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U.S. Senate Date: Wednesday, February 15, 2023

Committee on Environment
and Public Works

Washington, D.C.


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THE FUTURE OF LOW CARBON TRANSPORTATION FUELS AND CONSIDERATIONS FOR A NATIONAL CLEAN FUELS PROGRAM

Wednesday, February 15, 2023

United States Senate

Committee on Environment and Public Works

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The committee, met, pursuant to notice, at 10:02 a.m. in room 406, Dirksen Senate Office Building, the Honorable Thomas R. Carper [chairman of the committee] presiding.

Present: Senators Carper, Capito, Cardin, Merkley, Stabenow, Padilla, Fetterman, Lummis, Boozman, Mullin, Ricketts.

STATEMENT OF THE HONORABLE THOMAS R. CARPER, A UNITED STATES SENATOR FROM THE STATE OF DELAWARE

Senator Carper. Good morning, everybody. This is the day after Valentine's Day. I hope you all had a great Valentine's Day. We did in our family. My wife renewed my contract for another year. It is a no-cut contract. I am hopeful that we can extend beyond that.

Those of you who know my wife know that she is a saint. We are welcoming some saints here this morning. Not the New Orleans Saints, but some saints nonetheless.

I will be honest with you. I hadn't really thought a lot about this issue that is before us today in the last year or two, but I think we are on to something here. I am excited about the hearing today. Senator Capito, Ben, and others really look forward to this hearing and what we are going to learn.

As I think you all know, today is the first Environmental and Public Works Committee hearing of this 118th Congress. Senator Capito and I are pleased to welcome our newest members, Senator Fetterman, Senator Mullin, and Senator Ricketts, as well. Great to see you again. Thanks for letting me come and visit with you earlier this month.

We are delighted to be with our returning members as well, not the least of those, my wingman from DelMarVa, Senator Cardin. I call him my DelMarVa buddy.

Over the last couple of years, this committee has played a vital leadership role in passing historic infrastructure and climate legislation. Much of our success was, I am proud to say, bipartisan. We have a couple of people here from Wyoming, and I quote another fellow from Wyoming, who used to say when he was actually sitting right out where you are, Chris, he said these words: "Bipartisan solutions are lasting solutions."

I see we have been joined by Senator Fetterman. Welcome, Senator Fetterman, I am glad to see you. Thank you for joining our committee and being a neighbor. We have Delaware, we have Maryland, we have Pennsylvania. That is a pretty good combination.

Over the last couple of years, this committee has played a vital leadership role in passing historic infrastructure and climate legislation. Much of our success was bipartisan. Looking ahead, I am eager to work with Senator Capito and with all of our colleagues here, Democrats and Republicans as well, as we aim to build on that record of success and further strengthen our economy at the same time. Together, I know we can continue to develop lasting solutions to some of our biggest challenges.

That brings me to the topic of today's hearing, and that is exploring policies that support the development and deployment of low-carbon transportation fuels.

As a Senator from the lowest-lying State in our Country, I can think of no greater challenge than the climate crisis. My colleagues have heard me say more times than they want to remember, Delaware is the lowest-lying State in America, our State is sinking, the seas around us are rising. That is not a good combination, so we want to make sure that we are doing everything we can to address that and create economic opportunity for the rest of our Country.

Last year, some of you may recall that the National Oceanic and Atmospheric Administration, affectionately known as NOAA, reported that there were 18 climate disasters in the United States, with losses exceeding $1 billion each. Eighteen, exceeding $1 billion.

They also approached a report, a year ago, that sea level rise is occurring even faster than predicted. Those 18 costly disasters underscore the urgent need for further action to reduce greenhouse gas emissions and to limit the impacts of climate change.

We were reminded by Albert Einstein years ago that "in adversity lies opportunity," and that is true here, as well, and those opportunities are, frankly, enormous. By tackling the climate crisis, we can continue to fuel the growth of clean energy jobs in our Country and reduce our dependence on foreign oil.

Again, to our newest members of this committee, including our neighboring Pennsylvanian and Senator Ricketts as well, my colleagues have heard me tell once or twice the story of a guy named Willie Sutton. I don't know if you have ever heard of Willie Sutton, a famous bank robber during the Great Depression.

He finally got caught and was dragged before the judge and jury and everything. The judge said to him, famously, "Mr. Sutton, why do you rob banks?" He replied, "Because, Your Honor, that is where the money is." When people ask me, "why do we focus on reducing transportation emissions?" I say, "Because that is where a good deal of the emissions come from."

For some time now, our Nation's transportation sector has remained the largest source of greenhouse gas emissions in the U.S. economy, accounting for more than 25 percent of emissions in America. I think power plants account for close to 25 percent. Another 20 percent comes from our manufacturing operations, think cement plants, think steel mills, and so forth.

Through the Bipartisan Infrastructure Law that we all participated in crafting and passing and the Inflation Reduction Act, Congress and the Biden Administration have made significant investments to support American clean energy and zero-emitting vehicles while also securing the domestic supply chain of critical minerals for electric vehicles.

Many Americans, including several members of this committee, are making the switch to electric vehicles and hybrid vehicles. Still, there is more that we can and must do to support cleaner fuels for the vehicles on our roads and provide greater certainty and flexibility for those who produce these fuels.

As a recovering governor, while exploring ways to improve Federal policies, I often look to see what is working well in the States and try to replicate those efforts. I have called the States laboratories of democracy forever. They have been, and they continue to be laboratories of democracy for us to learn from.

States have learned from the Federal Government's mistakes when it comes to programs like the Renewable Fuel Standard. Many States, including Oregon and California, have implemented or are considering implementing technology-neutral low carbon fuel standards. These State-level programs have successfully advanced the production and use of cleaner fuels and kept consumers and compliance costs low while fostering local investment and job creation.

As we will hear today, these State programs have fuel flexibilities, greater long-term predictability, and cost-containment mechanisms that are not included in the Renewable Fuel Standard. Unlike the Renewable Fuel Standard, existing

State programs often focus more on emissions reduction potential when determining what qualifies as a clean fuel. In addition to reducing the number of questions the States have to ask when determining which fuels quality for a clean fuels program, this structure allows multiple options for obligated parties to comply.

For example, a wide range of stakeholders, including the Delaware City Refinery, about 20 miles from my house down the Delaware River, those stakeholders are interested in producing clean hydrogen as a qualifying clean fuel. They believe they can do so with their existing infrastructure to secure a stronger financial future and create new jobs. That is why we have invested significant Federal resources to support the development of clean hydrogen infrastructure in our Nation.

However, unlike existing State-level programs, the Renewable Fuel Standard does not currently consider hydrogen a clean fuel. Increasing the production and use of clean hydrogen is a key to reducing emissions in sectors of our economy that are difficult to decarbonize. Think large trucks, think buses, big buses.

The challenges with the Renewable Fuel Standard do not stop at hydrogen. As we are going to hear here today, there are challenges across clean fuel stakeholders, including biofuels, which we can address by moving toward a more technology-neutral

approach.

With that, I welcome the discussion on the benefits of establishing a Federal Low Carbon Fuel Standard, a program that can provide certainty, provide predictability, and provide flexibility for all stakeholders while also spurring innovation across clean fuel technologies to help us meet our ambitious climate goals.

My hope is that today's hearing is the first of many conversations on how we can bring industry together along with environmental groups, along with agriculture and stakeholders, to further decarbonize our Nation's transportation fuels while also supporting job creation across our Nation.

We look forward to hearing the perspectives of each of our witnesses here today. Before we do that, I want to turn to our Ranking Member, Senator Capito, for her opening statement. Senator Capito, it is great to be with you.

[The prepared statement of Senator Carper follows:]

STATEMENT OF THE HONORABLE SHELLEY MOORE CAPITO, A UNITED STATES SENATOR FROM THE STATE OF WEST VIRGINIA

Senator Capito. Thank you, Mr. Chairman, and thank the witnesses for being here today. I think we have a great panel, so we will get to learn a lot about this.

For those unfamiliar with a Low-Carbon Fuel Standard, it is a regulatory process meant to advantage fuels that generate lower carbon emissions in their production and use over fuels that emit more. This may be achieved through financial incentives funded by the taxpayers, decreasing quotas or limits on market access for more emissive fuels, or a combination of the two.

I am very concerned by the concept of empowering bureaucrats to decide what fuel sources qualify, how, and what associated phase-outs may look like. It sounds like a combination of social cost of carbon and centralized economic planning.

We have watched administrations of both parties seesaw on the execution of regulatory programs that impact American energy prices, with experience revealing that heavy-handed regulatory approaches inevitably lead to reduced supplies and higher prices. Perhaps nowhere has the tug of war been more obvious than the EPA's Renewable Fuel Standard.

Speaking of that program, in December, EPA proposed the new

RFS "Set" rule to establish the required volumes of biofuels to be blended with conventional gasoline and diesel for the next three years, 2023, 2024, and 2025.

As part of this proposal, EPA has allowed automakers contracting with certain renewable electricity producers to generate compliance credits, known as RINs, for the first time in this program. In fact, EPA says in their proposal that they are using the creation of electric RINs, or eRINs, which have a cash value, to incentivize increased vehicle electrification.

Yet another subsidy for EVs was not Congressional intent, nor is it a reasonable interpretation of the statute. This eRIN proposal has aggravated proponents of the RFS, critics of the programs, and environmentalists alike, a rare trifecta. The fact that it is also formulated without any political accountability should cause us all significant concern.

Speaking of things to be concerned about, one State that has taken a lot of action recently on transportation fuels is California. California was the first State to adopt the LCFS. It is no coincidence that California's gas prices are more than $1.20 higher than the national average due to its regulatory policies and taxes. A study from the Stillwell Associates found that California's LCFS by itself has added more than 22 cents per gallon in 2022.

Oregon and Washington have followed suit in establishing

their own LCFS programs and have seen their gas and diesel prices rise.

Last September, fuel prices in Oregon spiked 50 cents per gallon, the sharpest spike of any State in the Country. Washington's cap-and-trade and LCFS programs went into effect at the start of the year, and according to State legislators and Washington Independent Energy Distributors Association, gasoline has gone up by more than 34 cents per gallon and diesel by more than 43 cents on average as a result of the two policies in the past month and a half.

This stacked LCFS and other environmental regulations and taxes mean that residents of the West Coast States face the highest fuel prices in the lower 48. But don't worry, if these prices make your eyes water, you can just buy an EV. California is requiring 100 precent of new vehicles purchased to be zero-emission by 2035 through its Advanced Clean Cars II rulemaking. That target means higher costs for consumers to buy still-scarce electric vehicles and hydrogen vehicles and the potential disruption of interstate commerce.

According to Kelley Blue Book, the average price of an electric vehicle in the United States as of August of 2022 was $66,000. That is more than the median household income in my State, which is $50,000.

I don't have anything against EVs, and we will eventually

get there. But I think people should be free to buy the vehicles they want and can afford. It also does not help that California has some of the most expensive and least reliable electricity in the Country, with even greater challenges ahead as nuclear and natural gas plants are forced to retire and the transportation sector is electrified. But those electricity prices can be a subject for a future hearing.

Looking at the statistics on fuel and vehicle prices at a time of significant and sustained inflation, I doubt my State and many others, particularly in rural America, will want to import the West Coast's policies, which will also bring higher prices for at-best hypothetical climate benefits.

This is especially true at a time of sustained high inflation, which, despite monetary policy and the Inflation Reduction Act, inflation remains stubbornly predicted to be between 4 and 6 percent, we saw the figures yesterday, of over 6 percent, well above the 2 percent target of the Federal Reserve, and is being forecast by groups like Apollo Global Management to be stuck there for the near- or medium-term.

An LCFS and these other cap-and-trade regulatory process will only accelerate and lock in those price increases at a time when American households and businesses can least afford it.

I look forward to the testimony and thank you again.

[The prepared statement of Senator Capito follows:]

Senator Carper. Thank you, Senator Capito.

As our new colleagues probably don't know, I go home at night, almost every night, to Delaware. I am able to take the train. Every morning when I head for the train station, I drive by a BP station where I bought gasoline for about 20 years for my 2001 Chrysler Town and Country Minivan, which had 600,000 miles on it when I sold it for $1 last year.

I no longer stop at the station and get gas, but every day I look at the price. I noted that yesterday the price was $4.17 cents, which is down by more than $1 from where we were maybe this time last year. My hope is that it will continue to trend down. We will see.

Anyway, we are going to have a healthy debate here, Senator Capito and I, we may have some differences here. This is something I am just learning about, and that is why we are having the hearing. Hopefully, we will all learn something, and maybe we will learn that there is a way to find, to join forces and move together down this road. I hope so.

Now, we are going to turn to our esteemed panel of witnesses. In a few minutes, we are going to hear from them in this order. First is Michael Graff, the Chairman and CEO of American Air Liquide Holdings Incorporated. He is also Executive Vice President and Executive Committee Member of the Air Liquide Group. We are delighted to see you. Thank you so

much for joining us and thank you for your presence in our State.

Second, we are going to hear from Geoff Cooper, President and CEO of the Renewable Fuels Association, and finally, from Chris Spear, President and CEO of the American Trucking Association. Chris, it is very nice to see you again.

We are now going to begin our witness testimony. I am going to ask Mr. Graff if you will proceed with your statement. Your entire statement will be made part of the record. You may proceed as you wish.

Thank you so much. Welcome.

STATEMENT OF MICHAEL J. GRAFF, CHAIRMAN AND CEO, AMERICAN AIR LIQUIDE HOLDINGS INCORPORATED, EXECUTIVE VICE PRESIDENT AND EXECUTIVE COMMITTEE MEMBER, AIR LIQUIDE GROUP

Mr. Graff. Chairman Carper, Ranking Member Capito, and members of the committee, on behalf of Air Liquide's more than 20,000 employees in the United States --

Senator Carper. Excuse me, let me interrupt for just a second. My staff reminds me. It was not $4.17, it was $3.17. You are right. Hopefully it will continue to drop. I think it will. We will see. Thanks.

Mr. Graff. On behalf of our 20,000 employees in the United States, I thank you for the opportunity to testify today. My name is Mike Graff, and I am the Chairman and CEO of American Air Liquide, a world leader in sustainable technologies and solutions that help decarbonize the planet and advance a clean energy economy while creating high-paying careers.

It is a pleasure to be here today with Mr. Cooper from the Renewable Fuels Association and Mr. Spear from the American Trucking Association. I want to thank Mr. Spear and the ATA, with whom we worked closely during the pandemic to ensure patients and hospitals had the medical oxygen they needed to save lives. Thank you.

Mr. Chairman, it was Air Liquide's honor to host you, the Secretaries of Energy and Labor and the National Climate Advisor

at our Innovation Campus Delaware last August. We share a core belief: clean energy is about lowering emissions and growing our economy while creating new, value-added jobs.

As the committee considers the establishment of a national clean fuels program, we urge you to ensure that any proposal is technology-neutral and enables emissions reductions through certainty and flexibility. These are essential to promoting private sector investment, creating jobs, and minimizing burdens on the American consumer.

Hydrogen plays an important role in decarbonizing the transportation sector, and Air Liquide is at the forefront of that effort. In Nevada, Air Liquide has invested $250 million in the first world-scale liquid hydrogen production facility, with the capacity to supply renewable hydrogen for over 40,000 zero-emission hydrogen fuel cell vehicles. Much of this hydrogen is supplied to California under its LCFS.

Leveraging the versatility of hydrogen and regional energy ecosystems, Air Liquide is also involved in many hydrogen hub proposals, which include decarbonization of the transportation sector.

Mr. Chairman and Senator Fetterman, as mentioned, Delaware is home to our innovation campus, and Pennsylvania is home to 1,400 Air Liquide employees. As the headquarters of Airgas and Air Liquide Company, a hub here could unite the East Coast

transportation system with the necessary renewable fuel infrastructure.

Ranking Member Capito and Senator Cardin, an Appalachian hub could leverage the region's abundant supply of natural gas, joint with carbon capture, to produce low-carbon hydrogen.

Senators Sanders, Whitehouse, and Markey, NYSERDA is leading the effort to convert the Northeast's abundant wind and hydropower to low-carbon hydrogen via electrolysis, which Air Liquide already does in this region with the world's first industrial scale PEM electrolyzer. Similar initiatives are underway in the Midwest, the Southwest, and the Gulf Coast. Any clean fuels program must have flexibility at its core to fully leverage hydrogen within the local energy ecosystem.

Air Liquide is a significant low-carbon fuel supplier that gives us insight into clean fuels programs like the California Low Carbon Fuel Standard and the Nation's Renewable Fuel Standard and their effects on private investment and on the market.

First, the California LCFS has reduced CO2 emissions while stimulating private investment. Senator Padilla, the hydrogen and renewable natural gas that Air Liquide supplies to the California transportation market falls under the State's LCFS. We also supply hydrogen for the refining industry, which is also subject to the LCFS.

Second, the California LCFS employs a performance-based carbon intensity target and a fuels evaluation methodology that is agnostic about technologies and feedstocks. This is a key feature of the program designed to maximize the reduction of greenhouse gas emissions. However, given the number of fuel pathways requiring approval, a streamlined process through pathway standardization would be beneficial.

Third, policies that enable the use of renewable energy credits and environmental attributes enable investments that best use regional resources, infrastructure, and technologies to meet targets and increase the supply of low-carbon and renewable energy, ensuring consistency in the use of RECs and EAs across all feedstocks and processed energy, and in avoided emissions rules, would make the California LCFS more efficient.

Finally, the pathway approval process for the Renewable Fuel Standard is significantly delayed. Like many entities, Air Liquide has pending RFS pathway petitions. Ours seeks to qualify hydrogen for renewable natural gas. Despite favorable review by EPA, these pathways have not advanced. The RFS pathways process needs to be transparent and timely in order to advance the Nation's emission reduction goals.

In conclusion, we urge the committee to ensure than any national clean fuels program is technology neutral and enables emission reductions through the program's certainty and also

flexibility.

Thank you for inviting me to participate today, and I welcome your questions.

[The prepared statement of Mr. Graff follows:]

Senator Carper. Mr. Graff, thanks so much. Great to see you, and thank you. Our best to you and the team you lead back in Delaware and across the Country and around the world. Thank you.

Mr. Cooper, Carper welcomes Cooper. Capito welcomes Cooper.

STATEMENT OF GEOFF COOPER, PRESIDENT AND CEO, RENEWABLE FUELS ASSOCIATION

Mr. Cooper. Chairman Carper, Ranking Member Capito, and members of the committee, good morning. My name is Geoff Cooper, and I am the President and CEO of Renewable Fuels Association, the leading trade association for the U.S. ethanol industry.

I appreciate the opportunity to share our industry's perspective on the future of low-carbon fuels and the potential for a Federal Clean Fuels Program. The transportation sector, as you said, Mr. Chairman, is the leading contributor of greenhouse gas emissions in the United States, accounting for nearly one-third of total emissions annually. Although transportation emissions have fallen slightly from their peak in 2006, the pace of emissions reduction must rapidly accelerate in the years ahead if we are to meet the Administration's goals of net-zero emissions by 2050.

We believe a properly structured Clean Fuels Program offers the best opportunity to rapidly reduce carbon emissions from the transportation sector while simultaneously enhancing energy security, creating jobs, and reducing tailpipe pollution linked to poor air quality and health challenges.

RFA supports the development of a national program that is truly technology-neutral and performance-based. In essence, a

Clean Fuels Program sets annual greenhouse gas reduction requirements for the transportation sector, and then it allows the marketplace to determine the most efficient and economical ways of achieving those reductions without dictating the use of specific fuels or vehicles.

Under a well-designed policy, we believe renewable fuels like ethanol offer an effective and immediate solution for decarbonizing the transportation sector, including light and heavy-duty vehicles, rail, marine, and even aviation fuels. Today's corn ethanol already cuts greenhouse gas emissions by approximately 50 percent on average compared to gasoline.

With the increased adoption of low-carbon farming practices, Carbon Capture Utilization and Storage, and other technologies, the U.S. ethanol industry is well on its way to producing net-zero carbon corn ethanol. In fact, RFA's member companies have pledged that the ethanol they produce will achieve a 70 percent reduction compared to gasoline by 2030 and a net-zero carbon footprint by 2050 or sooner.

Clean fuel policies have already been implemented at the State level, as you pointed out, Mr. Chairman, and several countries are beginning to implement their own programs. While existing State programs like the California LCFS have been successful in reducing emissions and driving investment, certain design shortcomings have at times undermined the technology-

neutral intent of those programs and limited the ability of some low-carbon fuels to provide greater greenhouse gas emissions benefits.

Still, ethanol and other liquid biofuels have accounted for nearly three-quarters of the total carbon reductions that have been achieved under the California LCFS since it began in 2011.

If implemented on a national scale, a Clean Fuel Program will need to be designed in a way that avoids picking technology winners and losers and drives the greatest greenhouse gas emissions reductions at the lowest cost. A nationwide program should one, use consistent, science-based, and transparent life cycle analysis methodologies like the Department of Energy's GREET model for determining the carbon intensity of all fuel and vehicle options.

Two, it should set clear and predictable annual greenhouse gas emissions reduction requirements and then stick to those targets. Three, it should adopt rules for credit generation that are consistent across all fuel and vehicle pathways.

Four, it should include flexibility for low-carbon fuel producers to demonstrate process improvements and carbon intensity reductions across their entire supply chain. Five, it should include complementary measures to remove technical and regulatory barriers that artificially limit greater use of certain low-carbon fuel options, like the current barrier we

have in place today that prevents the sale of E15 during the summer months.

In closing, we believe a well-designed national program has enormous potential to quickly reduce greenhouse gas emissions from the transportation sector and help our Nation achieve net-zero emissions by 2050. We look forward to working with the committee as it continues to consider a nationwide clean fuels standard.

Thank you again, and I look forward to your questions.

[The prepared statement of Mr. Cooper follows:]

Senator Carper. Mr. Cooper, thanks. It is great to see you, and thank you for joining us.

We have been joined by the Senior Senator from the great State of Michigan, Senator Stabenow, who is also not just a member of the Ag Committee, but the Chairman of the Ag Committee. She might serve on the Finance Committee together with some of you.

The Finance Committee is going to have a confirmation hearing this morning for the Administration's nominee to head up the IRS, Danny Werfel, not the football player, the public servant. He has invited me to come and introduce him. I will be slipping out in about 10 minutes or so, but I will be back shortly. Senator Capito has agreed to hold the gavel until I get back.

Chris Spear, I already gave you a short introduction. I will just say again, it is great to see you. Welcome. Thank you very much for all you do and for your testimony today. Welcome.

STATEMENT OF CHRIS SPEAR, PRESIDENT AND CEO, AMERICAN TRUCKING ASSOCIATION

Mr. Spear. Thank you, Mr. Chairman, Ranking Member Capito, and members of the committee. I really appreciate the opportunity to testify on behalf of the American Trucking Association. For 90 years, the ATA has helped Congress shape solutions to our Nation's energy and environmental challenges. Today's hearing is no exception.

The trucking industry starts with "yes." The ATA was a proud supporter of the bipartisan IIJA. Prior to passage, ATA testified 25 times before the House and Senate, including this committee, sharing how our Nation's decaying infrastructure has given competitive aid to rising global powers, like China. In short, our first-world economy cannot survive with third-world infrastructure. Thank you for recognizing that.

To predict the future of low-carbon transportation, one should start with the IIJA's ability to eliminate congestion. Right now, our industry loses $75 billion a year sitting idle in traffic. That is 425,000 drivers sitting for an entire year. That is 6.87 billion gallons of wasted fuel pumping 67.3 million metric tons of CO2 into our environment.

In short, if you want to eliminate emissions, start with the top 100 traffic bottlenecks, of which 22 are in States represented by members of this committee.

IIJA monies are more than adequate for fixing existing roads and bridges. There is plenty more for new capacity too, including truck-only lanes, bypasses, bridges, and parking. There is no reason this Administration should have to pick favorites.

Another example: ATA worked with the EPA producing phases one and two emissions reduction rules. To date, 98.5 percent of all emissions have been removed from our tailpipes. In fact, 60 trucks today emit what one truck emitted in 1988.

These two rules alone cut CO2 emissions by 1.37 million metric tons, saved $220 billion in fuel costs, and reduced oil consumption by 2.5 billion barrels of oil.

The ATA and the ETA created the SmartWay Program, saving participating fleets more than four billion gallons of fuel, over $19 billion at today's costs. Those fuel savings resulted in massive emission reductions of 2.7 million short tons of nitrogen oxide, 112,000 short tons of particulate matter, and 143 million metric tons of CO2, all by putting the safest, newest, and most environmentally friendly equipment on our roads.

This is not a debate about if we get to zero, but when. We will get there, not just on the timelines proposed by California. Their excluding our industry in a mad dash to zero makes their timelines and targets not only unachievable, but

guarantees they will fail.

To get to zero, we have to be honest and we have to be transparent about the road ahead. Sourcing rare materials needed for millions of 5,000-pound truck batteries, the infrastructure needed to charge them, and the additional electricity needed to power our trucks, full-scale, doesn't yet exist, and won't, if you allow California to set the Nation's standard.

Trucking now moves 72.5 percent of our Nation's freight tonnage. Over the next decade, trucks will be tasked with moving 2.4 billion more tons of freight than they do today. The moment that slows or stops, Americans, your constituents, are going to want answers.

The responsible approach is also the realistic approach. Achievable timelines and targets do matter. The ATA will continue supporting policies that are responsible, realistic, and inclusive of our industry.

Our written testimony provides this committee with just that, targeting IIJA monies to reducing congestion, creating cost parity between current and future equipment and fuel sources, and the low-hanging fruit, such as drayage, port interconnectors, and safe, secure truck parking.

We are committed to a cleaner environment, and we have proven it. We simply ask that we be realistic about the path

forward. Do that, and we will post the best environmental gains possible.

I thank the committee and yield.

[The prepared statement of Mr. Spear follows:]

Senator Carper. Thank you, Mr. Spear.

I am going to ask unanimous consent to enter into the record a letter from Consumer Reports asking EPW to pursue a Clean Fuel Standard to decarbonize the Nation's transportation sector.

[The referenced information follows:]

Senator Carper. With that, I am going to slip out and go over to the Finance Committee and introduce Danny Werfel. I am going to yield to Senator Capito to preside in my absence. Thanks so much.

Senator Capito. [Presiding.] Thank you, Mr. Chairman.

Mr. Spear, I talked in my opening statements about the prices of diesel and how they have been at a record high in June of 2022. Can you talk about the impacts of when these prices are way up like they are, and have been for a sustained period of time, what impact that has on your industry, and how it impacts the small businesses, many of them small businesses, some quite large, across the Country?

Mr. Spear. It is significant, Senator. Fuel costs are our second-highest cost, just under labor. Under that, you have safety, including training. So a lot of important operational expenditures, but fuel is our second-highest cost, and that was before we went to 40-year highs on inflation, which comes as no surprise with the standard in California and Oregon. We have litigated it directly because of the cost impact that it has on our industry, particularly those that are running 20 trucks or less or owner-operators, one truck.

Senator Capito. Are you in the middle of that litigation right now?

Mr. Spear. We are, indeed.

Senator Capito. Okay. So, would you say then, that these regulations, as I said in my opening statement, are leading to higher prices in those particular States?

Mr. Spear. Yes, we are dealing nationally with 40-year highs on inflation. These two States compounded that problem, which is why you see fuel costs exceeding $7 in California, nearly $6.50 in Oregon. That is much, much higher than the national average as you said.

But if you are a small carrier or owner-operator, you don't have the luxury of a fuel contract. You are paying retail at the pump, so you are absorbing that cost into your operational expenses. It is chipping away. You are going to see consolidation in our industry as a result, and it is going to hurt the very small businesses that this committee says it supports.

Senator Capito. Thank you.

Mr. Graff, I think that Appalachian hydrogen hub sounds really good to me, and thank you for what you are doing to lend your expertise. I know we are in competition with a lot of good ones, as you mentioned, but I appreciate your mentioning that.

Let me ask you a question. I think this is an important question when we are all looking at what the environmental impacts can be. You mentioned, Mr. Cooper mentioned life cycle. So, in order to get to an EV, in order to get to a hydrogen car,

there is a lot that goes before you actually are at the tailpipe, I guess is how they say it, measuring it before the tailpipe.

So, a life cycle, have you done an analysis of that, of what it takes to create the hydrogens that go into these vehicles, and how the emissions, I guess I am focusing more on emissions than cost, although we know that does drive up the cost, if we have to do another process before another process. What are your thoughts on that, on life cycle analysis?

Mr. Graff. Thanks for the question, Ranking Member Capito. Clearly, we need to look at every aspect of basically well to wheel, so to speak, in the approach for any pathway to produce energy and understand its emissions potential and how we address that.

In terms of hydrogen, we have been in the business of producing and transporting and utilizing hydrogen for over 60 years. We have the full capabilities to make sure that hydrogen itself is well-managed, it is well-contained, and its fugitive emissions, as you consider its impact on the environment, are genuinely more second order.

I think we look at safety, we look at what we can do to make sure that there is safe transport, the safe production, the safe use of hydrogen. But any fugitive emissions of hydrogen into the atmosphere has a much lower effect than other

hydrocarbons or other substances that may end up in the environment.

Senator Capito. Okay.

Mr. Cooper, on ethanol, obviously, there is an expenditure of a great deal of energy to make ethanol. How would you answer that question on life cycle, both emissions and cost?

Mr. Cooper. We fully support a well to wheels full life cycle approach when analyzing the carbon intensity of all fuel pathways. We agree that in particular, when you talk about electric vehicles, we often hear then referred to as zero-emissions vehicles. Well, that is ignoring all of the upstream emissions associated with electricity production.

But for corn ethanol specifically, the Department of Energy analyzes in great detail that full life cycle, energy use and emissions involved with farming and harvesting the corn and processing that corn into ethanol. When you add all of that together, corn ethanol has an emissions footprint that is about 50 percent lower than gasoline. So that does include all the farm inputs and all the energy used on the farm, all the way through the process to the retail gas station, about 50 percent.

Senator Capito. Let me ask Mr. Graff a quick question, too. Does California have personal vehicles that are hydrogen? That doesn't exist right now, does it, in any large measure?

Mr. Graff. Ranking Member Capito, there are currently

15,000 hydrogen fuel cell vehicles that have been sold into the California market. I mentioned earlier that we had built the first-ever liquid hydrogen production facility to provide renewable hydrogen into the State. That was specific in working with the automotive companies to facilitate the introduction of those vehicles.

Senator Capito. What is the cost of a hydrogen vehicle?

Mr. Graff. I can't speak to the exact cost today. I think that, depending on the model and the make, you are in the $50,000 to $60,000 range today.

Senator Capito. And they are quite heavy, as well, correct?

Mr. Graff. No, they are quite light, actually.

Senator Capito. They are?

Mr. Graff. They are much lighter than, for example, a battery-powered electric vehicle.

Senator Capito. Right. Well, the electric vehicles are a lot heavier than the vehicles we have.

Mr. Graff. Their weight would be comparable to the weight you have in other vehicles today.

Senator Capito. Okay. Thank you.

Senator Merkley? Senator Fetterman? Senator Stabenow?

Senator Stabenow. Well, thank you very much. Good morning, and thank you to all of you for being here.

I will say on the issue of hydrogen, I know that there are joint ventures, partnerships going on right now in Michigan, and we are with the Army and so on in terms of development of hydrogen fuel cell vehicles, and they are having great success on a number of fronts.

Let me start off though, Mr. Cooper, and let me just say that, as we look at transitions, and I am all for transitions, and I want to see us get to electric vehicles. I am currently driving the Michigan-made Chevy Bolt. I think it is one of the most affordable American-made vehicles right now, in terms of electric vehicles. I love it. It is here; I love it.

But I know that the reality is that our cars are lasting longer than ever, even as we transition all the structures and things that need to happen, that the U.S. fleet is going to be comprised of hundreds of millions of internal combustion engines for years to come, so it really is important for us to understand all of this as we transition.

If we are going to meet our national climate targets, do you agree that we must secure a robust supply of low- and zero-carbon liquid fuels to complement the push towards electrification?

Mr. Cooper. Yes. Thank you for the question, Senator, and I absolutely agree that yes, we need to embrace the use of low-carbon liquid fuels. If we are serious about reducing

greenhouse gas emissions as quickly as possible, we can't wait around for full electrification of the fleet. That is going to take decades, as you pointed out.

There are roughly 270 million light-duty vehicles, cars, pick-ups, SUVs, and vans. Today, 1 percent of those are electric vehicles. It is going to take decades for that transition to occur, and we should be taking steps now to further decarbonize those liquid fuels that we know are going to be, as you said, hundreds of billions of gallons of liquid fuels will be needed in the decades ahead in these vehicles.

So we think a clean fuel standard is a great way to do that and really jump start that decarbonization of our liquid fuels.

Senator Stabenow. I am assuming you do not think it is instead of a Renewable Fuel Standard, that this is about complementing.

Mr. Cooper. That is correct. A well-done Clean Fuel Standard would complement a Renewable Fuel Standard, which really creates the foundation and the bedrock for the renewable fuels industry.

Senator Stabenow. Could you speak a little bit about the recent investments that we have made, Congress has made, including those in the Inflation Reduction Act, that are going to help us be able to achieve these goals?

Mr. Cooper. Absolutely. Our industry is very excited

about the Inflation Reduction Act and the suite of tax credits and grant programs in that legislation. It is a game changer for our industry.

One of the programs in particular is Section 45Z, the Clean Fuel Production Credit, which is, in essence, the tax version of a Clean Fuel Standard. It generates a tax credit for clean fuel producers based on the carbon intensity of their fuel, and the lower the carbon intensity, the more valuable the credit is up to $1 per gallon.

Our industry is already making investments based on the availability of that tax credit in the next few years. Along with that, we had the expansion and extension of Carbon Capture and Sequestration credits, a $500 million grant program for biofuels infrastructure. So yes, it was a wonderful investment and down payment in low-carbon renewable fuels.

Senator Stabenow. Great. I was very pleased to be able to, in the agriculture section of that bill, to have the investment in the biofuels infrastructure.

Mr. Cooper. We thank you for that.

Senator Stabenow. You have already mentioned less carbon, I am assuming, as you talk about that, it is jobs? I hear jobs, as you are talking about that as well. I think it is also important to stress that biofuel production lowers prices at the pump, and the fact that this last summer, where E15 saved

drivers in some areas as much as $1 a gallon, more at the time when we saw prices going through the roof, that was a big deal. I wonder if you might just speak more about how much renewable fuels save drivers at the pump.

Mr. Cooper. Absolutely. We did see it, especially last summer when we had record high gas prices. Ethanol was selling for about a $1 to a $1.25 a gallon less than gasoline at the wholesale level. So obviously, when you blend more of that lower cost product, it is going to reduce the price for the consumer. Still today, if you go to any retail gas station, the lowest cost fuel option for the consumer is going to be the fuel that has the highest content of ethanol.

We talked about California. The lowest cost fuel in the California market today is E85, it is that 85 percent ethanol blend. It is typically $2 to $3 a gallon less expensive than gasoline in the California market, and that is being driven by the LCFS in that marketplace.

Senator Stabenow. Thank you very much. I have other questions, but my time is up. Thank you, Madam Chair.

Senator Capito. Thank you.

Now, I turn to our newest Senator, Senator Ricketts. Welcome to the committee. You have five minutes for questions.

Senator Ricketts. Great. Thank you very much, and thank you to all of our testifiers here today about the future of

transportation fuels.

Mr. Cooper, you have a great barber there. That joke never gets old.

[Laughter.]

Senator Ricketts. One of the things I always talk about is ethanol. I would say three things: ethanol saves consumers money at the pump, it is going to help clean up the environment, and it is going to create jobs here in America. Ethanol must be central to any discussion that we are going to have about the future of transportation fuels.

Senator Stabenow, thank you for mentioning the dollar savings in some places, because that is awesome. I was going to put that as one of my talking points today, too, that E10, that 10 percent blend of ethanol and 90 percent gasoline is about 98 percent of all the gasoline that is sold in this Country. E15 and the EPA's decision to allow that last summer helped with the high inflation that people were experiencing, bringing down their fuel costs.

Senator Stabenow mentioned the dollar, I think the average is about 16 cents. I just filled up my gas last time I was home. It was about 40 to 45 cents a gallon on E10, helping save that, and of course, E20, E30, E85, as you mentioned, all have future potential on that.

Also, as we have discussed about ethanol helping reduce

carbon emissions, the use of ethanol blended fuels led to a reduction of nearly a billion metric tons of carbon dioxide equivalent greenhouse gas emissions between 2008 and 2020. Environmental Health and Engineering found that corn ethanol is 46 percent less carbon intensive than gasoline.

In addition, ethanol creates economic opportunities for our families, especially in Nebraska, there are over 1,000 direct jobs in Nebraska related to the ethanol industry and creates the demand for corn from our farmers. I would also note that the biproduct, the distillers grains, goes into feeding our livestock. It is just a wonderful thing, there. Ethanol has always fueled our trucks, cars, and other transportation vehicles along the American roads and highways.

So, Mr. Cooper, I want you to talk a little bit more about this Administration, as well as the State of California, has classified electric vehicles as zero emissions. Biofuels are considered low emissions. How would a National Clean Fuel Standard impact the use of biofuels and this new CFS, how would it work with the RFS, the Renewable Fuel Standard? Would it replace it, would it coexist? How would that work?

Mr. Cooper. Thank you for the question, Senator. We certainly believe that an LCFS or Clean Fuel Standard done right at the national level would complement a Renewable Fuel Standard. Again, the RFS was primarily about volume and energy

independence and reducing imports. A Clean Fuel Standard is more directly about reducing emissions based on performance.

We do think the two would work together very well, complement one another. As I mentioned earlier, the RFS was really that bedrock and kind of the foundation for the renewable fuels industry. It is important to keep that foundation in place. We do think the two would work together.

In terms of how the biofuels industry would respond to a Clean Fuel Standard, we expect that it would be similar, in ways, to the response in the California marketplace and in Oregon. It has been interesting to see some of the different ways that the markets have responded to those programs in those States.

As I mentioned, the E85 market in California is off the charts. They are using more E85 in that State than any other State in the Country as an outcome of the Low Carbon Fuel Standard. They are also one of the last two States that hasn't yet approved E15. Well, guess what? That are moving toward approval of E15 because the market is calling for it via the LCFS.

We do believe a properly designed clean fuel standard, and again, doing the life cycle analysis correctly, would drive increased use of ethanol and other renewable fuels above and beyond what it called for under the Renewable Fuel Standard.

Senator Ricketts. I think we have talked about it a little bit here; I am concerned that any national clean fuels program could prioritize electric vehicles over liquid fuel vehicles, including clean biofuels. This will only make us more dependent on our foreign adversaries who control the majority of the worldwide production of several key components.

For example, the CCP, Chinese Communist Party, controls 60 percent of the raw lithium mines in the world, 50 percent of the lithium processing and refining, and 75 percent of the lithium and battery mega factories. How can you ensure that a new national low carbon fuel standard won't falsely prop up EVs to satisfy an agenda and do significant damage to liquid fuels, including biofuels in the process?

Mr. Cooper. Great question, and thank you, Senator. Again, if the life cycle analysis is done correctly, and the carbon intensity scores are developed in a fair and transparent way, we believe that renewable fuels are going to compete very well with electric vehicles in terms of the carbon reductions that they provide.

As the Ranking Member mentioned, internal combustion engines and conventional vehicles are far less expensive than EVs. So again, if you step out of the way and let the market respond to these carbon reduction requirements, we think it is going to drive the market towards increased use of renewable

fuels, which are the lowest cost option of meeting the carbon reduction requirements.

If you stack on top of that an EV mandate or something like California is trying to do, then yes, that changes the calculation immensely. But we, again, think a truly technology-neutral standard is going to put renewable fuels in a very competitive position.

Senator Ricketts. Great. Thank you.

Senator Capito. Thank you. Senator Cardin?

Senator Cardin. Thank you, Madam Chair, and let me thank our three witnesses. I think it is very appropriate that our first hearing in this Congress is in regard to the future of low carbon transportation fuels.

Clearly, Senator Merkley and I have been engaged in some of the international meetings on the climate crisis. We have a crisis, so we need to do everything we possibly can in every aspect. The low carbon emission fuels is clearly part of that.

I am pleased that under the Bipartisan Infrastructure Bill Maryland has been able to take advantage of many of the new opportunities under the low or no emissions fuel programs. We have received three major grants in our State, $15 million to Montgomery County, Maryland for new hydrogen production sites, and acquiring 13 hydrogen fuel cell electric buses. In Prince George's County, $25 million for 70 zero-emissions electric

buses, and in Ann Arundel County, $1.9 million for four diesel electric hybrid buses. I say that, because there are three different technologies, but all of them are adding to our commitment to reduce our carbon footprint.

Under the Clean School Bus program, Baltimore City is receiving $9.4 million for 25 electric school buses. We are taking advantage of these opportunities.

Mr. Graff, you talked a little bit about the hydrogen issues. It is new technology, but it has limits. Where do you see the future of hydrogen as a source for transportation energy?

Mr. Graff. Senator, thanks for the question. Hydrogen itself is a very versatile molecule. If we are going to achieve our climate objectives, if the energy transition is going to occur, it will not happen without hydrogen. The estimate is that hydrogen itself, long-term, by 2050, will likely account for roughly 20 percent of the world's energy supply.

That versatility allows us to use hydrogen, produced in a variety of different pathways, to decarbonize energy intensive industry and also to decarbonize the transportation sector. The utilization of that hydrogen, we have talked a little bit about personal vehicles, but as you grow the vehicle, as you look at commercial vehicles, as you look at the class A tractors that are on the highways, if in fact, we want to get to a zero

emission vehicle, in that case, we are in a place where we can utilize hydrogen paired with a fuel cell, maintain the same utility you have today, the same drivability, the same refueling time, the same use regardless of temperature, and you will be able to utilize because of the small footprint and weight of the fuel cell along with the amount of hydrogen necessary to go ahead and carry on board to power that, you will be able to maintain the payload you have today.

So it has the capability in almost every use in the transportation sector to see that evolve. The key is to build out the infrastructure, the key is to build the need for the vehicles and see this grow and evolve as we have for other sectors.

Senator Cardin. So, we took a giant step in that direction under the Inflation Reduction Act, providing certain incentives. What more needs to be done?

Mr. Graff. The Inflation Reduction Act clearly provides the capability to produce hydrogen under a variety of pathways, whether utilizing renewable power or utilizing natural gas with carbon capture to produce the hydrogen at a lower cost and have the benefit of low carbon renewable hydrogen.

The key now, given the fact that the transportation sector is one of the most difficult to decarbonize, is to go ahead and further incentivize the use to build out the vehicles and fully

utilize those.

As a matter of fact, I was with one of our drivers just Thursday utilizing one of the Class A tractors we are currently using to deliver goods in the State of California between our industrial sites, which utilizes hydrogen and a hydrogen fuel cell to power it. We just need to build to scale to get there.

Senator Cardin. Thank you.

Mr. Spear, I want to get you engaged here on heavy duty trucks. I recognize that we have infrastructure challenges that are very important to the trucker and trucking industry. I recognize we have supply chain challenges that you have already mentioned in your testimony. How do we provide the necessary incentives so that heavy duty trucks are also going to have themselves a smaller carbon footprint? What additional incentives do you think are necessary?

Mr. Spear. I think if you want to get the newer, safer, more environmentally friendly equipment out on the road, you have to incentivize it. You have been a leader on this. You sponsored a bill that would repeal the Federal excise tax. This is a 100-plus year old tax, World War I. It is the only one left of that era that still exists.

It tacks on 12 percent of the price of the sale of a new tractor. So that is roughly $25,000 per tractor. Think about that. Not only is that more expensive, the impact that has on

manufacturing that equipment, jobs around the Country in those manufacturing facilities, is quite significant. We believe that repealing that would have immeasurable impact on getting cleaner, more environmentally safe equipment out on the road quicker.

Senator Cardin. Thank you for that answer. I appreciate it.

Thank you, Mr. Chairman.

Senator Carper. [Presiding.] Thank you, Senator Cardin. We are going to move down to Senator Merkley, and I will ask my questions a little bit later in the hearing. Senator Merkley?

Senator Merkley. Thank you very much, Mr. Chairman.

I wanted to start, Mr. Cooper, related to your experience with low carbon fuel standards, particularly the Oregon Clean Fuels Program. As you look at Oregon's program, has it been a success?

Mr. Cooper. Yes, we think the Oregon program has been very successful.

Senator Merkley. Any particular insights or lessons we should take to mind, as other States consider similar?

Mr. Cooper. Yes, when we think about a low carbon fuel standard done right, we typically point to Oregon, because we think the life cycle analysis and modeling and methodology that they used for their program is more transparent, is more

technology-neutral than what California is doing even. We think the Oregon program has been a great example and model for the rest of the Country to follow.

Senator Merkley. Thank you.

Mr. Graff, I want to turn to hydrogen, and specifically that that is made from fossil gas with carbon capture. The industry uses the term blue carbon or blue hydrogen, as you are familiar with. The first peer-reviewed study in 2021 found that using blue hydrogen, that is fossil hydrogen with carbon capture, was 20 percent more damaging in terms of greenhouse gas footprint than using fossil gas or coal directly for heating buildings, and that it was 60 percent worse than using diesel directly for heating buildings.

We have a lot of buildings heated by fossil gas and a lot that are heated by diesel. Do you agree with the studies that have shown that using fossil gas, even with carbon capture, and by the way, the assumption in this was 100 percent carbon capture, no leakage from a geological formation, doesn't make sense when it comes to trying to tackle greenhouse gas?

Mr. Graff. Senator, thank you for the question. I am not familiar with that exact study, and we can certainly take a look at that and spend more time with you and your staff to talk about it. What I know is this: we have looked at the emissions reductions and the benefits of utilizing hydrogen. For example,

it could be in the State of West Virginia, it could be on the Guld Coast, to go ahead and produce large quantities, what I would call low carbon hydrogen. Sometimes, people get confused with the various colors, and I just like to call it what it is, low carbon hydrogen.

We are able to capture that. We are able to capture that CO2 in those geographies. With large-scale production, like with autothermal reformers, technology that we have, we can decarbonize entire energy intensive industrial sites.

If you are going to produce hydrogen only with the need, for example, to burn it in a home, then you can certainly do this same thing in order to achieve that. However, when you are located with the local infrastructure, we can drive this in a very significant way for the industries that use it. By the way, if you utilize hydrogen in a fuel cell, it is a very, very different dynamic than a combustion engine. The benefits of that are very clear.

Senator Merkley. Mr. Chairman, the point I am wanting to drive here is, we often talk about with electric cars, it matters how the electricity is made. The parallel is that is makes a big difference how the hydrogen is made. The industry has given it the name, it sounds very nice, blue hydrogen. It sounds like the best of the best, but in fact, it is made from fossil gas, and this is the best version where carbon capture is

complete. Even in that case, it is more damaging to the climate than is burning fossil gas directly for heating homes or than using diesel for heating homes by a 60 percent factor.

That is assuming that every bit of carbon capture is perfect, which is rarely that case that you can capture all of the carbon out of the emissions and that you can store it for eternity underground with perfect security.

So I think it is very important, the hydrogen conversation is going to be very relevant as we go forward. When it is made from electrolysis, that is, from renewable electricity being used to make it, it has a profoundly different footprint than when it is made from fracked methane gas.

I want to make sure, as we talk about hydrogen, that we realize that there are many different forms that have very different life cycle footprints. If we go down a route that actually makes things worse in terms of substituting hydrogen for heating buildings that is made from fossil gas. And then say that there is no carbon capture, then it is even worse than that. So this is the best case for fossil gas using. This is also true in terms of the production of electricity.

There is a much better case to be made that hydrogen for high-temperature applications in industry, making that hydrogen from a clean system, making it from renewable electricity. Then you have a really important application because you have

hydrogen that works in settings where electricity doesn't work directly, but it is made from renewable electricity to begin with.

I just want to caution that not all hydrogen is the same, and not all hydrogen hubs would be the same. Hydrogen hubs that promote essentially making hydrogen from fossil gas have a very different footprint than those hubs that would be depending upon a clean hydrogen. Thank you.

Senator Carper. Thank you for your questions. Thanks for that cautionary note.

I am happy to have the opportunity, this is the first time I have been introduced to Senator Fetterman. He is from a State just north of us in Delaware. John, Delaware and Pennsylvania used to be the same State. Delaware, on June 15th, 1776, declared our independence from Great Britain, and we gave Pennsylvania their independence from Delaware. We still have a great relationship with your State.

We are delighted that you have joined us in the Senate, especially on this committee. Thanks so much. Welcome, Senator Fetterman. You are recognized.

Senator Fetterman. Thank you, Mr. Chairman.

Mr. Graff, I want to start with you. Many Pennsylvanians are employed in energy production industries. Transitioning to more clean energies is so important and ensuring metal class

workers are not being left behind in the changing economy, is, I think, equally important. Are there any barriers, very specific kinds of special barriers, for workers in the fossil fuel sector to learn skills in renewable fuel production?

Mr. Graff. Senator, thank you for the question, to begin with. The evolution of hydrogen, both from a low carbon standpoint and a renewable standpoint, as I mentioned earlier, will actually create many value-added jobs in the economy. The estimate is by 2030 in the United States that the utilization of hydrogen, as projected to grow, would create about $140 billion of additional revenue in the economy and create about 700,000 value-added jobs.

These are jobs that we are already beginning to build the workforce through in many States today. We are in 50 States across the Country, and we are at a place where these jobs are readily available. The skills and the competencies and the capabilities are readily available. Where necessary, we will continue to go ahead and train the workers to be prepared to accept these jobs.

The real benefit here is that these facilities and the use of hydrogen create for a much cleaner environment, both in terms of not just in their use in the community, but also in the workplace.

Senator Fetterman. No additional questions.

Senator Carper. We have been joined by Senator Lummis, who sent me the nicest note for my birthday last month. I saved it. I have it right here in my binder. I was going to read it aloud.

Senator Lummis. Well, I am not sure it is nice to tell people that in Latin the term "Senate" means council of old people, and then say "Happy Birthday." But that is, I think, what it said. Thank you.

Senator Carper. We are only as old as we feel. I feel about 20, so let's go. You are recognized for as long as you want to be recognized.

Senator Lummis. Perfect. Thank you, Mr. Chairman.

Mr. Spear, welcome to the committee. I have concerns that creating a national Low Carbon Fuel Standard will only galvanize efforts to enact another anti-consumer regulatory scheme, such as phasing out liquid fuels through electrification mandates or banning heavy duty diesel engines.

Do you share this concern, and are there examples of such efforts in the States that have already enacted their own low carbon fuel standards?

Mr. Spear. There are, thank you, Senator. As I mentioned previously, we had litigated in California and Oregon, largely because of the impact that it would have on our industry, particularly medium-sized companies with 20 trucks or fewer down

to owner-operators. Those are folks that pay retail at the pump. They don't have fuel contracts.

So the impact that this has on inflating the cost of diesel in those States and then those areas is quite measurable. It is the second-largest cost strain under labor. This is a make-or-break issue in terms of keeping them out on the road moving freight. Those costs generally will be reflected in what consumers pay, your constituents.

It needs to be a gradual process that takes into account the fact that we are already facing 40-year highs in inflation. This is just an additive on top and reflected in the fuel prices, $7 exceeding in California, nearly $6.50 in Oregon. Those are the highest in the Country, so we definitely are going to defend our membership when that happens.

Senator Lummis. President Biden recently noted in his State of the Union Address that the U.S. would continue to need liquid fuels for at least the next 10 years. Is that a statement that you agree with?

Mr. Spear. I think it is going to be a little longer than 10, I really do. I believe we will get there, as I said in my opening remarks, I firmly believe that we will transition in time, but it has to be inclusive. The timeline has to be realistic. The targets have to be achievable for that to happen.

I think this mad rush to zero is going to be very impactful, not just in State economies, but the national economy. Something we are very mindful, I think if we pace ourselves and let the market work its will, we will get to zero.

Senator Lummis. I know people in Wyoming are concerned because electric vehicles are tested at sea level, which Wyoming is not, tested on flat ground, which Wyoming is not, tested at 60 to 70 degrees Fahrenheit, which Wyoming rarely is. In fact, today it is zero degrees again in Casper, Wyoming.

Those factors change the distance one can travel on a charge dramatically, and I don't think that that is well understood. Hopefully, we can bring some of those factors to light in the coming months.

Mr. Cooper, thank you for being here as well. As you know, the EPA issued what is called their "Set" rule, which, among other things, set RVO limits for the next three years, and proposed to create a pathway for electric vehicles' participation in the RFS.

I am concerned with how the EPA is proposing that auto OEMs generate eRINs. What is your level of concern with the eRINs proposal from EPA?

Mr. Cooper. Thank you for the question, Senator, and we share your concern with the way that EPA is proposing to allow electricity into the RFS program. We are not opposed to the

inclusion of electricity in the RFS, but it has to be done right. We share your concern that, in the case of these eRINs, the generator of those credits would be the automaker, like Tesla, and that is completely different, completely inconsistent with how RIN credit generation is done across any other fuel that is regulated under the RFS. That gives us some concern.

We are also concerned with the way that EPA would allow those automakers to benefit from what is called book-and-claim accounting, which is essentially, the automaker is going to sign a contract with a renewable electricity producer that could be thousands of miles away. When that electron enters the grid, the automaker gets to claim that carbon reduction benefit from that electron, whether it ever is used to fuel an electric vehicle or not.

So, we have some concerns with inconsistent application of that accounting practice.

Senator Lummis. I may have to spend a little more time with you, Mr. Cooper, to better understand that, but I appreciate your making me aware of that.

Mr. Cooper. I would be happy to.

Senator Lummis. Do you believe EPA's proposal aligns with Congressional intent when it created the RFS nearly two decades ago?

Mr. Cooper. That is another concern we have. As we look

at the statutory intent of the RFS program and our understanding of that intent, it was all about stimulating the production and use of renewable fuels, not necessarily about stimulating the production and use of certain vehicle technologies. So we think if you all in Congress had intended the program to drive certain vehicle technologies, you would have been more explicit about that.

Senator Lummis. Is it appropriate for EPA to combine their eRINs rulemaking with 2023 through 2025 RVOs?

Mr. Cooper. We have asked in the comments we just submitted to EPA last week that they sever that portion of the proposal, or that portion of the rulemaking, from the actual volume requirements. We think EPA should move ahead with finalizing those volume requirements. But it sounds like they need more time to really figure out this eRIN proposal and to make sure they are getting it right. We would prefer to see EPA separate those two parts of the proposal from one another.

Senator Lummis. Mr. Chairman, I want to thank all of our witnesses for being here today. Thank you for helping educate and inform the committee. I yield back.

Senator Carper. I want to thank you for being here and joining us in a good learning exercise.

We are privileged that the governor of our State is very active in the National Governor's Association. We have

something in the National Governor's Association called the Center for Best Practices. They still have it, yes. It was an opportunity to for governors to share with other governors, other States, what was working in their respective States. I loved being part of all of that.

I believe you bring the same kind of thinking to this job as we did in those days, as well. Thank you so much for joining us today for your questions.

I want to ask unanimous consent to enter into the record the testimony of Oregon's Clean Fuels manager, whose name, believe it or not, is Wind. How about that? Cory Ann Wind.

[The referenced information follows:]

Senator Carper. Before the U.S. Senate Committee on Environment and Public Work, here is what she testified: that "Oregon's Clean Fuels Program has spurred innovation and kept consumer costs low," and the article that I referred to earlier actually spends some time elaborating on that. Good.

We have been joined by Senator Alex Padilla from California. Again, he comes from a State where I used to live, where I was a Naval flight officer. We always like to think of States as laboratories of democracy. California just happens to be a pretty big laboratory.

Thanks so much for joining us. I am delighted that you are in this hearing and this committee and that you could come with us and join us today. Thanks so much.

Senator Padilla. Thank you, Mr. Chairman. I am proud to represent not only a great laboratory of democracy, but the most populous and diverse State in the Nation, the largest electric of any State in the Nation, and the fourth largest economy in the world.

With that being said, let me brag a little bit about California's Low Carbon Fuel Standard. It is helping to advance a wide range of clean fuels while at the same time, keeping consumer costs low and fostering clean fuel investments.

California continues to grow its economy and reduce its emissions. The program's tech-neutral approach, greater long-

term predictability, and cost containment mechanisms have provided certainty and flexibility. I know prior to my opportunity to ask questions, there was a lot of California-specific comments and questions by my colleagues in the committee.

This program has been so successful that other jurisdictions are joining California, which is evident in the Pacific Coast Collaborative, a regional agreement between the States of California, Oregon, Washington, and British Columbia to strategically align policies to reduce greenhouse gas emissions and promote clean energy.

My first question is for Mr. Graff. You talk about certainty, flexibility, and technological neutrality as essential ingredients to any low carbon fuel program. Can you expand on how California's Low Carbon Fuel Standard provides a certainty and flexibility to industry?

Mr. Graff. Senator, thank you for the question. There is no question that California's LCFS program drove the introduction of zero-emission vehicles and the recognition that, in order to go ahead and fuel those vehicles, it recognized that the real point was carbon intensity and it was agnostic in terms of the pathways for the technologies to get there.

For Air Liquide, we have a long history. It is core in our culture to be sustainable in our approach. We see our

commitment to our climate goals, the world's climate goals, as well as the energy transition with hydrogen as a core component of delivering that.

For us, the ability to go ahead and leverage the ability to work with the automakers, to provide the renewable hydrogen for the nascent development of hydrogen fuel cell vehicles was paramount in our decision to invest the $250 million liquid hydrogen plant in Nevada to meet those needs.

What is important is that in that plant, we utilize both renewable power and we use biogas, the attributes of biogas, in order to produce that renewable hydrogen. As a result, we are leveraging many technologies in order to go ahead and meet the needs.

Senator Padilla. If I heard you correctly, California's program was paramount in your decision, not just whether or not to make the investment, but where to invest in clean hydrogen production, is that correct?

Mr. Graff. It clearly enabled the introduction of the zero-emission vehicles. We needed to demonstrate what that could mean, not just for the State of California, but for the Country, and the world, we wanted to find that opportunity to demonstrate what could happen, and we wanted to locate those things logistically as close to the market as possible. It is good to minimize logistics. It also creates value-creating jobs

in those communities in which you are going to use that product.

Senator Padilla. Thank you.

Follow-up question for Mr. Cooper. Could you elaborate on the RFA's pledge to achieve a net-zero carbon footprint by 2050 and talk about how low carbon fuel standards, not just in California, let us add Oregon to the conversation, may have contributed to innovation in the biofuels sector?

Mr. Cooper. Absolutely, and thank you for the question, Senator.

I did mention our pledge, our members' pledge to achieve net-zero emissions by 2050 or sooner in my opening remarks. This is a pledge and a commitment that our membership is taking very seriously. They are already taking steps and making investments to reach that goal.

Today, ethanol already reduces greenhouse gas emissions by about 50 percent compared to gasoline, so we are halfway there. But with the adoption of technologies like Carbon Capture and Sequestration, with the adoption of lower carbon farming practices upstream of our facilities, replacing fossil natural gas with renewable natural gas at our facilities, all of those practices and technologies will continue to drive the carbon intensity lower for corn ethanol. We absolutely think we can get there by 2050 or sooner.

A lot of those investments are happening today, and they

are being driven by the California LCFS, they are being driven by the Oregon program. Again, our member producers that serve those markets, their top priority is doing everything they can to reduce the CI, the carbon intensity, of those fuels.

So they are making investments. That was the purpose of the program. It is why we think a similar program at the national level would be a great way to rapidly reduce emissions from the transportation sector.

Senator Padilla. Thank you both.

My time is up, Mr. Chair. Let me just end with this. Imagine that: public policy, private investment. Thank you, Mr. Chairman.

Senator Carper. That is a good note to emphasize.

We have been joined by our new colleague from Oklahoma. Senator Mullin, we are delighted to see you today.

I just want to mention before I turn to you for your questions, this committee has a remarkable tradition for actually working together and working across the aisle to find common ground that you wouldn't really expect. I worked with John Barrasso for a number of years on something to reduce emissions of refrigerants from air conditioners and freezers and so forth that actually led to the ratification of the Kigali Treaty and phased down hydrofluoric carbons over the next 15 years. John Barrasso and I worked together on that for a long

time.

Before that, Barbara Boxer was our Senior Democrat on this committee. Your predecessor, Jim Inhofe, was our Senior Republican. You could not ask for two more polar different Senators, and they somehow managed to find common ground on any number of issues, to our amazement, including transportation policy, but other stuff, as well. Jim and I were cosponsors of the Diesel Emissions Reduction Act for any number of years.

That is something we are proud of on this committee. It is a wonderful tradition. We hope that we can continue to take advantage of it with your presence. Welcome aboard. We are delighted to hear from you. Thanks for joining us.

Senator Mullin. Thank you so much. I look forward to that; I look forward to getting to know everybody and finding those places we can work and use good common sense.

I would have loved to have been involved in the conversations with refrigerants, considering I have owned several HVAC companies, and I have a pretty strong opinion on the direction, just because from practical use, right?

I appreciate that. It is an honor to be on the committee. Sorry about sliding in here late. I am still trying to find where the committees are.

[Laughter.]

Senator Carper. You are right on time, and the restroom is

right outside the door, sir.

Senator Mullin. I figured that one out. I was in the Armed Services Committee, and since I am on the back side of that panel, it took a while to get there.

I would like to visit a little bit with Mr. Spear. California, obviously, they proposed replacing the diesel trucks with battery electric vehicles and trucks on the road for the air source, obviously, board. What has this meant for the prices of vehicles?

Mr. Spear. It is putting immense pressure on the sale of new vehicles, but also used trucks, significant costs in making equipment newer, safer, more environmentally friendly equipment, less available as a result. They are just out of reach.

Senator Mullin. As a guy who has a CDL in my back pocket, I own multiple semis, we have had fleets of vehicles out there. I have driven in California, and the traffic is pretty bad.

If you put these diesel trucks, which are already heavy and take up a lot of room, and then you make them all electric, has anybody done a study on how many more trucks that is going to add to the road? We have weight issues already, right?

We kind of have two options here. Either we increase the weight of these vehicles so that they can move, which could drastically affect safety, or we are going to have to literally put three-to-one on the road just to be able to move the same

product we are moving now.

Has anybody done a study on that, and what congestion that is going to cause, and honestly, how much bigger of a carbon footprint that is going to put on California?

Mr. Spear. Yes, the American Transportation Research Institute has done some pretty significant recent studies on this subject and the impact that it is going to have. Looking logically at the availability of minerals to create those batteries, these are 5,000-pound batteries or more going into these trucks. The amount of lithium, graphite, cobalt, that has to go into these batteries to process that is not readily available.

We are not sourcing that here in the U.S., and it is not going to come from China. It is going to come from Congo. That needs to be decided in terms of availability of the equipment. Beyond that, the infrastructure to charge it is not in place, and then the amount of electricity needed to charge it.

ATRI did this study, and they are showing that to charge all trucks and cars currently on the road would be 40 percent of current capacity. Think about that. Where is the power going to come from, especially in California, where there are already rolling blackouts? This is a question that we believe has to be answered before you move forward with such an aggressive timeline that is also, by the way, not just confined to

California. It is going to set the national standard for the entire Country if the EPA doesn't step in.

We need a national framework. We are interstate commerce. You have driven across the Country in a truck. You understand that.

Senator Mullin. It occurs to your point, just for the reference of those that are listening, the average house has a 200-amp service that goes to every house. To charge two vehicles overnight, these aren't semis, and we are talking about infrastructure here, just to charge, the average household has two vehicles, to charge those vehicles overnight, you would be required to take a 200-amp service house to a 400 amp service house.

As someone that owned a fleet of 300-plus vehicles on the road every day, I can't imagine how much power it would cost me at night to charge all those trucks. This is something that is short-sighted when we start talking about California's proposals.

I understand what they are trying to get to, but are we thinking long-range? Are we actually paying attention to the safety, the effects on the grid? Last time I checked, they still have rolling blackouts without going all-electric. Where is that infrastructure going to come from?

Sir, as you say, we work together. This is a point that we

need to have a deep discussion on, because when we start talking about renewable fuels versus fossil fuels, there seems to be somewhat of a divide, but we need to be realistic to our approach.

I am glad that you started your introduction to the committee for me in this, because I want to be part of a solution, not of a problem. The Choctaws, who have a privilege to represent the Choctaw Nation, and I am Cherokee and proud to be Cherokee, Chief Batton, he says that when we think of decisions, we think generational, not today, but we think generational. In this effect, we need to be thinking about, the effect today and generational, what our long-term goals are.

I look forward to working on the committee. Thank you for being here. With that, I yield back.

Senator Carper. Thanks again, and welcome to our committee.

Before you arrived here, I just want to mention this again. I mentioned that I was born in West Virginia, in a coal mining town. That is where my sister and I were born. That is where I grew up until we moved to Virginia, and then off into the world.

I have always focused on job creation and job preservation as governor, and even before that. I worked in the division of economic development. I always focused on job creation and job preservation. I continue to do that. I always look at

adversity and find opportunity.

There is plenty of adversity in our Country and our planet. Where is the opportunity for doing something about it? My mom raised my sister and me in Grace Gospel Baptist Church. She dragged us there every Sunday morning, every Sunday night, every Wednesday night, and most Thursday nights. Then we would go home and watch Billy Graham on TV. She wanted to make sure we understood.

Senator Mullin. Wait, you all had a TV?

[Laughter.]

Senator Carper. It was a little tiny one. We had three channels.

She wanted to make sure we understood the difference between right and wrong. She really wanted to make sure we internalized the Golden Rule, treat other people the way we want to be treated. I mentioned earlier, my State of Delaware is the lowest-lying State in America. Our State is sinking. The seas around us are rising.

If Bill Cassidy and John Neely Kennedy were here today, they would tell you, in every 100 minutes in Louisiana, they lose a piece of land the size of a football field to the ocean. The folks at NOAA told us last year that sea level rise isn't just a problem today. It is going to get worse before it gets better.

That is sort of the environment in which we are operating here. We somehow have to find consensus to address these problems and concerns in a way that is fair, but also in a way that strengthens our economy rather than diminishes it.

Delaware used to be the State that built more cars, trucks, vans per capita than any State in America. We had a Chrysler plant with 4,000 employees, we had a GM plant with 4,000 employees. I worked for years to keep those plants alive. We lost them both in the Great Recession, which was just a body blow to a little State with less than a million people.

I would just say that when Chrysler decided to close their plant, I remember being there the day they literally tore down the plant and leveled it to the ground. I nearly cried. But we have on a site that used to have 4,000 employees, we have 4,000 people go to work every day in the science and technology campus that is affiliated with the University of Delaware. In adversity, lies opportunity. We just have to be smart enough to figure out how to get there. The way we do it on this committee is just being honest with each other, working with each other, thinking outside the box, looking to see what works, and trying to do more of that.

I remember going to the Detroit Auto Show. We used to go every year to the Detroit Auto Show. I remember one year, being there, and they have the stands, and every auto producer has a

stand. GM has a stand. Ford has a stand. Some stands are bigger than others. They have all kinds of different models and trucks and so forth, and vehicles. One year, I remember meeting a woman named Mary Barra, who is pretty famous now. She is the Chairman of GM and chairs the Business Roundtable.

It was the year that the Chevy Volt was selected as the car of the year. It is a hybrid. The Volt that year got 38 miles on a charge. The vehicle I drive now, mentioned earlier, my 2001 Chrysler Town and Country Minivan, which I sold for $1 last year with 600,000 miles on it, but it has been replaced by an EV that gets 300 miles on a charge.

The numbers are actually getting better. Ten years ago is when the Chevrolet Volt won car of the year at the Detroit Auto Show. I remember walking around and visiting one of the stands. I don't know if it was Toyota, or who it was, but they had a vehicle, it looked like a framework with two-by-fours framed into a garage. They had a vehicle sitting in the garage, and next to it was a frame for a house.

I said to the people from the company that had that vehicle, "What is this?" They said, "This is a car that is sitting in a garage and has the ability not only to use hydrogen fuel cells, but to provide electricity to the vehicle, provide electricity for the house, cool the house in summer, warm the house in winter. This is where we are going to go in the

future." Ten years later, that is a reality.

There is a lot we can do here, and a lot of ways to create jobs. I am all about jobs. I think the best thing we could do is, I used to say in my speeches, I would talk about the least of these in our society, and I would say, give a person a fish, you feed them for a day. If you teach a person to fish, they can feed themselves for a lifetime.

I used to say that was in the Bible. One day, I would say that in a speech, and there was a minister there. He said to me after my speech, "That is not in the Bible." Well, I say it should be.

[Laughter.]

Senator Lummis. Mr. Chairman, may I remark on your comments? One of the things during the State of the Union Address when President Biden mentioned this one-decade goal, I thought about how, without permitting reform, we don't stand a chance, because one of the largest wind energy facilities in the Country has been developed in Wyoming by Philip Anschutz. It took him over 10 years just to acquire the transmission line right of way, and there is additional permitting that needs to be done there.

Even for people who desire to move to electric vehicles that can power houses out of the garage if there is no electricity available, it is because of the permitting burdens

that come with building transmission lines, it is just an unachievable goal. I think that, even for people who aspire to President Biden's goal, that that should become a priority. Thank you.

Senator Carper. I agree. President Biden, we ended up voting on permitting reform, as you will recall, at the end of last year. We ended up not passing it on the 47th vote. The President worked very hard to try to get it adopted.

I expect the Administration will come back and say, let's try it again, give it another try. He likes to say, as you may recall in his State of the Union Address, he kept going back to the phrase, let us finish the job we have begun.

It is all well and good that we have a lot of promising ways to create electricity without worsening our carbon situation here in this Country, but if we create all this clean energy over here in our Country, and over here we have a lot of people who need that energy, we have to figure out how to get it there.

Your point is well taken. I think this is an area where we can find consensus and should work hard to do that. I know Senator Capito has offered legislation on this front. I am hopeful that we can all be part of getting to that consensus. Thank you.

I have a couple more questions. Do either of you want to

ask another question, is there anything else? Okay.

This is a question for Mr. Graff and Mr. Cooper. As a recovering governor, I often look to States for policies that work. I have mentioned this before.

Today, there are States that have implemented or are in the process of considering technology-neutral low carbon fuel standards that provide greater flexibility and certainty than the Renewable Fuel Standard. For example, as we heard last year from, again, Ms. Cory Ann Wind, that is a great name, Oregon's Clean Fuels Program manager, Oregon has successfully advanced cleaner fuel usage, kept consumer costs low, and helped to foster local job creation.

Oregon is tracking consumer fuel costs as a requirement of the program, and Oregon has lower fuel prices than surrounding States, such as Idaho, which does not have a clean fuels program.

A question, if I can, for Mr. Graff, and also, Mr. Cooper, for you. What are the most important principle of lessons learned from State programs that should guide development of a national Clean Fuels Program, and how are these State programs protecting the interests of consumers? Mr. Graff, would you go first?

Mr. Graff. Mr. Chairman, thanks for the question. As I said in my opening remarks, I think that any program in itself,

first of all, needs to have clear certainty. That is to say, if, in fact, we are going to make major investments as a Country or as a business into the infrastructure, into the production capability, to provide for renewable fuels, for low carbon fuels, we need to have certainty as to the future. When we invest, we invest for the long-term. These facilities will be in operation for 15, 20, 40, 50 years.

The second thing is flexibility, that is the ability to choose the right solution for that ecosystem. If you have abundant wind power, solar power, hydropower, for example, you can produce hydrogen with electrolysis using water. If you have an abundant supply of natural gas and the capability to store carbon in sub-surface geological structures like you do in West Virginia or on the Gulf Coast, then you can utilize hydrogen with carbon capture in order to produce that hydrogen.

By the way, the byproduct natural gas liquids you produce are critical and necessary to the local economy to preserve the jobs and grow the jobs in the chemical industry. That is critical in terms of the versatility and the flexibility of what you need to have.

Then the final piece is around technology. We don’t want to pick or choose specifically what technology to apply in a rule or a law. We want to give the companies, we want to give the ability to go ahead and pick and choose what makes the most

sense, whether it is renewable power, whether it is biogas, whether it is hydrogen with carbon capture, whatever the case may be, and to build that at the appropriate scale to meet the needs of the local economy.

Senator Carper. Good, thank you. Geoff?

Mr. Cooper. Thank you, Senator. I think my list would be pretty similar to what we heard from Mr. Graff.

Senator Carper. Repetition is a good thing. Feel free to repeat.

Mr. Cooper. I won't repeat, but I will say setting clear and predictable carbon intensity reduction requirements is very important, and then sticking to them, not backtracking or changing them retroactively.

Secondly, life cycle analysis is critically important under a program like this. Those carbon intensity values for each fuel pathway, that really is the engine that drives the program. Having a consistent, transparent, science-based life cycle methodology is critical to the whole thing. Again, that is why we think the Department of Energy's GREET model is a great example for that type of methodology.

Senator Carper. Okay, thanks. I am going to pick on Mr. Graff again for a minute here. It is a question dealing with energy security. The recent price spikes in petroleum, particularly following Russia's invasion of Ukraine, all those

prices at the pump, as I have seen witnessed as recently as this morning in my neighborhood, they demonstrate that global markets continue to drive fuel prices. The volatile global oil market creates economic uncertainty, puts pressure on American families and businesses that no amount of domestic drilling can prevent.

I believe the solution to high oil prices and dependence on foreign oil is to reduce demand for oil and transition away from oil over time while giving consumers more choices to fuel our cars, our trucks, and our vans. Fortunately, clean hydrogen is an example of a low carbon fuel that can be produced domestically from renewable fuel resources like wind, like solar, like biomass.

My question is, how can the use of hydrogen in low carbon transportation fuels help strengthen our national energy security? I am going to repeat that. How can the use of hydrogen and low carbon transportation fuels help to strengthen our national energy security?

Mr. Graff. Thanks for the question, Mr. Chairman. As you pointed out, the world's energy needs only continue to grow. The inherent risks of various energy supplies continue to evolve. I think we should see everything we have today as additive, with the idea that hydrogen and its long-term growth and potential will help fill both a necessary void and provide the growth in low carbon and renewable sources of energy that we

need for the future.

The application, again, of hydrogen, and the use of hydrogen, again, is very versatile because it provides the capability in an industrial setting to decarbonize and provide the needs for energy intensive industry. We are already beginning to demonstrate that with some of our projects we are building around the world, but it also provides the flexibility and the capability to decarbonize the transportation sector and provide the additional fueling needs we need for that infrastructure.

We already had a conversation about personal vehicles, the introduction of those vehicles, and how it is used. As you scale those vehicles into commercial vehicles or a Class A tractor trailer, the utilization of hydrogen is a primary and a core vector that will allow us to decarbonize heavy transportation, and in its use, it has basically this --

Senator Carper. Did you say carbonize heavy, or decarbonize?

Mr. Graff. Decarbonize.

Senator Carper. Thank you.

Mr. Graff. As we look to go ahead and think about its utilization, which is similar to everything we have today. If you utilize hydrogen in any of these vehicles, regardless of their size, you have the same range of drivability. You have

the same utilization. That is to say, in refueling, it is the same experience you have today. You don't have to wait hours to recharge. It is the same experience you have today. If you were to still have your minivan, and you had to fill it with fuel, it would be the same experience in refueling a hydrogen fuel cell vehicle.

Senator Carper. Don't let my wife hear you say that.

[Laughter.]

Mr. Graff. The inherent drivability, regardless of temperature, is paramount. It doesn't matter where you are. We had a conversation on this earlier. Temperature is not an issue for a hydrogen fuel cell vehicle and its performance.

At the end of the day, the inherent weight and the size of the array necessary for just the fuel cells and a full charge of hydrogen is comparable to what we have today. It doesn't require additional weight; it doesn't require additional size from an array standpoint, so you can maintain the same type of payload you have today.

I think all this is additive, substitutive, and we are able to go ahead and demonstrate its versatility in almost every sector, including if you wanted to back up power and back up the grid.

Senator Carper. Okay. Just a quick follow-up, if I could, Mr. Graff. I mentioned earlier, you may recall, Consumer

Reports say they support the Clean Fuel Standard because it can, this is their quote from Consumer Reports, "help alleviate high gas prices by providing more fuel options for consumers that are not tied directly to fluctuating oil prices."

Mr. Graff, do you agree with Consumer Reports on this point? Could a technology-neutral clean fuel standard actually lead to lower costs for consumers?

Mr. Graff. I think any time you have a market-based, flexible program that allows you to utilize any technology, as long as it meets the requirements, will create the lowest cost solution to the consumer. At the end of the day, the consumer wants power to be or fuel to be available. It wants it to be as low cost as possible, and clearly, they want it to be cleaner.

I think that the affordability, the availability, and the ability to go ahead and provide cleaner fuels is paramount as we think about where we are going to go and the world around us.

Senator Carper. Good, thanks.

I have a question for the entire panel. Before I do, I want to just take a couple minutes and give Chris Spear a chance to comment, especially, if you would, Chris, on the potential for hydrogen with respect to large vehicles, trucks, vans, and semis, buses.

My hope is that there is a future there that would involve hydrogen, the cleaner the better. But are we barking up the

wrong tree, or is there something to this?

Mr. Spear. No, not at all. I think we have a tremendous amount of innovation that is occurring within our industry, and a lot of that is domestic innovation. Our trucks are largely manufactured here in the United States, even foreign flight carriers, so it is a very exciting space.

I appreciate Michael's comments across the board. We too, are tech neutral. Our industry will gravitate to different types of energy sources, fuel sources, that fit their business model.

I mentioned drayage. Starting in the ports where the equipment is confined, electrifying there makes a lot of sense. Don't do it too fast. A lot of that equipment is old, and a lot of the people servicing those boxes are 20 trucks or less operations. So if you go too quickly, the cost of an electric truck or even now hydrogen trucks as they come online are much, much higher in price.

You have to let parity work its course. That is why I keep coming back to the timeline. My comments about California and Oregon are not rhetorical. They are factual. If you have a timeline and a target that is that aggressive, and in an economy that size, fourth largest economy in the world, we service that.

If you want us to keep servicing that and providing those goods to consumers, your constituents, you have to build in time

to do it. Those wins that we have had with the EPA took 40 years to gets 98.5 percent of the tailpipe emissions out, and we are committed to the remaining 1.5 percent. Moving to electric, moving to hydrogen, these are emerging technologies that will take time, but they are very exciting.

Senator Lummis was talking about Wyoming. I am from Wyoming, Geoff is from Wyoming. It is a very different climate. It is going to have different conditions, different applications. Hydrogen has tremendous potential for longer haul, not affected by cold or heat. It is a very, very exciting technology for us, beyond electric.

We will get there, as I said in my opening remarks. It is just going to take a little bit more time than some States are providing.

Senator Carper. Okay, thank you for that.

The last question is for the entire panel. I want to start off with Geoff Cooper. Geoff, here is the question. First, I do appreciate the perspectives that all of you, this entire panel, have shared with us today. I hope that the dialogue can help further inform thoughtful action to support the development of national clean fuels policy that will reduce emissions from our transportation sector and help further grow our economy at the same time.

That said, I also recognize the challenges in developing a

new program that satisfies everyone will need compromise and collaboration as we go along that road.

My question is, would you take a moment and share with us where you believe there is common ground amongst you as a panel? I am always looking for common ground. Where would the common ground lie here on this panel? I think I have heard it, but I want you to sort of close with that thought in mind. Go ahead.

Mr. Cooper. Thank you, Mr. Chairman, and again, thank you for the opportunity to testify today. I think this has been a wonderful conversation and very enlightening.

I do think I have heard lots of common ground amongst the three of us today around the need to continue innovating and continue looking at and investing in technologies that reduce carbon emissions, that reduce dependence on petroleum and imports in particular, and that continue to stimulate investment and innovation and new technologies.

I think that is one area where we are all in agreement. I think a clean fuel standard, again, if properly structured, would do that.

Senator Carper. Good, thank you. Mr. Spear?

Mr. Spear. Yes, Mr. Chairman. You and I have had conversations on this, other members of this committee and staff.

We are all in on this. We start with yes. I think we have

demonstrated that over the last 40 years with the EPA. We need to collaborate, public and private, setting standards that are achievable, so the timelines and the targets do matter.

What I hear that is common amongst this panel is tech neutrality and market driven. To do that, you have to be inclusive. You have to be transparent. Our industry serves 72.5 percent of the domestic freight in this Country, so there is really nothing that we eat, drink, or wear that did not, at some point, touch a truck and 3.8 million drivers out there making it happen.

It is a very proud industry. It is a hard-working industry. It is one that we need to keep around as an economy. Going at the right pace and hitting the right targets, we will get there. I am convinced of that, and working with our partners at this table, we are committed to doing that, and we will help this committee achieve those goals.

Senator Carper. Great, thank you so much.

Mr. Graff, closing thought, please.

Mr. Graff. Thank you, Mr. Chairman, and thanks to the rest of the panel for their thoughts today, as well.

I fully agree with the other panelists. I think there is very common agreement, first of all, on the need for clarity, for certainty, for flexibility, and for the ability to innovate on various technologies in order to meet the end use consumer's

needs and in order the meet the Country's needs.

I think all of us here and in the organizations or companies we represent are clearly committed to the long-term prominence of the U.S., whether that is in innovation, which has been core to the U.S. since its founding, and the benefits that brings, whether it is to go ahead and recognize that the U.S. is clearly, from an energy standpoint, the world leader of production, and from the standpoint of the future, the willingness to innovate to demonstrate we are not only the energy leader today, but we will be the clean energy leader in the world in the future, as well.

But most importantly, to make sure that in everything we do, whether that is meeting the economic needs of the Country, meeting the economic needs of the various representatives here and the businesses we represent, is to give back to the community, to make sure we keep our own employees, but more importantly, communities in mind to what we do, and that we are able to go ahead and give back in those communities, we are able to create jobs in those communities and clearly maintain those jobs and grow the value-added jobs that we can create in the world around us.

If we continue to manage all that in balance, if we continue to go ahead and drive that in the right way, we will continue to propel the U.S. as we all know it.

Senator Carper. Great thoughts. Thank you. We are indebted to each of you; thank you for spending this time and sharing your ideas with us and helping to further cultivate an atmosphere to find consensus on an incredibly important issue.

I am going to make a couple of unanimous consent requests before we let you escape. I would ask unanimous consent to enter into the record announcements from Volvo, from Tesla, and from Nikola about their plans to roll out electric big rigs with 355-mile range. Let me say that again. I want to make sure I got that right. They plan, these three manufacturers, to roll out electric large rigs with 355-mile range, which is quite a bit.

Volvo is looking to have half of their truck sales to electric by 2030, proving electric heavy-duty vehicle technology is advancing quickly.

I would ask unanimous consent to enter into the record announcements from those companies.

[The referenced information follows:]

Senator Carper. I would also like to ask unanimous consent for the record to submit various articles, reports, and other documents that help demonstrate the benefits of a Federal program to help provide certainty, predictability, and flexibility for all stakeholders while lowering costs for consumer, spurring clean fuel technology innovation and helping to meet our climate emissions reductions goals.

[The referenced information follows:]

Senator Carper. True confession, I was born in West Virginia in a coal mining town. I grew up in Danville and Roanoke. All my life as a kid, I loved cars. I loved cars, trucks, and vans as a little boy and as a teenager, and even as a big boy today. It has been a passion of mine.

I am an Ohio State Graduate. I love Ohio State, but I love Detroit. I am a huge Tigers fan. I was on the phone earlier this week with Chris Ilitch, the owner of the Tigers, talking about our team and pitchers and catchers reporting, so this is something that is just part of my DNA.

The other thing that is part of my DNA is trying to find consensus and common ground, trying to make sure that the people that are being born today are going to have a planet to grow up on and a planet to grow old on. As they grow up and grow old, they will have jobs that will enable them to support themselves and their families.

I mentioned earlier, I used to love to go to the Detroit Auto Show. They have always had it in January. Some of you may have been there. It was always cold. They moved the Detroit Auto Show now to June or July, and now we have the Auto Show here in the winter. I am happy they invited me to come by and speak at the D.C. auto show last month.

I was struck, as I walked around, I looked at the vehicles that were being offered at the auto show and thinking about, 10

years ago, when I was starting to first think about maybe buying an electric vehicle, being at the Detroit Auto Show, we had the Chevrolet Volt. It was a hybrid. It got about 38 miles on a charge.

But I walked around the year after that, and after that, and after that, and there just wasn't much coming along in terms of electric vehicles and hybrid vehicles. Boy, there is now. I was stunned when I walked around the huge showroom for the D.C. Auto Show. There were so many. It was not just little cars; it was SUVs, it was minivans, like my old Chrysler minivan, all kinds of vehicles that are being offered these days. It was exciting to see, and a lot of them are being built right here in America.

This is a glass half full deal. This is a glass half full deal. It is not going to be easy to get from here where we need to go, but it is imperative that we do that.

I will close with a quick story about Albert Einstein that I occasionally share in this committee, so hopefully you will not have heard it. I take the train to work; I take the train to go home most days. I love the train, I love Amtrak. I used to be on the Amtrak Board. Bill Clinton put me on the Amtrak Board and gave me a chance to help fashion and form the future of passenger rail in our Country a little bit.

This weekend, my wife and I had gone up to New York City to

celebrate the birthday of one of our sons. On our way back, we stopped at a train stop where Albert Einstein used to get on and off the train. He used to teach at Princeton. As we stopped in Princeton, at the train station, I was reminded of an Albert Einstein story about the day he got on the train to go someplace, and sometimes he would go to New York City, he would go to Washington, wherever he would go.

One day, he got on the train and got to a seat and started looking for his train ticket. He looked in his pants, he looked in his coat, he looked in his briefcase, he couldn't find it.

The conductor comes along and sees that Albert Einstein is in some duress. He said, Dr. Einstein, we know who you are. You don't have to worry about it. Just forget about your ticket. That is okay.

The conductor turned around to walk out of the car to leave, and he turned around just before he went into the other car. Albert Einstein was down on his hands and knees looking for his ticket. The conductor rushes back to Albert Einstein, and he says, Dr. Einstein, you don't have to do this. We know who you are. You ride the train all the time. We know who you are.

Dr. Einstein looked up and said, I know who I am, too, I just don't know where I am going. I just don't know where I am going.

I have a pretty good idea, I think we all have a pretty good idea, where we are going. There is a smart way to get there, and there is a less smart way to get there. The smart way to get there is to figure out how to work together to get to where we all need to go.

One of the ways we will do that is by learning from those, it could be some States or jurisdiction, whether they have taken a wrong approach, and we will learn from their mistakes, and there will be others where they are on to something, something good, and we want to learn from both. We want to learn from both. Your testimony today will help get us on the right path, I think. We appreciate it very, very much.

In closing, I want to again thank our witnesses for your time and for your testimony today. Clean fuels help safeguard our Nation's energy security, boost economic opportunity for our famers, and reduce greenhouse gas emissions. It has been over 15 years since Congress passed significant revisions to the Renewable Fuel Standard. Since then, American ingenuity and innovation, clean vehicle and clean fuel technology has advanced further than I think a lot of us would have imagined. With that in mind, I think it is time to revisit our national fuels policy.

I know this is not an easy issue to tackle. My dad used to say, you probably remember things your parents said to you. One

of the things my dad used to say to us was, the hardest things to do are sometimes the things that are the most worth doing. This is not an easy one, but it is an important one, if we want to reach our energy security and our climate goals.

As I said earlier, my hope is that today's conversation will help be the start of more conversations between my colleagues and us and our other stakeholders, and what a national fuels program could look like, should look like.

Before I adjourn, some housekeeping. Senators will be allowed to submit written questions for the record through the close of business on Wednesday, March 1st. We will compile those question; we will send them to each of you. We would ask you try to reply to us by midnight, March 1st. No, I am just kidding. We will ask you to reply to us by Wednesday, March 15th.

With that, without further ado, this hearing is adjourned. Thank you all.

[Whereupon, at 12:02 p.m., the hearing was adjourned.]