RENEWABLE FUELS ASSOCIATION

TESTIMONY OF
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PRESIDENT & CEO, RENEWABLE FUELS ASSOCIATION

BEFORE THE

U.S. HOUSE OF REPRESENTATIVES, COMMITTEE ON AGRICULTURE

HEARING ON

"IMPLICATIONS OF ELECTRIC VEHICLE INVESTMENTS FOR AGRICULTURE AND RURAL AMERICA"

JANUARY 12, 2022

Chairman Scott, Ranking Member Thompson, 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. RFA believes the emergence of electric vehicles and the push to decarbonize the transportation sector could have important implications for the farm economy and rural America, and we commend the committee for thinking carefully about these issues.

I. Summary of Testimony

The massive increase in public and private investment in electric vehicles is being driven by the urgent need to reduce greenhouse gas (GHG) emissions and achieve economy-wide carbon neutrality by 2050. While increased deployment of electric vehicles will indeed 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.

That's where agriculture comes in. Through the increased production and use of low-carbon renewable fuels like ethanol, the U.S. agriculture sector offers 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 low-carbon farming practices and carbon capture, utilization, and storage (CCUS) 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 for ethanol by 2050 or sooner.[1]

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);
- 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 nationwide technology-neutral, performance-based low carbon fuel standard.

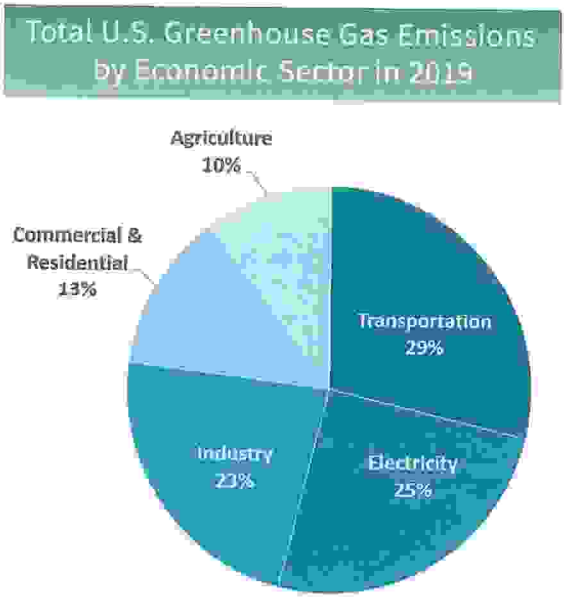
In addition to its environmental benefits, ethanol also makes a vital contribution to our nation's economy. The 206 ethanol biorefineries across the country serve as crucial drivers of employment in the communities in which they operate. Even as the COVID-19

[1] 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

pandemic continued to disrupt the U.S. economy and world energy markets in 2021, the production of 15 billion gallons of ethanol directly employed 73,000 American workers in the manufacturing and agriculture sectors. In addition, the ethanol industry supported 330,000 indirect and induced jobs across all sectors of the economy. Meanwhile, the industry generated $29 billion in household income and contributed $52 billion to the national Gross Domestic Product (GDP) in 2021.[2] 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.

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 6.56 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, followed by the electricity generation sector at 25 percent.



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

[2] J.M. Urbanchuk (ABF Economics). "Contribution of the Ethanol Industry to the Economy of the United States in 2021." Forthcoming (February 2022).
[3] U.S. EPA. "Sources of Greenhouse Gas Emissions." Viewed Jan. 8, 2022. https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions

GHG emissions from transportation primarily result from the burning of fossil fuels (mainly petroleum) in passenger cars, trucks, ships, trains, and planes. 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 1.88 billion MT CO2e in 2019.[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]

Despite progress in reducing GHG emissions from transportation, the sector remains as the most substantial source of emissions in the United States and, thus, should be the central focus of a national strategy to achieve net zero GHG emissions by 2050.

III. Increased deployment of electric vehicles will play an important role in reducing transportation-related GHG emissions, but other complementary solutions will also be required to truly decarbonize transportation fuels by mid-century.

Recognizing the urgent need to reduce GHG emissions from the transportation sector, public and private entities have massively expanded investments in the development of electric vehicles and the infrastructure to support them. Battery and plug-in hybrid electric vehicles are generally believed to offer a much smaller carbon footprint than vehicles with internal combustion engines operating on petroleum fuels.

As shown in the chart below from the International Energy Agency (IEA), mid-sized battery electric vehicles (BEV) are found to reduce lifetime GHG emissions by about 50 percent, on average, compared to an internal combustion engine (ICE) vehicle operating on petroleum.[7] It is notable, however, that the magnitude of the GHG reduction

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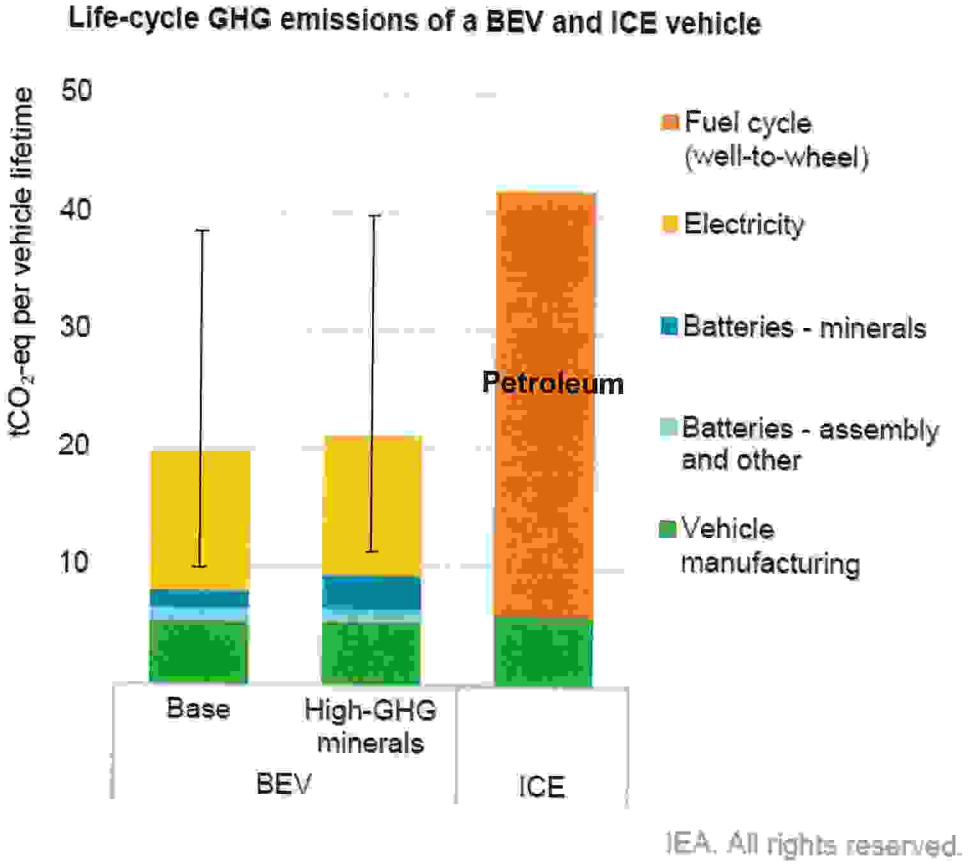
[4] *Id.*
[5] U.S. EPA. "Greenhouse Gas Inventory Data Explorer." Viewed Jan. 8, 2022. https://cfpub.epa.gov/ghgdata/inventoryexplorer/
[6] S. Unnasch and D. Parida. "GHG Reductions from the RFS2 – A 2020 Update." Life Cycle Associates Report LCA.6145.213.2021. February 11, 2021. Prepared for Renewable Fuels Association. https://ethanolrfa.org/file/748/LCA_-_RFS2-GHG-Update_2020.pdf
[7] International Energy Agency. "The Role of Critical Minerals in Clean Energy Transitions." May 2021. https://www.iea.org/reports/the-role-of-critical-minerals-in-clean-energy-transitions

achieved by the BEV can vary from just 7 percent to 77 percent, according to IEA, depending on the source of electricity used to charge the vehicle's battery and the origin of the minerals used in the manufacture of the battery.



Source: International Energy Agency (2021)

While the current 50 percent average GHG reduction offered by BEVs (as estimated by IEA) is already a significant improvement over ICE vehicles operating on petroleum, the GHG emissions associated with producing and operating BEVs are expected to decrease further in the future as electricity generation from renewable sources (e.g., biomass, wind, solar) increases and more efficient battery technologies are introduced.

Still, 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 ICE vehicle purchased today

will likely still be in use well beyond 2030.[8] Today, there are more than 267 million passenger cars, SUVs, pick-ups, vans, and other light-duty vehicles registered in the United States.[9] Just 2.3 million of those vehicles—less than 1 percent—are battery electric or plug-in hybrid electric vehicles,[10] 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 1.7 percent of light-duty vehicle sales in 2020[11] and were expected to account for roughly 4 percent in 2021[12]). 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.[13]

Even with increased electric vehicle sales expected in the years ahead, it would take decades to entirely turn over the fleet. 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. This reality was recognized in a recent study published by the Rhodium Group, which concluded, "While efficiency improvements and vehicle electrification can cut transport emissions by up to

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[8] 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

[9] 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.)

[10] Argonne National Laboratory. "Light Duty Electric Drive Vehicles Monthly Sales Update." Dec. 2021. https://www.anl.gov/es/light-duty-electric-drive-vehicles-monthly-sales-updates (Note: Argonne reports, "In total, 2,257,292 PHEVs and BEVs have been sold since 2010." We assume all of those vehicles remain in service today.)

[11] U.S. DOE, Office of Energy Efficiency & Renewable Energy. "Sales of New Electric Vehicles in the U.S. Were Up for 2020 While Conventional New Light-Duty Vehicle Sales Were Down." Aug. 23, 2021. https://www.energy.gov/eere/vehicles/articles/fotw-1200-august-23-2021-sales-new-electric-vehicles-us-were-2020-while

[12] ING. "Slow start for US electric vehicles, but times are changing." Dec. 1, 2021. https://think.ing.com/articles/slow-start-for-electric-vehicles-in-the-us-but-times-are-changing/

[13] U.S. EIA. "Annual Energy Outlook 2021: Transportation." Feb. 3, 2021. https://www.eia.gov/outlooks/aeo/pdf/05%20AEO2021%20Transportation.pdf

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."[14]

IV. Through renewable fuels like ethanol, the U.S. agriculture sector offers an effective and immediate solution for decarbonizing liquid fuels across all segments of the transportation sector.

As established in the remarks above, a national strategy to achieve net zero GHG emissions by 2050 cannot rely exclusively on electric vehicles to decarbonize the transportation sector. Complementary low- and zero-carbon solutions in the ICE vehicle market will also be required to secure carbon neutrality by mid-century.

Fortunately, U.S. agriculture offers one of those complementary solutions. Through renewable fuels like ethanol, the U.S. farm sector presents an effective and immediate opportunity for decarbonizing liquid fuels across all segments of the transportation sector.

Today's corn ethanol already reduces GHG emissions by roughly half, on average, compared to gasoline (i.e., similar to the GHG reduction offered by BEVs, according to the IEA study cited above). According to the Department of Energy's Argonne National Laboratory, typical corn ethanol provides a 44-52 percent GHG savings compared to gasoline.[15] 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.[16] In addition, the California Air Resources Board found that from 2011 to 2020, the use of ethanol cut GHG emissions from the California transportation sector by 27 million MT CO2e, more than any other fuel used to meet the state's Low Carbon Fuel Standard requirements.[17]

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 USDA found

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[14] Rhodium Group. "Closing the Transportation Emissions Gap with Clean Fuels." Jan. 15, 2021. https://rhg.com/research/closing-the-transportation-emissions-gap-with-clean-fuels/

[15] 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

[16] 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/abdeo8

[17] CARB. "Low Carbon Fuel Standard Reporting Tool Quarterly Summaries." Viewed Nov. 20, 2021. https://ww2.arb.ca.gov/resources/documents/low-carbon-fuel-standard-reporting-tool-quarterly-summaries

that some biorefineries could produce corn ethanol that offers a 70 percent GHG reduction versus gasoline as soon as this year.[18]

Indeed, the U.S. ethanol industry is well on its way to producing corn ethanol that is fully carbon neutral. With the adoption of carbon capture utilization and storage (CCUS); biogas substitution; and climate-smart farming practices, corn ethanol is expected to achieve net zero emissions, on average, by 2050 or sooner. In fact, RFA's member companies are so confident about the promise of carbon neutral ethanol that they adopted a resolution last summer 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.

Clearly, the U.S. agriculture sector—through increased production and use of ethanol and other biofuels—has the ability to jumpstart decarbonization efforts now. America's farmers and biofuel producers offer an effective and economical solution for drastically reducing the carbon impacts of liquid fuels 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).

V. Decarbonization strategies must adopt fair and accurate methodologies for assessing the lifecycle GHG emissions of various fuel and vehicle options.

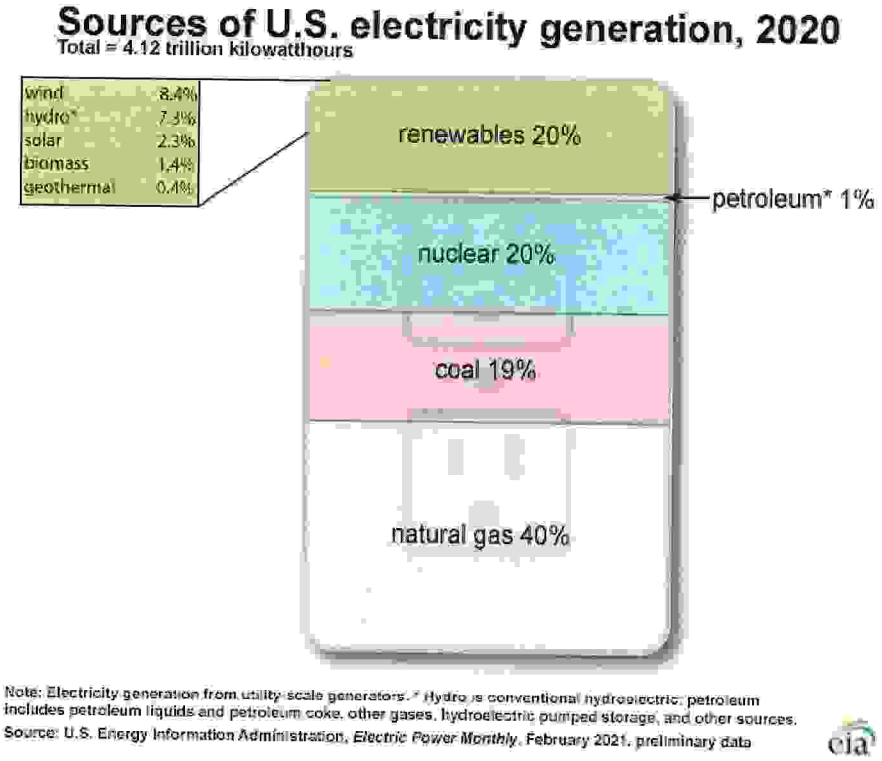
To ensure a wide variety of low- and zero-carbon technologies are allowed to contribute to national decarbonization efforts, fair, accurate, and consistent methodologies are needed for assessing the lifecycle carbon footprint of different fuels and vehicles.

For typical measurements of corn ethanol's carbon footprint, emissions associated with every step in the supply chain—from planting the seed all the way to delivering the fuel to a retail gas station—are included. For the carbon footprint of electric vehicles, however, the upstream emissions associated with electricity generation and battery

[18] 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://www.tandfonline.com/doi/full/10.1080/17597269.2018.1546488

manufacturing are often underestimated or entirely overlooked, giving the false impression that electric vehicles are "zero-emissions vehicles."

As underscored by the IEA report cited above in this testimony, emissions associated with battery minerals and electricity generation can be a significant determinant of the overall carbon performance of an electric vehicle (especially if the electricity is generated using coal, petroleum, or natural gas). As shown in the chart below from the EIA, coal, petroleum, and natural gas accounted for 60 percent of U.S. electricity generation in 2020, while wind and solar combined accounted for less than 11 percent.[19]



Source: U.S. Energy Information Administration (2021)

To further underscore the importance of accurate carbon footprint measurements, analysis recently conducted by RFA shows that a Ford F150 flex-fuel vehicle (FFV) running on an 85 percent corn ethanol blend (E85) will generate far fewer GHG emissions over its lifetime than Ford's new electric F150 Lightning running on fossil fuel-generated electricity. Yet, certain policies and regulations—like EPA's light-duty

[19] U.S. EIA. "Electricity explained: Electricity in the United States." Viewed Jan. 7, 2022. https://www.eia.gov/energyexplained/electricity/electricity-in-the-us.php

vehicle GHG standards—strongly incentivize the production of electric vehicles by treating them as "zero-emission vehicles" regardless of the source of electricity, while discouraging production of flex-fuel vehicles that can operate on high concentrations of low-carbon ethanol.

As Congress considers future climate and energy policies, RFA strongly recommends that each potential fuel and vehicle combination should be evaluated based on the GHG emissions associated with its full "cradle-to-grave" supply chain. The Department of Energy's Argonne National Laboratory GREET model is recognized worldwide as the "gold standard" for conducting this type of analysis, and RFA strongly supports its use for policy and regulatory decision-making.

VI. Smart policy can ensure agriculture and renewable fuels are able to effectively contribute to national decarbonization efforts.

In addition to a level playing for lifecycle GHG analysis, certain policy and regulatory actions are needed to fully leverage the potential of agriculture and biofuels to decarbonize transportation.

First, removal of EPA's arcane fuel volatility barrier would facilitate the rapid expansion of E15 in the marketplace. Not only does E15 typically sell for 5-10 cents per gallon less than regular gasoline with 10 percent ethanol (E10), it also reduces lifecycle GHG emissions. Simply switching from E10 to E15 would reduce the annual GHG emissions from a typical passenger car by 7 percent. If E15 replaced E10 nationwide, annual GHG emissions from the transportation sector would be reduced by nearly 18 million MT CO2e. RFA supports the *Year-Round Fuel Choice Act of 2021* (H.R. 4410), introduced by Reps. Angie Craig (D-MN) and Adrian Smith (R-NE), which would remove the illogical volatility barrier to E15 expansion. We also support administrative action to address this obstacle, and we have recently encouraged EPA to undertake such action.[20]

Second, implementation of strong Renewable Fuel Standard (RFS) volume requirements in 2023 and beyond will ensure low-carbon biofuels have access to a growing market. This year is the final year for statutorily prescribed RFS volume requirements, and EPA is expected to propose RFS requirements for 2023 and beyond

[20] RFA. "Farm, Biofuel Groups Ask EPA to Resolve Summertime E15 Barrier." Dec. 9, 2021. https://ethanolrfa.org/media-and-news/category/news-releases/article/2021/12/farm-biofuel-groups-ask-epa-to-resolve-summertime-e15-barrier

this summer. In order to maximize the GHG emissions benefits of the RFS program, we believe EPA must implement future RFS volume requirements that continue to grow beyond the levels proposed for 2022.

Third, our nation cannot fully capitalize on ethanol's low-carbon benefits unless more vehicles are produced that can run on flex fuels like E85. Over the course of a year, a flex fuel vehicle (FFV) running on E85 made from today's typical corn ethanol will reduce GHG emissions by roughly 29 percent compared to the same vehicle model operating on E10. Indeed, if all 21 million FFVs on American roadways were using E85 in lieu of E10, annual GHG emissions would be reduced by some 32 million MT CO2e. Accordingly, RFA strongly supports the *Clean Fuels Vehicle Act* (S.2267) introduced in the Senate by Sens. Klobuchar (D-MN) and Ernst (R-IA), which would encourage increased production and deployment of flex-fuel vehicles by creating a $200 refundable tax credit for each light-duty FFV manufactured for a period of 10 years. The legislation would also restore certain Corporate Average Fuel Economy credits that were previously available to automakers for producing FFVs.

Fourth, additional public and private investment is needed in the infrastructure necessary to distribute higher ethanol blends like E15 and flex fuels like E85. RFA supported the *Renewable Fuels Infrastructure Investment and Market Expansion Act* (H.R. 1542) introduced last year by Reps. Cindy Axne (D-IA) and Rodney Davis (R-IL), and we thank this committee for its efforts to ensure nearly $1 billion in biofuels infrastructure funding was included in the House-passed *Build Back Better* legislation.

Finally, we believe future decarbonization policies should take a technology-neutral, performance-based approach that focuses on reducing carbon emissions and increasing fuel efficiency without dictating the use of specific fuels or vehicles. That's why we support the concept of a national Low Carbon Fuel Standard, and we are hopeful Congress begins serious discussions around such a policy in 2022. It's also why we support the *Next Generation Fuels Act of 2021* (H.R. 5089), introduced last year by Rep. Bustos (D-IL). The bill would require liquid fuel suppliers to meet certain carbon performance and fuel efficiency standards, without dictating what specific fuels are used.

VII. Conclusion

On behalf of the membership of the Renewable Fuels Association, thank you again for the opportunity to share our perspective on the potential implications of electric vehicle investments on agriculture and rural America. We believe both electric vehicles and increased production and use of low- and zero-carbon renewable liquid fuels will be necessary to achieve our national goal of net-zero carbon emissions by 2050.