

Application No. B0360

Updated: 09/27/2022 (See Underlined Text)

Staff Summary

FirstElement Fuel, Inc
Fuel Production Facility: Praxair SMR, Ontario, California
Gasified and Liquefied Hydrogen from Renewable Biomethane

Intermediate Facilities
Deer Run RNG Project (71482)

Joint Applicant
U.S. Venture, Inc. (5504)

Deemed Complete Date: 6/30/2022
Posted for Comment Date: 8/5/2022
CI Certified Date: 9/27/2022
CI Start Date: 4/1/2022

Pathway Summary

FirstElement Fuel (FEF) seeks certification of three renewable hydrogen pathways produced by steam methane reformation at the Praxair SMR facility in Ontario, California facility using book-and-claim accounting for biomethane derived from dairy manure digester gas (RNG). Environmental attributes of dairy and swine manure (DSM) derived biomethane are procured from the Deer Run RNG Project (upgrader) using dairy digester gas feedstock produced at the Deer Run Dairy Digester in Kewaunee, Wisconsin. The upgrading facility is owned by U.S. Venture, Inc. who is registered as a joint applicant to the pathways. The biomethane used for book-and-claim accounting was previously certified in 2022 as CNG pathways as follows:

B028301 (2022): Deer Run Dairy Digester Gas to Deer Run RNG Project (71482) (CI =-195.09).

Gaseous hydrogen is produced at the Praxair SMR facility in Ontario, California and transported by tube trailers (heavy duty diesel truck) over a distance of 65 miles to hydrogen refueling stations for dispensing into fuel cell vehicles in Southern California.

Liquefied hydrogen is produced at the Praxair SMR facility in Ontario, California and transported by liquid tankers (heavy duty diesel trucks) over a distance of up to 500

miles to hydrogen refueling stations for dispensing into fuel cell vehicles in both Northern and Southern California.

Liquefied hydrogen produced at the Praxair SMR facility in Ontario, California is also transported over a distance of 390 miles by liquid tanker trucks to a trans-fill station in Livermore, California where it is re-gasified, and recompressed to gaseous hydrogen (G.H₂), and is then distributed by tube-trailer trucks over a distance of 75 miles to hydrogen refueling stations for dispensing into fuel cell vehicles.

The pathways are consistent with the Lookup Table Compressed and Liquefied H₂ pathway produced in California from central steam methane reforming of biomethane (HYB and HYBL)¹ with two notable exceptions: the liquid hydrogen transportation distance exceeds the 100 miles distance modeled in the Lookup Table pathway CIs, and the feedstock for hydrogen production was matched to biomethane attributes derived from dairy and swine manure digester gas with favorable carbon intensities (CIs). Therefore, these pathways require a Tier 2 application (95488.5(a)).

Carbon Intensity of Fuel Type Pathways

The CIs are determined from life cycle analysis conducted using the Board-approved CA GREET3.0 model. Model inputs are identical to those documented in the Lookup Table Technical Support Documentation² with the exceptions of the site-specific liquid hydrogen transport distance of more than 100 miles and lower upstream emissions for sourced biomethane. The following table lists the proposed CIs for these pathways.

¹ All citations to the LCFS Regulation are found in Title 17, California Code of Regulations (CCR), section 95480-95503. Book-and-claim accounting is primarily addressed in 95488.8(i) of the LCFS regulation.

² [CA-GREET3.0 Lookup Table Pathways Technical Support Documentation](https://ww3.arb.ca.gov/fuels/lcfs/ca-greet/lut-doc.pdf). Available at: <https://ww3.arb.ca.gov/fuels/lcfs/ca-greet/lut-doc.pdf>

Proposed Pathway CI

Pathway Number	Fuel & Feedstock	Pathway FPC	Pathway Description	Carbon Intensity (gCO₂e/MJ)
B036001	Compressed Hydrogen (G.H ₂) produced from Biomethane refined from Dairy Manure - derived Digester Gas	<u>HYG026B</u> <u>03600100</u>	Gaseous Hydrogen produced at Praxair SMR facility in Ontario, California using Biomethane derived from digester gas generated at Deer Run Dairy Digester and upgraded at Deer Run RNG Project in Kewaunee, WI; transported as compressed Hydrogen in tube trailers to refueling stations in California.	-159.04
B036002	Liquefied Hydrogen (L.H ₂) produced from Biomethane refined from Dairy Manure-derived Digester Gas	<u>HYL026B</u> <u>03600200</u>	Liquefied Hydrogen produced at Praxair SMR using Biomethane derived from dairy manure generated at Deer Run Dairy Digester and upgraded at Deer Run RNG Project in Kewaunee, WI; transported in liquid tanker trailers to refueling stations in California.	-120.27

Pathway Number	Fuel & Feedstock	Pathway FPC	Pathway Description	Carbon Intensity (gCO ₂ e/MJ)
B036003	Liquefied Hydrogen (L.H2) produced from Biomethane derived from Dairy Manure Digester Gas	<u>HYL026B03600300</u>	Liquefied Hydrogen produced at Praxair SMR facility in Ontario, California using Biomethane derived from dairy manure generated at Deer Run Dairy Digester and upgraded at Deer Run RNG Project in Kewaunee, WI; transported as liquefied Hydrogen in tanker trailers to trans-fill center, re-gasified and compressed, then transported to refueling stations in California.	-104.64

Operating Conditions

The certified CI value 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. Fuel distribution route: Hydrogen produced at the Praxair SMR facility is compressed and transported by gaseous tube trailer truck to hydrogen refueling stations. The gaseous tube trailer transport distance is determined using the weighted average distance of hydrogen transported from the Praxair SMR facility to all stations reporting gaseous refueling under this pathway. The weighted average distance of hydrogen delivered to all stations must not exceed 65 miles to maintain compliance with the certified fuel pathway.

3. Fuel distribution route: Hydrogen is liquefied and transported by liquid tanker truck to hydrogen refueling stations. The liquid tanker truck transport distance is determined using the weighted average distance of hydrogen transported from the Praxair SMR hydrogen production facility to all stations reporting fueling under this pathway. The weighted average distance of hydrogen delivered to all stations must not exceed 500 miles to maintain compliance with the certified fuel pathway.
4. Fuel distribution route: Hydrogen is liquefied and transported by liquid tanker truck to the hydrogen trans-fill facility located 390 miles away where the liquid hydrogen is re-gasified and recompressed to gaseous hydrogen. The compressed hydrogen is transported by gaseous tube trailer truck to hydrogen refueling stations. The gaseous tube trailer transport distance is determined using the weighted average distance of hydrogen transported from the trans-fill facility to all stations reporting gaseous refueling under this pathway. The weighted average distance of hydrogen delivered to all stations must not exceed 75 miles from the trans-fill facility to maintain compliance with the certified fuel pathway.
5. To confirm compliance with LCFS reporting requirements, the pathway holder will provide on an annual basis, the total monthly quantity (MMBtu) of biomethane produced and injected into the common carrier pipeline at the upgrading facility, and identify each LCFS fuel reporting entity or other final owner (including any business partners not participating in the LCFS) of environmental attributes, and the quantity of environmental attributes (MMBtu) transferred by the upgrading facility to each other entity.

Staff Analysis and Recommendation

Staff has reviewed the FirstElement Fuel application for hydrogen pathways, and has replicated, using the GREET3.0 model the carbon intensity calculations provided by the applicant. CARB staff recommends that the FirstElement Fuel fuel pathway applications for LCFS Tier 2 pathways stated in the above table be certified after all the comments received during the 10-day public comment period are addressed satisfactorily by the applicant. The certification is subject to the operating conditions set forth in this document.

Comments and Certification

CARB has reviewed the applicant's response to comments received during the 10-day comment period, determined that these adequately address factual and methodological errors, and certified the pathway.