



**TESTIMONY OF
GEOFF COOPER,
PRESIDENT & CEO, RENEWABLE FUELS ASSOCIATION
BEFORE THE
U.S. SENATE, COMMITTEE ON ENVIRONMENT & PUBLIC WORKS
HEARING ON
“THE FUTURE OF LOW CARBON TRANSPORTATION FUELS AND
CONSIDERATIONS FOR A NATIONAL CLEAN FUELS PROGRAM”**

FEBRUARY 15, 2023

Chairman Carper, Ranking Member Capito, and Members of the Committee, thank you for the opportunity to testify today. My name is Geoff Cooper and I am the President and Chief Executive Officer of the Renewable Fuels Association (RFA), the leading trade association representing the U.S. ethanol industry.

RFA’s mission is to drive expanded demand for American-made renewable fuels and bioproducts worldwide. Founded in 1981, RFA serves as the premier organization for industry leaders and supporters. With over 300 members, we work every day to help America become cleaner, safer, and more economically vibrant.

We thank the Committee for convening this timely hearing, and I appreciate the opportunity to share our industry’s unique perspective on the future of low carbon transportation fuels. RFA supports the development of a technology-neutral, performance-based national Clean Fuels Program (CFP), and we believe low-carbon renewable fuels like ethanol offer enormous potential to decarbonize the transportation sector under a well-structured program. We commend the committee for thinking carefully about these issues.

I. Summary of Testimony

The transportation sector is the leading contributor of greenhouse gas (GHG) emissions in the United States. Although GHG emissions from transportation have declined slightly after peaking in 2006, the pace of emissions reduction must rapidly accelerate if the nation is to meet the Biden Administration’s goals of achieving a 50-52 percent GHG

reduction by 2030 and net-zero GHG emissions by 2050.¹ Rapid decarbonization of the transportation sector is also crucial for meeting U.S. commitments under the Paris Climate Agreement.

While policies such as the Renewable Fuel Standard (RFS), the Inflation Reduction Act (IRA), and light-duty vehicle fuel economy and tailpipe standards (CAFE/GHG) will play a vital role in reducing GHG emissions from transportation, other complementary solutions will also be required to truly decarbonize the sector by mid-century. If properly structured, a national Clean Fuel Program (sometimes called a Low Carbon Fuel Standard or Clean Fuel Standard) offers the best potential to rapidly accelerate the decarbonization of the transportation sector, while simultaneously enhancing energy security, creating jobs, and reducing tailpipe emissions of pollutants linked to poor air quality and human health challenges.

Low-carbon renewable fuels like ethanol offer an effective and immediate solution for further 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. With the increased adoption of climate-smart 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 the ethanol they produce will achieve a 70 percent GHG reduction, on average, compared to gasoline by 2030 and a net-zero carbon footprint by 2050 or sooner.² But for this vision to become a reality, the biofuels industry needs smart policy and regulation, including:

- fairness and consistency in how the carbon footprint of different fuels and vehicles is measured;
- removal of unnecessary regulatory barriers that are blocking the use of fuel blends that contain higher levels of ethanol, such as 15 percent ethanol blends (E15);

¹ The White House. April 22, 2021. "FACT SHEET: President Biden Sets 2030 Greenhouse Gas Pollution Reduction Target Aimed at Creating Good-Paying Union Jobs and Securing U.S. Leadership on Energy Technologies." <https://www.whitehouse.gov/briefing-room/statements-releases/2021/04/22/fact-sheet-president-biden-sets-2030-greenhouse-gas-pollution-reduction-target-aimed-at-creating-good-paying-union-jobs-and-securing-u-s-leadership-on-clean-energy-technologies/>

² 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>

- continued investment in storage and distribution infrastructure for higher ethanol blends like E15 and flex fuels like E85;
- implementation of strong Renewable Fuel Standard volume requirements in 2023 and beyond;
- equitable incentives for the production of flex-fuel vehicles that can operate on fuels containing up to 85 percent ethanol; and
- a well-structured nationwide clean fuels policy.

Clean fuel policies have already been implemented at the state level (e.g., California and Oregon), and several countries are in the process of implementing their own programs (e.g., Canada and Brazil). While the existing state programs have been successful in reducing transportation-related GHG emissions and driving investment in new clean fuel technologies, certain design flaws and implementation challenges have, at times, undermined the technology-neutral intent of these programs and unnecessarily limited the ability of some low-carbon fuels to provide greater GHG benefits.

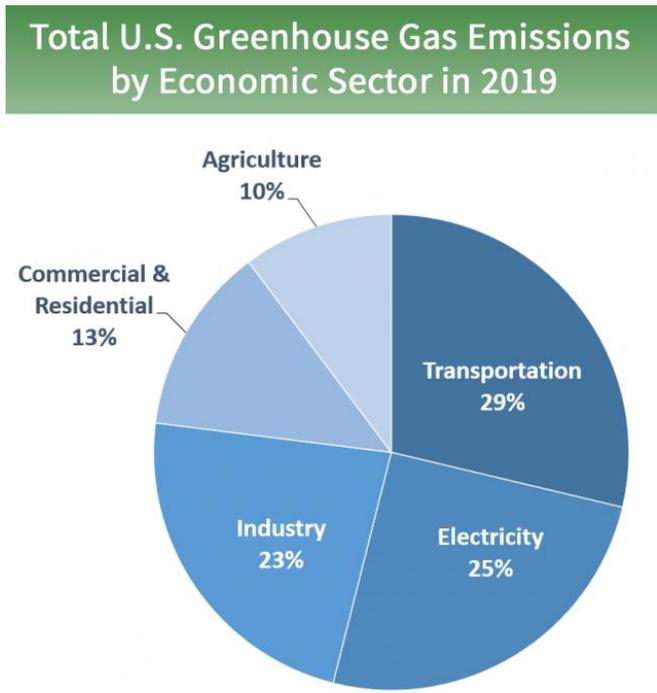
If implemented on a national level, a CFP will need to be carefully designed in a way that avoids picking technology winners and losers and drives the greatest GHG emissions reductions at the lowest cost. A nationwide CFP should use consistent, fair, and science-based lifecycle GHG analyses for all fuel and vehicle options; set clear and predictable annual GHG reduction requirements; allow low-carbon fuel producers to demonstrate continuous improvement if their individual carbon footprints; include cost-containment measures; and include complimentary measures to remove technical barriers that artificially limit greater use of low-carbon fuels.

II. As the leading source of GHG emissions in the United States, the transportation sector must be a central focus for national decarbonization efforts.

According to the U.S. Environmental Protection Agency (EPA), the United States was responsible for 6.57 billion metric tons of carbon dioxide equivalent (MT CO₂e) in 2019.³ As shown in the chart below, the transportation sector accounted for approximately 29 percent of total U.S. GHG emissions in 2019, followed by the electricity generation sector at 25 percent. GHG emissions from transportation

³ U.S. EPA. “Sources of Greenhouse Gas Emissions.” Viewed Feb. 8, 2023. <https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions> (Data from 2019 is used throughout this testimony rather than data from 2020, the most recent year for which data is available, due to the abnormal market conditions experienced in 2020 related to COVID-19).

primarily result from the burning of fossil fuels (mainly petroleum) in passenger cars, trucks, ships, trains, and planes.



Source: U.S. Environmental Protection Agency (2021)

The increased use of renewable fuels like ethanol has already helped reduce GHG emissions from the transportation sector, and EPA notes that “using renewable fuels such as low-carbon biofuels” is an important GHG “reduction opportunity” for the sector.⁴

After peaking at 1.98 billion metric tons of carbon dioxide equivalent (MT CO₂e) in 2006, transportation-related GHG emissions fell 12 percent to 1.75 billion MT CO₂e in 2012 and stood at 1.87 billion MT CO₂e in 2019—6 percent below 2006 levels.⁵ Recent research shows that the use of biofuels under the Renewable Fuel Standard resulted in the cumulative avoidance of nearly 1 billion metric tons of GHG emissions from the transportation sector between 2008 and 2020, equivalent to 75 million MT CO₂e per year.⁶

⁴ *Id.*

⁵ U.S. EPA. “Greenhouse Gas Inventory Data Explorer.” Viewed Feb. 8, 2023. <https://cfpub.epa.gov/ghgdata/inventoryexplorer/>

⁶ S. Unnasch and D. Parida. “GHG Reductions from the RFS2 – A 2020 Update.” Life Cycle Associates Report LCA.6145.213.2021. February 11, 2021. Prepared for Renewable Fuels Association. <https://ethanolrfa.org/file/748/LCA - RFS2-GHG-Update 2020.pdf>

Despite progress in reducing GHG emissions from transportation, the sector remains as the most substantial source of emissions in the United States. Thus, transportation fuels and vehicles should be the central focus of a national strategy to swiftly reduce GHG emissions. Without smart policy initiatives to drive rapid decarbonization in the transportation sector, it will be impossible to achieve net-zero GHG emissions economy-wide by 2050.

III. Renewable fuels like ethanol offer an effective and immediate solution for decarbonizing liquid fuels across all segments of the transportation sector. A well-structured national clean fuel policy would leverage the carbon reductions provided by ethanol.

Ethanol has an important role to play in reducing GHG emissions from the transportation sector. Today's corn starch ethanol already reduces GHG emissions by roughly half, 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.⁷ 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, including land use change emissions.⁸

In addition, the California Air Resources Board (CARB) has conducted extensive lifecycle 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 corn-based cellulosic biomass was used in California in 2021, reducing GHG emissions by nearly 800,000 MT CO₂e.⁹

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 (LCFS)

⁷ 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>

⁸ 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>

⁹ CARB. "LCFS Pathway Certified Carbon Intensities." Viewed Feb. 7, 2023. <https://ww2.arb.ca.gov/resources/documents/lcfs-pathway-certified-carbon-intensities>

requirements.¹⁰ All liquid biofuels—including ethanol, renewable diesel, and biodiesel—accounted for 74 percent of the carbon reductions delivered under the LCFS from 2011 through 2021.¹¹ Similarly, ethanol has generated 45 percent of the carbon reductions achieved under Oregon’s Clean Fuel Program (CFP) since its inception 2016.¹² When combined with biodiesel and renewable diesel, liquid biofuels have accounted for 87 percent of total GHG reductions under the Oregon CFP.¹³

With the rapid emergence of new technologies and more efficient practices, even greater GHG reductions are coming to the corn ethanol sector. In fact, analysis by the U.S. Department of Agriculture found that some biorefineries are likely to produce corn starch ethanol that offers a 70 percent GHG reduction versus gasoline as soon as this year.¹⁴

Indeed, the U.S. ethanol industry is well on its way to producing corn ethanol that is fully carbon neutral. With the adoption of CCUS, biogas and renewable electricity substitution, and climate-smart farming practices, corn ethanol is expected to achieve net zero emissions, on average, by 2050 or sooner. A landmark 2022 study examined numerous technology pathways for corn ethanol producers to achieve net zero emissions, concluding that “...ethanol producers can achieve extremely low corn ethanol emissions and fill a critical need in tomorrow’s zero-carbon economy.”¹⁵ The study found that the corn ethanol industry is likely to meet its goals of producing net-zero ethanol, on average, well before 2050. In fact, RFA’s member companies are so confident about the promise of carbon neutral ethanol that they adopted a resolution in 2021 to achieve a net-zero carbon footprint, on average, for ethanol by 2050 or sooner. This pledge was memorialized in a letter to President Biden last July.

It is important to note that the expansion of low-carbon ethanol production in the United States has *not* resulted in cropland expansion or conversion of native lands (e.g., forest or grassland) to agriculture. As shown in the chart below, the U.S. EPA’s annual

¹⁰ 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>

¹¹ *Id.*

¹² Oregon DEQ. “Quarterly Data Summaries.” Viewed Feb. 8, 2023. <https://www.oregon.gov/deq/ghgp/cfp/Pages/Quarterly-Data-Summaries.aspx>

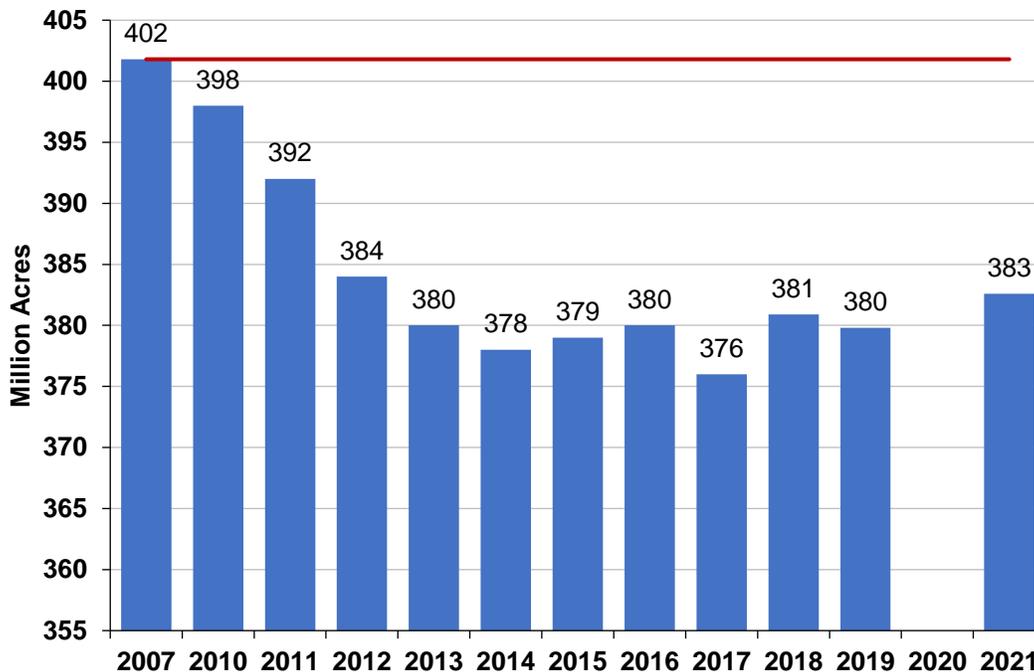
¹³ *Id.*

¹⁴ Jan Lewandrowski, Jeffrey Rosenfeld, Diana Pape, Tommy Hendrickson, Kirsten Jaglo & Katrin Moffroid (2020). “The greenhouse gas benefits of corn ethanol – assessing recent evidence,” *Biofuels*, 11:3, 361-375, DOI: [10.1080/17597269.2018.1546488](https://doi.org/10.1080/17597269.2018.1546488)
<https://www.tandfonline.com/doi/full/10.1080/17597269.2018.1546488>

¹⁵ Emery, Isaac. Informed Sustainability Consulting (2022). “Pathways to Net-Zero Ethanol: Scenarios for Ethanol Producers to Achieve Carbon Neutrality by 2050.” Prepared for the Renewable Fuels Association. <https://d35t1syewk4d42.cloudfront.net/file/2146/Pathways%20to%20Net%20Zero%20Ethanol%20Feb%202022.pdf>

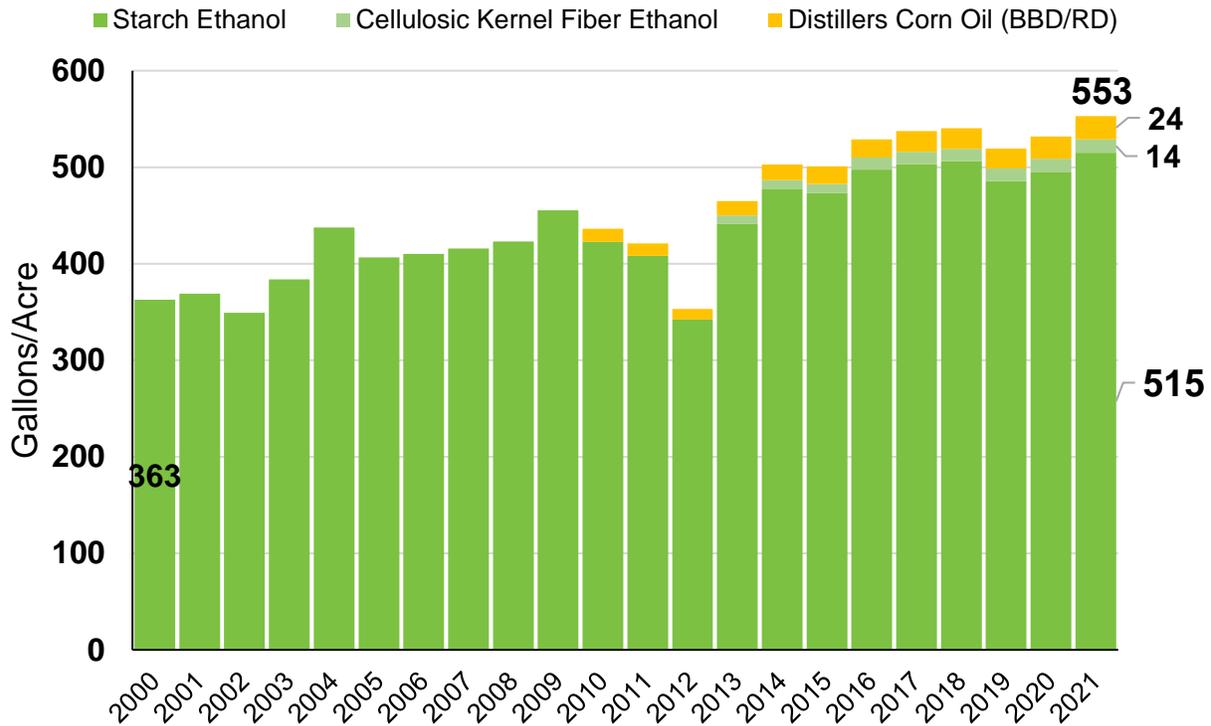
analysis of U.S. agricultural land area continues to show that the amount of land engaged in agricultural production is well below the level in 2007 when the RFS2 was adopted by Congress. Over the last 10 years, the U.S. agricultural land area has averaged 380 million acres, which is 22 million acres less than the agricultural land area in 2007, according to EPA.

Agricultural Land Use Area vs. 2007 Baseline (U.S. EPA)



The reduction in cropland area during a period of growth in ethanol production is explained by significant gains in efficiency—both on the farm and at the ethanol biorefinery. Between 2005 (the year RFS1 was adopted) and 2021, the amount of corn produced per acre of land increased 19.5 percent—from 147.9 bushels per acre to a record 176.7 bushels per acre. Meanwhile, the amount of ethanol produced per bushel of corn has increased from an average of 2.6 gallons per bushel in 2005 to over 2.9 gallons per bushel in 2021. At the same time, ethanol biorefineries have also diversified the types of renewable fuels and co-products they are producing, with most facilities now producing starch-based ethanol, cellulosic ethanol, and distillers oil used for renewable diesel or biodiesel. Overall, as shown in the chart below, these compounding efficiency gains have led to a 52 percent increase in the amount of biofuel produced per corn acre since 2000. At 553 gallons of biofuel per acre, the average U.S. corn acre produces more renewable fuel today than the average sugarcane acre in Brazil, while also generating nearly 1.5 tons of high-protein animal feed.

Biofuel Gallons per Acre of Corn



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 2022.¹⁶

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.

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

¹⁶ J.M. Urbanchuk (ABF Economics). “Contribution of the Ethanol Industry to the Economy of the United States in 2022.” Forthcoming (February 2023).

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). A properly structured CFP could accelerate the expansion of ethanol and other low-carbon, renewable fuels into all of these market segments.

IV. A well-designed national clean fuels policy would drive investment in a broad and diverse portfolio of low-carbon fuel solutions.

While ethanol and other renewable fuels would likely play an important role in delivering carbon reductions under a national CFP, the beauty of a well-designed program is that it does not pick technology winners and losers. A CFP sets specific carbon reduction requirements for the transportation sector, then lets the marketplace determine the most technologically and economically efficient methods of achieving those carbon reductions.

Thus, under a truly technology-neutral policy, the marketplace would determine the optimal combination of low-carbon fuels and vehicle technologies to achieve the goals of the program. Despite some design and implementation shortcomings, clean fuel programs in California and Oregon have driven substantial increases in the use of a wide array of low-carbon transportation fuels, including ethanol, renewable diesel, biodiesel, renewable natural gas, electricity, hydrogen, renewable gasoline, alternative jet fuel, and others. The fuel diversity that results from such a portfolio approach has obvious economic and energy security benefits.

While the use of low-carbon electricity in electric vehicles would very likely be one promising option for some parties to meet the requirements of a national clean fuel policy, it is widely acknowledged that electrification alone cannot deliver the GHG emissions reductions necessary to achieve a 50-52 percent reduction nationwide by 2030 and net-zero emissions by 2050.

The contribution of electric vehicles to decarbonization efforts will be constrained—especially in the near term—due to the sheer size and scale of the U.S. light-duty vehicle fleet and the amount of time required for the fleet to turn over. On average, consumers keep their vehicles for more than 12 years, meaning that an internal combustion engine (ICE) vehicle purchased today will likely still be in use well beyond 2030.¹⁷ Today, there are more than 267 million passenger cars, SUVs, pick-ups, vans, and other light-duty

¹⁷ IHS Markit. “Average age of cars and light trucks in the US rises to 12.1 years, accelerated by COVID-19.” June 14, 2021. <https://ihsmarkit.com/research-analysis/average-age-of-cars-and-light-trucks-in-the-us-rises.html>

vehicles registered in the United States.¹⁸ Just 3.3 million of those vehicles—or 1.2 percent—are battery electric or plug-in hybrid electric vehicles,¹⁹ meaning the other 99 percent are ICE vehicles that operate on liquid fuels.

While electric vehicle sales are growing, they continue to represent a relatively small share of overall light-duty vehicles sales (i.e., electric vehicles accounted for 5.8 percent of light-duty vehicle sales in 2022).²⁰ Growth in electric vehicle sales is expected to continue in the decades ahead, but there is significant uncertainty and debate around the rate of growth. For example, the Energy Information Administration’s (EIA) *Annual Energy Outlook 2021* forecast that roughly 80 percent of new light-duty vehicles sold in the U.S. in 2050 will be powered by an ICE that requires liquid fuel.²¹

Even with increased electric vehicle sales expected in the years ahead, it would take decades to entirely turn over the fleet (assuming consumer acceptance of electric vehicles would allow a complete transition). As such, hundreds of billions of gallons of liquid fuel will continue to be used in ICE vehicles for many years to come. To achieve true carbon neutrality in the U.S. transportation system by mid-century, strategies focused on decarbonizing those liquid fuels will need to be undertaken.

The dangers of over-reliance on electrification for achieving carbon reduction in the transportation sector were highlighted in a recent study by Rhodium Group. “We are still a long way from being on track to net-zero emissions by 2050,” the report found. “Electric vehicles alone will not get the U.S. to net-zero by 2050.” Rather, the report concluded that “...a portfolio of strategies is the lowest cost and most likely to succeed. While efficiency improvements and vehicle electrification can cut transport emissions by up to two-thirds by 2050, *low-GHG liquid fuels are needed to fill the remaining gap* and achieve net-zero emissions in the transportation sector by mid-century.”²² Indeed,

¹⁸ Federal Highway Administration. Highway Statistics 2020. “State Motor-Vehicle Registrations – 2020.” <https://www.fhwa.dot.gov/policyinformation/statistics/2020/mv1.cfm>. (Note: 8.3 million motorcycles and 1 million buses are excluded from the 267 million figure.)

¹⁹ Argonne National Laboratory. “Light Duty Electric Drive Vehicles Monthly Sales Update.” Jan. 2023. <https://www.anl.gov/es/light-duty-electric-drive-vehicles-monthly-sales-updates> (Note: Argonne reports, “In total, 3,268,828 PHEVs and BEVs have been sold since 2010.” We assume all of those vehicles remain in service today, which likely results in overestimation of the share of the fleet comprised by EVs.)

²⁰ Sean Tucker. Kelley Blue Book. Jan. 17, 2023. “New Car Sales Fell in 2022, But New Electric Car Sales Rose Dramatically.”

²¹ U.S. EIA. “Annual Energy Outlook 2021: Transportation.” Feb. 3, 2021.

<https://www.eia.gov/outlooks/aeo/pdf/05%20AEO2021%20Transportation.pdf>

²² Rhodium Group (2021). “Closing the Transportation Emissions Gap with Clean Fuels.” Available at: <https://rhg.com/research/closing-the-transportation-emissions-gap-with-clean-fuels/> (emphasis added)

President Biden himself has also acknowledged that “...you simply can’t get to net-zero by 2050 without biofuels.”²³

V. In order to achieve optimum GHG emissions reductions, a national clean fuel program must be carefully designed to maintain technology neutrality.

The overarching goal of an effective CFP is to steadily reduce GHG emissions from the transportation fuel sector without picking technology winners and losers. The program must be fuel- and vehicle-neutral and should avoid discriminating against, or disproportionately favoring, any specific fuels or vehicle technologies.

A CFP sets annual GHG reduction requirements, then allows transportation fuel suppliers to determine the most efficient ways of achieving those reductions without dictating the use of specific fuels or vehicles. All fuel production methods (or “pathways”) are assigned unique carbon intensity (CI) scores that represent the full lifecycle GHG emissions associated with the production and use of the fuel (sometimes called “well-to-wheels” or “cradle-to-grave” emissions). Fuels supplied to the marketplace that have a lower CI than the annual GHG reduction requirement generate credits, while fuels that have a higher CI than the annual requirement generate deficits. A party is in compliance with the annual standard when credits offset deficits.

RFA believes the development of any national clean fuel program must be guided by the following principles:

- The program should take a market-based approach that sets clear and predictable annual GHG reduction requirements, then allows the marketplace to determine the most cost-effective means for achieving the reductions.
- Credits toward complying with clean fuel program obligations should be generated only for the use of fuels that deliver actual, verifiable carbon reductions.
- Any clean fuel policy must use transparent and science-based lifecycle analysis. Because lifecycle analysis is the “engine that drives a CFS,” it is imperative that clean fuel programs are based on sound science and transparent lifecycle accounting methodologies. One such methodology is the Department of Energy Argonne National Laboratory GREET model, which is accepted worldwide as the

²³ The White House. Remarks by President Biden on Lowering Energy Costs for Working Families. April 12, 2022. <https://www.whitehouse.gov/briefing-room/speeches-remarks/2022/04/12/remarks-by-president-biden-on-lowering-energy-costs-for-working-families/>

most robust and authoritative tool for lifecycle carbon accounting for a wide array of transportation fuels. The GREET model is also updated once annually to incorporate the latest data. Legislation establishing a national CFP could use the same approach to specifying lifecycle analysis methodologies that was used by Congress for non-aviation fuels in sections 45Z (Clean Fuel Production Credit) and 45V (Credit for Production of Clean Hydrogen) of the Inflation Reduction Act.

- Lifecycle accounting of all transportation fuel options must use consistent system boundaries for analysis of all fuels. If indirect GHG effects, leakages, “rebound effects,” etc. are considered and included as part of the CI score for one fuel type, those same effects must be simultaneously analyzed, with the same rigor, and included in the CI scores for all fuel types.
- Lifecycle accounting should allow for unique production pathways and be flexible enough to incorporate the variable carbon impacts of different feedstock extraction and production practices for all fuel pathways (e.g., extraction of various minerals for EV batteries, differences in agricultural practices for biofuel feedstocks, differences in extraction methods for various crude oil sources, etc.) Specifically, lifecycle accounting for biofuels should be allowed to include the soil carbon sequestration benefits associated with certain cropping systems and practices. Additionally, lifecycle accounting for biofuels should not take a “one-size-fits-all” approach to estimating the emissions associated with agricultural feedstock production. Biofuel producers should have the ability to demonstrate variations and improvements in the carbon intensity of farm-level feedstock production practices.
- Fuel efficiency ratios (sometimes called “energy economy ratios”) should be equitably applied under a national CFP. Under existing state-level programs, the drivetrain of electric vehicles is assumed to be 3-4 times more efficient per unit of energy than a conventional ICE drivetrain running on regular gasoline (i.e., an EV is assumed to travel 3-4 times further on one unit of energy than a conventional ICE vehicle on one unit of energy). The application of this efficiency ratio results in very low CI scores for electricity used in EVs, making that technology pathway more attractive as a means of compliance with annual standards. More efficient liquid fuels in optimized engines (e.g., high-octane fuels used in high-compression ratio engines) should also have the ability to use an energy efficiency ratio under a national CFP (i.e., a high-compression ratio engine using a 98 RON octane fuel will travel 1.1-1.2 times further per unit of

energy than a conventional internal combustion engine running on regular gasoline).

- A national CFP could include measures to contain or limit the cost of compliance. Such measures add stability and certainty to the clean fuel program. For example, the California LCFS has a cap on credit prices of \$200 per metric ton (adjusted for inflation). This containment mechanism has helped stabilize the program and soften the economic impacts on the supply chain and consumers. Similarly, a floor price for credit values could be considered to ensure that a positive market signal is maintained in order to facilitate compliance with long-term GHG reduction requirements.
- Credits should not be selectively awarded to businesses simply for installing certain low-carbon fuel distribution infrastructure (such as EV fast-chargers). The infrastructure itself does not generate actual GHG reductions; and, there is no guarantee that the infrastructure will actually be used to distribute only low-carbon fuels. Similarly, credits should not be selectively awarded to businesses who make alternative fuel vehicles that may or may not actually use low carbon fuels.

Finally, the benefits of a clean fuel program can only be fully realized if complementary policy and regulatory measures are adopted to remove technical and regulatory barriers to low-carbon fuel options and open the marketplace. For example, measures to encourage the production and sale of flex fuel vehicles (FFVs) capable of running on high levels of low-carbon ethanol (e.g., E85) should be considered in tandem with a CFP. Ensuring parity in the regulation of fuel volatility (RVP) is another example. Similarly, tax incentives and/or grant funding for the installation of low-carbon fuel infrastructure at retail stations should be maintained or expanded.

RFA is an active participant in multiple coalitions advocating for the creation of a technology-neutral national CFP. We generally support the principles and policy design concepts developed by those organizations, and we encourage the Committee to consider them as discussions around a national program continue to develop.^{24,25}

VI. Interaction with other policies

²⁴ For a more detailed discussion of desirable design principles, see “A Clean Fuels Policy for the Midwest: A [White Paper](#) from the Midwestern Clean Fuels Policy Initiative.” January 7, 2020. RFA was actively involved in the preparation of this white paper.

²⁵ Drive Clean, Statement of Principles. <https://www.driveclean.us/#statement-of-principles>

As with any potential new energy or climate policy, the interaction of a possible national CFP with existing state and federal policies and regulations must be carefully considered. RFA believes a national CFP should be developed and implemented in a way that complements existing energy and climate policies and regulations. Specifically, we believe the interaction of a potential national CFP with the following existing policies and regulations deserves special consideration:

- **State LCFS and CFP programs:** As detailed earlier in this testimony, clean fuel programs are already in place at the state level. California’s LCFS has been in operation since 2011 and Oregon’s CFP has been in operation since 2016. In addition, Washington began implementation of its own Clean Fuel Standard on Jan. 1, 2023. Several other states are considering clean fuel programs as well, including Minnesota, New York, New Mexico, Michigan, Ohio, and others. With proper coordination and harmonization of key provisions, RFA believes it is possible for state programs to work in concert with a federal program. However, we believe a single nationwide CFP would be preferable to multiple state programs, each of which might have its own unique characteristics.
- **Renewable Fuel Standard:** A well-designed national CFP would complement—not conflict with—the existing RFS program. While the RFS does have statutorily prescribed GHG reduction requirements, the primary statutory purpose of the RFS is “to move the United States toward greater energy independence and security...”²⁶, and the renewable fuels used to comply with the program were primarily intended by Congress “to replace or reduce the quantity of fossil fuel present in a transportation fuel.”²⁷ The fundamental purpose of the RFS is to stimulate the production and use of large volumes of renewable fuels to replace fossil fuels—particularly imported crude oil—in an effort to enhance energy security. As evidenced by the impact of Russia’s invasion of Ukraine on U.S. gasoline prices, this objective remains as relevant today as it was in 2007 when Congress created the RFS2 as part of the Energy Independence and Security Act. Meanwhile, the express purpose of a clean fuel standard is to reduce GHG emissions from the transportation sector. While reduced petroleum dependence and enhanced energy security may be co-benefits of a clean fuel program, the RFS takes a more direct and purposeful approach to those objectives. The interaction of the RFS with state and potential national clean fuel programs has been rigorously studied by energy policy experts, with the Food and Agriculture Policy Research Institute concluding that the two programs would be

²⁶ Public Law 110—140 (Dec. 19, 2007) at 1.

²⁷ *Id.* at 30.

“mutually reinforcing” and “the compliance costs of meeting one of the requirements is lower in the presence of the other policy.”²⁸ Similarly, Rubin and Leiby (2013) found that a national LCFS and the RFS would have a degree of “mutual reinforcement” that tends to increase the use of more advanced biofuels beyond the effect of either policy by itself.²⁹ RFA strongly believes that a national CFP should complement the existing RFS program, as the two policies have distinctly different primary objectives but would act in a mutually reinforcing manner.

- **Vehicle Tailpipe GHG Standards:** EPA has implemented tailpipe GHG emissions standards for light-duty on-road vehicles since 2010 and medium- and heavy-duty vehicles since 2011. These regulations are implemented in tandem with the Dept. of Transportation’s fuel economy regulations as part of a harmonized “CAFE/GHG” regulatory regime. To date, EPA’s standards have focused only on tailpipe GHG emissions resulting from fuel combustion in a vehicle’s engine, while disregarding upstream emissions related to fuel production. Because a well-structured CFP takes a full “well-to-wheels” lifecycle approach to measuring emissions related to the production and use of a fuel in a vehicle (*including tailpipe emissions from fuel combustion*), a separate program regulating tailpipe emissions may be duplicative and unnecessary. As discussions of a potential national CFP proceed, we encourage the Committee to consider ways in which EPA’s existing tailpipe GHG standards could be replaced by, or integrated into, a CFP that uses a full “well-to-wheels” lifecycle GHG approach.
- **Clean Fuel Tax Incentives:** The recently enacted Inflation Reduction Act (IRA) included a suite of tax incentives intended to spur increased production of low-carbon fuels. In particular, the IRA extended existing tax credits for biodiesel, renewable diesel, and second-generation biofuels, while also creating a new Clean Fuel Production Credit (Section 45z) and new Sustainable Aviation Fuel credit (Section 40B). The Act also includes numerous tax incentives designed to stimulate increased production of clean hydrogen and low-carbon electricity for transportation. RFA believes a national CFP would be complementary to, and distinct from, these tax incentives; a CFP is designed to compel the *use* of low-carbon fuels, whereas the IRA tax incentives are designed to stimulate *production* of clean fuels (which may, in turn, be used to satisfy the

²⁸ Jarrett Whistance, Wyatt Thompson, Seth Meyer, “Interactions between California’s Low Carbon Fuel Standard and the National Renewable Fuel Standard,” *Energy Policy*, Volume 101, 2017, Pages 447-455, ISSN 0301-4215, <https://doi.org/10.1016/j.enpol.2016.10.040>

²⁹ Jonathan Rubin, Paul N. Leiby, “Tradable credits system design and cost savings for a national low carbon fuel standard for road transport,” *Energy Policy*, Volume 56, 2013, Pages 16-28, ISSN 0301-4215, <https://doi.org/10.1016/j.enpol.2012.05.031>

requirements of a clean fuel program). Again, however, we believe it is crucially important to use a consistent lifecycle GHG analysis methodology for both a national CFP and the tax incentives under the IRA that require fuel producers to determine a CI score for their fuels.

VII. Conclusion

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 the potential for a national CFP to rapidly decarbonize the U.S. transportation sector. We believe a well-designed national CFP has enormous potential to substantially reduce GHG emissions from transportation and help our nation achieve its goal of net zero carbon emissions by 2050.