel production, transport and distribution, etc). More complete detail can be found in the published RTFO Compliance Guidance.

which the UK's renewable fuels were made in 2023. "Other fuels" represent a mix of 10 renewable fuels including biomethane, development diesel and petrol, biomethanol and biobutane.

6.14 The top five feedstocks in 2023 were used cooking oil (41.0% of all renewable fuel), corn, POME, ULDUR, and sugar cane.

Fuel type	Feedstock	Total volume (million litres equivalent)	Percentage of total renewable fuel supply
Biodiesel*	Used cooking oil	1,018.5	27.6%
Bioethanol	Corn	466.8	12.7%
HVO	Used cooking oil	389.0	10.5%
Bioethanol	Unrefined liquid dextrose ultrafiltration retentate	269.6	7.3%
Bioethanol	Sugar cane	219.7	6.0%
Bioethanol	Wheat	204.3	5.5%
Biodiesel*	Palm oil mill effluent	199.5	5.4%
Bioethanol	Starch slurry (waste)	130.7	3.5%
HVO	Palm oil mill effluent	98.2	2.7%
Avtur (renewable)	Used cooking oil	96.3	2.6%
Other fuels	Other feedstocks	594.1	16.2%
Total		**3,689.4**	**100%**

Table 3 Most common fuel types and feedstocks for UK renewable fuels in 2023. *Biodiesel includes Biodiesel ME & Off road biodiesel.

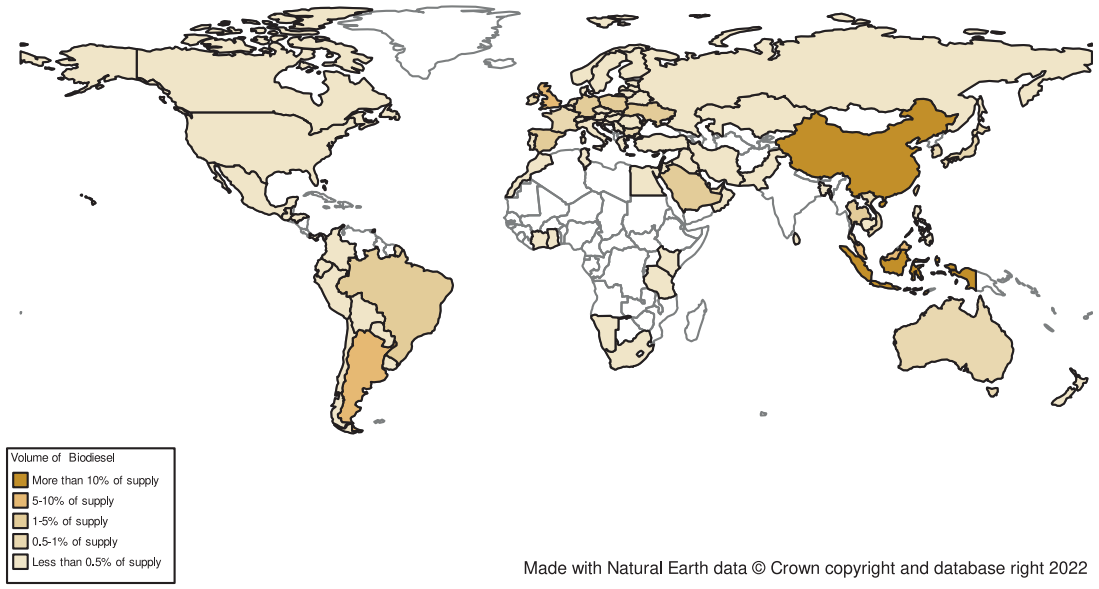
6.15 High ILUC feedstocks, which are considered to have an ILUC value of 55 gCO2/MJ, represented a small volume of renewable fuel, such as soy (2.5%) and oilseed rape (0.7%). In total, 3.4% of renewable fuel was made from high ILUC feedstocks, down from 3.5% in 2022, and down from 6.5% in 2019.

6.16 A small volume of hydrogen was produced using solar power in 2023 and issued certificates an increase from 2022, where no hydrogen was awarded certificates. There were several new feedstocks supplied in 2023, summarised in Figure 5.

6.17 Feedstocks for UK renewable transport fuel were sourced from a total of 93 countries, compared to 90 in 2022 and 18 when the RTFO began in 2008-09. The top five supplying countries are USA, China, UK, Indonesia, and Brazil. Last year, in 2022, the five top countries were China, USA, UK, Brazil, and Malaysia. The proportion of renewable fuels supplied by the UK decreased to 9.5% compared to 10.6% in 2022. Figure 8 shows countries of feedstock origin for biodiesel and bioethanol, by their percentage share of supply of renewable fuel for use in the UK.

Feedstock	Used to produce	Total volume (million litres equivalent)	Percentage of total renewable fuel supply
Crude sulphate turpentine fractionation residues	Pure bio oil	1.0	< 0.1%
Crude sulphate turpentine fractionation residues	Pure bio oil (off road)	< 0.1	< 0.1%
Matter organic non glycerol	Biomethane (compressed)	< 0.1	< 0.1%
Out of date disinfectant	Bioethanol	0.6	< 0.1%
Rapeseed residue - single counting	Biodiesel ME	1.9	< 0.1%
Rapeseed residue - single counting	Pure bio oil	< 0.1	< 0.1%
Solar power	Hydrogen	< 0.1	< 0.1%
Unrefined liquid dextrose ultrafiltration retentate	Bioethanol	269.6	7.3%
Washdown water	Methanol (bio)	1.9	< 0.1%
Waste slurry from the distillation of grain mixture	Biomethane (compressed)	< 0.1	< 0.1%
Waste/residues from the production of vegetable oil	Methanol (bio)	3.8	0.1%

Table 4 New feedstocks supplied in 2023.



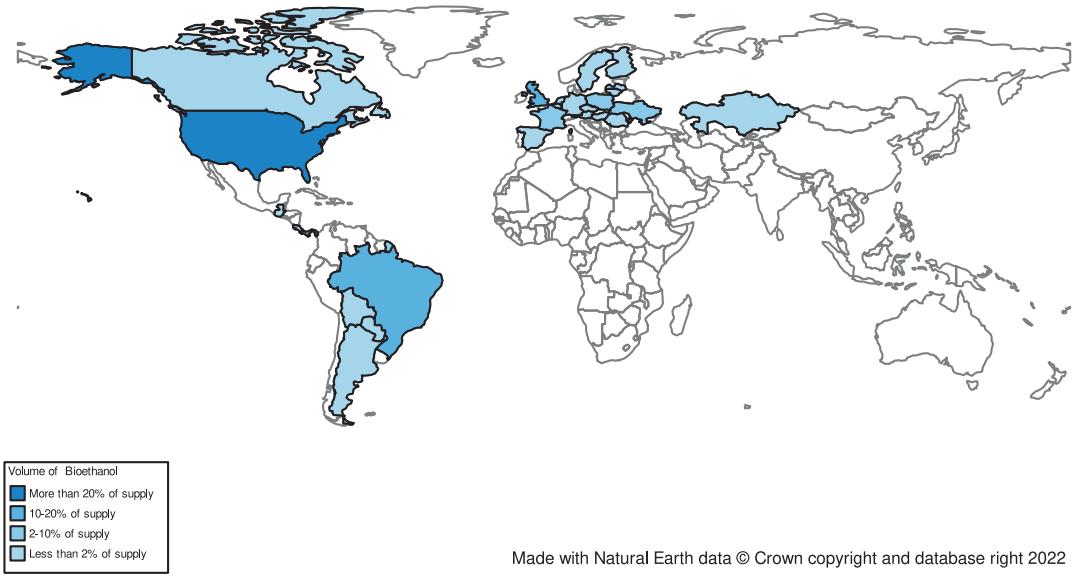


Figure 8 Global feedstock sources for UK Biodiesel and Bioethanol 2023.

Meeting the 2023 obligation

6.18 The main obligation for 2023 (13.078%) was met by suppliers.[16] No obligated supplier was required to buy-out any of their main obligation.

6.19 The development fuel obligation for 2023 (1.142%) was also met by suppliers. However, apart from one, all suppliers achieved this by at least partially buying out of their obligation.

6.20 In 2023, 6,351 million RTFCs were redeemed. 6.4% of the total obligation (entirely from the development fuel sub-target) was levied through buy-out. Figure 9 shows the number of RTFCs redeemed each year for the total obligation including both the main obligation and development fuel sub-target.

[16] Note that the actual equivalent share of fuel supplied is somewhat less than the obligation level due to buy-out, carry-over of certificates from previous years and predominantly because renewable fuels produced from eligible waste feedstocks and renewable fuels of non-biological origin are awarded double certificates. Renewable fuels represented 7.5% of total fuel in 2023 (see paragraph 6.3).

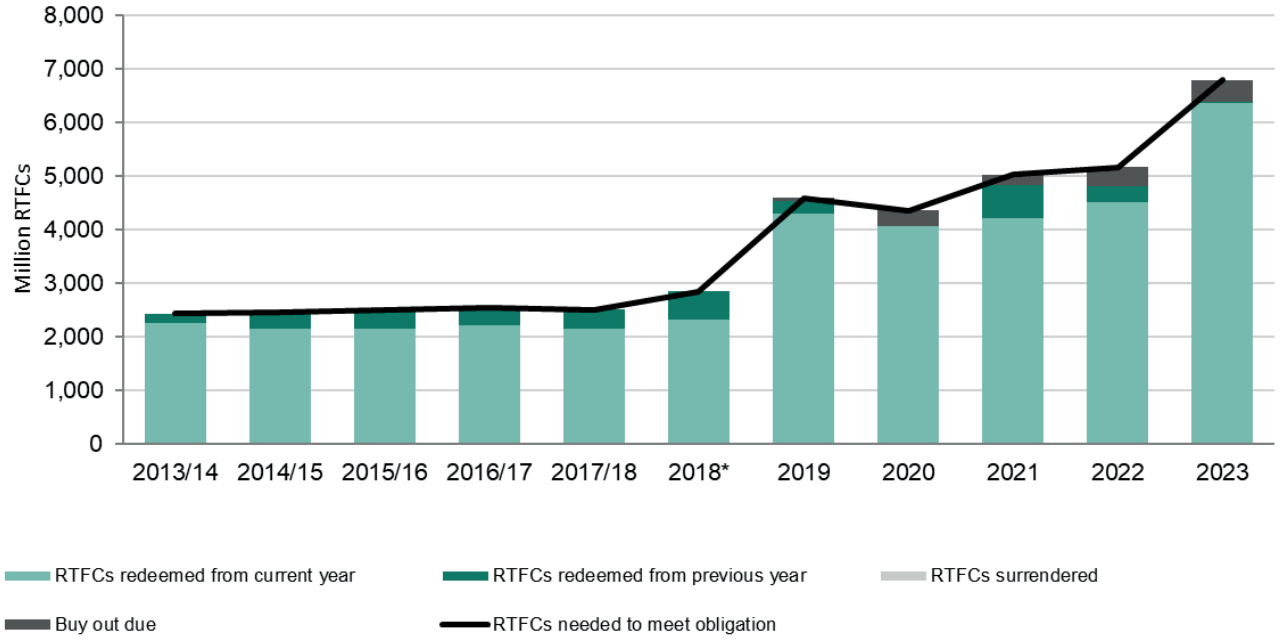


Figure 9 RTFCs redeemed and surrendered. The figures shown here include the development fuel sub-target, brought in from 2019.

6.21 As the Administrator of the RTFO, DfT operates systems and processes designed to prevent and detect inaccurate or non-compliant applications for RTFCs, including revocation of certificates and powers to impose civil penalties if certain requirements of the RTFO Order are not complied with. In 2023, 74 million RTFCs were revoked due to inaccurate applications made that year. No civil penalties were imposed.

Modelled RTFC prices

6.22 We have modelled certificate prices for the 2023 obligation year using market price data for fuels because RTFC price data is not publicly available. For this purpose, we assume used cooking oil biodiesel is the marginal fuel supplied under the RTFO and therefore it is the price differential between diesel and used cooking oil biodiesel which determines the RTFC price. We estimate that RTFC prices in 2023 ranged from £0.15 per RTFC to £0.29 per RTFC, with a mean value of £0.22 per RTFC.

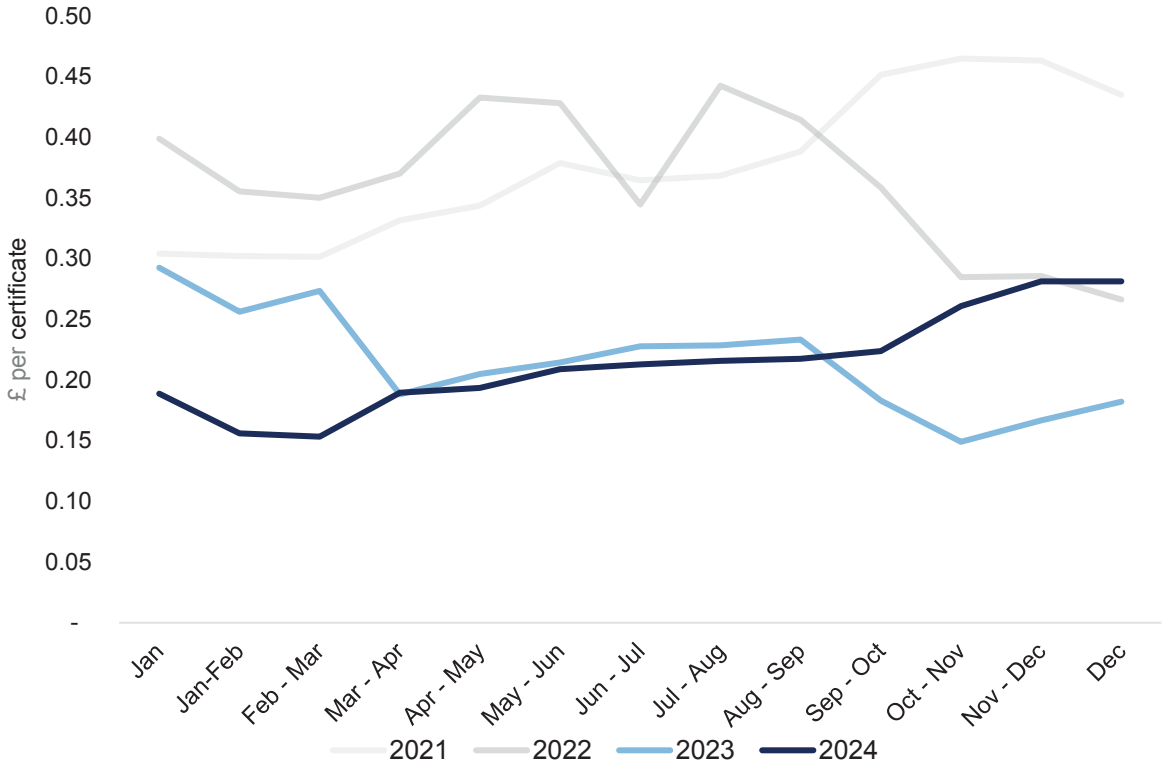


Figure 10 RTFC prices, by month, for 2021 to 2024. Please note that all "months" run from the 15th of one month to the 14th of the next, apart from Jan (which runs from 1st January to 14th January) and Dec (which runs from 15th December to 31st December)

Conclusion

6.23 The RTFO continues to meet its objective of reducing GHG emissions from UK transport fuel. The RTFO is designed and managed to ensure a high level of compliance with its requirements.

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