

Staff Summary:

Method 1: North American Landfill Gas to Compressed Natural Gas Pathway

Pathway Summary

ARB staff has developed a Low Carbon Fuel Standard (LCFS) pathway covering the production of biomethane from landfill gas (LFG) anywhere in North America. The biomethane produced under this pathway would be transported to California by pipeline, compressed, and made available to motor vehicles as compressed natural gas (CNG). This pathway will be available via Method 1 to all North American biomethane producers who can demonstrate that their pathways are substantially similar to the pathway described in this summary and the accompanying life cycle analysis report.¹

Most of the CA-GREET inputs used to develop ARB's California LFG-to-CNG pathway² were left unchanged in this North American pathway. Only the following inputs were changed in order to make the resulting pathway available to as many North American LFG-to-CNG producers as possible:

- A pipeline transport distance of 3,600 miles;
- An electrical energy generation mix of 100% coal for the LFG recovery and processing phases³.
- An LFG capture and processing efficiency of 77.2%—the lowest efficiency currently in use at North American Landfills.
- Fuel shares of 76.8% thermal and 26.2% electricity in LFG processing
- A NG leak fraction of 0.15%

Carbon Intensity of the Fuel Produced

The LCFS lookup table currently contains no pathways whereby biomethane produced from out-of-state LFG can enter California via pipeline for use as a vehicle fuel. This pathway will make such a pathway available to all North American LFG-to-Biomethane producers through the Method 1 provisions of the LCFS. The CA-GREET inputs used to develop this pathway were chosen so as to yield a pathway CI at or near the high end of the range of potential LFG-to-CNG CIs for North American producers. As shown in Table 2, that CI is 33.02 gCO₂e/MJ.

¹ North-American Landfill gas to CNG pathway document by ARB:

<http://www.arb.ca.gov/fuels/lcfs/2a2b/internal/nalfg-cng-rpt-031513.pdf>

² California Landfill gas to CNG pathway document by ARB: http://www.arb.ca.gov/fuels/lcfs/022709lcfs_lfg.pdf

³ The California marginal mix was used for the electricity consumed within California. This was also true of the original California LFG-to-CNG pathway.

Table 2: Proposed Lookup Table Entry

Fuel/Feedstock	Pathway Identifier	Pathway Description	Carbon Intensity in gCO₂e/MJ (Including Indirect Effects)
LFG-to-CNG	CNG006	North American landfill gas to biomethane, delivered to California via pipeline and compressed in California	33.02

Staff Analysis and Recommendation

The LFG-to-CNG pathway summarized in this document was developed using the existing California LFG-to-CNG pathway. All input parameters except those that permit the California pathway to be extended to all North American producers were left unchanged. Consistent with LCFS Method 1 pathway development goals, all changed inputs were set at the upper ends of their ranges in order to allow this pathway to be used by as many North American producers as possible. Thus this North American LFG-to-CNG pathway is consistent with both the existing LCFS LFG-to-CNG pathway, and with the general goals of LCFS Method 1 pathway development.

On the basis of these findings, staff recommends that pathway CNG006—North American LFG-to-CNG—be approved for inclusion in the LCFS Lookup table.