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February 20, 2024

Ms. Rajinder Sahota  
Deputy Executive Officer - Climate Change & Research  
California Air Resources Board  
1001 I Street  
Sacramento, California 95814

*Submitted via LCFS Comments Upload Link*

**RE: CalBio Comments on CARB's Proposed Tier 1 Simplified Calculator for Biomethane from Anaerobic Digestion of Dairy and Swine Manure released December 19, 2023**

Dear Ms. Sahota,

Thank you for the opportunity to provide comments to the California Air Resources Board (CARB) on the proposed Tier 1 Simplified Calculator for Biomethane from Anaerobic Digestion of Dairy and Swine Manure released December 19, 2023.

California Bioenergy LLC (CalBio) is a leading developer of dairy digester projects. Founded in 2006, CalBio works closely with California dairy farm families, dairy co-ops and cheese producers, CARB, the California Department of Food and Agriculture (CDFA), the California Public Utility Commission (CPUC), the California Energy Commission (CEC), and the U.S. Environmental Protection Agency (EPA). We develop projects that reduce greenhouse gas (GHG) emissions, improve local air quality, protect water quality, and create local jobs. Our projects produce renewable natural gas and generate electricity, both used as a vehicle fuel to power low emission trucks, buses, and cars.

CalBio has extensive experience working with the Tier 1 Simplified CI Calculator for Biomethane from Anaerobic Digestion of Dairy and Swine Manure (DSM CI Calculator). With over 30 certified Tier 2 pathways, we have developed expertise in both using and understanding the complexities of this tool. In addition, both our in-house staff and consultants are skilled greenhouse gas (GHG) accountants that value incorporating the latest climate science and emission factors into the DSM CI Calculator analysis framework and our project pathways. CalBio is thankful for the opportunity to share our feedback on the proposed updates and commends CARB on implementing changes that will make the DSM CI calculator more streamlined, require less user modifications, and reflect the latest industry standards for GHG accounting.

**A. Tier 1 Simplified CI Calculator for DSM Biogas-to-Electricity Pathways**

CARB supports the electrification of the transportation sector in California and seeks to build more electric projects to help CARB meet goals of the Scoping Plan<sup>1</sup> and serve the growing demand for electric

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<sup>1</sup> <https://ww2.arb.ca.gov/sites/default/files/2023-04/2022-sp.pdf>



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vehicles. Thus, CalBio strongly recommends that CARB develop a separate DSM biogas-to-electricity Tier 1 CI Calculator for such pathways to streamline the process for reviewing and approving biogas-to-electricity projects. The proposed CI Calculator would inherently include all the modifications and technical guidance included in CARB's [LCFS Guidance 19-06 document](#). Absent a standard Tier 1 CI Calculator for biogas-to-electricity, all such projects will be forced into a Tier 2 application. This disadvantages in-state projects which help California to achieve its methane reduction goals and support electrification.

Based on our experience building the first dairy biogas-to-fuel cell project and successfully achieving pathway certification for the low-CI electricity produced by this project, CalBio also proposes the following modification for this new CI calculator:

- CalBio recommends updating the guidance that CARB issued in LCFS Guidance 19-06 document to divide the final biogas electricity CI by the efficiency of the electric generator used in the project. The approach appears to introduce a cap in the CI value when the engine efficiency exceeds the 50% benchmark. When the CI is divided by a higher efficiency value, it effectively penalizes the project for being more efficient. CalBio proposes using the benchmark efficiency instead, which allows the credits to remain linear with increased generator efficiency. The CI calculator already caps avoided methane crediting based on either the lesser of biogas produced and the modeled emission reductions. It does not seem reasonable to further cap based on efficiency, especially when CARB's motivation has been to encourage projects to use more efficient and cleaner fuel cell technology.

**Suggested Modification:** In Cell E91 of the "Manure-to-Biogas" Worksheet, the formula for the Final Electricity CI for the 2018 CARB-modified electricity calculator should be:

$=IF(W52=0,0,(G68+G75+G88+G89+G90))/(IF('EF Table'!E89>0.5,'EF Table'!E91,'EF Table'!E89))$ .  
An equivalent formula should be added to a 2024 DSM biogas-to-electricity Tier 1 CI Calculator.

## B. Proposed DSM Biomethane CI Calculator

Please see below for CalBio's feedback on and additional recommendations for the Proposed DSM Biomethane CI calculator.

'Biogas-to-RNG' Worksheet

- **Field 2.7 Flared Biogas Biomethane Content:** The proposed calculator does not appear to include an emissions factor for the newly added Flared Biogas field in the LCFS pathway system boundary or resulting CI calculations. To solve this, CalBio proposes applying the same emission factor used in Sections 2.20 and 2.30 to apply to the CO<sub>2</sub> emitted from the combustion of biogas based on the inputs to Sections 2.6 and 2.7. CalBio believes flared biogas at the digester should be treated consistently with how flared biomethane is accounted for at the upgrading facility, and the resulting emissions should be included in the LCFS pathway system boundary regardless of the biogas handling method (i.e., flaring or venting). The project should also demonstrate the flare was operational through a thermocouple or other instrument to demonstrate the gas was



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truly combusted. In the absence of operational data demonstrating combustion, the biogas flow should be treated as vented.

**Suggested Modification:** *Include an Emission Factor calculation in Cell F57. Also include row in the Raw Biogas Production-Digester in Section 4 to include "Biogas (flaring)".*

- **Field 2.22 On-Site Electricity from Biogas (upgrading and compression):**
  - CARB has emphasized its goals for producers to choose more efficient, cleaner technologies for on-site power generation. In alignment with these goals, CalBio recommends that CARB recognize the biogenic nature of the CO<sub>2</sub> emissions occurring from the combustion of biogas for on-site electricity use. The default emission factor for the use of on-site electricity from biogas (641 gCO<sub>2</sub>e/kWh) assumes the fuel is fossil-based natural gas and is more than double the default emission factor for grid electricity in all but six of the eGRID regions. Thus, most renewable fuel producers are penalized if they choose to offset some of the power for their facilities using on-site electricity fueled by biogas rather than grid electricity.
  - For facilities that use biogas for electricity production, CARB's Instruction Manual instructs applicants to choose the User Defined Mix electricity option for Field 2.1 Select Regional Electricity Mix, however that User Defined Mix emission factor flows into all the Grid Electricity Fields, rather than the On-Site Electricity from Biogas (Field 2.22). CalBio recommends CARB allow users to select an electricity mix for each electricity field.
  - CalBio also recommends that CARB include a User-Defined Option for electricity generation equipment and associated technology-specific emission factors so users can appropriately model emissions from technologies other than conventional stationary reciprocating engines, such as fuel cells, linear generators, etc. Similar to the guidance issued for User-Defined Fuels in Section 2 of the calculator, applicants can consult with CARB Staff to develop the technology-specific emission factors.

**Suggested Modification:** *RNG producers which use biogas to generate electricity should be able to replace the Emission Factor calculation in Cell U57 with 0 recognizing that the CO<sub>2</sub> emissions are biogenic.*

- **Field 2.6 Flared Biogas Flow (metered):** User Input cells are formatted as "Percentage," but should be formatted as "Number" like Sections 2.4 and 2.8. The formatting of cell E52 could also be updated to use the 1000 separator (,).

#### 'Avoided Emissions' Worksheet

- **Accounting Errors in Cells C45 and C47 for Projects that use Biogas to Generate On-site Electricity:** If a project seeks to generate on-site electricity from biogas, it is assumed the Biogas in MMBTUs will be entered into "2.20 Raw Biogas (as Process Fuel for upgrading and



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compression)" and the electricity generation will be entered into "2.22 On-Site Electricity from Biogas (upgrading and compression)" on the 'Biogas-to-RNG' Worksheet. However, when these values are entered, the "RNG associated with onsite electricity production" is not recognized in Cell C45 in the 'Avoided Emissions' Worksheet. The CI impact should be the same if the electricity is derived from Biogas as opposed to Biomethane.

Similarly, Cell C47 contains a note where CARB recognizes that if on-site power generation is used in the LCFS system boundary, the value of "RNG associated with onsite electricity production" can be included in the avoided CH<sub>4</sub> calculation here. CARB should modify these cells to treat on-site electricity derived from biogas consistently since electricity can be generated from both and still be considered within the RNG production boundary.

**Suggested Modification:** *In the scenario described above, Cell C45 should be revised to the following  $=('Biogas-to-RNG'!S52+'Biogas-to-RNG'!AE52)/Reference!D16*Reference!E16$  and Cell C47 should be revised to equal  $SUM(C45,C41)/C40$*

'Manure-to-Biogas (LOP Inputs)' Worksheet

- **Field L3.7 Biomethane Content in Vented Biogas (metered):** User Input cells are formatted as "Number" but should be "Percentage" for consistency with units identified in cell H53.

## C. Proposed DSM Biomethane CI Calculator Instruction Manual

Please see below for CalBio's feedback on the Proposed DSM Biomethane CI calculator Instruction Manual.

- **Table 2, Field L1.(1-6).13 Fraction of Volatile Solids Sent to Anaerobic Storage/Treatment System:** The Description and Instructions for this Field states: "...For modeling the manure (volatile solids) from more than six livestock categories/sources, please use a separate worksheet to calculate the weighted fraction of manure (volatile solids) average for each livestock category, and use the calculated weighted average as the inputs to Fields L1.(1-6).12." However, Fields L1.(1-6).12 is the Van't Hoff-Arrhenius factor and is not a User Input. The calculated weighted average be the inputs to Fields L1.(1-6).13.
- **Table 9, Field 2.1 Select Regional Electricity Mix for Biomethane:** CARB publishes the prior year's grid electricity factors on an annual basis (<https://ww2.arb.ca.gov/resources/documents/lcfs-pathways-requiring-public-comments>). CARB should explicitly allow applicants to enter the CARB-published values as a User Defined Mix by stating these instructions directly in the Instruction Manual, to more accurately reflect the emissions from electricity utilized at their facilities.



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## **D. Proposed Data Substitution Requirements in § 95491.2.**

CalBio believes the Data Substitution Requirements listed in Table 13 of Section 95491.2 do not appropriately consider the specific types of common data issues often observed by flow meters, methane analyzers, and other equipment used as inputs to the CI Calculator. The requirements are overly prescriptive and overly simplified and do not allow for more nuanced and appropriate data substitution.

First, CARB should specify a definition and a threshold for “Missing Data” where the requirements are only triggered if a certain duration or volume of missing data is observed. For instance, is a single missing 15-minute flow reading considered missing that must follow these procedures? In many cases, it would not make sense to substitute flow using the prescriptive language, especially if the meter totalizes flow and the volume of biogas which flowed through the meter during the data-outage period is known. Durations and volumes which stay under a certain limit should be able to be addressed within the project’s data substitution procedures defined in its monitoring plan and subject to verifier review. What CARB is proposing may lead to more Alternate Methods as developers seek to justify why an approach is needed because it does not fit with the prescriptive requirements. Additionally, performing data substitution that is “conservative” for a particular project that exists in a cluster, may affect its gas allocation contribution which may inadvertently credit another project with a greater proportion of biogas production which may not be appropriate or conservative.

Lastly, the 10 day alternate method submittal requirement is not realistic as there are times when a process change occurred on the equipment or at the farm or in the data that is not observed until after a report is submitted when the project is undergoing verification. By prohibiting alternate methods which are not submitted within the specified timeframe and the outcome be that “no reporting entity may generate LCFS credits associated with the time period for which there is missing data” is not reasonable for something that is potentially de minimus to the integrity of the pathway. CARB and the project applicant should be able to work together to ensure a robust, accurate, and agreed upon approach to support the goals of a well-functioning program.

We would like to thank CARB for the opportunity to comment and we look forward to engaging further on the topics above.

Sincerely,

Andrew Craig  
Vice President, Greenhouse Gas Programs  
California Bioenergy LLC