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

LNG and L-CNG from North American Natural Gas

A. Introduction

This document provides detailed instructions for the use of the Simplified CI Calculator for Tier 1 North American Natural Gas pathway applications. This Calculator is to be used to calculate the carbon intensity (CI) for Liquefied Natural Gas (LNG) and Liquefied and subsequently Compressed Natural Gas (L-CNG) from North American natural gas. 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 Tier 1 Calculator and the operational data template in pathway application packages. Applicants are required to add facility information and verifiable operational energy use and fuel production data, and transport distances used in calculating the CI of NA NG pathways. **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 CA-GREET3.0 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 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

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
NA NG Summary	Summary worksheet. Contains an overall summary of the information entered in the "NA NG" tab of the calculator and calculated CIs for NA NG to 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.
NA NG	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 on 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.
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 specifications of fuels (i.e., HHV, LHV, density, carbon ratio), global warming potentials of greenhouse gases, unit conversions, tailpipe emissions, LNG boil-off emissions and other information used in calculating CIs.

D. NA NG tab

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

- Section 1. Applicant Information for Fossil LNG Production
- Section 2. Information for Fossil LNG Production
- Section 3. CI Calculation Details

Section 1. Applicant Information for Fossil LNG Production

The following table lists the fields used in Section 1 of the NA NG 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, If not available, contact CARB for LCFS Facility ID.
1.4. LNG Liquefaction Facility Location	Location of the liquefaction facility (Street, City, State).
1.5. Provisional Pathway?	If available data is less than 24 months, select “Yes”, else “No”. If the application is for a provisional pathway, input available months of operational data starting in Month 1 (minimum three months of operational data required to meet provisional requirements).
1.6. Application Number	Enter the application number generated by the AFP.
1.7. LNG Dispensing Station(s) Location	Location of LNG dispensing location (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 for Field 2.7.b. below Table D.2.
1.8. L-CNG Dispensing Station(s) Location	Location of L-CNG station in California (Street, City, State). For multiple stations, calculate a centroid location based on a weighted average of fuel dispensing stations to which L-CNG is supplied. See additional details for Field 2.7.b. below Table D.2.

Section 2. Information for Fossil LNG and L-CNG Production

Table D.2. provides details of inputs for Fossil LNG and L-CNG pathways. Additional details are included below Table D.2.

Table D.2. List of Input Fields for Section 2 of the Simplified CI Calculator.

Field Name	Description
2.1. 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, Brazilian average mix, Canadian average mix and User Defined mix included in the pull down menu. For facilities in the U. S. select one of 26 eGRID zones available for the U. S. If processing facility is located outside the U.S., select "User Defined Mix". After selecting an electricity mix option, click the "**Calculate**" button. If "User Defined Mix" is selected, consult with CARB staff to develop an emission factor for the user defined mix to be input in field 2.8. Data sources for User Defined electricity mixes must be documented in the Supplemental Documentation attached with the Simplified CI Calculator.
2.2. Monthly Data	Input the months and year(s) corresponding to the operational data provided.
2.3. NG from NG purchase invoices	Input monthly total fossil NG sourced from a pipeline (or other) in MMBtu from utility invoices (reported in HHV) for 24 months of operation in field 2.3. The input includes fossil NG used as process fuel and liquefied to LNG.
2.4. LNG Production from Production Log	Input monthly total LNG produced in gallons (reported at ambient temperature) for 24 months in field 2.4.
2.5. NG as process fuel (Calculated)	This field calculates NG used as process fuel using inputs in fields 2.3 and 2.4. No user input is required for this field.
2.6. Electricity from Utility Invoices	Input monthly total electricity use from the grid in kWh for 24 months in field 2.6.
2.7. LNG Transport and Distribution	This field serves as a label for LNG transport and distribution section. No input is required for field 2.7.
2.7.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 2.7.a.

2.7.b. Enter Transport Distance from Liquefaction Plant to station	Input distance from liquefaction facility to the intended LNG or L-CNG dispensing station in California in field 2.7.b. Additional details are included below Table D.2.
2.8. Specify GHG Emission Factor for Electricity Mix	If "User Defined Mix" is selected in field 2.1, consult with CARB staff to develop a user defined mix GHG emissions factor and input in this field in field 2.8. Data sources for User Defined electricity mixes must be documented in the Supplemental Documentation attached with the Simplified CI Calculator.

After all data are input in Section 2, click the "Calculate" button (cell H21-I21) to calculate pathway CIs for the LNG and L-CNG pathways.

Additional Details for Section 2

Transport of LNG to dispensing facility (Field 2.7.b)

Driving distance between any two locations may be determined using a publicly available web-based driving distance 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.

Section3. CI Calculation Details

This section contains an example pathway CI calculation with a detailed breakdown of all calculations used for CI determination based on information entered by the user and applicable reference data.