Note- this instruction manual is an excerpt from a clean version of the final modified version of Attachment C: CA-GREET3.0 Technical Support Documentation, posted on August 13, 2018 as part of the rulemaking process supporting the LCFS amendments in effect from Q1 2019.

Tier 1 Simplified CI Calculator Instruction Manual

Biomethane from Anaerobic Digestion of Organic Waste

A. Introduction

This document provides detailed instructions for the use of the Tier 1 Simplified CI Calculator for Biomethane-derived from the Anaerobic Digestion of Organic Waste. This Calculator is to be used to calculate the carbon intensity (CI) for Compressed Natural Gas (CNG), Liquefied Natural Gas (LNG), and Liquefied and subsequently Compressed Natural Gas (L-CNG) produced from biogas (also referred to as digester gas) generated by the anaerobic digestion of food scraps, urban landscaping waste, and other user-defined organic waste such as agricultural residues, in a dry or wet fermentation process. Each required specific input in the Calculator has been numerically labeled (i.e., 1.1, 1.2, etc.) so that users can follow the sequence and enter information as required.

Download the Simplified CI Calculator here:
https://www.arb.ca.gov/fuels/lcfs/ca-greet/ca-greet.htm

The Calculator has been automated to perform CI calculations using factors from the CA-GREET3.0 model. The Calculator replaces the existing worksheets and the operational data templates for high solids-based anaerobic digestion pathways. Applicants are required to add facility information and verifiable monthly feedstock, operational energy use, transport distances, and fuel production and buy-back fossil fuel data used in calculating the CI of biomethane derived from the anaerobic digestion of food scraps, urban landscaping waste, and other organic waste in a dry or wet fermentation process. **All inputs selected and input by the applicant must meet the requirements of the monitoring plan for entities required to validate or verify pursuant to sections 95491.1(c) and are subject to verification unless specifically exempted.**

This Calculator also includes additional reference material such as greenhouse gas emissions factors used in the CA-GREET3.0 life cycle analysis (LCA) model, and reference fuel specifications. Also included with the Calculator is a detailed breakdown of the calculations used to determine the final CI of each fuel pathway.

The applicant may only enter values or make selections in yellow input fields designated by CARB for user input/selection, and may not change any other values or fields in the Calculator.

B. Color Legend Used in the Calculator

The Calculator uses the following color legend to differentiate required inputs, calculated values, etc., described below:

Yellow cells require user input
Light Blue cells show CI results
Green Cells show the calculation button
Gray Cells are calculated values
Orange Cells are elements in flow charts that are credited to pathway

C. Calculator Overview

The following table provides an overview of the tabs used in the Simplified CI Calculator.

Table C.1. Overview of Tabs Used in the Simplified CI Calculator

Tab Name	Description
RNG Summary	Summary worksheet. Contains an overall summary of the information entered in the "RNG" tab of the calculator, and calculated CIs for organic waste-derived CNG, LNG, and L-CNG. If desired, a **conservative margin of safety** may be added to the calculated CI in this tab in order to establish the final CI, pursuant to section 95488.4(a) of the regulation.
RNG	Main calculation worksheet. Contains the main components of the calculator with fields requiring user inputs, and those calculated by the sheet. Calculations in grayed out cells are automatically calculated but dependent upon input to yellow cells in the corresponding sections of the calculator. This tab also includes CI calculations using inputs in this tab. See more detailed instructions below.
FS Fate	Worksheet that illustrates the fate of food scraps in a block-flow diagram. No user input is required since all input parameters have been pre-determined. Only GHG emissions depicted in orange are credited to the pathway; the rest being the "business-as-usual" case with no diversion attributes. A feedstock diversion credit for avoided emissions is calculated and applied to the pathway.
ULW Fate	Worksheet that illustrates the fate of urban landscaping waste in a block-flow diagram. No user input is required since all input parameters have been pre-determined. Only GHG emissions depicted in orange are credited to the pathway; the rest being the "business-as-usual" case with no diversion attributes. A feedstock diversion credit for avoided emissions is calculated and applied to the pathway.
OW Fate	Worksheet that illustrates the fate of user defined organic waste that do not fall into the above two categories (food scraps and urban landscaping waste). These may include specific wastes such as industrial food processing waste and agricultural residues. Applicants are urged to consult with staff on defining the fate of user-defined organic waste (i.e.

	landfill, composting, animal feed). Only GHG emissions depicted in orange are credited to the pathway; the rest being the "business-as-usual" case with no diversion attributes. A feedstock diversion credit for avoided emissions is calculated and applied to the pathway.
EF Table	Reference worksheet. Contains greenhouse gas emissions factors from the CA-GREET3.0 model used in calculation of carbon intensities.
Reference	Reference worksheet. Contains physical property specifications of fuels (i.e., HHV, LHV, density, carbon ratio, etc.), global warming potentials (GWP) of greenhouse gases, unit conversion factors, tailpipe emissions factors, LNG boil-off emissions factors, and other information used in calculating CIs.

D. RNG tab

The "RNG" tab contains the main CI calculation worksheet and consists of the following major sections:

- *Pathway Summary and Estimated CI*
- *Section 1. Applicant Information*
- *Section 2. Information for Biomethane Production*
- *Section 3. CNG, LNG, and L-CNG Production and Transport Data*
- *Section 4. CI Calculation Details*

Section 1. Applicant Information

The following table lists the fields used in Section 1 of the RNG tab.

Table D.1. List of Input Fields for Section 1 of the Simplified CI Calculator

Field Name	Description
1.1. Company Name	Registered name of the company. Example "ABC Company, LLC" or "ABC Company, Inc."
1.2. Company ID	Enter U.S. EPA Company ID. If not available, contact CARB for LCFS Company ID.
1.3. Facility ID	Enter the Company's Facility ID. If not available, contact CARB for LCFS Facility ID.
1.4. Digester Name and Location	Name and address of the Anaerobic Digester Facility (Street, City, State).
1.5. LNG Liquefaction Facility Location	Location of the liquefaction facility (Street, City, State).
1.6. Application Number	Enter the application number generated by the AFP.
1.7. CNG Dispensing Station(s) Location	Location of California CNG dispensing station (Street, City, State). For multiple stations, use Bakersfield as the endpoint (the Standard Station Centroid location). See additional details below Table D.2.
1.8. LNG Dispensing Station(s) Location	Location of LNG dispensing station (Street, City, State). For multiple stations, calculate a centroid location based on a weighted average of fuel dispensing stations to which LNG is supplied. See additional details below Table D.3.
1.9. L-CNG Dispensing Station(s) Location	Location of L-CNG station (Street, City, State). For multiple stations, calculate a centroid based on a weighted average of fuel dispensing stations to which L-CNG is supplied. See additional details below Table D.3.
1.10 Provisional Pathway	If there is less than 24 months of available data, select "Yes," otherwise choose "No." If the application is for a provisional pathway, input available months of operational data. A minimum of three months of operational data is required to meet provisional pathway certification requirements.

Section 2. Information for Biomethane Production

The following table lists the fields used in Section 2 of the RNG tab. Additional details are included below Table D.2.

Table D.2. List of Input Fields for Biogas Processing

Field Name	Description
2.1 Select Regional Electricity Mix for Biomethane	Choose the electricity mix corresponding to the zip code for the region where the biogas upgrading plant is located. The Calculator includes 26 eGRID zone mixes, a Brazilian average mix, a Canadian average mix, and a User Defined Mix to select from in the pull down menu. For facilities in the U.S., select one of the 26 eGRID zones available. If upgrading facility is located outside the U.S., select "User Defined Mix." Facilities which use biogas for electricity production must also choose the "User Defined Mix" option in field 2.1. If "User Defined Mix" is selected, consult with CARB staff to develop an emissions factor for the User Defined Mix to be input as detailed in field 2.22. Data sources for User-Defined electricity mixes must be documented in the Supplemental Documentation attached with the Simplified CI Calculator. Additional details are included below Table D.2.
2.2 Monthly Data	Input the months and year(s) corresponding to the operational data provided.
2.3 Food Scraps Throughput	Input source-separated food scraps feedstocks received for each month of operation (in wet short ton). If the waste feedstock is not source-separated, then evidence must be provided in support of the monthly estimate in the Supplemental Documentation, and the methodology used to derive the estimate or proportion that is food scraps must also be provided.
2.4 Food Scraps Weighted Mean Transport Distance by HDT (miles)	Enter monthly weighted average food scraps feedstock transport distance from the source to the digester facility for each month of operation.
2.5 Urban Landscaping Waste Throughput (wet, short tons)	Input source-separated urban landscaping waste feedstocks received monthly for each month of operation (in wet short tons). If the waste feedstock is not source-separated, then evidence must be provided in support of the monthly estimate in the Supplemental Documentation, and the methodology used to derive the estimate or proportion that is urban landscaping waste must also be provided
2.6 Urban Landscaping Waste Weighted Mean Transport Distance (miles)	Enter monthly weighted average urban landscaping waste feedstock transport distance from the source to the digester facility for each month of operation.
2.7 Other Organic Waste Throughput (wet, short tons)	Input source-separated "other organic waste" feedstocks received for each month of operation (in wet, short tons), if the wastes cannot be otherwise classified as food scraps or urban landscaping waste. If the waste feedstock is not source-

	separated, then evidence must be provided in support of the monthly estimate in the Supplemental Documentation, and the methodology used to derive the estimate or proportion that is "other organic waste" must also be provided. The characteristics of "other organic waste" must be profiled in subsequent fields.
2.8. Other Organic Waste Weighted Mean Transport Distance by HDT (miles)	Enter monthly weighted average other organic waste feedstock transport distance from the source to the digester facility for each month of operation.
2.9. User Defined Factors for Other Organic Waste	This field is a label for defining the characteristics of the "Other Organic Waste" category (see 2.9.a through e below). No User input is required in this cell.
2.9.a Diversion Rate of Other Organic Waste (%)	Input the fraction of other organic waste that would be disposed of by landfill (in absence of anaerobic digestion). The fraction diverted from other treatments is assumed to be the total not diverted from a landfill (calculated value).
2.9.b Degradable Organic Carbon (DOC), wet basis (fraction)	Input the fraction of carbon in other organic waste that is degradable organic fraction (DOC). Some materials have pre-determined values and can be found in the worksheet "OW Fate." Alternative methods in determining the DOC factor of a unique waste not depicted in the tables are also provided in the same tab.
2.9.c Fraction of DOC that decomposes (DOC_f), (fraction)	Input the fraction of DOC in other organic waste that actually decomposes (DOC_f). Some materials have pre-determined values and can be found in the worksheet "OW Fate." Alternative methods in determining the DOC_f factor of a unique waste not depicted in the tables are also provided in the same tab.
2.9.d Moisture Content (%)	Input the weighted average moisture content of the other organic waste for the entire reporting period. Value may be used to estimate the DOC factor of such organic waste. Value must be representative of all organic waste throughput during the reporting period.
2.9.e Volatile Solids , dry basis(%, dry basis)	Input the weighted average volatile solids content of the other organic waste for the entire reporting period. Value may be used to estimate the DOC factor of such organic waste. Value must be representative of all organic waste throughput during the reporting period.
2.10. Diesel Fuel Use in Material Handling Equipment (Hydrolysis Loading) (gallons)	Input monthly diesel fuel use data for each month of operation. The volume measured must be corrected to 60^{o}F. Diesel fuel is commonly used in equipment such as front end loaders. For delivery of feedstocks by truck, only the transport distance is required. Diesel fuel use for digestate or compost load out, or fuel use for windrow composting, or to work compost piles should be excluded from this field.
2.11. Digester Gas Flow (metered) (scf at 60^{o}F, 1 atm)	Input monthly metered digester gas flow data for each month of operation. The volume of digester gas measured must be corrected to 60^{o} F. Information must be backed by metered and measured process data output. Additional details are provided below Table D.2.
2.12. Methane Content (% Methane)	Input monthly volume weighted average methane concentration data (measured as dry biogas) for each month of operation. Additional details are provided below Table D.2.

2.13. Digester Gas Use in Facility Boiler, or Bypass to Flare/TO (scf at 60ºF, 1 atm)	Enter metered amounts of digester gas that is consumed by the facility boiler, or destroyed by the flare or thermal oxidizer (TO) in the event the facility is unable to process or upgrade the gas.
2.14. Biogas Upgrading - Tail Gas to Flare/TO (MMBtu, HHV)	Enter metered amounts of tail gas methane that is destroyed by the flare or thermal oxidizer (TO) prior to release to the atmosphere as CO_2.
2.15. Facility Consumption of Utility-sourced NG (MMBtu, HHV)	Input monthly total buyback fossil natural gas use from a pipeline source (or other) in MMBtu from utility invoices (reported in HHV) for each month of operation. If buyback gas is used to boost the Btu of biomethane to meet pipeline specifications, do not include this quantity of NG in this field (monthly basis). This will be input separately in field 2.17.
2.16. Facility Consumption of Grid Electricity (kWh)	Input monthly total electricity use from the grid in kWh from utility invoices for each month in this field. If biogas-derived electricity is generated on-site, input metered quantity of electricity in this field in addition to ensuring that the emissions factor for the User Defined Mix is included in cell U26.
2.17. Buy Back fossil NG to boost Btu prior to Pipeline Injection (MMBtu, HHV)	Input monthly total quantity of buyback fossil NG (in MMBtu, HHV) if NG is used to boost biomethane energy content to meet pipeline specification. This quantity is not used in CI calculations. Subtract this quantity of fossil NG when reporting pipeline injected biomethane in field 2.19. See additional details below Table D.2.
2.18. Propane used to boost Btu prior to Pipeline Injection (gallons)	Input monthly total quantity of propane (in gallons at ambient temperature) if propane is used to boost biomethane energy content to meet pipeline specification. This quantity is not used in CI calculations. Subtract this quantity of propane when reporting pipeline injected biomethane in field 2.19. See additional details below Table D.2.
2.19. Biomethane Injected into Pipeline (metered) (MMBtu, HHV)	Input monthly total biomethane injected into the pipeline in MMBtu (as HHV) for each month. The quantity must be supported by the installation of utility grade meters. Subtract monthly total fossil NG or propane blended with biomethane to meet pipeline specifications from the injected quantity (in MMBtu). See additional details below Table D.2.
2.20. NG Pipeline Transmission	This field includes a label for NG pipeline transmission and does not require an input.
2.20.a From upgrading facility to CNG Station	Input pipeline distance from biogas processing facility to the intended CNG station in California. For onsite dispensing, assume that the pipeline distance is 1 mile. If fuel is sent to multiple stations, use the Standard Station Centroid of Bakersfield as the endpoint. Additional details can be found below Table D.2.
2.20..b From upgrading facility to LNG plant	Input pipeline distance from biogas processing facility to the liquefaction facility. This is required only if the application includes LNG and L-CNG fuel pathways. Additional details can be found below Table D.2.
2.21. Specify GHG Emissions Factor for Electricity Mix (or User Defined Parameters)	If “User Defined Mix” is selected in field 2.1, consult with CARB staff to develop a user defined GHG emissions factor and input this field in cell U 26. Data sources for User Defined electricity mixes must be documented in the Supplemental Documentation attached with the Simplified CI Calculator.
“Calculate” Button	After all data in Section 2 are entered, click the “Calculate” button (cell G22) in Section 2 to calculate CI for the CNG pathway.

Additional Details for Section 2 and Table D.2

Using biogas to generate electricity for biogas upgrading (Field 2.1)

For self-generated electricity onsite using digester gas, the “User Defined Mix” option must be selected in Field 2.1. Although the Calculator can accommodate facilities which use biogas to generate electricity for biogas upgrading, applicants must declare the use of on-site electricity generation, and consult with CARB staff prior to submission of a pathway application for the appropriate emissions factor. A dedicated meter to quantify biogas-derived electricity in kWh must be used to report quantities of electricity consumed in this Calculator sheet.

Raw digester gas sourced from the anaerobic digester (Field 2.11)

Requires a dedicated flow measurement system with temperature measurement to enable reporting of the total monthly raw digester gas flow quantity at 1 atmosphere pressure and 60°F (dry gas corrected for moisture). The flow measurement system must be installed upstream of the valve used to divert gas flow to the flare, boiler or combined heat and power (CHP) unit, or the feed compressor to the biogas upgrading plant. The system must also be calibrated per manufacturer’s requirement and scaled to measure the entire range of potential flow of biogas. Measurement must be continuous and all data must be electronically archived (manual recording is not acceptable). The direct metering of the quantity and percentage methane concentration of biogas captured from the digester are not used in CI calculations, but rather as a check to ensure that total biomethane sales do not exceed the biogas quantity produced or generated in the digester. If biogas is used for electricity generation, applicant must report metered quantity of biogas used for electricity generation and metered quantity of electricity generated on-site.

Methane content (% Methane in Field 2.12)

Input monthly weighted average methane concentration (dry gas basis) in the digester gas. Methane concentration measurement must be recorded every 15 minutes (at a minimum) with instrumentation capable of electronic archival (manual recording will not be acceptable). The methane measurement system requires calibration per manufacturer’s requirement and scaled to measure the entire potential range of methane concentration in the biogas.

Dedicated metering of buyback NG and propane (Field 2.17 and 2.18)
For biogas upgrading facilities which use buyback natural gas (NG) or propane to boost the Btu of biomethane prior to pipeline injection (to meet pipeline specifications), dedicated metering must be installed to substantiate quantities of NG or propane used for this purpose. If dedicated metering is not installed or not verifiable, all NG and propane reported in fields 2.17 and 2.18 respectively will be added to NG reported in field 2.15 (and considered used for upgrading biogas).

Biomethane injected into the pipeline (Field 2.19)

The monthly total quantity of biomethane input must correspond to the quantity of biomethane (in MMBtu) injected into the pipeline. However, since this quantity may include NG or propane blended with biomethane to meet pipeline specifications, the use of any non-renewable gas must be explicitly disclosed through invoices. The quantity entered would include only the biomethane quantity; any fossil inputs must be subtracted from the actual quantity injected into the pipeline that was purchased by the local utility or other party. Staff believes that this reporting is most consistent with quantities reported for RIN generation under the RFS, which is based on the Btu of the pipeline quality biogas after treatment, and prior to any blending with non-renewable fuel or injection into a pipeline.

Note: CI calculations for biomethane are performed on a net MMBtu injected by subtracting all fossil NG and propane inputs (including quantities used in a flare, or thermal oxidizer) from renewable biomethane (in MMBtu) injected into the pipeline.
Pipeline transport distance for renewable natural gas (Fields 2.20.a and 2.20.b)

For pipeline transport distance from a biogas processing facility to a CNG dispensing station or to a liquefaction facility, driving distances between the two locations may be determined using a publicly available web-based driving distance estimator. For RNG to CNG pathways which use multiple dispensing stations, staff used fuel sales data for Q1 and Q2, 2017 and calculated a volume weighted Standard Station Centroid, which was found to be just below Bakersfield. Based on the centroid approach, applicants using multiple dispensing stations may use driving distance from the digester facility in the U.S. or Canada, to Bakersfield, California as the pipeline transmission distance in the Simplified CI Calculator (or Tier 2 if applicable). Alternatively, the applicant could choose to use a more conservative value, such as the distance to the farthest fueling facility, in order to minimize the risk of exceeding the certified CI as a result of changes in the supply chain.

Section 3. CNG, LNG and L-CNG Production and Transport Data

Table D.3 provides details of inputs for LNG and L-CNG pathways. Additional details are included below in Table D.3.

Table D.3. List of Input Fields for Section 3 of the Simplified CI Calculator.

Field Name	Description
3.1. Select Regional Electricity Mix for LNG Production	Choose the electricity mix corresponding to the zip code for the region where the liquefaction plant is located. The Calculator includes 26 eGRID zone mixes, a Brazilian average mix, a Canadian average mix, and a User Defined Mix in the pull down selection menu. For facilities located in the U.S., select one of the 26 eGRID zones available. If the liquefaction facility is located outside the U.S., select the "User Defined Mix." After selecting an electricity mix option, click the "**Calculate**" button. Note, if "User Defined Mix" is selected, consult with CARB staff to develop an emissions factor for the User Defined Mix to be input in field 3.7. Data sources for User Defined electricity mixes must be documented in the Supplemental Documentation attached with the Simplified CI Calculator.
3.2. NG from NG purchase invoices	Input monthly total fossil-based NG sourced from a pipeline source (or other) in MMBtu from utility invoices (reported in HHV) for 24-months of operation in field 3.2. The input includes fossil NG used as process fuel and liquefied to LNG. Renewable attributes to support renewable biomethane dispensed must be provided to verifier during on-site audit.
3.3. LNG Production from Production Log	Input monthly total LNG produced in gallons (reported at ambient temperature) for 24 months in field 3.3.
3.4. NG as Process Fuel (Calculated)	This field calculates NG used as process fuel using inputs in fields 3.2 and 3.3. No user input is required for this field.
3.5. Grid Electricity Consumption from Utility Invoices	Input monthly total electricity use from the grid in kWh for the 24-months of operation in field 3.5.
3.6. LNG Transport and Distribution	This field serves as a label for LNG transport and distribution section. No input is required for field 3.6.
3.6.a. Select to affirm LNG delivery trucks are equipped with Boil-Off Recovery	If trucks transporting LNG are equipped to recover "Boil-Off", select "Yes," else "No" in field 3.6.a.
3.6.b. Enter Transport Distance from Liquefaction Plant to Dispensing Station	Input distance from liquefaction facility to the intended LNG or L-CNG dispensing station in California in field 3.6.b. Additional details are included below Table D.3.

3.7. Specify GHG Emissions Factor for Electricity Mix	Only displayed when "User Defined Mix" is selected in field 3.1. Consult with CARB staff to develop a user defined GHG emissions factor, and input this emissions factor into cell AD28. Data sources for User Defined Electricity mixes must be documented in the Supplemental Documentation attached with the Simplified CI Calculator.
"Calculate" Button	After all data are input in Section 3, click the "Calculate" button (cell AC22) to calculate pathway CIs for the LNG and L-CNG pathways.

Additional Details for Section 3

Transport of LNG to dispensing facility (Field 3.6.b)

Driving distance between any two locations may be determined using a publicly available web-based driving distance estimator if fuel is dispensed at a single station. If multiple dispensing facilities are utilized, a volume weighted average transport distance based on 24 months of sales records must be used for LNG distribution to fueling facilities. Alternatively, the applicant could choose to use a more conservative value, such as the distance to the farthest fueling facility, in order to minimize the risk of exceeding the certified CI as a result of changes in the supply chain.

Section 4. CI Calculation Details

This section provides a detailed breakdown of CI calculations using inputs in the RNG tab and applicable reference data. Standard inputs and corresponding GHG emissions are detailed in this section.

E. Waste Characterization Tabs

There are three wastes characterization tabs to help determine the baseline emissions (including avoided emissions) associated with the diversion of the organic material from its "business-as-usual" fate to its use as a biofuel feedstock; one for food scraps (FS Fate), one for urban landscaping waste (ULW Fate), and one for all other organic waste and residues (OW Fate) which cannot be characterized into the previous two categories of food scraps or urban landscaping waste.

The term "food scraps" in this calculator is characterized as the portion of municipal solid waste (MSW) (including intentionally separated from MSW, or separately collected) that consists of wastes derived from plants or animals for the explicit preparation or consumption of food for human and animals. This includes those foods and scraps processed or produced at residences, hospitality facilities (hotels, restaurants, amusement parks, stadiums, special events, etc.), institutions (hospitals, schools, prisons, etc.), grocery stores and food distributors. In California, the business-as-usual fate of 97.5% (by mass) of these wastes is landfill disposal and the business-as-usual fate of the remaining 2.5% is recycling into compost.

The term “urban landscaping waste” in this calculator is characterized as the portion of MSW (including intentionally separated from MSW, or separately collected) that consists of materials resulting from any public or private landscaping activities such as leaves, grass clippings, plants, prunings, shrubs, branches and stumps. In California, the business-as-usual fate of 35.9% (by mass) of these wastes is landfill disposal and the business-as-usual fate of the remaining 64.1% is recycling into compost. Based on the California state-average MSW characterization,[1] the calculator assumes that ULW consists of 2/3 yard trimmings (including leaves, grass clippings, plants, prunings and shrubs) and 1/3 wood (including branches and stumps).

The “other organic waste” category is intended to be a User-Defined category, in which the applicant provides information on the moisture content of the material, fraction of degradable organic carbon, fraction of DOC that is decomposed, and whether the material is normally disposed of in a landfill, compost facility, combusted at a biomass power plant, or used as animal feed, for example. To facilitate the application process, the calculator includes the DOC and the DOC_f of a list of common organic wastes. If a certain organic waste cannot be classified into any categories provided in the list, applicant may use the following methods to determine the DOC and the DOC_f of such feedstock:

1. For DOC,
    a. The total organic carbon (TOC) content of one unit of the feedstock can be measured by a TOC test (or equivalent method approved by the Executive Officer) and used to determine the DOC of such feedstock.
    b. If the analytical tests cannot be performed, applicant may estimate the feedstock-specific DOC using the equation[2] below:

$$DOC = F_{DOC} \times \frac{\%\ \text{Volatile Solids}}{100\%} \times \frac{\%\ \text{Total Solids}}{100\%}$$

Where:

F_{DOC} is the fraction of the volatile residue that is degradable organic carbon (weight fraction); use default value of 0.6.

% Total Solids = 100% - % Moisture Content.

[1] California Department of Resources Recycling and Recovery. 2014 Disposal-Facility-Based Characterization of Solid Waste in California. October 6, 2015. Publication # DRRR-2015-1546. Available at: http://www.calrecycle.ca.gov/Publications/Documents/1546/20151546.pdf

[2] The Code of Federal Regulations, 40 CFR Part 98, Subpart TT, Section 98.464

2. For DOC_f,
    a. The TOC content of one unit of the feedstock before and after a biochemical methane potential (BMP)[3] test (or equivalent method approved by the Executive Officer) can be used to determine the DOC_f of such feedstock.[4]
    b. If the analytical tests cannot be performed, use default value of 0.5.

Note that all user-defined values must meet the requirements of the monitoring plan for entities required to validate or verify pursuant to sections 95491.1(c).

No user input is required in any three of these waste characterization tabs. Feedstock diversion credits for avoided emissions are automatically calculated based up the specific parameters for each feedstock type.

[3] Moody, L. 2014. Using Biochemical Methane Potentials & Anaerobic Toxicity Assays. https://www.epa.gov/sites/production/files/2014-12/documents/moody_final.pdf

[4] Lee, U., Han, J., Wang, M. 2017. Evaluation of landfill gas emissions from municipal solid waste landfills for the life-cycle analysis of waste-to-energy pathways. Journal of Cleaner Production. 166, 335-342