



April 23, 2018

Richard Corey  
California Air Resources Board  
1001 I Street  
Sacramento, CA 95814

Western Propane Gas Association Comments Regarding Propane in the LCFS

Dear Mr. Corey,

Please accept these comments on behalf of the Western Propane Gas Association (WPGA) and its members who provide propane fuel, products, and services to residents, businesses, and farms across California. Propane provides a lower emission fuel option for many transportation applications in California including school buses, airport shuttles, and public transit buses.<sup>1</sup>

The WPGA strongly supports the inclusion of propane as a fuel under the LCFS. We wish to express our concern, however, with CARB's characterization of key parameters affecting net credit generation in the early years of participation in the LCFS. These parameters include the carbon intensity ("CI") for fossil propane, and treatment of the displaced transportation fuels for forklifts and heavy-duty trucks.

We are similarly concerned with very recent propane fuel specification changes proposed by CARB LCFS staff; these changes, if approved, will require reductions in propene (propylene) and butane content and will serve to discourage renewable propane refinery development. No "due process" information has been provided to justify either the need for these fuel constituent changes or the emission benefits they presumably are intended to provide, nor are they consistent with the propane fuel specification adopted by CARB in 1999 following more than a year of extensive private-public collaborations, analysis, emissions testing, and public review.

Finally, we suggest potential modifications of the renewable fuel standard that will increase flexibility for refiners while ensuring that vehicle emissions continue to meet applicable tailpipe standards and emissions durability requirements.

#### **I. Propane CI Should Be Decreased to Reflect Greater Proportion of Natural Gas Liquid Feedstock**

The CI for propane from oil refineries varies depending upon the approach used to define the allocation of emissions within oil refineries as described in a recent study published by the WPGA<sup>2</sup>. The average CI of propane from oil refinery and natural gas resources is 82.37 (g CO<sub>2</sub>e/MJ), yet CARB appears now to rely on a CI of 83.38 in Table 7-1 (Lookup Table for Gasoline and Diesel Substitutes) of the proposed regulation order.

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<sup>1</sup> For example, San Diego MTC operates 77 propane-powered transit buses, class 4 through 6. CA School Districts rely on more than 1250 propane school buses, from small to full-size 72-passenger size.

<sup>2</sup> Unnasch, S. and L. Goyal (2017) Life Cycle Analysis of LPG Transportation Fuels under the Californian LCFS. Life Cycle Associates Report LCA.8103.177.2017, prepared for the Western Propane Gas Association.

While we appreciate the nuances of sources of LPG that went into ARB's analysis, the incremental nature of propane vehicle populations tied to growth of natural gas liquids should take precedence. Oil refinery capacity in California is essentially fixed and is not expected to increase, and thus growth in the use of propane will be met not by traditional petroleum refinery product but by greater quantities of natural gas-based propane. Because natural gas-derived propane has a lower CI, we urge ARB to establish a CI for fossil propane that reflects the practical, greater proportional mix of natural gas-based production.

## **II. Indoor Propane Forklifts Do Not Displace Gasoline or Diesel Forklift Use**

Another issue of concern involves CARB's assumption that displacement of gasoline or diesel occurs with use of propane forklifts in indoor settings (e.g. warehouses, distribution centers, big-box stores). Indoor forklifts require clean burning fuels such as propane. CARB has assigned an EER value of 3.8 for electricity for forklift applications; however, such forklifts do not displace gasoline or diesel because these fuels are not used in indoor applications.

Since neither electric or propane indoor forklifts displace gasoline or diesel, these applications should not be included in the LCFS. And if they are to remain in the LCFS, propane should not receive an EER of 0.9 as it has been the fuel of choice in indoor forklifts and does not compete against diesel. Inclusion of the 3.8 EER for electric indoor forklifts is clearly not consistent with CARB's stated mission of diesel and gasoline displacement--and not the displacement of propane. Further, CARB's characterizing propane forklifts used indoors with an EER of 0.9, on the basis that they would otherwise operate on gasoline or diesel, acts to penalize propane at the same time it contradictorily discourages development and advancement of low-carbon fuel options.

## **III. Propane Onroad Trucks and Buses Primarily Displace Gasoline, Not Diesel**

Propane vehicles in CA operate in several market niches in medium duty applications. Airport shuttle bus, school bus, and transit bus fleet operators routinely choose to not purchase diesel vehicles for a number of reasons. It is well known that 2010 onroad diesel tailpipe emission standards have resulted in greater diesel vehicle purchase and repair costs, and with reduced duty-cycle flexibility (particularly in stop-and-go settings and lower load or temperature profiles that can lead to DPF failure). Airport shuttles routinely operate in highly competitive, contracted settings where higher diesel vehicle and repair costs are simply not tolerated. In addition, shuttles and buses routinely operate in areas sensitive to diesel exhaust exposure, including multi-level airport structures and with daily transporting school children between home, school, and offsite school events. Public transit operations have similarly rejected use of diesel vehicles, purchasing lower-emitting propane or other alternatively-fueled bus options<sup>3</sup>

Propane vehicles primarily compete in the Class 4-6 markets, where, contrary to CARB LCFS staff's assumption that all heavy-duty ( $\geq 14,000$  lb. GVWR) onroad vehicles in CA will operate as diesel vehicles, they displace gasoline vehicles. Because of the discrepancies in diesel, gasoline, and propane heavy-duty vehicle EER values proposed by CARB staff, one option would be for CARB to assign all gasoline heavy-duty vehicles an EER of 0.9; this would effectively eliminate the fuel displacement issue. Absent this option, CARB should add a Class 4-6 option for propane vehicles displacing not diesel, but gasoline. We invite CARB to review our previously submitted comments on the displacement of gasoline by propane vehicles, as well as the photos provided at the end of this letter.

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<sup>3</sup> San Diego Metro Transit System operates 77 propane buses; according to MTS' Michael Wygant, diesel buses were simply not a viable option.

#### **IV. Recent CARB LCFS Staff Proposed Changes to the Propane Fuel Specification Require Expanded Review and Public Input**

CARB LCFS staff very recently proposed changes to California's propane fuel specification as they would apply to renewable propane, reducing both propene (propylene) and butane percentages from quantitative percentages established nearly 20 years ago following a year-plus long exhaustive private-public collaborative fuel specification study developed under the operation of the CARB-chaired Task Group.<sup>4</sup>

That extensive work resulted in the establishment of the propane fuel standard<sup>5</sup> allowing up to 10% propene and 5% butane and was predicated on emissions test data developed from both light-duty and heavy-duty vehicle test applications evaluated primarily under Test Method ASTM D 2163-87. Importantly, emissions controls and tailpipe standards on passenger and heavy-duty vehicles have improved exponentially since 1999, yet no due-process evidence has been provided with CARB LCFS staff's recent proposed fuel quality changes to show why propane fuel quality acceptable for operational emissions certainty on those less robust emissions control systems is now unacceptable for modern vehicles that would use renewable propane.

Renewable propane will provide very substantial carbon emission benefits over fossil propane, whether the renewable product is consumed as a 100% "neat" fuel or is in blend form with traditional fossil propane. Currently, renewable propane is produced as a secondary by-product, at a rate of only 5% or less of the total output in the production of renewable diesel. Testing provided during the Task Group's work in 1999 – 2000, which resulted utilized a vehicle propane fuel test blend containing 20% butane (by volume).

Without documentation supporting the recent CARB proposal, we infer that CARB is concerned with the potential for increased formation of NOx caused during engine pinging or knocking events. However, even with the propane test fuel containing 20% butane, its anti-knock index remained at over 100 (in comparison to the maximum value of 91 still applicable to today's highest octane-rated gasoline). Further, CARB should consider language permitting fuel blending of renewable propane containing 5% - 8% butane so long as the final product complies with the current standard (13 CCR § 2292.6).

In the absence of supporting documentation and public/private collaboration to justify the proposed reductions in propene and butane maximums in renewable propane, consistent with that applied by CARB and resulting in the formation and operation of a propane fuel specification Task Group in 1999, we request that CARB staff accept the interim use of CA Vehicle Code Section 380<sup>6</sup> as the renewable propane fuel specification; this would provide important flexibility to the developing renewable fuel refining industry, and consistent with the essential objectives of the LCFS. Coupled with this, we request on behalf of WPGA and renewable fuel refiners working to support CA low-carbon objectives that CARB initiate a collaborative working group—this group would develop a renewable propane fuel specification, with increased opportunities for cost-effective carbon emission reductions while ensuring that tailpipe emission standards are met.

In conclusion, the Western Propane Gas Association asks that CARB recognize that:

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<sup>4</sup> Chaired by CARB, the 1999 HD-10 Task Group included SCAQMD, refiners, LPG industry members and associations, engine manufacturers associations, vehicle OEMs and product suppliers, the Canadian government, and the State of Texas. The Task Group was to identify LPG fuel blends that would meet or exceed emissions findings for test vehicles using certification LPG fuel; after many months of Group meetings and extensive project analysis and testing the propane fuel standard, which came to be known as "HD-10", was enacted by CARB following its approval by their Board of Directors on Dec. 11, 1999.

<sup>5</sup> 13 CCR § 2292.6 governing propane fuel specifications and allowing up to 10% propene and 5% butane content in vehicle fuel was approved by CARB Board of Directors in the late 1999-early 2000 timeframe and is still in place today.

<sup>6</sup> CVC 380: "Liquefied petroleum gas means normal butane, isobutane, propane, or butylene (including isomers) or mixtures composed predominantly thereof in liquid or gaseous state having a vapor pressure in excess of 40 pounds per square inch absolute at a temperature of 100 degrees Fahrenheit".

- Natural gas-based propane is the growing feedstock resource that will supply the increased demand for propane in vehicles, pending growth in renewable propane refining and output.
- Propane engines operating in Class 4 – 6 vehicles displace gasoline engines in the supermajority of cases.
- Propane forklifts should not be accorded a lower-than-appropriate EER (0.9 as now proposed by CARB) on the mistaken assumption that they displace gasoline or diesel lifts, since indoor propane forklifts operate where gasoline and diesel lifts are prohibited.
- Renewable propane would provide substantial carbon emission reduction benefits. It is highly improbable that CARB staff-proposed reductions in butane and propene content will, aside from leading to increased renewable-fuels refinery costs, provide improvements in actual tailpipe emissions or in durability and fitness of vehicle in-use emission controls.
- Renewable propane fuel specifications should adopt CVC §380 as an interim, pending development of specifications by a Task Group. Similarly, CARB should permit fuel blending of renewable propane (with higher constituent content) with traditional propane, with the final blend meeting, as necessary.
- Table 8 of the proposed LCFS regulation order should include temporary fuel pathways codes for renewable propane that are the same as those for renewable diesel.

We look forward to continuing to work and dialogue with CARB staff in the coming weeks, and we remain hopeful that renewable propane's carbon benefits are recognized and treated fairly in the evolving LCFS process and then realized with their expanding use in CA fleets.

Sincerely,

/ Joy Alafia/

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(See photos below)

Attachment 1: Many school buses that operate on gasoline are candidates for replacement with LPG.

