Guide for Fleet Operators

WTW GHG Emissions Calculation Tool

Date: July 2023

Version 1.0

Contents

1 Introduction to RFAS

Zemo's [Renewable Fuels Assurance Scheme (RFAS)](www.zemo.org.uk/RFAS)[1] provides commercial vehicle fleet and non-road mobile machinery operators with independent assurance of the life cycle greenhouse gas emissions and feedstock sustainability performance of renewable fuels sold in the UK. This information is specific to the customer's renewable fuel supply chain.

Renewable Fuel Suppliers (RFS) approved under the RFAS, issue their customers a Renewable Fuel Declaration every 3 months for the batches of renewable fuel sold. The declaration is specific to each customer and provides GHG emissions data for the fuel supplied. To ensure that the chain of custody is unbroken and the information presented is valid, the declarations are non-transferable: fuel distributors or traders must be approved in their own right to issue declarations to their customers.
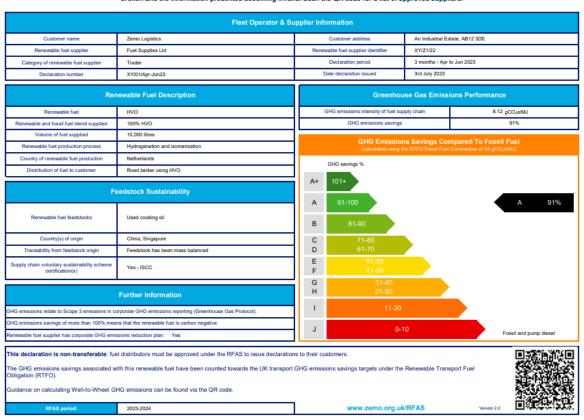
Example Renewable Fuel Declaration

In alignment with the Government's Renewable Transport Fuel Obligation (RTFO), the GHG savings (%) reported on the RFAS Renewable Fuel Declaration are relative to the fossil fuel comparator, currently 94 gCO$_2$e/MJ. (This should not be confused with a percentage GHG saving relative to a 'baseline' fuel, when a fleet operator opts for a fuel with a lower carbon intensity e.g. switch from using B7 pump diesel to a higher blend of biodiesel or HVO.)

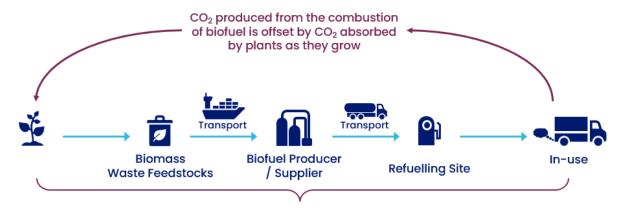
[1] www.zemo.org.uk/RFAS

2 WTW GHG Emissions Calculator

The GHG emissions intensity of the fuel shown on the Renewable Fuel Declaration is provided in gCO_2e/MJ. Zemo has produced a simple calculator[2] to enable fleet operators to estimate the WTW (Well-to-Wheel) GHG emissions of the renewable fuel purchased in $kgCO_2e$. **Disclaimer: whilst every effort has been made to ensure the accuracy of this tool, Zemo Partnership take no responsibility or liability whatsoever for the results provided.**

2.1 Methodology

Under the RFAS, the GHG emissions intensity of the renewable fuel, or blend, is based on a fuel lifecycle methodology. This encompasses feedstock cultivation or waste raw material collection, fuel production, distribution and combustion. The methodology is aligned with the RTFO methodology for the calculation of renewable fuel GHG emissions.

With this methodology, the vehicle combustion GHG emissions from renewable fuels (or the renewable fuel component of a blend) are accepted as zero. CO_2 from combustion is offset by the CO_2 absorbed by the biomass feedstock during growth. This differs from the methodology (GHG Protocol) used in company carbon reporting, whereby the Scope 1 GHG emissions for biofuels are based on N_2O and CH_4 emissions, while CO_2 emissions are set to zero.

Example Biofuel Supply Chain

CO_2 produced from the combustion of biofuel is offset by CO_2 absorbed by plants as they grow

Transport

Transport

Biomass Waste Feedstocks

Biofuel Producer / Supplier

Refuelling Site

In-use

Life cycle GHG emissions account for collection and processing of biomass waste feedstocks, feedstock transportation to biofuel production plant, manufacture of biofuel, distribution of biofuel to market and use in a vehicle (combustion).

2.2 Inputs

To use the WTW GHG emissions calculator, the user should input data for the following parameters, sourced from the RFAS Renewable Fuel Declarations received.

1. **Renewable fuel**
   Select the fuel type from the dropdown list. This should match the 'Renewable fuel' entry in the declaration.

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[2] www.zemo.org.uk/RFAS

2. **Percentage of renewable component in fuel supplied (%)**
    This should match the 'Renewable and fossil fuel blend supplied' entry in declaration. Enter '100' if unblended. Do not include the % symbol.
3. **Volume of fuel (L or kg)**
    This should match the figure in the 'Volume of fuel supplied' entry in the declaration. The calculator automatically populates the units as L (litres) or kg depending on the fuel type selected. Check that the units match the declaration. If not, a conversion will need to be applied before entering the data.
4. **GHG emissions intensity of fuel supply chain (gCO2e/MJ)**
    This should match the figure in the 'GHG emissions intensity of fuel supply chain' entry in declaration.

To calculate the total WTW GHG emissions from a single type (and % blend) of renewable fuel purchased over a year, the user can enter data from 4 subsequent declarations (periods 1 to 4 in the calculator). If multiple fuel types or blends are required the user should repeat the process, starting with a blank calculator each time.

2.3 Inbuilt data and assumptions

The calculator uses some input data that is built into the tool. This data can be found on the Emissions Factor sheet and includes values for WTT (Well-to-Tank) and TTW (Tank-to-Wheel) emissions factors and LHV (Lower Heating Value). The source of the data is also listed for each fuel type. Where available, the values are sourced from the company GHG reporting conversion factors published annually by the UK Government Department for Energy Security and Net Zero (DESNZ, formerly BEIS). Zemo plans to update the calculator in July each year, following the publication of the DESNZ company GHG reporting conversions factors. The LHV of renewable diesel is assumed to be the same as HVO.

2.4 Outputs

The calculator estimates the WTW GHG emissions (kgCO2e) as follows.

1. **WTW GHG emissions (kgCO2e): RFAS supply chain specific**
    This is the estimated WTW GHG emissions for the renewable fuel purchased, based on the RTFO methodology. It is calculated from the GHG emissions intensity (gCO2e/MJ) of fuel supply chain data (as supplied on the RFAS Renewable Fuel Declaration) and the LHV of the renewable fuel or blend.

2. **WTW GHG emissions (kgCO2e): RFAS + TTW (Scope 1) company reporting**
    The calculator also shows the estimated WTW GHG emissions from summing:
    - WTT emissions for the renewable fuel purchased, calculated from the GHG emissions intensity data in the RFAS Renewable Fuel Declaration and the LHV.
    - TTW N_2O and CH_4 emissions, sourced from DESNZ company reporting TTW emissions factors where available.

3. **WTW GHG emissions (kgCO2e): WTT (Scope 3) + TTW (Scope 1) company reporting**
    For comparison purposes, the calculator also shows the estimated WTW GHG emissions of the renewable fuel purchased, calculated from the WTT and TTW emissions factors, sourced from DESNZ company reporting where available.

Acronyms and glossary

gCO_2e	Grams of CO_2 equivalent. Unit of measurement for GHG emissions.
GHG	Greenhouse Gas.
LHV	Lower Heating Value. A measure of the energy provided from combustion of a fuel.
Renewable diesel	Paraffinic diesel made from renewable sources.
RFAS	Renewable Fuels Assurance Scheme, managed by Zemo Partnership.
RFS	Renewable Fuel Supplier. A supplier approved under the RFAS.
RTFO	Renewable Transport Fuel Obligation. UK Government's low carbon fuel policy for reducing GHG emissions from road transport.
Scope 1	Scope 1 of company GHG reporting covers emissions from sources that an organisation owns or controls directly. DESNZ Scope 1 fuel and bioenergy conversion factors are used for primary fuel sources combusted at a site or in an asset owned or controlled by the reporting organisation (e.g. TTW emissions from combusting fuel in a fleet vehicle).
Scope 3	Scope 3 of company GHG reporting covers emissions that are not produced by the company itself, and not the result of activities from assets owned or controlled by them, but by those that it's indirectly responsible for, up and down its value chain. DESNZ WTT fuels and bioenergy conversion factors are used to account for the upstream Scope 3 emissions associated with extraction, refining and transportation of the raw fuel and bioenergy sources to an organisation's site (or asset), prior to combustion.
TTW	Tank-to-Wheel. TTW emissions are generated when driving the vehicle. For renewable fuels, TTW emissions are not the same as the emissions measured from the vehicle tailpipe. This is because the CO_2 emissions from combustion are offset by the CO_2 captured by the biomass feedstock during growth. Where biomethane is produced from biogenic waste feedstock comprising of manure, fugitive emissions of methane are prevented and a methane credit can be applied (as per REDII), resulting in a negative carbon intensity value.
WTT	Well-to-Tank. WTT emissions are generated from fuel production, from the primary energy source to the point of dispensing.
WTW	Well-to-Wheel. WTW emissions are all the emissions generated by a vehicle in-use. This is the sum of the WTT and TTW emissions. (This differs from the vehicle lifecycle emissions which also includes vehicle production and disposal/recycling at end-of-life.)

Further Information

The following publications may be of interest to the reader.

RFAS Technical Guidance https://www.zemo.org.uk/RFAS

GHG Protocol https://ghgprotocol.org/corporate-standard

DEFRA guidance on reporting GHG emissions
https://www.gov.uk/government/publications/guidance-on-how-to-measure-and-report-your-greenhouse-gas-emissions

DESNZ company GHG reporting conversion factors, June 2023
https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2023

JEC Well-to-Tank report v5, Joint Research Centre, 2020
https://publications.jrc.ec.europa.eu/repository/handle/JRC119036

For further information about the RFAS please email rfas@zemo.org.uk.