

Method 2B Application
Applied Natural Gas Fuels
Liquefied Natural Gas and Liquefied Compressed Natural Gas
(Pathway Codes LNG011_1 and CNG015)

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Pathway Summary

Applied Natural Gas Fuels, Inc. (ANGF) operates a Liquefied Natural Gas (LNG) Plant in Topock, Arizona. The facility has the capacity to produce 86,000 gallons of LNG per day. It is located adjacent to a pipeline system currently owned by Kinder Morgan (previously owned by El Paso Natural Gas Corporation). This system primarily conveys natural gas from various wells in North America. ANGF currently supplies LNG and L-CNG¹ to the California transportation market from two retail refueling stations in Barstow and Ontario, as well as to its wholesale transportation customers.

ANGF applied for a Method 2B fuel pathway under the LCFS in June of 2012. In October of 2012, staff assigned the ANGF pathway an LCFS identification code of LNG011,² and certified it at a carbon intensity (CI) of 85.77 gCO₂e/MJ. This CI was calculated from energy consumption data covering calendar year 2011 only. Based upon the inclusion of data from calendar year 2012, ANGF applied, in September of 2013, for a reduced pathway CI of 76.48 gCO₂e/MJ. This application also includes a new pathway for liquefied compressed natural gas (L-CNG). L-CNG is produced by vaporizing and then compressing LNG so that it can be used in compressed-natural-gas-powered vehicles.

This Staff Summary updates the original ANGF Staff Summary for LNG011 and includes the applicant's new L-CNG pathway (pathway code CNG015). It incorporates by reference all sections of that original Summary (as published in October 2012) except the pathway CI value sought by the applicant.

Carbon Intensity of LNG Produced

ANGF calculates the CIs of the LNG and L-CNG it sells in California to be 76.48 gCO₂e/MJ of LNG produced and 76.87 gCO₂e/MJ of L-CNG produced. The liquefaction plant efficiency on which these CIs are based was calculated using energy consumption data from calendar years 2011 and 2012.

¹ Liquefied natural gas compressed to CNG

² Applied Natural Gas Fuels Inc. October 3, 2012. LCFS Life Cycle Fuel Pathway Report: Method 2B Application, Topock LNG Plant. <http://www.arb.ca.gov/fuels/lcfs/2a2b/apps/angf-090612.pdf>

The CI of the revised LNG pathway described in this summary (LNG011_1) is lower than the CI of 85.77 gCO_{2e}/MJ for pathway LNG011 for the following reasons:

- Energy consumption per unit of fuel produced was lower in 2012 than it was in 2011.
- Fuel recovery systems have been installed at the two ANGF refueling stations. These systems reduce fugitive methane emissions
- CI calculations were performed using the lower rather than the higher heating value of natural gas which was used inadvertently in the previous application.
- The LNG011 pathway CI was calculated based on the U. S. average electrical energy generation mix. The LNG011_1 pathway CI was calculated using the Southwest energy mix from the U. S. Environmental Protection Agency's eGRID system.³

³ The U.S. Environmental Protection Agency's Emissions and Generation Resource Integrated Database (eGRID) can be found at http://www.epa.gov/cleanenergy/documents/egridzips/eGRID2012V1_0_year09_SummaryTables.pdf. The Topock LNG plant falls within the eGRID WECC Southwest region.

Table 1: Proposed Lookup Table Entry

Fuel/ Feedstock	Pathway Identifier	Pathway Description	Carbon Intensity in gCO ₂ e/MJ (Including Indirect Effects)		
			Direct Emissions	Land Use or Other Indirect Effects	Total
NG to LNG	LNG011_1	2B Application: (Specific Conditions Apply) North American NG, delivered via pipeline; liquefied in Topock, AZ; delivered to CA via truck	76.48	0	76.48
NG to L-CNG	CNG015	2B Application: (Specific Conditions Apply) North American NG, delivered via pipeline; liquefied in Topock, AZ; delivered via truck; re-gasified and compressed to L-CNG in CA	76.87	0	76.87

Operating Conditions

1. Actual pathway energy consumption values shall remain at or below the levels specified in ANGF's application. In contrast, the liquefaction efficiency shall remain at or above the values in the ANGF's application. These conditions apply to the LNG liquefaction plant in Topock, Arizona, and the LNG and L-CNG dispensing stations in Barstow and Ontario, California. Energy consumption values for these facilities are classified by the applicant as confidential business information.
2. Because ANGF purchases, liquefies, and sells into the California transportation fuels market both fossil natural gas and biomethane produced from landfill gas, and because gas from these two sources is commingled in the fuel ANGF sells, ANGF must maintain an accounting system that will enable it to demonstrate unequivocally at any time that

every unit of biomethane and fossil natural gas sold and reported under the LCFS can be associated with equal amounts of each fuel type purchased.

Staff Analysis and Recommendation

Staff has reviewed the ANGF application for LNG and L-CNG produced by ANGF at the Topock, Arizona LNG plant, and has replicated, using the CA-GREET spreadsheet, the CI value calculated by ANGF. ANGF has provided documentation, covering the years 2011-2012, of liquefaction and dispensing energy use, LNG production volumes, and LNG transportation modes and distances. Staff therefore recommends that AFNG's Method 2B application for a modified LNG pathway (LNG011_1) and a new L-CNG pathway (CNG015) be approved, subject to the operating conditions stipulated above.