SOUTHERN CALIFORNIA GAS COMPANY (SOCALGAS)
SIERRA CLUB-SCG-08
WOODY BIOMASS PILOT PROJECT APPLICATION (A.25-10-008)
DATE REQUESTED: May 7, 2026
RESPONSE DUE: May 21, 2026

QUESTION 8-1:

Please describe in detail how the biomass generates greenhouse emissions from the baseline case, specifically addressing the share of carbon in the biomass that enters the atmosphere, and in what form. Please indicate the witness responsible for this answer.

RESPONSE 8-1:

In the baseline case, greenhouse gas emissions are generated through two primary pathways: the biogenic carbon flux from decomposition/burning and the non-biogenic emissions from industrial logistics.

1. Biogenic Carbon Flux: Based on Culumber et al. (2025), in the "Whole Orchard Recycling" scenario (which applies to ~63% of total baseline biomass), approximately 93% of the biogenic carbon returns to the atmosphere within 20 years as CO2 and the analysis assumes 100% will decompose within 100 years as carbon stored in orchard soil residues is highly vulnerable to land use change, redevelopment, or modified agricultural practices, any of which would likely re-release stored carbon, nullifying any perceived "sink" benefit of the base case.
    - Carbon Dioxide (CO2): This is the primary form of emission, resulting from the oxidative decomposition of incorporated biomass or the direct combustion of sticks in air curtain incinerators.
    - Nitrous Oxide (N2O): The baseline includes small fluxes of non-biogenic associated with natural decomposition processes.
    - Methane (CH4): The field studies of the baseline incorporation practice have found that emissions are negligible.[1]
2. Non-Biogenic Logistics Emissions: Beyond the biogenic flux, the baseline disposal processes require consumption of fossil fuels, resulting in non-biogenic emissions of CO2, N2O and CH4. These include:
    - Biomass Preprocessing (Chipping and Loading): This stage utilizes diesel-powered heavy equipment to chip orchard removals and load sticks for transport. The analysis applies a validated factor from the 2024 R&D GREET model of 7.02 g CO2e/kg of biomass for these activities.
    - Biomass Transportation (Hauling): The baseline requires hauling biomass to various disposal sites, such as dairies or regional cogeneration plants. These heavy-duty diesel truck trips generate approximately 92.06 g CO2e/ton-mile.

By converting this biomass into Bio-SNG through the SB 1440 Pilot Project's controlled process, these emissions are displaced, and their associated biogenic and non-biogenic emissions are considered "avoided" when calculating the SB 1440 Pilot Project Net Carbon Intensity (CI).

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[1] Since methane emissions are considered negligible, methane emissions are excluded in the calculation of GHG emissions for the base case (Table 1).

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Witness: Dr. Matthew Summers

QUESTION 8-2:

Please indicate the witness responsible for this answer. Please describe in detail how Bio-CNG generates greenhouse gas emissions. Please indicate the witness responsible for this answer.

RESPONSE 8-2:

For the proposed SB 1440 Pilot Project, the Corrected Revised Direct Testimony of Lucas/Summers (Chapter 2) presents the carbon intensity (CI) at various stages of producing Bio-CNG from woody biomass using gasification technology, as shown in Tables 2 and 3 (pages 16 and 17, respectively).

In descriptive terms, the production and utilization of Bio-CNG generate greenhouse gas emissions across a full lifecycle, which are categorized into biogenic emissions from the biomass carbon cycle and non-biogenic emissions from fossil fuel and grid electricity use. The detailed breakdown of these emissions across the lifecycle stages is as follows:

1. Feedstock Logistics (Non-Biogenic): This stage includes the gathering, processing, and hauling of almond biomass to the production facility. These activities generate non-biogenic emissions of carbon dioxide, methane, and nitrous oxide because they rely on diesel-powered heavy equipment for chipping and loading, as well as heavy-duty trucks for transporting the material.
2. Bio-SNG Plant Operations (Mixed Biogenic and Non-Biogenic):
    - Plant Electricity: The facility consumes grid power for its various technical processes, which involves upstream non-biogenic emissions from the regional power mix.
    - Direct Plant Emissions: The gasification and methanation processes produce a concentrated stream of biogenic carbon dioxide. The facility is also expected to emit a minor amount of nitrous oxide, which is included in the project's lifecycle modeling.
    - Fugitive Methane: Potential methane leakage from the pressurized, enclosed industrial system is estimated using industry-standard protocols for equipment like valves and connectors. These fugitive emissions were estimated to be a nearly negligent fraction of the direct greenhouse gas emissions from the plant.
3. Carbon Capture and Storage (CCS) (Non-Biogenic Impact): If the project implements carbon capture and storage, it will require additional grid electricity, contributing further non-biogenic emissions. This technology is designed to capture and sequester a vast majority of the plant's biogenic carbon dioxide, preventing it from being released into the atmosphere.

4. Compression and Transportation (Non-Biogenic): Grid electricity is used to compress the Bio-SNG to high pressure for transport. The fuel is then hauled to the pipeline interconnection point using trucks powered by compressed natural gas, resulting in non-biogenic emissions from both the compression energy and the transport vehicles.
5. Vehicle End Use (Biogenic): The final combustion of the fuel in a vehicle releases biogenic carbon dioxide at the tailpipe. These are treated as positive emissions to the atmosphere to be consistent with counting the baseline emissions as “avoided” when calculating the SB 1440 Pilot Project’s Net CI.

Witness: Dr. Matthew Summers.

QUESTION 8-3:

Please provide any scientific justification for classifying alternative biomass fate as an "avoided emission," but not doing the same for the purported avoided use of natural gas.

RESPONSE 8-3:

The "avoided emission" classification for alternative biomass disposal reflects the real-world "business-as-usual" baseline (such as air curtain burning or soil incorporation) that is prevented by the SB 1440 Pilot Project. This is a standard Net CI methodology consistent with CARB's approach to low-carbon fuels and waste diversion, where a credit is applied for preventing emissions that would have otherwise occurred in the baseline case.

Furthermore, the avoided use of fossil natural gas was accounted for in the comparison with Bio-CNG. As shown in Table 3 of the Corrected Revised Testimony of Lucas/Summers, the carbon intensity of the produced Bio-CNG is compared unit-for-unit against North American Compressed Natural Gas (NA-CNG). By demonstrating that Bio-CNG (36.1 CI without CCS) has a lifecycle impact significantly lower than the NA-CNG it replaces (70.12 CI), the analysis effectively quantifies the atmospheric benefit of displacing fossil fuels.

Witness: Dr. Matthew Summers / James Lucas.

QUESTION 8-4:

In Response 6-3c, SoCalGas states "…there was no modeling involved in removing the row with the -55.0 gCO2e/MJ in Table 3."

QUESTION 8-4a:

Please indicate which witness confirmed that biogenic CO2 should not have been accounted for as carbon neutral or similar.

RESPONSE 8-4a:

Dr. Matthew Summers in consultation with Dr. Eric Tan of National Laboratory of the Rockies (formerly National Renewable Energy Laboratory) confirmed the revision to the accounting rules for biogenic carbon.

QUESTION 8-4b:

Please indicate the witness responsible for this answer.

RESPONSE 8-4b:

Dr. Matthew Summers.

QUESTION 8-5:

SoCalGas states in response 6-4, that the designation of "net carbon sink" reflects a comparison between the lifecycle emissions associated with producing Bio-CNG (as shown in Table 3), which include avoided emissions, and the carbon intensity (CI) of conventional natural gas (also shown in Table 3)

QUESTION 8-5a:

Please provide support for SoCalGas's definition of a "net carbon sink."

RESPONSE 8-5a:

In SoCalGas's response to Question 6-4, the phrase "net carbon sink" reflects SoCalGas's intended use of the term within the context of the sentence. No external source was relied upon for this definition, as the response is meant to clarify SoCalGas's usage. Accordingly, citation to a separate source is not necessary.

QUESTION 8-5b:

If wind turbines were to generate electricity emitting fewer greenhouse gases than fossil gas turbines generating the same amount of electricity, would those wind turbines meet SoCalGas's definition of "net carbon sink"?

RESPONSE 8-5b:

SoCalGas objects on the grounds this question calls for information that is irrelevant and not reasonably calculated to lead to the discovery of admissible evidence because it raises issues related to wind turbines and fossil gas turbines and their climate impacts, which are outside the scope of this proceeding.

QUESTION 8-5c:

Please indicate the witness responsible for this answer.

RESPONSE 8-5c:

Not applicable.

QUESTION 8-6:

SoCalGas states in Response 6-4 that "[b]ecause the CI associated with producing Bio-CNG is approximately 49% lower than the CI of natural gas, the project achieves net lifecycle emission reductions."

QUESTION 8-6a:

Please indicate what SoCalGas means by "net lifecycle emissions reductions."

RESPONSE 8-6a:

In the context of SoCalGas's response to 6-4, net lifecycle emission reductions refers to the decrease in carbon intensity (CI) when comparing the use case scenario and to the base case scenario in the Corrected Revised Testimony of Lucas/Matthews (Chapter 2) – Tables 1 through 3.

QUESTION 8-6b:

Please indicate the witness responsible for this answer.

RESPONSE 8-6b:

James Lucas.

QUESTION 8-7:

In Response 6-6a, SoCalGas states, "The U.S. EPA Protocol (EPA-453/R-95-017) is the industry-standard guidance for estimating equipment leaks from valves, flanges, and connectors in pressurized gas systems. While the factors are often expressed as 'Total Organic Compounds' (TOC), they are technically valid for methane, the primary component of the gas in this facility, and are used to generate defensible engineering estimates for fugitive methane leakage."

QUESTION 8-7a:

Please state the basis for the claim that these factors are "technically valid for methane[.]"

RESPONSE 8-7a:

The U.S. EPA Protocol is the established industry standard for estimating leaks from valves, flanges, and connectors in pressurized industrial systems. Because methane is the primary constituent of the gas within the Bio-SNG facility, these component-level factors, though often expressed as Total Organic Compounds (TOC), provide a technically defensible engineering basis for estimating fugitive methane leakage in a thermochemical industrial plant.

QUESTION 8-7b:

Please indicate the witness responsible for this answer.

RESPONSE 8-7b:

Dr. Matthew Summers.

QUESTION 8-8:

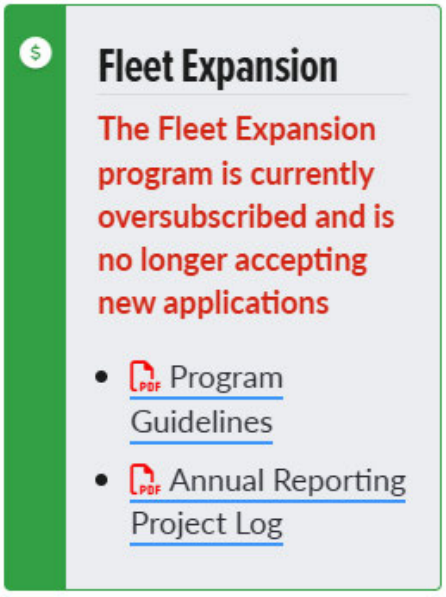
In Response 6-7a, SoCalGas states, "With funding running out for the San Joaquin Valley Air Pollution Control District Ag Burn Alternatives Grant Program, which provides incentives to whole-orchard recycling operations in the San Joaquin Valley, there may be upward pressure to use agricultural burning for disposal."

QUESTION 8-8a:

Please state the basis for the claim that "funding running out for the San Joaquin Valley Air Pollution Control District Ag Burn Alternatives Grant Program "

RESPONSE 8-8a:

This is based on information provided by the San Joaquin Valley Air Pollution Control District and also information contained on their website. See screenshot below from the district's webpage where it states the "Fleet Expansion program is currently oversubscribed and is no longer accepting new applications." Webpage link provided below as well. This program provides incentives for the purchase of new agricultural wood-chipping equipment to chip orchard and vineyard removals located within District boundaries.



https://www.valleyair.org/grants/ag-burn-alternatives-grant-program/

QUESTION 8-8b:

Please state the basis for the claim that "there may be upward pressure to use agricultural burning for disposal."

RESPONSE 8-8b:

The basis for this statement is that farmers require affordable options to manage woody biomass disposal. In the absence of cost-effective solutions or incentives, this may create pressure to pursue alternative practices, such as reverting to agricultural burning or allowing wood waste to accumulate on-site. This dynamic is similar to challenges observed under SB 1383, where limitations in available infrastructure have constrained the ability to achieve the policy goal of diverting 75% of organic waste from landfills.

QUESTION 8-8b:

Please indicate the witness responsible for this answer.

RESPONSE 8-8b:

James Lucas.

QUESTION 8-9:

In Response 6-8a, SoCalGas states, "The conclusion is based on standard air dispersion modeling principles and the West Biofuels facility's 7-to-8-mile distance from the populated areas. Concentrations of toxic air contaminants decrease rapidly with distance. At 7-to-8 miles, incremental impacts from a stationary source of this small scale are indistinguishable from regional background levels. Formal Health Risk Assessments (HRA) will be finalized during the SJVAPCD permitting process."

QUESTION 8-9a:

Please state the "air dispersion modeling principles" supporting this claim.

RESPONSE 8-9a:

Standard principles of atmospheric dispersion and dilution show that the concentration of toxic air contaminants decreases rapidly with distance from a stationary source. The 7-to-8-mile buffer between the facility and the populated areas provides significant mixing, so that incremental impacts from a small-scale source are indistinguishable from background levels. To estimate pollutant concentration at 7 miles (≈11.3 km) downwind from a point source, the Gaussian plume model is the standard for regulatory and screening purposes.[2] The Gaussian plume formulation shows that concentration dissipates with distance as an inverse square in the near field and inverse power of 1.5 in the far field. For example, if the property line is 100 meters from the source, the concentration at 7 miles (11,300 meters) would be 0.00008 to 0.0008 times the concentration at the property line using the near-field and far-field formulations. Therefore, if concentrations are at safe levels at the property line, the concentration at the population center would be infinitesimally smaller.

[2] See U.S. EPA Air Quality Dispersion Modeling website for details on models used for regulatory and screening purposes, available at: https://www.epa.gov/scram/air-quality-dispersion-modeling.

QUESTION 8-9b:

Please provide the data and analysis supporting the claim that the stationary source impacts are "indistinguishable from regional background levels" at this distance.

RESPONSE 8-9b:

This conclusion is supported by established air dispersion modeling principles and professional experience in reviewing health-risk evaluations for industrial stationary sources. Experience with evaluating the health-risk of these types of emission sources at the property line indicates that pollutant concentrations are managed within regulatory safety limits at the point of maximum potential exposure.

Because concentrations of toxic air contaminants decrease rapidly with distance due to dilution and atmospheric mixing, an additional distance of 7-to-8 miles between the facility and populated areas will result in a non-significant concentration that is indistinguishable from existing regional background levels. This assessment is consistent with the CARB Air Toxics "Hot Spots" program and SJVAPCD Rule 2201, which focus on identifying and managing localized health risks from stationary sources. A formal, site-specific Health Risk Assessment (HRA) will be finalized and verified by the SJVAPCD as a mandatory component of the post-approval permitting process to confirm that impacts remain well below significance thresholds.

QUESTION 8-9b:

Please indicate the witness responsible for this answer.

RESPONSE 8-9b:

Dr. Matthew Summers.

QUESTION 8-10:

Please detail Dr. Matthew Summers's experience in air dispersion modeling and health risk assessment. Please indicate the witness responsible for this answer.

RESPONSE 8-10:

Dr. Matthew Summers holds a Ph.D. in Biological Systems Engineering and is a licensed Professional Engineer in California, with more than 25 years of experience in biomass gasification and renewable energy systems. He has served as an Air Resources Engineer for the State of California and as a private consultant, participating in multiple emissions studies. In this capacity, he has utilized air dispersion modeling for several projects and has also reviewed health-risk assessments and the underlying analysis performed by regulatory entities related to multiple past projects. His expertise includes assessing the technical performance and emissions of industrial bioenergy systems, and his evaluation of the Pilot Project's atmospheric impacts is based on extensive experience in stationary-source monitoring and regulatory compliance.

Witness: Dr. Matthew Summers.

QUESTION 8-11:

Are the “technical parameters” listed in Response 6-13b reflective of the parameters of the equipment actually used by the CCAGA-associated entities whose woody biomass would provide the feedstock for the Bio-SNG facility of the proposed Project? Please indicate the witness responsible for this answer.

RESPONSE 8-11:

Yes, the 2024 R&D GREET estimates are derived from commercial equipment for woody biomass management and are expected to be reflective of equipment to be used by CCAGA-associated entities. The actual equipment utilized can be documented as part of the SB 1440 Pilot Project data collection.

Witness: Dr. Matthew Summers.

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QUESTION 8-12:

Please provide the data showing monthly capacity factors for the Hat Creek Bioenergy Facility (Burney, CA) and the Rice Hull Bioenergy Facility (Williams, CA) since these facilities began operation.

RESPONSE 8-12:

This response contains confidential and protected materials (highlighted below) provided pursuant to PUC Section 583, D.21-09-020 and GO 66-D (Revision (Rev.) 2) and the Non-Disclosure Agreement between Sierra Club and SoCalGas.

The Hat Creek Bioenergy figures are derived from CAISO metering logs for the facility since Commercial Operations began in June 2025.

Month	Capacity Factor
Jul 2025	
Aug 2025	
Sep 2025	
Oct 2025	
Nov 2025	
Dec 2025	
Jan 2026	
Feb 2026	
Mar 2026	
Apr 2026	

The Rice Hull Bioenergy facility is privately operated by another party, and the monthly data is not available.

QUESTION 8-13:

In Response 6-20, SoCalGas states, “Suppliers like GE Vernova and Shell CANSOLV have commercially deployed CCS systems for industrial gas streams with similar CO2 profiles to those to be produced for this project.”

QUESTION 8-13a:

Please state the basis for the assertion that these projects have “similar CO2 profiles.”

RESPONSE 8-13a:

The SB 1440 Pilot Project’s gasifier flue gas and the stream following the methanation reactor contain concentrated streams comparable to the post-combustion and industrial process streams for which GE Vernova and Shell CANSOLV have commercially deployed capture systems.

QUESTION 8-13b

Please indicate the witness responsible for this answer.

RESPONSE 8-13b:

Dr. Matthew Summers.

QUESTION 8-14:

Response 7-6(a) states, "The analysis provided for the SB 1440 Pilot Project utilizes validated emission factors sourced directly from the 2024 R&D GREET model released by Argonne National Laboratory. These factors cover all standard lifecycle activities, including biomass preprocessing, trucking, and grid electricity. To demonstrate the mathematical calculations, a full lifecycle model in Excel format containing active cells and formulas was developed. These formulas trace the emissions for each production step (Lanes 1–10) using the same logic as the Argonne GREET framework—multiplying mass/energy throughput by the validated factors to arrive at the carbon intensity. This workbook was specifically formatted to improve transparency and traceability by excluding extraneous information present in the larger Argonne tool that is not relevant to this specific pilot."

QUESTION 8-14a:

Regarding the statement "[t]o demonstrate the mathematical calculations, a full lifecycle model in Excel format containing active cells and formulas was developed," who developed this model?

RESPONSE 8-14a:

Dr. Eric Tan of National Laboratory of the Rockies (formerly National Renewable Energy Laboratory).

QUESTION 8-14b:

Regarding the statement, "[t]his workbook was specifically formatted to improve transparency and traceability by excluding extraneous information present in the larger Argonne tool that is not relevant to this specific pilot," who formatted the workbook?

RESPONSE 8-14b:

Dr. Matthew Summers with the support of Dr. Eric Tan of National Laboratory of the Rockies (formerly National Renewable Energy Laboratory).

QUESTION 8-14c:

Please provide a copy of the 2024 R&D GREET model with all of the inputs and assumptions adopted by SoCalGas in its model (including emissions factors) highlighted or indicated in any other way that is identifiable.

RESPONSE 8-14c:

SoCalGas objects to this request to the extent it imposes upon SoCalGas an obligation to generate or create records that do not exist, or which have not been generated or created in its development of this application.

Subject to and without waiving the foregoing objection, SoCalGas responds as follows: SoCalGas previously provided Sierra Club with an Excel file titled "NREL GREET MODEL – WBF," which contains the active formulas and validated emission factors used in the lifecycle analysis developed by Dr. Eric Tan (including various 2024 R&D GREET inputs and assumptions). Additional information was provided in the response to Sierra Club Question 1-5a and Sierra Club Question 4-2, which identifies various specific 2024 R&D GREET inputs and assumptions used in the lifecycle analysis.

QUESTION 8-14d:

Please indicate the witness responsible for this answer

RESPONSE 8-14:

Dr. Matthew Summers.

QUESTION 8-15:

In Response 7-12a, SoCalGas states, “the Shell CANSOLV system at Boundary Dam Unit 3. . . was designed to capture ~90% of from a coal-fired unit[.]”

QUESTION 8-15a:

Please provide the achieved, rather than designed, capture rate.

RESPONSE 8-15a:

West Biofuels has not contacted Shell CANSOLV to discuss any achieved capture rate and is therefore unable to provide it.

QUESTION 8-15b:

Please indicate the witness responsible for this answer.

RESPONSE 8-15b:

Witness: Dr. Matthew Summers.

QUESTION 8-16:

In Response 7-12b, SoCalGas states, that the "SB 1440 Pilot Project's 78–80% capture target is a conservative design floor for this technology class, purposefully set below the 90–95% capture rates advertised by leading industry suppliers to support the credibility and achievability of the Project's GHG reduction estimates."

QUESTION 8-16a:

Please provide the achieved, rather than advertised, capture rate by the "leading industry suppliers[.]"

RESPONSE 8-16a:

West Biofuels has not contacted the suppliers to discuss any achieved capture rate and is therefore unable to provide it.

QUESTION 8-16b:

Please indicate the witness responsible for this answer.

RESPONSE 8-16b:

Witness: Dr. Matthew Summers.

QUESTION 8-17:

In Response 7-12b, SoCalGas states, “Evidence for the ability to mitigate GHG emissions while accounting for parasitic loads (excess GHGs induced by CCS) is found in the commercial deployment of modular systems like those from SLB Capturi, which are engineered for thousands of operating hours across multiple facilities with a standard ~90% capture performance.”

QUESTION 8-17a:

Please provide the achieved, rather than engineered, capture rate “found in the commercial deployment of modular systems like those from SLB Capturi[.]”

RESPONSE 8-17a:

West Biofuels has not contacted SLB Capturi to discuss any achieved capture rate and is therefore unable to provide it.

QUESTION 8-17b:

Please indicate the witness responsible for this answer.

RESPONSE 8-17b:

Witness: Dr. Matthew Summers.