

Application No. B0102

Updated: 12/3/2020 (See underlined text)

Staff Summary

**Trillium Transportation Fuels, LLC,
Greengasco, LLC, Stratford, Texas
Compressed Natural Gas (Bio-CNG) from Dairy Manure**

**Intermediate Facilities:
Etter Dairy Digester, Dumas, Texas
Exum Dairy Digester, Dalhart, Texas
Westside Dairy Digester, Dumas, Texas**

Deemed Complete: 06/24/2020

Posted for Comment: 11/13/2020

Certified and Posted: 12/3/2020CI Effective: 7/1/2020Fuel Pathway Codes: See Below

Pathway Summary

Trillium Transportation Fuels, LLC (Trillium) seeks provisional certification of three Tier 2 pathways for biomethane from anaerobic digestion of dairy manure from a cluster of three digesters within 30 miles of the GreenGasco upgrading facility located at Stratford, Texas. Manure is collected from four dairy farms: Etter Dairy, Exum Dairy, Eastside Dairy and Westside Dairy. Manure from Eastside Dairy and Westside Dairy goes to one digester (Westside digester). The biogas produced from each digester is gathered and transmitted via low pressure pipeline to the biogas upgrading facility. Biogas is upgraded to biomethane, pipeline injected and supplied to CNG vehicles in California as bio-CNG using book-and-claim accounting for biomethane.¹ Trillium owns the environmental attributes associated with biomethane.

The four participating dairy farms have average cattle populations shown in Table 1 below. In the baseline, these dairies used free stall systems where 100% of the manure was flushed into reception pits. Manure from the reception pit was pumped over a slope screen separator for solids separation. The solids removed by the sloped screen were dried in passive windrows for animal bedding and land application. The liquid fraction of the manure flowed first to settling lanes and then into a secondary process pit. Some manure water from the reception pit was recycled to barns for flushing, while the remaining liquid overflowed into a secondary settling lane. Finally, the liquid flowed

¹ All citations to the LCFS Regulation are found in Title 17, California Code of Regulations (CCR), section 95480-95503. Book-and-claim accounting for pipeline injected biomethane used as a transportation fuel is primarily addressed in section 95488.8(i) of the [LCFS Regulation](#).

from the secondary settling lane to large storage lagoons. The liquid manure from the storage ponds was used for crop irrigation.

Prior to installation of the digester, incomplete removal of volatile solids (VS) occurred annually in the anaerobic storage/treatment system (settling ponds) and as a result, no lagoon cleanouts are modeled in section L1 of the Dairy and Swine Manure Calculator.

With covered lagoons installed (project case), manure from Etter and East/Westside Dairies is sent to covered lagoons with no additional modifications to the manure management practices from the baseline. Because Exum Dairy is a greenfield project, the default greenfield project baseline assumptions are applied to Exum Dairy. The assumptions are that 90% of manure goes to an anaerobic lagoon and 10% of manure is treated in solid storage. The covered lagoons capture methane that would otherwise be vented into the atmosphere.

The table below gives the population of each dairy during the baseline data period, the cleaning schedule that is modeled in each digester's CI Calculator, and the operational data period for which fuel production data was supplied in the application. All calculators used the same period (April 2019 – March 2020) for the 12-month baseline emissions modeling.

Table 1: Dairy Projects Descriptions

Location of Digester	Approximate Range of Cattle Population	Operational Data Months (Fuel Production)
Etter Dairy	2,000-2,500	December 2019 – March 2020
Eastside Dairy and Westside Dairy	30,000-45,000	December 2019 – March 2020
Exum Dairy	30,000-35,000	December 2019 – March 2020

The raw biogas produced from covered lagoons is upgraded to pipeline-quality renewable natural gas (RNG). Some of the raw biogas is flared directly from the digester prior to upgrading.

Carbon Intensities of Dairy Manure to RNG Pathway

The carbon intensity (CI) values are calculated based on life cycle analysis using a modified version of the board-approved Tier 1 Simplified CI Calculator for Biomethane from Anaerobic Digestion of Dairy and Swine Manure² as described in the applicant's Life Cycle Analysis (LCA) Report. Each digester is modeled in a separate Simplified CI Calculator and is proposed to be certified with individual CI values. The calculators were modified to account for fugitive emissions in excess of the default (2%) as determined by energy balance at the upgrading facility and to incorporate the allocation methodology for processed biogas from multiple digesters. The modified calculator has

² The Tier 1 Simplified CI Calculator for Biomethane from Anaerobic Digestion of Dairy and Swine Manure (August 13, 2018), incorporated by reference in the LCFS Regulation, section 95488.3(b).

been determined to be equivalent or superior to CA-GREET3.0 as per section 95488.3(a). The applicant has supplied four months of operational data (December 2019 - March 2020) and supporting documentation for baseline manure treatment and RNG production to determine the CIs.

The following table lists the proposed CIs for this pathway application.

Table 2: Proposed Pathway CI value

Fuel & Feedstock	Pathway FPC	Pathway Description	Carbon Intensity (gCO₂e/MJ)
Compressed Natural Gas (CNG) from Dairy Manure	<u>CNG026B01020101</u>	Renewable Natural Gas (RNG) produced from Dairy Manure at Westside Dairy and Eastside Dairy and upgraded at GreenGasco in Stratford, Texas; RNG pipelined to California for transportation use	-408.62
Compressed Natural Gas (CNG) from Dairy Manure	<u>CNG026B01020200</u>	Renewable Natural Gas (RNG) produced from Dairy Manure at Exum Dairy and upgraded at GreenGasco in Stratford, Texas; RNG pipelined to California for transportation use	-289.76
Compressed Natural Gas (CNG) from Dairy Manure	<u>CNG026B01020300</u>	Renewable Natural Gas (RNG) produced from Dairy Manure at Etter Dairy and upgraded at GreenGasco in Stratford, Texas; RNG pipelined to California for transportation use	-308.74

Operating Conditions

The certified CI values in the above table may be used to report and generate credits for fuel quantities that are produced at the facility in the manner described in the applicant's LCA report, and dispensed for transportation use in California, subject to the following requirements and conditions:

1. Fuel pathway holders are subject to the requirements of the California Air Resources Board's (CARB) Low Carbon Fuel Standard (LCFS) regulation, which appears at sections 95480 to 95503 of title 17, California Code of Regulations. Requirements include ongoing monitoring, reporting, recordkeeping, and third-party verification of operational CI and a controlled process for providing product transfer documents or other similar records to counterparties or CARB.
2. CARB has reviewed the contractual agreements between the pathway holder, upgrader and natural gas fuel dispensing entities. To confirm compliance with Annual Fuel Pathway Report requirements, the pathway holder shall notify CARB of any change in existing contracts that were submitted to CARB with the fuel pathway application, including any new contracts and termination of existing contracts, with any entity engaged in the transfer, purchase, or sale of

biomethane and its environmental attributes. Failure to notify CARB of such a change could result in enforcement action and could invalidate this fuel pathway.

3. The biomethane and its environmental attributes claimed under this pathway shall not be claimed by any entity for any other purpose, nor under any other program notwithstanding the exceptions listed in LCFS Regulation section 95488.8(i)(2). The LCFS places no restriction on the use of any voluntary emission reduction credits generated by the project for emissions that are demonstrated to be additional to reductions claimed under the LCFS.
4. The fuel pathway holder must include the assumptions and calculations used to establish the fraction of volatile solids input to each manure management system in its Annual Fuel Pathway Report submitted to CARB for third-party verification of the operational CI.
5. Any quantity of biomethane metered at inlet to the upgrading facility that cannot be demonstrated by meter records to have been pipeline injected or destroyed, must be calculated by energy balance and accounted for in the CI as a fugitive methane emission if the calculated value exceeds the default 2% fugitive emission.

Staff Analysis and Recommendation

Staff has reviewed the application and has replicated, using the Tier 2 modified version of the Simplified CI Calculator, the CI values calculated by the applicant. Weaver and Tidwell, LLP (H3-20-021) submitted a positive validation statement. Staff recommends this application be certified on a provisional basis after all the comments received during the 10-day comment period are addressed satisfactorily by the applicant. The certification is subject to the operating conditions set forth in this document.

Comments and Certification

These pathways did not receive public comments during the 10-day comment period. CARB certified the pathways.