Technical Guideline: Cleaner Transportation Fuels

2026 Version 5.0

ONTARIO MINISTRY OF THE ENVIRONMENT, CONSERVATION AND PARKS

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1. Introduction

On November 25, 2020, O. Reg. 663/20 (“Cleaner Transportation Fuels” or “the Regulation”) came into effect. This Guideline is incorporated by reference into the Regulation. Where the Regulation requires certain information to be provided in accordance with the Guideline, that information is set out herein.

This Guideline replaces *Technical Guideline: Cleaner Transportation Fuels* (2025 v 4.0). This Guideline is divided into three parts:

- Part A: Calculating the Greenhouse Gas (GHG) Intensity of Bio-Based Content, which sets out:
    - The method that is required to be used to calculate GHG intensity for the purposes of Schedule 1 of the Regulation
    - Where the method of calculation of GHG intensity involves the use of a model, any modifications to the manner in which fuel suppliers must enter data into the model
    - Alternate methodologies to calculate GHG intensities

- Part B: Compliance Equation Values, which sets out the values to be used for equations in Schedule 1 of the Regulation.

- Part C: Quality Standards for Fuels, which sets out the quality standards and specifications required to be met for all fuels distributed as required by section 6 of the Regulation.

2. Definitions

“Class VI well” means wells located in the United States that are used to inject carbon dioxide (CO_2) into deep rock formations.

“Co-processing” means the simultaneous treatment of biogenic (renewable) feedstocks and fossil-derived feedstocks in petroleum refinery process units.

“Director” means the Director appointed for the regulation or a specific section of the Regulation pursuant to s.5 of the EPA.

“Fuel Pathway” means the total modelled emissions calculated by accounting for each lifecycle phase of the production and use of a specific renewable fuel made from a specific feedstock, using a specific fuel production process and distribution method.

“Regulation” means Cleaner Transportation Fuels Regulation (O. Reg. 663/20).

“Non-fuel ethanol product” means ethanol that is not represented or sold as gasoline or diesel and that does not conform with the requirements for ethanol specified in Canadian General Standards Board (CGSB) document CAN/CGSB-3.511.

3. Part A: Calculating the GHG Intensity of Bio-Based Content

Where the Regulation requires that a fuel supplier calculate the lifecycle greenhouse gas intensity of particular bio-based content, the fuel supplier shall use the following GHGenius models with the required setting, input and outputs listed in this Guideline:

- For the calculation of GHG intensities for the 2025 compliance year: GHGenius 4.03a, 4.03 b or 4.03c.

- For the calculation of GHG intensities for the 2026 compliance year: GHGenius 4.03a, 4.03 b, 4.03c or 5.03.

- For the calculation of GHG intensities for the 2027 and subsequent compliance years: GHGenius 5.03.

Fuel suppliers must adhere to all principles and instructions set out in this document.

GHGenius 5.03 is available at www.ghgenius.ca.

3.1 Principles to be Employed When Using the Model to Calculate the Carbon Intensity of Bio-Based Content from A Facility

- **Transparency:** All assumptions and changes to the GHGenius model should be documented so that results are reproducible. This should include a summary table with descriptions of all cells changed by the fuel supplier from default values a rationale for the value input by the fuel supplier.

- **Reasonability:** In general, fuel suppliers should only make changes to primary1 data. If changes to secondary data2 are required to accurately estimate the carbon intensity of the fuel pathway and have a material impact (i.e. 1% or greater) on the final result, the fuel supplier shall notify the Director of any changes and provide a written description and rationale.

- **Consistency:** Fuel suppliers shall ensure that the assumptions, methods and data are consistently applied throughout the carbon intensity calculations.

- **Calculating GHG Intensity:** Fuel suppliers shall ensure, in every case, that a professional engineer is of the opinion that the data used to determine GHG intensity of renewable content is reasonable and that the calculation is correct. The data should be assessed and selected to best represent the fuel pathway considering geographical, temporal, and technological contexts.

[1] *Primary Data* refers to data for which the fuel supplier has direct, verifiable measurements.
[2] *Secondary data* refers to data in the model which are taken for processes that occur beyond the facility (e.g. feedstock production) using secondary information sources.

3.2 Using GHGenius

When using GHGenius to calculate GHG intensity for bio-based content, a person shall complete all cells as specified in the following tables using reproduceable and measurable data.

Item	Work Sheet	Cell(s)	Value to Input
Target year (year of analysis)	Input	B7	Use value corresponding to primary data collection period
Country/region	Input	B9 to Q9	Use an appropriate default button as per region of analysis
GWP selector (Global Warming Potential)	Input	B11	Use value of 2013 (100 years).
	Input	D11	Use value of Carbon Weighted

Fuel suppliers using bio-based content from producers that are located in a country or region that is not included in GHGenius can use the regional default value for the Central United States for feedstock or fuel production, provided all other necessary changes to the input sheet are completed.

The primary data entered into the model should be based on 12 months of operating data except as otherwise specified in this document.

Where the bio-based content is from a bio-based content producer that has less than twelve consecutive months of operating data associated with the production of that bio-based content, calculations using GHGenius should be completed using all available data and best estimates as if the bio-based content producer had one full year of data. Once 12 consecutive months of data is available, the calculations should be replaced with calculations using the actual 12-month data.

3.3 Alternative Electricity Generation Values

Fuel suppliers using bio-based content may use alternative electricity generation values that are representative of the grid mix in the region where the facility is located instead of the regional default values contained in GHGenius, provided that the alternative data originates from a federal regulator such as the Canada Energy Regulator or the US Environmental Protection Agency.
These alternative values should be entered into the appropriate cells on the ‘Power Gen’ worksheet. For example, a bio-based content producer in Atlantic Canada or the non-contiguous United States could make the appropriate adjustments to the model.

3.4 Carbon Capture and Storage

Carbon capture and storage ("CCS") can be included in the modelling provided that the captured carbon dioxide is injected for the purpose of geologic storage:

- In Canada: into a Provincially approved injection well, Enhanced oil recovery is not considered CCS.

- In the United States: into a class VI injection well permitted by the US EPA or a state with the authority to approve class VI wells.

- In other countries: into an injection well permitted by a National or Sub-national authority that is subject to permit conditions similar to those required in Canada.

3.5 Renewable Energy

Renewable energy sources such as renewable electricity and renewable natural gas ("RNG") can only be modelled if they are directly connected to the biobased content production facility.

3.5.1 Renewable electricity

In GHGenius, in the "Input" worksheet, set net electricity purchased (row 255) to the total electricity use (in kWh), minus the amount of direct connected renewable electricity used on-site (in kWh).

3.6 Co-processing

3.6.1 Principles for Calculating the Carbon Intensity of Co-Processed Fuels:

- **Justified Co-product Allocation:** Fuel suppliers must justify the allocation method (i.e., mass, energy or displacement) used to determine the relative carbon intensity value of various co-products that cannot be used in the Cleaner Transportation Fuels program. Co-products that could be used in gasoline or diesel must use energy allocation.

- **CI Validity:** The calculated CIs will be considered valid for two years when the baseline data represent a minimum of six consecutive months of operation. CIs will be considered valid for one year when shorter baseline periods are used. The quantities of renewable gasoline and renewable diesel produced during the year will be based on the amount of biogenic feed processed during the year and the renewable gasoline and renewable diesel fuel yields from the one-week test period.

3.6.2 Technical Instructions for Co-Processing:

- **Accounting for Bio-Based Intermediates from Other Sources:** In addition to bio-crude, bio-based feedstocks may include intermediates in the refinery process (e.g. bio-based naphtha) from other sources or facilities.

- **Baseline Determination:** The baseline represents the operating condition of a refinery processing unit before renewable feedstock is introduced through co-processing; it is a reference for determining changes in GHG emissions.
    - The feedstock throughput for the baseline scenario should not be more than 105% of the total feedstock throughput for the benchmark scenario. The minimum baseline period for a new co-processing project is 2 weeks.

- **Benchmark Determination:** The benchmark is a defined operating condition that represents fuel production during co-processing; this is used to compare modelled carbon intensity results.
    - The benchmark is defined by the biobased feedstock rate and the total feedrate.
    - The minimum co-processing benchmark must be 1 week at the maximum low CI feedstock feed rate.
    - A request for alternative co-processing benchmark for valid reasons may be made to the Director at the address shown in section 3.11.
    - Feedstocks streams used for blending into the final product, or the final products that have a mix of bio- and non-bio content will require radiocarbon C14 testing to determine volume of renewable content.

- **Acceptable Methods for Quantifying Bio-based Content:**
    - ASTM D-6866 Methods B and C
    - A minimum of two samples should be taken and analyzed for each stream over the minimum 7-day data collection period. The samples should be representative of steady state operation. The first sample should be taken no earlier than 3 days after the biobased feedstock is introduced into the system at the rate specified for the benchmark.

- **Justified Process Inputs Allocation:** Fuel suppliers must justify the allocation method used to quantify energy use, hydrogen consumption, and greenhouse gas emissions for the renewable portion of a co-processed fuel. The justification should demonstrate that:
    - The method is appropriate for the operational design of the facility.
    - Where intermediate process flows undergo further processing prior to the finished fuel, the allocation approach reflects associated energy and hydrogen use.
    - The selected method is based on representative operational data.
    - The selected method does not materially underestimate refinery energy use, hydrogen consumption or associated emissions attributed to the renewable portion used in determining the fuel's carbon intensity.

- **Acceptable Methods for Determining Flow Rates for process inputs:**
    - For electricity consumption, allocation between the fossil and biogenic portions by mass or energy is acceptable.
    - For other process inputs that require allocation to the fossil and biogenic streams (e.g. steam, fuel gas, hydrogen, etc.) the incremental allocation approach is required.
    - For situations where incremental allocation produces negative values, allocation by mass or energy is acceptable.

3.7 Treatment of Multiple Feedstocks

Fuel suppliers shall use one of the following methods to calculate the weighted average GHG intensity for bio-based content produced in facilities with multiple feedstocks:

3.7.1 Method 1: Feedstock-specific allocation

Separate GHG intensities shall be allocated on a quarterly basis to specific volumes of bio-based content produced by the facility according to the feedstock purchased or used at a facility over the quarterly period.

3.7.2 Method 2: Facility average basis

A single GHG intensity value shall be allocated for all bio-based content produced by the facility, based on the weighted average of feedstocks used over a quarterly or annual period.

For greater certainty, when applying either of these methods, the fuel supplier shall ensure, as required by the Regulation, that only bio-based content that is first placed in the Ontario market is counted for the purpose of the Regulation and that bio-based content that is produced at the facility and not first placed in the Ontario market (e.g. is placed in the market of another province) is not counted for the purposes of the Regulation.

Fuel suppliers shall report feedstocks used and product type, e.g. fatty acid methyl ester, Fischer-Tropsch, hydrogenation derived renewable diesel, ethanol or renewable gasoline. The choice of accounting approaches is at the discretion of fuel suppliers and bio-based fuel producers.

3.8 Treatment of Non-Fuel Ethanol Products in Facilities with Multiple Ethanol Products

When determining the GHG intensity of bio-based content produced at a facility that also produces additional non-fuel ethanol products from the same feedstock as the bio- based content but with different GHG intensities, (e.g. medical or beverage-grade ethanol, etc.) fuel suppliers shall use one of the methods set out below to calculate the weighted average GHG intensity of the fuel-grade bio-based content produced at that facility and

first placed in the Ontario market. The methodology to be used shall be selected in accordance with the following rules:

1. A facility shall use Method 1 (Direct Measurement) where possible.

2. If Method 1 (Direct Measurement) cannot be used because direct bio-based fuel product-specific input data is not available, method 2 (Output-Based Allocation) shall be used.

3. When methods 1 or 2 cannot be used because the allocation of input data for the different products cannot be reasonably determined, then method 3 (Facility Average) shall be used.

3.8.1 Method 1: Direct Measurement

Fuel suppliers shall calculate the GHG intensities on a quarterly basis for all fuel-grade bio-based content produced by the facility according to the energy used at a facility over the quarterly period. These calculations shall be based on direct measurements of all relevant inputs (e.g. natural gas or electricity usage).

3.8.2 Method 2: Output-Based Allocation

Where direct measurements of inputs for fuel-grade products are not available, fuel suppliers shall use the following output-based allocation methodology.

1. Calculate the GHG intensities of the fuel-grade products and the non-fuel ethanol products as separate processes.

2. Document that the weighted average GHG intensity of all products is consistent with the total facility inputs.

3. Document what plant processes are excluded from fuel grade products and the rationale for exclusion.

4. Enter the prorated values for the bio-based content considered a fuel in Section 3.2.

3.8.3 Method 3: Facility Average

Where output-based allocations for bio-based content produced by the facility cannot be performed, fuel suppliers shall use the following facility average methodology.

A single GHG intensity value shall be allocated for all bio-based content, including non-fuel ethanol products, produced by the facility, based on the weighted average of all feedstocks used at the facility over a quarterly or annual period.

3.9 Model Results: Calculating the GHG intensity of bio- based content

The instructions in this section pertain to the calculation of individual GHG intensities for bio-based content.

3.9.1 Calculating the GHG intensity of bio-based content in gasoline

In the GHGenius model, the individual GHG value for a specific volume of bio-based content in gasoline is the feedstock-appropriate sum value in row 19 on the “Prov Low Carbon” sheet.

3.9.2 Calculating the GHG intensity of bio-based content in diesel

In the GHGenius model, the individual GHG value for a specific volume of bio-based content in diesel is the feedstock-appropriate sum value in row 19 on the “Prov Low Carbon” sheet.

3.10 GHG Intensity, Expiry and Recalculation

Calculation results and corresponding documentation are to be made available to the Director upon request and considered valid until the earlier of:

- a period of 3 years or
- a point in time where there has been a material change in one or more of the fuel pathway components that change the result (i.e. +/- 5%)

3.11 Determining GHG Intensity of bio-based content that is not in GHGenius

Subsection 7(2) of the Regulation allows for fuel suppliers to apply to the Director in accordance with this Guideline for approval of a model to calculate the GHG intensity of bio-based content not listed in the Guideline. Applications made pursuant to that section shall include the following where applicable:

- In Canada: into a Provincially approved injection well, Enhanced oil recovery is not considered CCS.
- An explanation of the fuel production technology and how the technology differs from the existing technology in GHGenius 5.03.
- An explanation of the new feedstock including a description of the inputs used to calculate the GHG intensity of the feedstock.
- A description of all modifications made to an existing facility or a description of how a new facility process is different than a facility process that is already included in GHGenius 5.03.

- A comprehensive description of the life cycle analysis applied to determine GHG intensity, including all background data and emissions factors and, where applicable, an explanation of the GHG lifecycle model and version that should be used to calculate the GHG intensity of the bio-based fuel:
    - Where the proposed model is proposed to be based on a modified GHGenius 5.03 pathway:
        - a list of cells that were modified
        - an explanation about why a modified pathway has more precision and more accurately reflects emissions than an existing one
        - a summary of reasons for selecting the cells and values that were chosen
        - a process flow diagram detailing the modified pathway
        - conversion factors and calculations used and supporting materials
    - If a new pathway that is not in GHGenius 5.03 should be created:
        - a list of cells that were chosen
        - a summary of reasons for selecting the cells and values that were chosen
        - a process flow diagram
        - conversion factors and calculations used and supporting materials

Requests that the Director approve a proposed model to calculate the GHG intensity of bio-based content not listed in GHGenius 5.03 should be sent to: fuels-report@ontario.ca. Alternatively, the request can be mailed to:

Modern Regulator Branch
Ministry of the Environment, Conservation and Parks
Foster Building
40 St. Clair Ave. W., 3rd Floor
Toronto ON M4V 1M2
Re: Cleaner Fuels methodology request

4. Part B: Compliance Equation Values

Where Schedule 1 requires a fuel supplier to enter values for the fossil fuel baseline and the corresponding GHG intensity reduction requirement, the values should be entered in the formula as follows:

4.1 Fossil Fuel Baseline

- The value for letter x (diesel) in s.1 of Schedule 1, is: 90.9 gCO2e/MJ
- The value for letter x (gasoline) in s.2 of Schedule 1, is: 90.3 gCO2e/MJ

4.2 GHG Intensity Reduction Requirement of Bio-Based Content

- The value for letter z (diesel) in s.1 of Schedule 1, is: 63.6 gCO2e/MJ
- The value for letter z (gasoline) in s.2 of Schedule 1 from the years 2020 to 2029 is: 40.6 gCO2e/MJ
- The value for letter z (gasoline) in s.2 of Schedule 1, for the year 2030 and all subsequent years is: 45.2 gCO2e/MJ

5. Part C: Quality Standards for Fuels

5.1 Quality standards for blended diesel

Pursuant to Section 6 of the Regulation, no fuel supplier shall transfer blended diesel for use or sale in Ontario unless the blended diesel meets the standards and specifications set out in one of following documents:

Canadian General Standards Board (CGSB) document CAN/CGSB – 3.517-2025 – Diesel Fuel, as amended from time to time.

1. Canadian General Standards Board (CGSB) document CAN/CGSB – 3.522-2025 – Diesel Fuel Containing Biodiesel (B6-B20), as amended from time to time.

2. Canadian General Standards Board (CGSB) document CAN/CGSB – 3.524-2022 – Biodiesel (B100) for Blending in Middle Distillate Fuels, as amended from time to time.

3. American Society for Testing and Materials (ASTM) document ASTM – D6751-12 – Standard Specification for Biodiesel Fuel Blend Stock B100 for Middle Distillate Fuels, as amended from time to time.

4. American Society for Testing and Materials (ASTM) document ASTM – D7467-13 – Standard Specification for Diesel Fuel Oil, Biodiesel Blend (B6 to B20), as amended from time to time.

5. American Society for Testing and Materials (ASTM) document ASTM – D975-14 – Standard Specification for Diesel Fuel Oils, as amended from time to time.

6. An equivalent set of standards and specifications that is approved in writing by the Director before the blended gasoline is distributed.

5.2 Quality standards for blended gasoline

Pursuant to Section 6 of the Regulation, no fuel supplier shall transfer blended gasoline for use or sale in Ontario unless the blended gasoline meets the standards and specifications set out in one of the following documents as applicable to the type of fuel:

1. Canadian General Standards Board (CGSB) document CAN/CGSB – 3.517-2025 – Diesel Fuel, as amended from time to time.

2. Canadian General Standards Board (CGSB) document CAN/CGSB-3.5-2026- Automotive gasoline, as amended from time to time.

3. Canadian General Standards Board (CGSB) document CAN/CGSB-3.512-2023 - Automotive ethanol fuel (E50-E85 and E20-E25), as amended from time to time.

4. An equivalent set of standards and specifications that is approved in writing by the Director before the blended gasoline is distributed.