



April 17, 2023

Honorable Sen. Ed Markey
Chairman
Senate Environment & Public Works Comm.
Sub-Committee on Clean Air, Climate
and Nuclear Safety
255 Dirksen Senate Office Building
Washington, DC 20510

Honorable Sen. Pete Ricketts
Ranking Member
Senate Environment & Public Works Comm.
Sub-Committee on Clean Air, Climate
and Nuclear Safety
139 Russell Senate Office Building
Washington, DC 20510

Dear Chairman Markey and Ranking Member Ricketts,

As the Subcommittee on Clean Air, Climate, and Nuclear Safety prepares for its April 18, 2023, hearing on “Cleaner Vehicles: Good for Consumers and Public Health,” the Renewable Fuels Association would like to share our thoughts on the important role that low-carbon renewable fuels like ethanol can play in cleaning up our nation’s transportation sector.

As you know, the transportation sector is the leading contributor of greenhouse gas (GHG) emissions in the United States, as well as a significant source of pollutants linked to poor air quality and human health concerns. Although GHG emissions from the transportation sector have declined slightly after peaking in 2006, the pace of emissions reduction must rapidly accelerate if the nation is to meet the ambitious goal of achieving net zero GHG emissions by 2050.

Achieving these emissions goals will require a broad and diverse portfolio of vehicle and fuel technologies. As the Subcommittee considers future strategies for reducing carbon emissions from vehicles and fuels, we believe it should avoid policy concepts that pre-determine technology winners and losers. Focusing on only one technology pathway or course of action for reducing transportation emissions would be shortsighted; if that course of action would happen to fail, American consumers and our environment would suffer the consequences. Under a technology-neutral policy approach to emissions reduction, the marketplace would determine the optimal combination of low-carbon fuels and vehicle technologies to achieve the goals that are best for consumers and public health.

We encourage the Subcommittee to remember this simple fact: **We can’t have clean vehicles without clean fuels.** Fuels and vehicles operate as integrated systems; examining the carbon impacts of one in isolation of the other leads to distorted and flawed comparisons. For example, the

carbon footprint of certain battery electric vehicles operating on fossil-fuel generated electricity is no smaller—and can sometimes be larger—than the carbon footprint of modern internal combustion engine vehicles operating on today’s ethanol-blended liquid fuels. It should not be assumed that an electric vehicle is a “clean vehicle” or a “zero emissions vehicle” simply because it does not have a tailpipe. The full range of emissions impacts related to producing, transporting, and using vehicle fuels must be considered when examining the overall carbon footprint of a certain vehicle/fuel technology pathway.¹

When the full carbon emissions lifecycle of all fuels is examined fairly, it becomes quickly obvious that low-carbon renewable fuels like ethanol offer an effective and immediate solution for reducing carbon emissions from liquid fuels across all segments of the transportation sector. Today’s corn-based ethanol already cuts GHG emissions by approximately 50 percent, on average, compared to gasoline. According to the Department of Energy’s Argonne National Laboratory, typical corn ethanol provides a 44 percent GHG savings compared to gasoline, even when unverifiable emissions from direct and indirect changes in land cover/land use are included.² When corn ethanol is compared directly to gasoline (i.e., no indirect emissions included for either fuel), Argonne National Laboratory finds that corn ethanol reduces GHG emissions by 52 percent, on average, versus gasoline. Similarly, researchers affiliated with Harvard University, MIT, and Tufts University concluded that today’s corn ethanol offers an average GHG reduction of 46 percent versus gasoline.³

In addition, the California Air Resources Board (CARB) has conducted analysis and certified that ethanol produced from the cellulosic biomass found in corn generally reduces GHG emissions by 70-80 percent compared to gasoline; more than 140 million gallons of ethanol from cellulosic biomass was used in California in 2021.⁴ Overall, CARB found that from 2011 to 2021, the use of ethanol from all feedstocks cut GHG emissions from the California transportation sector by 31 million MT CO₂e, more than any other fuel used to meet the state’s Low Carbon Fuel Standard requirements.⁵

¹ For a simple explanation of lifecycle (“well to wheels”) carbon analysis and a carbon intensity comparison of ethanol, gasoline, and electricity for electric vehicles, see Cooper, G. (2022), The Truth About Ethanol and Carbon Emissions. <https://ethanolrfa.org/media-and-news/category/blog/article/2022/10/the-truth-about-ethanol-and-carbon-emissions>

² Lee, U., Kwon, H., Wu, M. and Wang, M. (2021), Retrospective analysis of the U.S. corn ethanol industry for 2005–2019: implications for greenhouse gas emission reductions. *Biofuels, Bioprod. Bioref.*, 15: 1318-1331. <https://doi.org/10.1002/bbb.2225>

³ Melissa J Scully *et al* (2021), Carbon intensity of corn ethanol in the United States: state of the science. *Environ. Res. Lett.* **16** 043001. <https://iopscience.iop.org/article/10.1088/1748-9326/abde08>

⁴ CARB. “LCFS Pathway Certified Carbon Intensities.” Viewed Feb. 7, 2023. <https://ww2.arb.ca.gov/resources/documents/lcfs-pathway-certified-carbon-intensities>

⁵ CARB. “Low Carbon Fuel Standard Reporting Tool Quarterly Summaries.” Viewed Jan. 20, 2023. <https://ww2.arb.ca.gov/resources/documents/low-carbon-fuel-standard-reporting-tool-quarterly-summaries>

With the increased adoption of low-carbon farming practices, Carbon Capture Utilization and Storage (CCUS), and other technologies, the U.S. ethanol industry is well on its way to producing zero-carbon corn ethanol. In fact, in a July 2021 letter to President Biden, RFA's member companies pledged that ethanol will achieve a 70 percent GHG reduction, on average, compared to gasoline by 2030 and a net-zero carbon footprint by 2050 or sooner.⁶

While ethanol's use historically has been as a motor fuel for light-duty vehicles, new innovations and emerging technologies are underscoring ethanol's carbon reduction benefits across *all* segments of the transportation sector, including light-, medium-, and heavy-duty vehicles; the marine sector; and even the aviation sector, through the utilization of ethanol as a feedstock in the production of sustainable aviation fuels (SAF).

But for this vision to become a reality, the biofuels industry needs smart policy and regulations for cleaner vehicles and fuels, including:

- use of the same carbon footprint boundaries for all fuels and vehicles;
- fairness and consistency in the methodologies used for measuring the carbon footprint of different fuels and vehicles;
- removal of unnecessary regulatory barriers that are blocking the use of fuel blends that contain higher levels of low-carbon ethanol, such as 15 percent blends (E15);
- continued investment in storage and distribution infrastructure for higher ethanol blends like E15 and flex fuels like E85;
- equitable incentives for the production of all cleaner vehicle technologies, including flex-fuel vehicles that can operate on fuels containing up to 85 percent ethanol.

Unfortunately, EPA's recently proposed *Multi-Pollutant Emissions Standards for Model years 2027 and Later Light-Duty and Medium-Duty Vehicles* **does not** take a technology-neutral approach to stimulating production of "clean vehicles."⁷ Instead, if finalized as proposed, the regulation would establish a de facto mandate for electric vehicles. This is due to the fact that the proposed regulation ignores the upstream carbon emissions and environmental impacts of electric vehicles (e.g., emissions related to electricity generation and mining for battery minerals like lithium, cobalt, nickel, etc.), giving the false impression that these vehicles are, in every case, "clean" and "zero emissions" vehicles.

⁶ Letter from RFA member companies to President Joseph R. Biden. July 27, 2021.

<https://ethanolrfa.org/file/2036/RFA-Net-Zero-Commitment-Letter-to-President-Biden--1.pdf>

⁷ EPA (2023). Proposed Rule: Multi-Pollutant Emissions Standards for Model years 2027 and Later Light-Duty and Medium-Duty Vehicles. <https://www.epa.gov/regulations-emissions-vehicles-and-engines/proposed-rule-multi-pollutant-emissions-standards-model>

At the same time, the proposed EPA regulation ignores the potential of low-carbon renewable liquid fuels like ethanol to reduce GHG emissions in the existing fleet of nearly 280 million liquid-fueled light-duty vehicles. The proposal also ignores the opportunity to drive greater GHG emissions reductions via increased production and use of flex-fuel vehicles (FFVs), which can operate on fuels containing up to 85 percent ethanol (E85). FFVs operating on E85 offer comparable—or better—emissions reductions to today’s electric vehicles (depending on the source of the fuel and the electricity) at a much lower cost. As detailed in the table below, it is important that EPA and the automakers avoid picking winners and losers, and instead support an “all of the above strategy” to emissions reduction.

Vehicle	Vehicle Fuel	Lifecycle Carbon Emissions (grams CO2e/MJ)	Carbon Emissions Reduction vs. Gasoline	Fossil Fuel Content of Vehicle Fuel	Additional Vehicle Purchase Cost vs. Conventional Gasoline Engine Model	Vehicles in U.S. Light Duty Auto Fleet (million)
Flex Fuel Vehicle	E85 (corn kernel fiber ethanol & renewable naphtha)	22	77%	1.6%	\$0-150	23
Flex Fuel Vehicle	E85 (corn starch ethanol & natural gasoline)	53	46%	18%	\$0-150	23
Battery Electric Vehicle	California grid electricity	24	75%	43%	\$10,000-25,000	3
Battery Electric Vehicle	Missouri grid electricity	57	41%	83%	\$10,000-25,000	3

In addition to its environmental benefits, ethanol also makes a vital contribution to our nation’s economy. The 199 ethanol biorefineries across the country serve as crucial drivers of employment and income in the communities in which they operate. Even as Russia’s invasion of Ukraine caused a global energy crisis in 2022, and even as abnormally high inflation rates impacted the U.S. economy, the production of 15.4 billion gallons of ethanol directly employed nearly 79,000 American workers in the manufacturing and agriculture sectors. In addition, the ethanol industry supported 343,000 indirect and induced jobs across all sectors of the economy. Meanwhile, the industry generated \$35 billion in household income and contributed \$57 billion to the national Gross Domestic Product (GDP) in 2022.⁸ These significant employment impacts and economic contributions should be taken into consideration by Congress as it examines potential future energy and climate policies that may impact the biofuels sector.

In conclusion, any clean vehicle policies at the federal level should be carefully crafted and designed in a way that avoids picking technology winners and losers, but instead drives the greatest GHG emissions reductions at the lowest cost. Policies aimed at reducing the emissions impacts of vehicles must recognize that vehicles and fuels work together as a system. When evaluating the

⁸ J.M. Urbanchuk (ABF Economics). “Contribution of the Ethanol Industry to the Economy of the United States in 2022.” Forthcoming (February 2023).

emissions impacts of various transportation options, the impact of the vehicle's fuel must be given at least as much attention as the vehicle itself. Federal vehicle policy should use consistent, fair, and science-based lifecycle GHG analyses for all fuel and vehicle options; set clear and predictable annual GHG reduction requirements; allow low-carbon fuel producers to demonstrate continuous improvement in their individual carbon footprints; include cost-containment measures; and include complimentary measures to remove technical barriers that artificially limit greater use of low-carbon technology.

On behalf of the members of the Renewable Fuels Association, thank you again for the opportunity to share our perspective on the future of ethanol and other low-carbon fuels, and how they can contribute to a future of clean vehicles that are beneficial to the U.S. economy, environment, and public health.

Sincerely,

A handwritten signature in black ink that reads "Geoff Cooper". The signature is written in a cursive, flowing style.

Geoff Cooper
President and CEO