

**Staff Summary
Method 2B Application**

**Clean Energy: LES Renewable NG, LLC
SWACO Landfill Gas (Grove City, Ohio) to Compressed Natural Gas,
Liquefied Natural Gas, and Liquefied-Compressed Natural Gas Delivered in
California
(Pathway Codes: CNG025, CNG026, and LNG022)**

Deemed Complete Date: December 3, 2014
Posted for Comments Date: February 5, 2015
Certified Date: February 16, 2015

Pathway Summary

Clean Energy (LES Renewable) has applied for three prospective landfill-gas-to-biomethane fuel pathways. The landfill gas (LFG) for all three pathways would be extracted from the Solid Waste Authority of Central Ohio's (SWACO) Franklin County Sanitary Landfill in Grove City, Ohio. One pathway covers the liquefaction of the resulting biomethane at Clean Energy's Boron, California liquefaction facility and the dispensing of the fuel as liquefied natural gas (LNG); one pathway covers the liquefaction of the resulting biomethane at Clean Energy's Boron, California liquefaction facility and the subsequent vaporization and compression of the liquefied natural gas into compressed natural gas (CNG); and the final pathway covers the compression of the biomethane for dispensing at CNG fueling stations. All fueling stations covered by these pathways are located in California. The proposed pathway CIs are subject to verification against operational data covering two years of commercial production. The LES Renewable facility commenced full operations on March 12, 2014 and is required under the terms of this certification to submit operational data at intervals of no greater than six months until staff is in possession of data covering a full two years of operation.

The LFG processing facility at the SWACO landfill is powered by grid electricity and natural gas. Natural gas is used in the compressor, thermal oxidizer, and flare pilot. The thermal oxidizer is used to destroy the VOCs in the tail gas while the flare is used to destroy the CH₄ in the landfill gas.

Rather than provide plant-specific energy consumption and emissions data at this time for the LFG extraction and processing operations at the SWACO landfill, LES Renewable based its proposed CIs on default values from the CA-GREET1.8b model. Flare and thermal oxidizer emissions were based on the model defaults for a natural gas turbine.

The biomethane Clean Energy purchases from the SWACO LFG processing plant is injected into the interstate pipeline system for conveyance to Clean Energy's LNG plant in Boron, California. The pipeline transport distance is

2,256 miles. As such, Clean Energy will be obligated to retain records that unequivocally demonstrate that the credits it earns under the pathways described in this summary correspond directly with the volumes of biomethane it purchases from the SWACO Landfill in Grove City, Ohio.

Carbon Intensity of the CNG, LNG, and L-CNG Produced

As shown in table below, the applicant has calculated the CIs of its CNG, LNG, and L-CNG pathways to be 28.68, 33.19, and 35.31 gCO₂e/MJ, respectively.

Proposed Lookup Table Entries

Fuel	Pathway Identifier	Pathway Description	Carbon Intensity Values (gCO ₂ e/MJ)		
			Direct Emissions	Land Use or Other Indirect Effects	Total
CNG from LFG	CNG025	2B Application*: Ohio landfill gas to pipeline-quality biomethane; delivered via pipeline; compressed to CNG in CA	28.68	0	28.68
L-CNG from LFG	CNG026	2B Application*: Ohio landfill gas to pipeline-quality biomethane, delivered via pipeline, liquefied in CA; transported by trucks; re-gasified and compressed to L-CNG in CA	35.31	0	35.31
LNG from LFG	LNG022	2B Application*: Ohio landfill gas to pipeline-quality biomethane; delivered via pipeline; liquefied to LNG in CA	33.19	0	33.19

* Specific Conditions Apply.

Operating Conditions

1. The CIs appearing in the above table were based on default energy consumption values from the CA-GREET 1.8b model rather than on pathway-specific energy consumption data. Thermal and electrical energy consumption records covering a total of two years are required for LCFS Method 2 pathway applications. Staff is able to prospectively certify applications, however, on the condition that the applicant submits a full two-year data record. Clean Energy will, therefore, submit energy consumption records no less frequently than every six months, until staff is in receipt of records covering a full two years of operations at its LES Renewable plant. If these records indicate that one or more of the

certified CIs shown in the above table are lower than the actual CIs, staff may adjust the certified CI to reflect actual operations at the LES Renewable plant.

2. Actual pathway energy consumption values shall remain at or below the levels specified in Clean Energy's application. The recovery and processing efficiency levels at the SWACO Landfill in Grove City, Ohio shall remain at or above the levels specified in Clean Energy's application¹. In addition, the liquefaction efficiency at the Boron LNG plant and the compression efficiency level at the CNG and L-CNG stations in California shall remain at or above the levels specified in the application. Energy consumption values for these facilities are classified by the applicant as confidential business information.
3. Because the biomethane supplied under this pathway is commingled with fossil natural gas both when it enters the interstate pipeline system and when it enters Clean Energy's Boron liquefaction facility, Clean Energy must maintain an accounting system that will enable it to demonstrate unequivocally at any time that every unit of biomethane-based transportation fuel sold and reported under the LCFS can be associated with an equal unit of biomethane purchased from the SWACO Landfill.

Staff Analysis and Recommendations

Staff has reviewed Clean Energy's LES Renewable application for the production of CNG, L-CNG, and LNG from LFG originating in Grove City, Ohio. Staff has replicated the proposed prospective CI values calculated by Clean Energy using the CA-GREET1.8b spreadsheet. Clean Energy has provided documentation in support of the key components of its proposed pathways: energy consumption at the California liquefaction plant and California CNG fueling stations. It has also provided the proposed volumes of LNG and CNG to be produced. Energy consumption data at the Ohio LFG processing plant (LES Renewable) will be submitted every six months until staff is in possession of data covering a full two years of operation, as stated in the operating conditions above.

Staff is satisfied that the energy consumption levels reported in Clean Energy's application accurately represent the levels that will be realized during normal operations, and that Clean Energy is capable of maintaining CIs that are at or below those shown in the table above. Therefore, staff recommends that Clean Energy's Method 2B prospective application for LFG-to-CNG, LFG-to-LNG, and LFG-to-L-CNG pathways be certified, subject to the operating conditions set forth in this staff summary.

¹ Clean Energy assumed recovery and processing efficiencies equivalent to those used in pathway LNG007: http://www.arb.ca.gov/fuels/lcfs/022709lcfs_lfg.pdf