

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

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**HEARING**

BEFORE THE

**COMMITTEE ON AGRICULTURE  
HOUSE OF REPRESENTATIVES**

ONE HUNDRED SEVENTEENTH CONGRESS

SECOND SESSION

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JANUARY 12, 2022

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# **IMPLICATIONS OF ELECTRIC VEHICLE INVESTMENTS FOR AGRICULTURE AND RURAL AMERICA**

**WEDNESDAY, JANUARY 12, 2022**

HOUSE OF REPRESENTATIVES,  
COMMITTEE ON AGRICULTURE,  
*Washington, D.C.*

The Committee met, pursuant to call, at 10:05 a.m., in Room 1300 of the Longworth House Office Building and via Zoom, Hon. David Scott of Georgia [Chairman of the Committee] presiding.

Members present: Representatives David Scott of Georgia, Costa, Vela, Adams, Spanberger, Hayes, Delgado, Brown, Rush, Pingree, Kuster, Bustos, Maloney, Plaskett, O'Halleran, Carbajal, Khanna, Lawson, Craig, Harder, Axne, Schrier, Panetta, Bishop, Thompson, Austin Scott of Georgia, Crawford, LaMalfa, Davis, Allen, Kelly, Bacon, Johnson, Baird, Jacobs, Balderson, Cloud, Mann, Feenstra, Miller, Moore, Cammack, Fischbach, and Letlow.

Staff present: Josh Lobert, Ashley Smith, Luke Theriot, Paul Balzano, Patricia Straughn, Erin Wilson, and Dana Sandman.

## **OPENING STATEMENT OF HON. DAVID SCOTT, A REPRESENTATIVE IN CONGRESS FROM GEORGIA**

The CHAIRMAN. The hearing will come to order. Ladies and gentlemen, we are at a very historic moment for our nation. Who would have thought of it, even as soon as just a few years ago, that we would have this golden opportunity to be able to provide electricity that would motor our vehicles? But it is bringing on some very serious questions, some very serious issues, so that we know what it will take to make sure that our people in this country are well aware and will be able to take advantage and enjoy this movement, this great movement, that we are making to transition from petroleum for our vehicles to electricity.

And I want to welcome everyone to this hearing, and especially our witnesses, because we are looking to you to tell us what this means. What does it mean for jobs? What is the impact that this will have in rural America if we do not move and make sure that those in rural America can enjoy and be productive from this move we are making? I am sure that none of us want to deal with this move as we have with getting broadband internet into our rural communities. The whole issue is it is just not that if we go back to electricity. It took almost forever for it to get to rural America, which harvests our food and the necessities of our life, our clothing from textiles and cotton, from our forestry for lumber and our shel-

ter. When we deal with agriculture, when we deal with rural America, we are dealing with the heart and the soul of our great nation.

And so, I am so delighted to have all of you here and for us to move in this direction.

I want to also—before I get to that, I want to go over some basic housekeeping here. Let me just make sure that everyone understands how we will be proceeding. After brief opening remarks, Members will receive testimony from our witnesses today, and then the hearing will be open for questions. Members will be recognized in order of seniority, alternating between Majority and Minority Members, and in order of arrival for those Members who have joined us after the hearing was called to order. And when you are recognized, you will be asked to un-mute your microphone, and each of you will have 5 minutes to ask your questions and make your comments. And also, Members, please, if you are not speaking, I ask that you just remain muted in order to minimize background noise. And in order to get to as many questions as possible, the timer will stay consistently visible on your screen.

And now, before we begin, I want to welcome one of our newest Members, our newest Member who has just come to be with us just a few weeks ago. And so, we want to welcome Ms. Shontel Brown from Ohio, our newest Member. Welcome, Shontel.

Ms. BROWN. Thank you, Mr. Chairman.

The CHAIRMAN. It is great having you.

Ms. BROWN. Thank you.

The CHAIRMAN. You are welcome.

Now, I want to turn to my own opening statement for a moment. As I mentioned a little earlier, this is historic and I am so, first of all, grateful to our staff for pulling together this hearing and working it under the direction of Ms. Anne Simmons. Ladies and gentlemen, I am sure she won't mind, but I call her my Ethan Hunt. And for those of you who may not know who Ethan Hunt is, he is a character that is played by Tom Cruise in *Mission: Impossible*. But the thing here is, this Agriculture Committee staff I have now coined our Mission: Possible.

We are witnessing a point of major research and investment and adoption of electric vehicles across the country and the world, driven in large part in an effort to mitigate the impacts of climate change. And as with so many other of our technological advancements, like, as I mentioned a little earlier, electrification, broadband, telephone service, and even plumbing. I want to see that we make sure that our rural America is not left behind as they were left behind in movements to electricity, to plumbing, to all of the other areas. This is our duty.

I want to make sure that we can ensure the needs also of farming and agriculture. These are our vital producers of food, of our fiber, of so many other areas that we are working on. We need to know what impact this will have on the movement we have made to biofuels and other areas that our Agriculture Committee is working on. And as I mentioned about rural America, I want to just share with you an article from *The Atlanta Journal-Constitution*\* that really provides the essence of why we are here. It says

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\* **Editor's note:** the article referred to is located on p. 99.

here that Georgia has 1,500 EV charging stations, seventh out of 50 states and the District of Columbia. Metro Atlanta has 1,110 of them, the third highest among U.S. metro areas, according to real estate data provider, Yardi Matrix. But this is the major point. Outside of Atlanta, the article says, good luck. In rural America, good luck. On I-16 between Macon and Savannah, which is a 170 mile stretch of urban America, drivers pass only four charging stations, just off the interstate, according to the website PlugShare. This is why we are here, to make sure that we know what we are getting into.

And as anyone who lives in a rural community knows, our gas stations, our convenience stores are oftentimes the pillars of these communities. Many of them don't have the kinds of businesses and providers that we have in the urban areas. So, we need to know what is the impact of these businesses? What will this impact be?

And I am also hoping to hear about some of the positive developments that could come from a more widespread adoption of electric vehicles all across rural America. And with so many input costs fluctuating for our farmers, could electric vehicles also provide one additional stable cost on their balance sheet? And beyond that, how will this electrification of vehicles translate to tractors, to other farm elements, to the huge trucking operations that are vital in our food supply? We hope to find answers to this today. There are so many issues that will impact agriculture and our rural communities, and I want to ensure that this Committee has a seat at the table and that the voice of America's farmers, America's ranchers, America's foresters, and above all else, our rural residents who go to school, who make life livable in our rural areas are considered.

[The prepared statement of Mr. David Scott follows:]

PREPARED STATEMENT OF HON. DAVID SCOTT, A REPRESENTATIVE IN CONGRESS FROM  
GEORGIA

Good morning, and welcome to a hearing that I have been greatly looking forward to hosting. Today we will discuss the implications on rural communities and agriculture from the ongoing investment and adoption of electric vehicles.

We are witnessing a point of major research, investment, and adoption of electric vehicles across the country and the world, driven in large part in an effort to mitigate the impacts of climate change. As with so many other technological advancements like electrification, broadband, or telephone service, I want to see what can be done to make sure that rural America is not left behind. And to that point, I want to also ensure that the needs of agriculture and rural residents are being considered with these important developments.

As anyone who lives in a rural community knows, gas stations and convenience stores are often a pillar of those communities and are sometimes the only place for miles to get food. With the ongoing investment and transition to electric vehicles, we must know what the long-term impacts to these businesses will be.

I am also hoping to hear about some of the positive developments that could come from more widespread adoption of electric vehicles across rural America. With so many input costs fluctuating for farmers across the country, could electric vehicles provide one more stable cost on their balance sheets? And beyond that, how will this electrification of vehicles translate to tractors and other farm implements? I hope to find out today.

As with so many issues that will impact agriculture and our rural communities, I want to ensure that this Committee has a seat at a table and that the voice of America's farmers, ranchers, foresters, and rural residents are considered.

With that, I yield to Ranking Member Thompson for any opening remarks he would like to share.

The CHAIRMAN. And so, with that, I now would like to welcome our distinguished Ranking Member, the gentleman from Pennsylvania, Mr. Thompson, for any opening remarks he would like to make.

Thank you, Mr. Thompson.

**OPENING STATEMENT OF HON. GLENN THOMPSON, A  
REPRESENTATIVE IN CONGRESS FROM PENNSYLVANIA**

Mr. THOMPSON. Thank you, I am pleased to be with you today and being here in the middle of the week during 8 days when we celebrate the largest indoor agriculture exposition, 24 acres under one roof of the Pennsylvania Farm Show, the 106th annual show. It is going to go through this coming Saturday. I appreciate this hearing.

Mr. Chairman, electric vehicles are impressive feats of technology and engineering, and the substantial industry investment in EVs is testament to the hope that they can meet the varied needs of drivers across America, including in rural communities.

In recent years, the electrification of our transportation systems and the elimination of liquid fuels has been advertised as a critical component of the global fight to reduce carbon dioxide emissions. I am not sure that is completely proven yet, but maybe this hearing will help us with that. Last Congress, the Democratic Members of the Select Committee on the Climate Crisis called for eliminating internal combustion engines by 2035, and that is despite the fact that we have been using these and our CO<sub>2</sub> emissions have been steadily reducing as a result of a lot of what we do in agriculture, actually. Then this past August, President Biden pledged half of all new cars will be electric by 2030. I don't think he should be making those decisions for consumers, quite frankly. I am skeptical such top-down planning from Washington will meet the needs of rural residents. Congress should not be picking winners and losers. Drivers in the marketplace must decide what technology meets their transportation needs, especially rural residents for whom vehicles and private transportation are an essential service. And quite frankly, the utilization can be much different from what we see in densely populated urban areas. The ability to choose ensures vehicles remain a productive tool and not a technological burden to work around.

Now, while I am encouraged by the substantial investments being made by private industry in EVs, I do have a few honest concerns associated with this government-first drive to electrify the transportation system. Chief among those are, number one, who will finance the huge investments in electric generation and transmission capacity so that we don't wind up with brownouts and blackouts with the significant increase in demand when charging, new retail distribution points, and all the associated equipment? Who is going to finance that? Will electric vehicles be able to meet the needs of all drivers as efficiently as a conventional vehicle without demanding unacceptable tradeoffs in cost, range, capacity, or time of service, particularly for rural residents? I would throw in these wonderful cold temperatures we are experiencing right now would be a factor. What will the impact of a transition to EVs be on the liquid transportation fuel industry, particularly for the agri-



culture producers and the oil producers, two industries which have often formed the very foundation of regional rural economies? And number four, will expanding electric vehicle manufacturing increase our dependence on unfriendly, unstable, and under-regulated foreign nations for the raw materials necessary to build EV batteries?

Now I think those are fair questions, and perhaps we can find some solutions to those, or get some answers to them and then maybe some solutions.

Now, these potential costs associated with answering these questions must be balanced against the purpose of the policy, which is reducing global CO<sub>2</sub> emissions. That should be the driving force. If at the end of the day an accurate accounting of the total emissions associated with transitioning to electric vehicles fails to make a significant dent in global carbon dioxide emissions, then Congress must ask the difficult question of whether a national policy of promoting or imposing EVs is worth it. If not, what other policies could meet our goals of continuing to lower emissions, because America has done better than the nine countries that follow us in terms of reducing CO<sub>2</sub> emissions—what can we do to further our success at a lower cost and with more flexibility for consumers?

Now, this question is especially pressing for rural communities like those I represent in Pennsylvania's 15th Congressional District, which stands to bear the brunt of the cost of building new infrastructure and eliminating liquid transportation fuels. I am not sure that President Biden's Administration recognizes that liquid fuel's money are critical in doing the road maintenance for rural roads. Are the global emissions reductions worth the potential disruptions to rural communities, implications for our national security, and costs for our infrastructure?

Now, as we consider the impact of electric vehicles in rural America, we should ensure policies are in place which meet the needs of drivers and integrate these vehicles into the transportation system as seamlessly as possible, without exacerbating our public policy problems.

Now, I am really appreciative to all the witnesses that agreed to testify before us today. I want to thank each and every one of them for their time today, their expertise, and their willingness to share their perspectives. I look forward to hearing as each of you testify.

As I close, Mr. Chairman, I want to thank you again for holding this hearing. I appreciate your convening a panel of experts who can help us sort through our many questions.

And with that, I yield back the balance of my time.

The CHAIRMAN. Thank you, Ranking Member, and the chair would request that other Members submit your opening statements for the record so witnesses may begin their testimony and to ensure that there is ample time for questions.

[The prepared statement of Ms. Brown follows:]

PREPARED STATEMENT OF HON. SHONTEL M. BROWN, A REPRESENTATIVE IN  
CONGRESS FROM OHIO

Thank you, Chairman Scott and Ranking Member Thompson, for holding this hearing. And thank you to all the witnesses for joining us today.

We are currently at a great inflection point. How we approach the next 10, 20 years will determine where we will be in 50 years. The existential threat of climate

change to humankind is clearer than ever. People in Ohio and around the country are experiencing the dire consequences of climate change: devastating hurricanes in Louisiana, raging wildfires in California, harmful algal blooms in Lake Erie, and rising sea levels in south Florida, to name a few.

The generally accepted agreement that greenhouse gas emissions contribute to the threats has led many to electric vehicles (EVs) which are likely to have lower emissions than internal combustion engine vehicles (ICEVs). While U.S. auto sales declined 23% in 2020, the sales share of EVs increased two percent. My home State of Ohio has also seen a steady increase in EV registrations in recent years. The EV market is only going to continue to grow as consumer demand for the technology increases. It is prudent to begin examining this new technology, so we adequately address the needs of all stakeholders in America—urban, suburban, and rural.

As we work to transition to a clean energy economy, we owe it to our farmers and autoworkers to ensure they are not left behind. Many of them have spent generations feeding and powering our country, and their work has every bit as much dignity as the work of an EV battery manufacturer.

I am confident that the investment of EVs is a step in the right direction. It will supercharge America's efforts to lead the electric future that will allow us to remain competitive and strong in the days to come.

The CHAIRMAN. And now, I want to introduce our very distinguished witnesses, and our first witness is the Honorable David Strickland. Mr. Strickland is the Vice President of Global Regulatory Affairs for General Motors.

Our next witness is Mr. Lincoln Wood, the Electrification Policy Manager of our Southern Company, headquartered in Atlanta, Georgia.

Our third witness today is Mr. Matthew Laughridge, the owner and Managing Director of the Terry Reid Enterprises, on behalf of the National Automobile Dealers Association of Cartersville, Georgia.

Our fourth witness today is Mr. Trevor Walter, the Vice President of Petroleum Supply Management for Sheetz, Inc., and also on behalf of the National Association of Convenience Stores of Altoona, Pennsylvania.

Our fifth witness is Mr. Geoff Cooper, the President and Chief Executive Officer of the Renewable Fuels Association from Ellisville, Missouri.

And our sixth witness today is Mr. Josh Nassar, who is the Legislative Director for the International Union of the United Automobile, Aerospace, and Agricultural Implementation Workers of America, the UAW, here in Washington, D.C.

And our seventh and final witness today is Mr. Mark Mills, who is Senior Fellow at the Manhattan Institute from Chevy Chase, Maryland.

Thank you all for coming, and you represent the important industries. You all are the ones that will make this happen, and we thank you for it. I am so pleased to have such a distinguished panel before us today.

Each of you will have 5 minutes. The timer should be visible to you on your screen, and you will count down to 0, at which point, your time has expired.

Mr. Strickland, please begin when you are ready.

**STATEMENT OF HON. DAVID STRICKLAND, J.D., VICE PRESIDENT FOR GLOBAL REGULATORY AFFAIRS AND TRANSPORTATION TECHNOLOGY POLICY, GENERAL MOTORS, WASHINGTON, D.C.**

Mr. STRICKLAND. Here we go. Yes, I fell prey to the mute button once again, just like the Ranking Member.

Good morning. My name is David Strickland, and I am General Motors Vice President of Global Regulatory Affairs. I would like to thank Chairman Scott, Ranking Member Thompson, and the other Members of the Committee for inviting me to tell you more about General Motors commitment to an all-electric, zero emissions future, and the opportunities of electric vehicle investments for rural America.

At General Motors, our vision for the future is a world with zero crashes, zero emissions, and zero congestion. Building an inclusive, all-electric future is the right thing to do for the world, U.S. competitiveness, and our company, which includes more than 85,000 U.S. employees across the country. We are committed to bringing everybody in on this future, and we are working hard to ensure we leave no community behind.

While we can't achieve this alone, GM is committed to doing our part. We are on track to invest \$35 billion in electric and autonomous vehicles by 2025, and planning to launch more than 20 electric vehicles in North America over that same timeframe, including options at every price point and for every lifestyle. We are increasing range and decreasing costs of EVs to make them more affordable and accessible. In addition to our manufacturing incentives, we are investing \$25 million in our climate equity fund, which is dedicated to closing equity gaps in the transition to electric vehicles and other sustainable technologies.

We just revealed the Chevrolet Silverado EV, which is the vehicle in my background. This new electric pickup will integrate the capability Silverado customers have come to expect in terms of strength, durability, and performance. Silverado EV will offer a GM-estimated range of 400 miles on a full charge, which is a round trip from Atlanta to Albany, and with 664 horsepower, our customers in rural America will find it satisfies all their needs, both on and off the farm.

With GM's EV portfolio today and those that are just on the horizon, which includes a range of vehicles from pickups, SUVs, and commercial vehicles, we believe that no other auto maker matches the depth and range of our portfolio. To support this growing portfolio, we are converting large portions of our manufacturing footprint for EV production. GM is committed to bringing our workforce and our dealers with us on this journey, as well as to continue to create good-paying U.S. jobs.

By 2025, our North American EV assembly capacity will reach 20 percent, and climb to 50 percent by 2030. We have announced nearly 9,000 jobs and more than \$9 billion in new electric vehicle or battery cell manufacturing facilities in Michigan, Ohio, and Tennessee, and there is more to come. Furthermore, we are working to secure the raw material supply chain needed to build and grow at the scale required.

Another critical aspect of preparing communities for an all-electric future is ensuring access to charging. Today, charging deserts still exist in many rural and underserved areas. GM will invest nearly \$750 million to expand home, workplace, and public charging. We are developing a community charging program with our more than 4,000 dealers to expand access by installing up to 40,000 level 2 destination chargers at key locations throughout their communities, including rural communities. This is significant because nearly 90 percent of the U.S. population lives within 10 miles of a GM dealership. These charging stations will be interoperable, available to all EV customers, not just those who purchase a GM EV.

GM is leading integration with major EV charging networks to simplify the charging experience. Customers can use their app to see real-time information from over 100,000 charging spots throughout the U.S. and Canada. To get to an all-electric future, we must ensure customers can get from farm to city, from coast to coast.

Governments across the globe have recognized the competitive advantages to be gained by leading EV and battery technology. If the U.S. is to remain the global leader in automotive technology, several key policy elements are needed to help augment private-sector efforts in leading electrification. They include investing in infrastructure that includes fast charging stations along highway corridors. The IIJA's (Pub. L. 117-58) investments are an important first step, and we welcome the opportunity to work with the Committee to leverage existing USDA programs to further that effort. Investment tax credits to incentivize companies to establish battery and EV manufacturing capacity in the U.S., and to help build the U.S. supply chain, and also, consumer incentives, which include a modification to the EV tax credit for new and used vehicles, which has proven to be an effective accelerator for adoption.

As we implement our strategy, we have the opportunity to create a better future for generations to come. Thank you again for the opportunity to testify, and I look forward to answering your questions.

For just a small moment of personal privilege, I see that Representative Rush is on the call, on the hearing, and when I was first nominated and confirmed to be NIST Administrator, Mr. Rush called me to his office and gave me, frankly, some of the best advice that any new Federal executive could have, and the kindness he showed me I will never forget.

Mr. Rush, please enjoy getting home to your grandbabies, and thank you so much for all that you have done for me and for the country.

[The prepared statement of Mr. Strickland follows:]

PREPARED STATEMENT OF HON. DAVID STRICKLAND, J.D., VICE PRESIDENT FOR GLOBAL REGULATORY AFFAIRS AND TRANSPORTATION TECHNOLOGY POLICY, GENERAL MOTORS, WASHINGTON, D.C.

Good morning.

My name is David Strickland, and I am General Motors' Vice President of Global Regulatory Affairs. I want to thank Chairman Scott, Ranking Member Thompson, and the other Committee Members for inviting me to tell you more about General

Motors' commitment to an all-electric, zero emissions future and the opportunities of electric vehicle investments for rural America.

At General Motors, our vision for the future is a world with zero crashes, zero emissions, and zero congestion. The key to unlocking that vision is automobile electrification. Building an inclusive, all-electric future is the right thing to do for the world, U.S. competitiveness and our company—which includes more than 85,000 U.S. employees across the nation. We're committed to bringing everybody in on this future, and we are working hard to ensure we leave no community behind. While we can't achieve this alone, GM is committed to doing our part.

We are on track to invest \$35 billion in electric and autonomous vehicles by 2025, powering our plants to launch more than 20 electric vehicles in North America over that same timeframe—including options at every price point and for every lifestyle. We are increasing range and decreasing the cost of EVs to make them more affordable and accessible. In addition to our manufacturing investments, we are investing \$25 million in our Climate Equity Fund, which is dedicated to closing equity gaps in the transition to electric vehicles and other sustainable technologies.

Just last week at the Consumer Electronics Show, we revealed the Chevrolet Silverado EV. This new electric pickup will harness Silverado's proven credentials as the brand's best-selling nameplate and integrate the capability Silverado customers have come to expect in terms of strength, durability, and performance. Based on GM's revolutionary Ultium battery platform, Silverado EV will offer a GM estimated range of 400 miles on a full charge (a round trip from Atlanta to Albany), and with 664 horsepower, our customers in rural America will find it satisfies all their needs, both on and off the farm. The Silverado EV will be built in our first ever fully dedicated EV Assembly Facility, Factory Zero, which just opened in Detroit after a \$2.3 billion investment to retool the plant from the production of internal combustion engine vehicles.

With GM's EV portfolio today and those just on the horizon—including Chevrolet Silverado EV, Equinox EV, Blazer EV, Bolt EV and Bolt Electric Utility Vehicle, GMC Sierra EV, GMC HUMMER EV and EUV, Cadillac LYRIQ, and BrightDrop EV600 and EV450—GM believes that no other automaker today matches the depth and range of our all-electric portfolio. We will deliver electric vehicles that fit all needs and price points, for all customers, including those in rural America. To support this growing portfolio, we are converting large portions of our manufacturing footprint for EV production. GM is committed to bringing our workforce and our dealers with us on this journey as well as continuing to create good paying U.S. jobs as we transition to an all-electric future.

By 2025, our North American EV assembly capacity will reach 20 percent and climb to 50 percent by 2030. We have recently announced nearly 9,000 jobs and more than \$9 billion in new electric vehicle or battery cell manufacturing facilities in Michigan, Ohio, and Tennessee, and, there is more to come. This transformation has already happened at Factory Zero, and is underway in Spring Hill, Tennessee. To meet the demand for batteries, two of our battery plants are already under construction today in Ohio and Tennessee, and two more U.S.-based plants are also being planned as we build the scale that will enable us to lower the cost of EVs to make them accessible to everyone. Furthermore, we are working to secure the raw materials supply chain needed to build and grow at the scale required.

Another critical aspect of preparing communities for an all-electric future is ensuring access to charging. Today, charging "deserts" still exist in many rural and underserved areas that lack the critical EV charging infrastructure necessary for the more widespread adoption of EVs. GM is committed to helping expand access and offering ubiquitous charging solutions that can help meet customers where they are. Last year, we announced that GM will invest nearly \$750 million to expand home, workplace, and public charging. As part of this investment, we are developing a new community charging program working with our more than 4,000 dealers to expand access by installing up to 40,000 Level 2 destination chargers at key locations throughout their communities, including rural communities and other areas where charging is limited. This is significant, because nearly 90 percent of the U.S. population lives within 10 miles of a GM dealership. These charging stations will be available to all EV customers, not just those who purchase a GM EV. It is critical that America's charging infrastructure be an interoperable network.

Beyond this Dealer Community Charging Program, GM is leading integration with major EV charging networks to simplify the charging experience. Customers can use their GM brand mobile apps to see real-time information from over 100,000 charging spots throughout the U.S. and Canada, find stations along a route and initiate and pay for charging. We know that to get to an all-electric future we must ensure customers can get from farm to city, from coast to coast. We are working

with our partners, and with the Federal, state, and local governments to make this happen.

Many governments across the globe have recognized the competitive advantages to be gained by leading in electric vehicle and battery technology. China has included EV development as a key industry in their Made in China 2025 initiative and provided billions in government subsidies to develop their domestic industry. European countries have provided similar levels of support to domestic EV manufacturers. If the U.S. is to remain the global leader in automotive technology, several key policy elements are needed to help augment private sector efforts to lead in electrification. They include:

- **Investing in infrastructure** that includes fast-charging stations along highway corridors. We look forward to working with Congress and the Administration to implement funding plans from the recently enacted Infrastructure Investment and Jobs Act to make EV charging accessible to all, including rural communities. Further, we would welcome the opportunity to work with the Committee to leverage existing USDA programs to further support EV charging infrastructure. We are also committed to working with our dealers and community partners, using our learnings from years of electric vehicle experience, to make charging ubiquitous and convenient.
- **Investment tax credits** to incentivize companies to establish battery and EV manufacturing capacity in the U.S. and to help build out the U.S. supply chain for critical EV components. Investment tax credits can help ensure the U.S. remains competitive for capital.
- **Consumer incentives** including a modification to the EV tax credit for new and used vehicles, which has proven to be an effective accelerator for EV adoption. As we make significant investments to bring 20 models to market in the U.S. by 2025, we support a modification that lifts the cap.

As we implement our strategy, we have an opportunity and, frankly, a responsibility to create a better future for generations to come. Our mission is to leave no one behind. Thank you again for your invitation to testify on this topic that is critical to the future of our company, our customers, our industry, and our country. I look forward to answering your questions.

The CHAIRMAN. Thank you so much. I agree with you. Bobby Rush is legendary in terms of his leadership in representing the fine folks in Chicago.

Mr. Wood, please begin when you are ready.

**STATEMENT OF LINCOLN E. WOOD, ELECTRIFICATION POLICY  
MANAGER, SOUTHERN COMPANY, ATLANTA, GA**

Mr. WOOD. Chairman Scott, Ranking Member Thompson, Members of the Committee, thank you for having me here today to testify. I am Lincoln Wood, Electrification Policy Manager for Southern Company.

Southern Company, as you may know, is an Atlanta-based energy company. We serve nine million customers through our electric and gas subsidiaries across the country.

This is an important hearing on an important topic that, as already has been discussed today, there is lots of opportunity. In our understanding, electric vehicles are cheaper to operate, fuel, and maintain, and it represents an opportunity to decarbonize the transportation sector, which aligns well with Southern's net-zero carbon goals by 2050.

But first, I want to offer a bit of thanks to Congress for passing the bipartisan Infrastructure Investments and Jobs Act. The \$7½ billion of EV infrastructure that is allotted is a welcome development for EV drivers nationwide. Paired with regulated utility programs and private market investment, that will dramatically expand the availability of EV charging. Thank you.

To tell you a bit about Southern Company and our efforts, we have a long history in electric transportation and supporting the industry and our involvement continues to grow. For over 50 years, our research and development organization has been at the forefront of researching electric transportation technologies both on road and off road. We are a founding member of Energy Impact Partners, which is a clean tech venture capital fund, which counts EV charging among its product portfolio.

Our activities really can be broken down into six kind of big buckets, the first being rolling out public EV charging infrastructure, of course, but then paired with that, rates that incent EV charging, including mitigating the demand charge component where needed. The third piece of it would be fleet electrification, so if you have large customers that have fleet delivery vehicles or whatnot that can be converted into electric and they are interested in that, we have partners through a turnkey process that can help with that. We have a long history of industry involvement, with Southern being a founding member of two electric transportation industry organizations since 2017.

Workforce development and preparing the workforce for the future is a key area of focus for us. We are working with the University of Georgia, University of Alabama, and Mississippi State on e-Mobility curriculum development, and with that goes, of course, economic development for our cities, for our communities, for the states in which we serve. A battery plant, EV manufacturer, and a battery recycling plant announcement coming out of Georgia all in the past year are just three examples of the growth in the industry.

Of special note for this Committee, Southern Company is helping the Administration with their electrification goals where we are piloting the first ET turnkey service at Marine Corps Logistics Base in Albany, and we hope that process will be a, I guess, a template for us internally, but also one we can share with regulatory utilities nationwide.

So, as I came here today, I wanted to offer a few thoughts around where Congress could be helpful going forward, the first being an agriculture—Chairman Scott, to your point. There is a need to understand the implications of agriculture electrification. There could be a research program created. In doing that, it needs to be a multi-stakeholder process, so to have the manufacturer of the equipment, the utilities, of course, to understand the implications of charging, but also the farmers' involvement in that case so that they do not bear the full cost of the new equipment all by themselves. With that, we have a joint DOT/DOE Office of Transportation Electrification, so that agriculture still qualifies as moving people, moving good with electricity. So, whatever learnings we have there, we should be able to make sure those learnings are allocated to that DOE/DOT office. And Chairman Scott, I have to mention: I have contacts at UGA through our e-Mobility curriculum. I know UGA has a College of Agriculture, and I certainly can't speak for this school, but I think should it please the Committee, there are avenues we can explore on how we can get there and what action might be needed.

And the last piece I will leave you with would just be in terms of battery recycling. That is still an issue for the industry that we are working toward, but obviously through research budgets that come up, we want to fund research programs. That is a place we need to focus.

And a bit of personal privilege, just so you know, I am Atlanta-based, you may hear it in the accent. I actually drove to D.C. this week in an electric vehicle through rural North Carolina and Virginia, so 660 miles of gasoline-free driving. I am happy to be here, happy to answer your questions. Thank you for having me. [The prepared statement of Mr. Wood follows:]

PREPARED STATEMENT OF LINCOLN E. WOOD, ELECTRIFICATION POLICY MANAGER,  
SOUTHERN COMPANY, ATLANTA, GA

Chairman Scott, Ranking Member Thompson, and Members of the Committee, thank you for inviting me to testify today. My name is Lincoln Wood, and I serve as the Electrification Policy Manager of Southern Company.

Southern Company is one of America's largest energy companies, with 42,000 megawatts of generating capacity and 1,500 billion cubic feet of combined natural gas consumption and throughput volume serving nine million customers through its subsidiaries, as of July 31, 2021. The company provides clean, safe, reliable, and affordable energy through electric operating companies in three states, natural gas distribution companies in four states, a competitive generation company serving wholesale customers in 11 states across America and a nationally recognized provider of customized energy solutions, as well as fiber optics and wireless communications.

I am pleased to address the Committee today to share what steps Southern Company and its affiliates are taking to electrify the transportation sector. This is an important hearing on an important topic. According to EIA<sup>1</sup> the transportation sector is now the number one emitter of greenhouse gases; moving people and goods with electricity represents an un-paralleled opportunity to reduce the sector's carbon footprint. Additionally, it makes good economic sense—electric vehicles typically are cheaper to fuel, operate, and maintain.

First, on behalf of Southern Company, thank you to Congress for passing the bipartisan Infrastructure Investment and Jobs Act. The EV charging infrastructure investment of \$7.5 billion is a welcome development for the transportation sector and growing number of EV drivers nationwide. Paired with existing EV infrastructure investment both through regulated utility programs and private market investment, the Infrastructure Investment and Jobs Act will dramatically increase the availability of EV charging.

The energy we provide to charge electric vehicles continues to become cleaner. In 2018, Southern Company was among the first U.S. utilities to set a bold goal of net-zero greenhouse gas (GHG) emissions by 2050—and we're on the right track. We have rapidly transitioned our system's generation fleet. In 2020, the Southern Company system reduced GHG emissions 52% from its 2007 benchmark levels, exceeding its intermediate 2030 goal to reduce GHG emissions by 50%.

#### **Electric Transportation Programs**

Southern Company has a long history of supporting electric transportation. For more than 5 decades, Southern Company's world-class Research and Development (R&D) organization has remained at the forefront of innovation, including researching electric transportation technologies, both on-road and off-road. The Company is testing Smart Charging strategies to maximize the number of vehicles that can be charged with our current energy capacities, as well as ways to maximize range from battery packs. Additionally, Southern Company is a founding member of Energy Impact Partners,<sup>2</sup> a venture capital fund focused on clean energy technologies including electric transportation.

Southern Company's electric operating companies offer specific electric vehicle programs and pricing options designed to meet customer electric transportation requirements. Alabama Power and Georgia Power both offer EV rates that provide

<sup>1</sup> <http://www.eia.gov/todayinenergy/detail.cfm?id=29612>.

<sup>2</sup> <http://www.energyimpactpartners.com/>.



clean, reliable, and affordable electricity for all EV charging requirements, from home charging to public fast charging.

As part of DOE's Clean Cities Program, Southern Company affiliates hold board seats in Alabama Clean Fuels Coalition and Georgia Clean Cities. These organizations work to promote the use of domestic, affordable alternative fuels including electricity, and improve transportation efficiency at the local, state, and national levels.

Both Alabama Power and Georgia Power are actively supporting EV charging infrastructure rollouts in their respective states. Alabama Power Company (APC) contributed \$737k to Alabama Dept. of Economic and Community Affairs (ADECA) awardees served by APC to assist their installation of DCFC along Interstate Corridors at ten sites.

As the largest of SoCo's electric subsidiaries, Georgia Power Company (GPC) offers additional infrastructure programs to accelerate adoption of EVs. GPC offers EV charger rebates for both residential and business customers. The rebates range from \$100 to \$500 depending on the type and purpose of the installation.

Additionally, Georgia Power offers an EV time-of-use rate that offers 1¢/kWh charging overnight, which allows an EV customer to charge their vehicle all month long for about \$20.<sup>1</sup>

Georgia Power offers two regulated electric vehicle charging infrastructure programs:

Community Charging Program—Business & Residential (GPC branded charging).

- Georgia Power's Community Charging program provides fast-charging sites along travel corridors to give charging options and increase EV drivers' confidence traveling throughout Georgia. Through this program, Power is addressing gaps in EV corridors according to the Federal Highway Administration in hopes to help Georgia become "EV Corridor Ready."
- The Community Charging locations are sited in partnership with GPC commercial business customers on their properties. Through this structure, both the business (site host) benefits as well as the public who rely on the EV charging infrastructure to travel both short and long distances.

Make Ready Program—Business & Residential: this program pays for infrastructure from the electricity meter up to but not including the charger.

- Georgia Power's Make Ready EV infrastructure program provides charging infrastructure to business owners to significantly reduce the cost of installing chargers for public, employee, or their business operations use.
- The Company partners with a variety of business customers that want to install infrastructure to support electric mobility technology charging. Examples of customer installations include public transit agencies, warehouse applications, multifamily residential properties, colleges and universities, and many others.

#### **Additional Programs in 2022**

Southern Company Fleet Electrification Turnkey Offering: Strategic partnerships provide a turnkey offering for our customers who want to electrify their transportation fleets.

- Through strategic partnerships, each of Southern Company's electric subsidiaries offers:
  - software and consulting to analyze current fleet needs and understand the power implications of transitioning a customer's fleet.
  - resources for charging installation and financing, to effectively meet customers' needs and leverage any regulated utility programs.

#### **Southern Company Electric Transportation—Industry Involvement**

In 2020, Southern Company played a leadership role with the Department of Energy to produce a state-of-the-industry report, "Voices of Experience: An EV Transition".<sup>3</sup> This report represents the feedback from more than 3,500 industry stakeholders worldwide, representing 700 unique entities. Topics covered include deploying EV charging infrastructure, managing load, fleet electrification, new technology implications, and conventional fuel retailing.

Southern Company is a founding member of two dynamic electric transportation trade associations, the Alliance for Transportation Electrification, and the Zero Emissions Transportation Association.

<sup>3</sup><http://www.evplusgridworkshop.com/>.

Established in late 2017, the Alliance for Transportation<sup>4</sup> (ATE) is state-focused, aligning EV policy at the state level. Counting automakers, utilities, EV charging providers, engineering firms, and standards-based organizations in its membership roster, ATE is one of North America's largest electric vehicle industry coalitions. Priorities include:

- Increasing EV charging infrastructure
- A strong utility role in EV charging
- A “big-tent” approach for all stakeholders
- Open standards among EV charging hardware and firmware

The Zero Emission Transportation Association<sup>5</sup> (ZETA) was established in 2020 with a singular vision: 100% electric vehicle sales in 2030. ZETA's policy focus is at the Federal level; policy pillars span light, medium, and heavy-duty vehicles; recommendations for a national charging initiative, domestic manufacturing, performance and emissions standards, and Federal leadership.

Southern Company is a founding member of the National Electric Highway Coalition<sup>6</sup> (NEHC). The NEHC, which was announced in December 2021, is comprised of 50 investor-owned utilities, one electric cooperative, and the Tennessee Valley Authority, and represents approximately 120 million U.S. electric customers across 47 states and the District of Columbia. The NEHC is committed to providing electric vehicle (EV) fast charging stations so that the public can drive EVs with confidence along major U.S. travel corridors by the end of 2023.

#### **Workforce Development**

In 2021, Southern Company and Georgia Power partnered with the University of Georgia's College of Engineering to create an e-Mobility Certificate program. With elements of engineering, public policy, public health, and business acumen, this new program will prepare Georgia's workforce for an electrified future. The Company is also working closely with design students at Georgia Tech to evaluate the environmental benefits and future workforce opportunities of transportation electrification.

Also in 2021, Alabama Power, in partnership with Mercedes-Benz and the University of Alabama, launched the Alabama Mobility and Power (AMP) Center in Tuscaloosa. The AMP Center will serve as a research and development hub for creating and sustaining modern mobility and power technologies, developing charging infrastructure and managing power delivery to support large-scale growth in electric vehicles.

#### **Considerations for Ongoing Congressional Assistance**

As Congress looks to 2022 and beyond, I wanted to leave you with a few ideas to provide additional support to transportation electrification:

- Create a multi-stakeholder, agriculture-focused electrification research program where new technology can be tested at reduced risk to farmers
- Continue to provide budgetary support to ARPA-E and other research programs, especially battery recycling and autonomous technologies
- Consider funding a specific electric vehicle education center at the Federal level as a resource for K-12, technical schools, and universities nationwide, using the joint DOT and DOE office as a starting point

I am honored to have the chance to testify. I look forward to your questions.

The CHAIRMAN. Thank you.

Now, Mr. Laughridge, please start when you are ready. You may need to un-mute, Mr. Laughridge. Okay.

#### **STATEMENT OF MATTHEW LAUGHRIDGE, OWNER AND MANAGING DIRECTOR, TERRY REID ENTERPRISES, CARTERSVILLE, GA; ON BEHALF OF NATIONAL AUTOMOTIVE DEALERS ASSOCIATION**

Mr. LAUGHRIDGE. Mr. Chairman, Ranking Member Thompson, Members of the Committee, my name is Matt Laughridge, and I am a Hyundai/Genesis dealer in Cartersville, Georgia. I am hon-

<sup>4</sup><http://www.evtransportationalliance.org/>.

<sup>5</sup><http://www.zeta2030.org/>.

<sup>6</sup><https://www.eet.org/issuesandpolicy/Pages/NEHC.aspx>.

ored to appear here today representing the National Automobile Dealers Association, or NADA, a national trade association with more than 16,000 franchise new car and truck dealers. Most NADA members are small businesses, and franchise dealers employ more than one million Americans.

Mr. Chairman, the transition from internal combustion engines to electric is well underway. Dealers right now are making substantial investments to sell and service the dozens of new electric vehicles, or EVs, which automakers already or will soon be manufacturing. NADA estimates that dealers nationally will spend between \$2 to \$3 billion installing electric chargers, purchasing special equipment, and investing in training sales and service personnel.

Franchise dealers are not only all in on selling and servicing EVs, dealers are essential to the speedy adoption. With EVs currently comprising 2.9 percent of sales, dealers will be critical in transitioning from internal combustion vehicles to EVs. As with any unfamiliar technology, consumers will need to be educated on owning and operating EVs. Consumers will need a reliable, nationwide network of qualified service technicians to service their EV or perform safety recalls. Consumers will also want a place where they can kick the tires, test drive a new EV, trade in their old vehicle, and obtain affordable financing, preferably all under one roof. The dealer network is perfectly positioned to assist consumers with the transition to electric vehicles, as franchise dealers already perform all these necessary services.

The franchise dealer model benefits rural America. In some communities, the franchise dealership is one of the largest private employers. Many franchise dealerships are family-owned and operated, and have served their local community for decades, just like mine. State vehicle franchise laws are also key ensuring price competition and market success for EVs. As Members may be aware, states traditionally license and regulate the distribution, sale, and service of vehicles within their state, including EVs. These laws are based on the state's interest to protect consumers, preserve price competition, support local jobs, and provide local tax revenue. These laws also regulate the economic relationship between dealers and automakers which ensure small dealers in rural areas are treated fairly. We urge Congress to preserve the states' traditional role to regulate vehicle commerce by rejecting any attempt to preempt state dealer franchise law.

Mr. Chairman, America's franchise dealer will help usher in the next chapter of American automotive history by doing what dealers do best: providing our customers with reliable and affordable private transportation.

Thank you for the opportunity to testify.

[The prepared statement of Mr. Laughridge follows:]

PREPARED STATEMENT OF MATTHEW LAUGHRIDGE, OWNER AND MANAGING DIRECTOR, TERRY REID ENTERPRISES, CARTERSVILLE, GA; ON BEHALF OF NATIONAL AUTOMOTIVE DEALERS ASSOCIATION

Mr. Chairman, Ranking Member Thompson, Members of the Committee, my name is Matt Laughridge, and I am a Hyundai/Genesis dealer based in Cartersville, Georgia. I'm honored to appear before you today representing the National Automobile Dealers Association (NADA), a national trade association representing more

than 16,000 franchised new car and truck dealers, most of whom are small businesses as defined by the Small Business Administration, and who collectively employ more than one million Americans.

Mr. Chairman, this hearing is timely, as the transition from internal combustion engines (ICE) to electric is well underway. Dealers right now are making substantial investments to sell and service the dozens of new electric vehicles (EVs) which automakers already are or will soon be manufacturing. In the aggregate, NADA estimates that dealers across America will spend between \$2 to \$3 billion on installing electric chargers, purchasing special equipment, parts and tools, and investing in training sales and service personnel. My two dealerships have already committed to spend \$160,000 in upgrades to prepare for future EV sales.

Franchised dealers are not only “all-in” on selling and servicing EVs; dealers are essential to their speedy adoption by consumers. With 283.8 million vehicles on the road today, and EVs currently only comprising 2.9% of sales, dealers will be critical to advancing the process of transitioning from ICE vehicles to EVs. As with any unfamiliar technology, consumers will need to be educated on owning and operating an EV. Customers will also need a reliable nationwide network of qualified service technicians to service their EV or perform safety recalls. Customers will also want a place where they can “kick the tires,” test drive a new EV, trade in their old vehicle, and obtain affordable financing—preferably under one roof.<sup>1</sup>

The good news is that all this infrastructure is already in place, as franchised dealers across the country perform these necessary services for tens of millions of Americans annually. In 2021 through thousands of retail locations nationwide, franchised dealers sold a total of 14.9 million new vehicles and 15 million used vehicles, while completing 279 million service and repair orders. Clearly, consumers trust their local franchised dealers to meet their individual transportation needs, so this expansive retail network is perfectly positioned to assist customers with the transition to electric vehicles.

The franchised dealer model especially benefits rural America. In some small communities, the franchised dealer is one of the largest private employers. Many franchised dealerships are family owned and operated and have served their local community for decades.

As Members may be aware, states traditionally license and regulate the distribution, sale and service of vehicles within their state, including EVs. These laws are based on the states’ interest to protect consumers, preserve price competition, support local jobs and provide local and state tax revenue.<sup>2</sup> These laws not only protect consumers, but also regulate the economic relationship between dealers and automakers, which helps to ensure small dealers in rural areas are treated fairly.

However, some in academia claim that EVs are significantly different from ICE vehicles. These academics believe that Congress should circumvent these long-standing state laws which provide consumer protections and regulate vehicle commerce—but only for EVs. They claim that “[d]ealerships are often found in out-of-the-way locations” and EVs should be offered “in places like shopping malls and city centers.”<sup>3</sup>

This argument ignores one of the key benefits of a national franchised dealer network—that no one part of America is forsaken. As a rural dealer, I can attest that my customers find my dealerships conveniently located, and even an “out of the way location” can be a godsend for the traveler who breaks down on the road, far away from a city center or shopping mall. The jobs and local tax revenue my dealerships provide also help keep my community vibrant.

Mr. Chairman, it makes no sense to have a system where the sale of one vehicle is under one set of rules and the vehicle next to it is under no rules at all. Additionally, the assertion that EVs are significantly different from ICE vehicles, and that this justifies nullifying every state franchise law protecting local businesses and their customers is simply false. Last year, over 135,000 EVs were sold by franchised dealers, and it is likely dealers will be selling more EVs as new models are introduced. An EV is still a motor vehicle, and dealers know how to sell and service the

<sup>1</sup>For example, the Georgia Automobile Dealers Association has created the “Georgia in Charge” dealer network, which establishes criteria relating to the sale and service of EVs. Participating dealers must commit to the criteria.

<sup>2</sup>See *Franchise Law Journal*, “An American Solution: Automotive Franchise Laws Serve Local Communities and Consumers,” pgs. 665–680, (2021) [https://www.americanbar.org/content/dam/aba/publications/franchising\\_law\\_journal/spring21/franchiselaw-spring21.pdf](https://www.americanbar.org/content/dam/aba/publications/franchising_law_journal/spring21/franchiselaw-spring21.pdf)

<sup>3</sup>Open Letter by Academics in Favor of Direct EV Sales and Service, Apr. 14, 2021.

vehicles their customers want. State vehicle franchise laws are key to ensuring price competition<sup>4</sup> and market success for EVs.

We urge Congress to continue to preserve the states' traditional role to license and regulate vehicle commerce by rejecting any attempts to preempt state dealer franchise laws.

Obviously, the transition from ICE vehicles to EVs will present challenges, especially in rural America where distances can be great. In the near future, we expect that the majority of EV customers in rural areas will be commercial, centrally charged fleets owned by small businesses which serve rural communities and agricultural operations ranging from small family owned to larger commercial farms.

Another challenge that will disproportionately impact rural America is the ease and availability of public charging. Today any gasoline-powered vehicle can be refueled at any gasoline pump, but not every EV charger is compatible with every EV. In our view, one of the biggest potential impediments to widespread EV deployment could be avoided if all publicly funded charging stations were made non-proprietary and EVs were standardized so they could be recharged at any charging station. Dealers are also committed to working with local utilities to help ensure that public charging is rolled out in an effective manner.

Additionally, rural Americans are more likely to purchase sport utility vehicles and pick-ups, both of which are underrepresented in the EV market. Last year, 77% of the fleet sold in the U.S. were light-duty trucks. In some states, the percentage of light duty trucks is notably higher. For example, 80% of vehicle sales in Maine are light duty trucks, and in Michigan, 84% of the fleet sold were light duty trucks.<sup>5</sup> We expect this situation to improve for rural Americans as more electric light duty truck models are introduced in the coming years.

Mr. Chairman, the auto industry is always changing. A little over 100 years ago, dealers who sold wagons drawn by horses began the transition to selling vehicles propelled by fossil fuels. While the internal combustion engine has been a mainstay for the past century, America's franchised dealers have adapted over the years as the technology in motor vehicles has evolved dramatically, reducing environmental impact, increasing safety and enhancing the consumer experience. For example, the sophisticated driver assist functions in vehicles today are much more advanced compared to vehicles manufactured just a few years ago. Our role in explaining these enhancements to our customers keeps evolving with the technology. In some ways, I expect the transition to EVs may be less dramatic, as the manufacturers we represent send us EVs that match the functionality of the ICE vehicles on the road today. America's franchised dealers look forward to helping usher in the next chapter of America's automotive history by doing what dealers do best: selling and servicing automobiles that provide our customers with reliable and affordable private transportation.

Thank you again for the opportunity to testify and I look forward to answering any questions you may have.

The CHAIRMAN. Thank you very much.  
Now, Mr. Walter, you may begin.

**STATEMENT OF TREVOR WALTER, VICE PRESIDENT OF  
PETROLEUM SUPPLY MANAGEMENT, SHEETZ, INC.,  
ALTOONA, PA; ON BEHALF OF NATIONAL ASSOCIATION OF  
CONVENIENCE STORES**

Mr. WALTER. Chairman Scott, Ranking Member Thompson, and Members of the Committee, thank you for the opportunity to testify today. My name is Trevor Walter, and I am the Vice President of Petroleum Supply Management at Sheetz. I am testifying today on behalf of the National Association of Convenience Stores.

The companies that currently provide transportation energy to motorists are well-positioned to play an important role in decarbonizing the transportation sector through the sale of cleaner

<sup>4</sup>See T. Randolph Beard, George Ford & Lawrence J. Spiwak, "Spatial competition in automobile retailing," *Applied Economics*, (2021), <https://www.nada.org/WorkArea/DownloadAsset.aspx?id=21474865303>.

<sup>5</sup>Alliance for Automotive Innovation, "Economic Impacts: Every State is an Auto State" <https://www.autostinnovate.org/resources/insights>.

liquid fuels and alternative technologies, such as electricity. We want to partner with Congress to help achieve environmental goals in a market-oriented and consumer-friendly manner.

We know that one of the challenges to the development of the electric vehicle market is consumer perceptions on the availability of chargers, often referred to as range anxiety. These perceptions often do not match reality. By far, the best way to address this problem is for more chargers to be deployed. Our industry's locations are purposely visible. People already have established patterns using them, and we typically show the prices of fuels we offer on large signs that motorists can see as they are driving. When drivers are able to readily see that they can get electricity the same way and in the same places they refuel now, range anxiety will no longer be an impediment to the purchase of the vehicles.

The importance of our industry to tackling this problem is particularly relevant to rural America. Eighty-six percent of Americans living in rural America live within 10 minutes of a convenience store. This shows the remarkable reach of our industry. This reach is even more true in urban areas, as 93 percent of Americans overall live within 10 minutes of a C store.

For our industry to play an important role and for charging to be good for consumers, the sale of electricity must be reformed such that a functioning retail market for selling electricity to vehicle drivers emerges. We have several impediments to that today. First, utilities hit commercial users of electricity, such as convenience and fuel retailers, with punitive demand charges. Given the large electricity demands associated with fast chargers, these demand charges overwhelm the cost of electricity and make it impossible for retailers to sell electricity and make a profit.

Second, many utilities have had the rates they charge adjusted so that residential and business customers pay higher rates in order to underwrite the construction and operation of EV chargers. This, too, creates an unlevel playing field and prevents a competitive market from emerging because other businesses that deploy chargers must try to recover construction and operating costs from vehicle drivers themselves.

Third, a handful of states still prohibit businesses from selling electricity to vehicle drivers. They only allow regulated utilities to do that. This makes businesses with chargers engage in awkward practices such as renting the chargers based on time spent on a charger, rather than selling electricity. This makes for confusing experiences and stunts the growth of the market. These barriers must be addressed.

We should also take advantage of healthy competition among technologies to reduce carbon. One of those technologies is the renewable fuels that are part of our system of powering vehicles today. Those renewables are responsible for some of the largest gains we have made in decarbonizing the transportation sector.

Unfortunately, some policymakers want to pick technology winners and losers, rather than allowing competing options to deliver the best environmental results they can. The risk is that we may pick wrong and miss some benefits. There is also a risk that too much of one technology will be more than the system can bear. Specifically, those who would ban internal combustion engines are

making a grave mistake. Such a ban would end investment in those technologies and the technologies that fuel them. A ban would set renewable fuels on a path to elimination, and would cause economic hardship for the farmers who produce and sell the feedstocks for those fuels. Those farmers have relied on the long-term policy decisions that Congress has made to gear their operations towards production of these feedstocks and renewables. To pull the rug out from under them now would betray their trust.

The problem for us to focus on is on carbon emissions, not the internal combustion engine. That is why technology-neutral performance goals that honestly take into account the life cycle of carbon emissions in the supply chain, including the carbon emissions from electricity generation, must be part of the foundation for sound policy. And that is why this Committee has such an important role to play in this debate. This Committee has a recognition of the role played by agriculture in transportation fueling and decarbonization that must be part of policy in this area.

We look forward to working with the Committee to deal with these questions and come up with policies that most effectively support reducing carbon emissions and delivering a market that brings reliable, sustainable, and cost-effective energy to American consumers.

[The prepared statement of Mr. Walter follows:]

PREPARED STATEMENT OF TREVOR WALTER, VICE PRESIDENT OF PETROLEUM SUPPLY MANAGEMENT, SHEETZ, INC., ALTOONA, PA; ON BEHALF OF NATIONAL ASSOCIATION OF CONVENIENCE STORES

### **I. Summary of Testimony**

The retail fuel industry is an indispensable asset to any alternative source of powering vehicles, including electricity and renewable fuels, that lower the carbon footprint of transportation fuel in the United States. Fuel retailers should be viewed as surrogates for the consumer in that we identify the most reliable, lowest cost transportation energy available, and deliver that energy to every community in the country. In so doing, we compete with one another on price, speed, and quality of facilities and service.

To be effective, policies designed to encourage private sector investment in alternative fuel infrastructure, including but not limited to electric vehicle (“EV”) charging stations, must be based upon clear policy signals that such alternatives create attractive economic propositions for our industry and for our customers.

This can be done. Not even 2 decades ago, Congress passed the Renewable Fuel Standard (“RFS”). Although the RFS is far from perfect, it created market incentives for fuel retailers to invest in new fuel dispensers and storage infrastructure to accommodate higher amounts of biofuel. Many fuel marketing companies have invested in the physical and intellectual capital necessary to participate in agriculture and commodities markets. Fuel retailers did this in order to efficiently incorporate those products into our fuel supply in a manner that improved fuels’ greenhouse gas (“GHG”) footprint while also enabling us to sell the alternative fuel to customers for less money at retail than purely petroleum-based fuels. This has caused more customers to gravitate toward those cleaner burning fuels and renewable fuels should not be abandoned in our collective effort to increase the availability of electricity as a vehicle fuel. Doing that would be harmful to the environment and to rural economies.

Our industry is eager to work with policymakers, such as the House Committee on Agriculture, to find market-driven ways to address concerns about carbon. To do that, Federal policy should incentivize and leverage private investment in bringing to market a variety of alternatives. Equally important, Federal policies should not undercut the incentives for retailers to invest in alternatives such as EV charging. There has to be a viable pathway to profitability for any alternative to gain any meaningful market share.

For any solution to work, it must promote competitive market dynamics and work with consumers’ existing behavior and the business infrastructure we have. If policy

does that and ensures a functioning private market—then private dollars will make sure infrastructure is there to meet consumers’ needs. If that is not done, it is likely that any public dollars spent will be stranded and wasted in ways that do not serve an appreciable number of consumers and cost far more than any benefit they produce.

At the moment, there are several impediments that make it challenging for fuel retailers to find a pathway to profitability with respect to EV charging. Most of these impediments involve an electricity market structure that was not designed for—and is not surprisingly incompatible with—the competitive retail fuel market.

Foremost among these obstacles is the threat of regulated utilities making use of their status as monopolies to gain a competitive edge over private businesses. Throughout the country today, for example, regulated utilities are seeking to convince public utility commissions that they should be able to charge all of their ratepayers—regardless of income—a higher dollar figure on their monthly electric bill in order to underwrite the utilities’ investment in EV charging stations. Private companies do not have access to such a pool of risk-free capital. What’s more, many regulated utilities want to bill EV charging station owners more money for electricity than their own cost to power their utility-owned chargers by adding extra tariffs or fees, such as demand charges. If these efforts persist, fuel retailers will not consider EV charging stations to be an attractive investment. No amount of grant money or tax incentives will change that fundamental reality.

On the flip side, if policymakers signal that there must be a productive partnership between utilities and fuel retailers, with each sector incentivized to concentrate on its core competencies, progress can be made faster and at a lower cost. For utilities, the focus should be on modernizing the power grid and ensuring a reliable and adequate supply of clean power to meet dramatic increases in demand that will come with enhanced EV penetration. At the same time, the market dynamics that govern the retail fuel industry today should be replicated to accommodate EVs. This will ensure that customers have multiple fueling options at locations where they travel every day that are competing for their business.

Simple, modest guardrails around how any Federal money going to alternatives such as electric vehicle charging can be used to leverage rather than waste Federal dollars, such as was included in the Infrastructure Investment and Jobs Act. Any future Federal incentives for EV charging infrastructure should stipulate that businesses that are putting capital at risk in order to own and operate EV charging stations are prioritized over other potential funding recipients. This, in conjunction with other tax credits and incentives, can move us toward a viable business model, rather than exacerbating the various challenges that already exist.

Such guardrails have been crafted in a way that would impose no limitations on utilities’ ability to use ratepayer funds and access Federal funds for any infrastructure development up to and until the point of owning and operating the chargers and allows utilities to compete with the private sector with no disadvantage if they are putting their own capital at risk and not increasing all of their customers’ electricity bills to pay for EV chargers.

Replacing the highly familiar, price competitive fuel market in place today with the opaque and monopolistic pricing of electricity would reduce efficiency, raise costs, and impose large regressive costs on lower income Americans. That is not an attractive solution.

Changes must also be made to electricity pricing related to EV charging. Retailers with EV chargers today are forced to pay retail prices for electricity that include very high demand charges. There is no business case for buying at retail prices and selling at retail prices. Regulated utilities that own and operate their own charging stations, on the other hand, are not subject to demand charges and thus have an insurmountable competitive advantage over anyone else in that market.

For the private market to work, there must be a pathway to retailers buying electricity at wholesale prices (like the internal transfer cost that utilities have to deliver electricity) without punitive demand charges. That would make the economics work not only for retailers but, more importantly, for consumers.

In addition, retailers must be allowed charge EV drivers for the cost of electricity by kilowatt/hour and not be regulated as a utility. Though many states are addressing this issue, there remain over a dozen states that have not addressed this impediment for private sector investment in EV charging.

The bottom line is that any changes to the transportation energy mix must make it work for American consumers—which means those changes must work for our industry. Fuel retailers already have the real estate that customers visit when they refuel. The industry offers the services and amenities that consumers have come to expect alongside the refueling network (such as foodservice facilities, restrooms, se-



curity, and the like). Until consumers see alternatives like electricity at the outlets where they currently refuel, they will not adopt those alternatives in large numbers.

Fuel retailers are surrogates for the consumer. If you ensure there are competitive market dynamics governing refueling—including alternatives like electricity—you will make the transition more affordable and attractive for the public. We are eager to work with you to ensure policy accounts for that reality.

## II. Introduction

Chairman Scott, Ranking Member Thompson, and Members of the Committee, my name is Trevor Walter. I am the Vice President of Petroleum Supply Management at Sheetz, Inc.—a Pennsylvania-based marketing and retail company with locations primarily in the mid-Atlantic area of the country—and am testifying today on behalf of the National Association of Convenience Stores (NACS). The fuel retailers that currently provide transportation energy across the United States, including Sheetz, are well positioned to play an important role in the development of infrastructure to offer American motorists not only traditional liquid motor fuels but also a range of alternatives, including electricity to power their vehicles, so long as the policy framework and incentive regime established facilitates a competitive and level playing field. In fact, it is nearly impossible to effectively decarbonize the transportation sector without working with our industry to offer a range of alternatives to our nation's drivers.

## III. Background

Sheetz operates 637 retail fuel and convenience stores across six states: Pennsylvania, Ohio, West Virginia, Maryland, Virginia and North Carolina. Sheetz employs around 23,000 individuals across its divisions and subsidiaries. More than half of our stores offer E15 and E85 fuels for our customers. In fact, our sales of E15 have grown 92 percent since 2019 and more than 300 percent since 2017.

With respect to electric vehicle charging, we were one of the first retailers in the nation to offer EV chargers more than a decade ago. We currently offer EV charging at 78 locations and plan to grow that offer. But, to date, charging electric vehicles has not been a financial winner for our company due to the market impediments that I describe in this testimony. We are eager to work with Congress to help ensure that these substantial investments can become beneficial for everyone.

The National Association of Convenience Stores (NACS) is an international trade association representing the convenience store industry with more than 1,500 retail and 1,600 supplier companies as members, the majority of whom are based in the United States. We are also a member of two other national trade associations representing our industry—the National Association of Truck Stop Operators (NATSO) and the Society of Independent Gasoline Marketers of America (SIGMA). NATSO currently represents more than 4,000 travel plazas and truck stops nationwide, comprised of both national chains and small, independent locations. SIGMA represents a diverse membership of approximately 260 independent chain retailers and marketers of motor fuel.

The industry as a whole represents approximately 90 percent of retail sales of motor fuel in the United States. The fuel wholesaling, fuel retailing and convenience industry employed about 2.34 million workers and generated more than \$548.2 billion in total sales in 2020, representing more than three percent of U.S. gross domestic product. Of those sales, approximately \$292.6 billion came from fuel sales alone.

Members of the industry process more than 160 million transactions every single day.

That means about half the U.S. population visits one of the industry's stores on a daily basis. In fact, ninety-three percent of Americans live within 10 minutes of one of our industry's locations. These businesses are particularly important in rural areas of the country that might not have as many large businesses. In these locations, the convenience store not only serves as the place to get fuel but is often the grocery store and center of a community.

The average time a customer spends in a convenience store is about 3½ minutes and industry members compete to ensure the customer's needs are met as efficiently as possible—saving them time and money.

Our industry's sole objective is to sell legal products, in a lawful way, to customers who want to buy them. While agnostic as to what types of fuel they sell to satisfy consumer demand, industry members do have a bias: they believe it is best for the American consumer and America's industrial position in the world marketplace to have reasonably low and stable energy prices.

### A. Environmental Transportation Policy Principles

The industry believes the most expeditious and economical way to achieve environmental advancements in transportation energy technology is through market-oriented, consumer-focused policies that encourage our industry to offer more alternatives. With the right alignment of policy incentives, the private-sector is best equipped to facilitate a faster, more widespread, and cost-effective transition to alternatives—including electricity—in the coming years.

Policies attempting to improve the environmental characteristics of transportation energy in the United States should adhere to the following principles:

- (1) *Science should be the foundation for transportation climate policies*—Any effort to improve transportation energy’s emissions characteristics requires an accurate accounting of the lifecycle carbon intensity associated with particular fuels and technologies. This analysis should include everything from acquisition of natural resources, engine and battery manufacturing, tailpipe emissions, and vehicle end-of-life consequences. It should also be regularly updated so that policy is nimble enough to adjust to efforts to innovate and improve the environmental characteristics of different alternatives. Additionally, every sector of the economy should assume a burden of reducing carbon emissions.
- (2) *Establish performance goals without mandating specific technologies to allow for the benefits of innovation and technology development*—Sound policy must recognize that the state of technology can change rapidly, and tie incentives to technologies’ lifecycle environmental attributes rather than the underlying technology itself. No one solution will decarbonize transportation energy and policies should incentivize multiple technologies. What policymakers think is the best solution today may be surpassed by subsequent ingenuity and innovation. Sound policy should not stifle innovation by mandating specific fuel solutions. Instead, policy should set performance goals and let the market—guided by consumers—innovate to find the best way to meet those goals.
- (3) *Develop competitive market incentives to ensure a level playing field and provide long-term consumer benefits*—As described in more detail below, fuel retailers today are best positioned to provide alternative sources of transportation energy—including EV charging stations—because we are fuel agnostic and have a keen understanding of consumer preferences and tendencies. Fuel retailers have strategically located themselves where refueling demand is greatest and they compete with one another on price, speed, and quality of service. Moreover, fuel retailers offer the security and amenities that consumers demand regardless of the type of fuel their vehicle consumes. Fuel retailers have made investments in renewable fuels and existing alternative fuel incentives allow retailers to offer lower carbon fuels to consumers at a price at which they are willing to purchase them.
- (4) *Harness existing infrastructure to help commercialize new technology, maximize diverse investments, and achieve near-term and long-term emission reduction goals*—It is far less expensive to leverage existing infrastructure than create entirely new supply chains and infrastructure. To the extent environmental objectives can be achieved by harnessing existing infrastructure, especially retail fuel outlets, customers will more seamlessly gravitate to new types of fuels and vehicles. American companies have spent more than sixty years building out a refueling infrastructure system that optimizes logistics and maximizes customer benefits. Deployment of new technology that complements this infrastructure will (all else being equal) be less expensive and thus more likely to generate consumer loyalty.
- (5) *Set consistent, uniform national policy so that (i) the market has certainty to help it invest, and (ii) state policies do not create inconsistent or counterproductive measures*—Federal policy should be designed to lower the cost of alternative fuels to make those sources of transportation energy more competitive with petroleum-based fuels. This is the only way to ensure that consumers will gravitate toward low carbon technologies. Although some state incentive programs adopt this approach, others have vacillated between different approaches in a way that does not allow private market participants to plan long-term investments in alternatives. These inconsistent policies are ultimately self-defeating and should be avoided.
- (6) *Ensure fair treatment so that all households are not forced to subsidize alternative energy users*—Fundamental tenets of fairness dictate that users of transportation energy pay for that energy and related infrastructure. It is patently unfair and inequitable for policymakers to force most households to

subsidize the refueling costs for EV drivers. When utilities rate-base their EV infrastructure investments in EV chargers, however, it raises the monthly utility bills for all of a particular rate class, even though the benefits are confined to a small group of users. Vehicle owners should pay the costs of powering their own vehicles in order to create a market system that will keep energy prices down and avoid regressive charges. Moreover, it is imperative that highway infrastructure funding comes from all highway users, and not just those that rely on a particular technology.

By observing these principles, environmental transportation policies can create new jobs, accelerate the deployment of advanced alternative fuel infrastructure and vehicles, benefit consumers through a competitive and robust marketplace and drive massive economic investment and improvements in air quality-objectives fuel retailers and lawmakers share.

#### **IV. Fuel Retailers Understand Consumer Behavior and Respond to Consumer Demand**

##### *A. Overview of the Retail Fuels Marketplace*

The retail fuels market is the most transparent, competitive commodities market in the United States. Retailers post fuel prices on large exterior signs that consumers use to shop for the best prices. Many consumers drive out of their way to save a few cents per gallon. Our members operate on small margins—generally measured in cents per gallon of fuel sold.

Fuel retailers are agnostic to the type of fuel sold to satisfy consumer demand and have demonstrated they are prepared to invest in any transportation energy technology that their customers desire. Over the last thirty years, our industry has adapted to meet consumer demand with increased biofuel blends and other alternative fuels, as well as healthy and made-to-order food and beverage offerings. Fuel retailers provide the security and amenities desired by the motoring public more than any other type of location. These dynamics can be harnessed to facilitate the transition to a growing market for alternative transportation energy sources, such as electricity.

The competitive nature of the retail fuels market compels retailers to pass through cost savings to consumers in order to maintain and increase their market share. It is in retailers' interests to increase the amount of energy they sell to consumers. This is not only because those sales drive profit opportunity in and of themselves, but also because such sales drive in-store traffic, which is another source of profit for the retailer.

##### *B. Fuel Retailers Are the Solution to Range Anxiety*

To have any chance to be successful, the refueling experience for alternative fuels should be as similar as possible to today's refueling experience. Fuel retailers are best positioned to provide alternative sources of transportation energy because they have a keen understanding of consumer preferences and habits. This fact is essential when it comes to adoption of EVs or other alternative fuel vehicles. The transition to EVs will require what was previously a quick stop to become a 30 minute consumer experience. Currently, it takes the driver of a passenger vehicle approximately 2 to 3 minutes to complete a fueling experience. It takes the driver of an EV, on the other hand, 20 to 40 minutes to recharge at a Direct Current ("DC") Fast Charger (depending upon the vehicle and the capacity of the charger available). Fuel retailers will be forced to compete on the service and amenities they offer their customers during this refueling experience to maintain their share of the market. This is a positive market dynamic for consumers.

Observers of vehicle trends and consumer behavior agree that one of the major factors deterring consumers from transitioning to EVs is concern about where they will (and will not) be able to "refuel" those vehicles. This "range anxiety" is such a strong sentiment that consumers often underestimate the availability of EV charging infrastructure that already exists today.<sup>1</sup> Beyond the number of EV chargers available, desirability of the location also factors into concerns about "range anxiety."

Availability of EV charging stations at our locations is the most effective way to solve range anxiety. Consumers freely drive their gas- and diesel-powered vehicles to every part of the country today without concerns about whether they will be able

<sup>1</sup>There are currently 102,621 public charging outlets available at 42,078 public stations across the United States, of which 17,861 charging outlets at 5,040 public stations are DC Fast Chargers. See Alternative Fueling Station Locator available at [https://afdc.energy.gov/fuels/electricity\\_locations.html](https://afdc.energy.gov/fuels/electricity_locations.html).

to refuel whenever they need to do that along the way. Offering EV charging at fuel retailing locations would mean drivers would not need to change their habits if they choose not to—they can refuel on the go at the same convenient locations they do today. The availability of EV charging on large price signs at fuel retailers' locations as they drive down the streets in their communities and traverse America's highways will effectively relieve EV range anxiety.

Consumers frequently use their vehicles for travel—including visits to family and friends and vacations. And, the majority of consumers are not in a position to purchase or rent a separate vehicle solely for these types of trips. If EV charging is not available in the neighborhoods they want to visit as well as along Interstate locations, many Americans simply will not purchase an EV.

Placing chargers only in individual garages in private homes, apartment buildings, and parking lots cannot combat the notion of “range anxiety” the way fuel retailers offering that service would. This is particularly true in rural and urban areas where fewer people live in single-family homes with garages that are conducive to private charging equipment. If EVs are to be adopted at the rate policymakers desire and by broader demographics than those that currently can afford an EV, the charging model must include the full range of options available in the refueling experience that exists today. The majority of renters across the nation do not have garages nor do many homeowners. And, those that have garages often do not have space in their garage for the number of vehicles their family drives nor do they have the electrical capacity in their garage to support a charger or multiple chargers. This is also true for workplaces; many employees will not have the option, for a variety of reasons, to charge at work. Consumers must have viable charging options available outside of their home or workplace.

Refueling stations are strategically located throughout the country where refueling demand is greatest, competing with one another on price, speed, and quality of service. In fact, we currently have about 150,000 fueling stations across the country in local communities of all kinds, including in every single Congressional district. Furthermore, these locations include accessible restrooms and parking lots, food and beverage options, vehicle service and repair centers, and even showers and other amenities for professional drivers. Consumers demand all of this, regardless of the type of fuel their vehicle consumes, and fuel retailers respond accordingly.

### *C. EV Charging Needs Price Competition*

As described above, there are about 150,000 locations across the country for drivers to currently refuel. This refueling capacity drives aggressive price competition which, in turn, keeps prices as low as possible for consumers. Consumers know how much a gallon of gas costs at a location—either due to a big price sign on the street or some type of fuel price comparison resource—before they decide to refuel. This forces retailers to shave every penny they can off of the price of a gallon of fuel to compete for market share. When adjusted for inflation, the 3 years with the lowest average gas prices in the United States since 1978 are 2020, 2018, and 2019, in that order.<sup>2</sup> That is not an anomaly. While the pandemic and some other events have created pricing anomalies the past couple of years, in general, fuel prices stay as low as possible and generally trend slightly downward over time when adjusted for inflation due to price competition. If electricity is to be the transportation fuel of the future, EV drivers should get the benefits of that remarkable price competition.

The overarching structure of wholesale and retail electricity markets are not designed for—and is thus incompatible with—the retail fuel market. Many states are exacerbating this problem by allowing utilities to pass through the costs of EV charging stations to all of their customers on their monthly utility bill, rather than having EV drivers pay for the costs of refueling their own vehicles. And, there are no wholesale purchasing options or pricing structures for retailers to provide electricity as a fuel. If that practice were to continue and become the prevalent model, this country will risk replacing one of the most price-transparent and price-competitive consumer markets in the world (retail fuel pricing) with one of the least price-transparent and price-competitive markets in the United States (utility electricity pricing).

## **V. Federal Policies Should Incentivize Private Investment**

Competitive markets with a level playing field for investments must be the focus for any alternative fuel to be successful. Existing alternative fuel incentives—such as biofuel blending and alternative fuel infrastructure tax credits—have allowed re-

<sup>2</sup>See <https://www.usinflationcalculator.com/gasoline-prices-adjusted-for-inflation/>. Figures for 2021 are not yet available though the year was an anomaly due to supply chain and crude oil price issues.

tailers to offer less expensive, lower carbon fuels to their customers, while also supporting investments in renewable fuel production. Regardless of how one may feel about ethanol and biodiesel, the incentives Congress established for those fuels have successfully displaced a large volume of petroleum-based fuel by these renewable fuels since 2005.

In just the past decade, there has been extraordinary growth in consumption of biofuels such as ethanol and biodiesel, as well as other low carbon fuels such as renewable natural gas, compressed natural gas, renewable diesel, and biobutanol. These are all liquid fuels that are mostly compatible with existing infrastructure that was originally developed for hydrocarbons. With all of these fuels, fuel retailers have responded to policy signals by allocating capital toward bringing the fuels to market. Retailers then sell the fuels to consumers for less money than the fuels that were being displaced. This has created enormous environmental benefits in a relatively short period of time and has been beneficial to U.S. agriculture.

Federal policy should be designed to lower the cost of alternatives to make those sources of transportation energy more competitive with petroleum-based fuels. This is the only way to ensure that consumers will gravitate toward low carbon technologies. Although some state incentive programs adopt this approach, others have vacillated between different approaches in a way that does not allow private market participants to plan long-term investments in alternatives. Such inconsistent policies are ultimately self-defeating, and that approach should be avoided. Federal policy instead should incentivize and leverage private investment in bringing alternative fuels to market. By the same token, Federal policies should not undercut incentives for retailers to invest in alternative fuels. Policymakers can leverage existing infrastructure to achieve meaningful environmental benefits while also incentivizing fuel retailers to invest in new technology if policymakers adopt a market-oriented and consumer-focused perspective.

## **VI. Challenges**

In an effort to decarbonize the transportation sector, the Biden Administration has committed to adding 500,000 EV charging stations over the next decade. One of the biggest impediments currently to fuel retailers investing in EV charging infrastructure is the practice of utilities charging all of their electricity customers more in order to pay for their investments in EV charging stations—in other words, their ability to use rate base. Where this occurs, utilities are able to compete with private sector groups without risking a single dollar of their own. This tilts the cost for EV charging infrastructure in favor of utilities such that the private market cannot compete, placing existing and new market participants at a competitive disadvantage which they cannot overcome. That the private market is reluctant to risk capital investing in EV charging infrastructure is entirely predictable when it knows it cannot make a return on that investment due to the threat of monopolistic and anti-competitive practices from investor owned utilities.

As described above, many states allow utilities to charge all of their customers, regardless of the type of vehicle they drive (or if they drive at all), for the utility's investments in EV charging stations via their customers' monthly electric utility bills. There is no public policy rationale for pursuing this approach with respect to refueling, as it will only decrease transparency and competition, increase costs, and stifle innovation.

This type of pricing system was designed for fixed locations, such as homes and commercial properties. It does not take into account EVs. The use of rate base or passing along the costs of a project to all ratepayers makes sense for projects that benefit the whole, such as generation plants, transmission grid, interconnection systems. Funding necessary electricity infrastructure investments to carry the electricity to fixed locations through rate increases therefore makes sense and should be done for the increasing future demands our electricity grid will face.

EVs move from place to place rather than remaining in one spot. Policy should enable the motoring public to access every benefit that our competitive market system has to offer. If that customer interface is funded through consumer utility bills, consumers will collectively pay far more than they should for the chargers and electricity to fuel EVs.

That cost burden will hit hardest on those least able to afford it. Individuals who struggle to pay their monthly bills should not be required to underwrite investments that the private sector is willing and better equipped to make. EV drivers—who today have above-average incomes and drive cars that cost much more than average—can and should pay the costs of charging their vehicles. As EVs become more common in less affluent communities, it will be especially important that drivers know that they will pay the smallest amount possible due to retail price competition.

Furthermore, some states classify businesses that sell electricity for the purpose of charging EVs as utilities, effectively prohibiting such sales from anyone other than utilities. Federal policy preempting these state regulations should be established, allowing non-utilities such as fuel retailers to resell electricity for refueling commercially.

Finally, Federal policy should maintain the ban on commercialized Interstate rest areas, including disallowing EV charging within Federal Interstate rights-of-way. This will ensure that off-highway businesses are not discouraged from investing in EV charging. Our industry has supported the ban on commercial activity and electric charging should be treated no differently from any other commercial service. If EV charging is opened up at Interstate rest areas, it will undercut private-sector investments in that infrastructure at Interstate exits. That will mean fewer, not more, EV chargers. The bipartisan infrastructure bill that became law kept this ban in place and did not include an exception for EV chargers. Regulatory efforts to the contrary should be stopped.

In addition to the challenges fuel retailers face investing in EV charging infrastructure, there are challenges with the electricity market that must be addressed before a robust EV charging marketplace is viable. Utilities do not simply charge their commercial customers a fixed price for electricity that is used. Instead, commercial consumers are charged a rate for the energy itself, billed as kilowatt-hours (kWh), and then an additional rate to provide reserve capacity when needed, known as a demand charge, billed as kilowatts (kW).

Demand charges are based on the largest amount of power that a business needs at a particular time during the entire month. They are there to compensate the utility for having enough power in reserve to meet spikes in demand. Private businesses that have short, but high spikes in their power needs will be hit hard by this pricing structure. Utilities' demand charges make it very challenging for private companies to offer electricity to EV drivers at a price that is competitive with gasoline or diesel.

DC Fast Chargers require a large amount of power in a short time frame to recharge vehicles quickly. A DC Fast Charger pulls 150% more power than a typical store and fueling operation combined does at its peak moment in a month. Accordingly, when businesses offer EV charging, these large demand costs restrict profitability and increase the cost for drivers of EVs to "refuel." DC Fast Chargers are capable of filling a vehicle up half-way in about 20 minutes and 80 percent of the way in about 35 minutes. For a customer, a charge can cost anywhere from \$10 to \$30 depending how much charge is required to refuel the battery. For a typical business, adding a single DC Fast Charger can increase its monthly bill by about \$1,600. The demand portion of this bill is \$1,500 and the energy portion of this bill is \$100.

But, it is very difficult for businesses to have consumers fully pay the demand charge. The business would have to precisely know ahead of time how many people would use its chargers over the course of an entire month in order to do that. If it turned out to make the wrong assumptions, consumers could be dramatically undercharged or overcharged—leading to difficult consumer protection questions or business losses, respectively. No matter the incentive for charging infrastructure, the ongoing costs for electricity, particularly demand charges which cannot effectively be passed through to consumers today, make profitability near impossible to achieve for private businesses without changes.

Fuel retailers getting hit with demand charges also cannot compete with a utility that has substantially lower costs for energy and power. Utilities have excess capacity and much lower energy costs that allow them to offer EV charging with little impact to their bottom line. What's more, demand charges are compounded so a fuel retailer will be saddled with higher demand charges for every additional charger available to their customers. That will make it more difficult for retailers to deploy DC Fast Chargers and give consumers the benefit of competitive pricing. The utility demand pricing model could not be further from the current retail fuel model, where increased consumption and volume results in efficiencies and lower costs for consumers. The utility model, then, will not work for EV charging on a large scale.

The challenges with electricity pricing as it exists today threaten to stunt the growth of the EV market. Congress could address this problem by ensuring businesses offering EV charging only pay the costs that utilities pay for the electricity, without demand charges. Such a wholesale rate would allow businesses to offer charging, compete, and develop the competitive market for EV charging. Demand charges are the greatest barrier to entry to mass adoption of DC Fast chargers by private business, even greater than the large capital costs to install DC fast chargers.

## VII. The Need for Multiple Technologies

One key to decarbonization of the transportation sector is ensuring that we pursue advances wherever we can. If government policymakers pick technology winners and losers, that denies us the chance to squeeze gains out of existing technologies and creates huge risks that any misreading of future markets or advances in technology could deny us the benefits those markets or advances would have delivered. We have seen huge mistakes made in exactly this way—for example, when Congress and regulators pushed for MTBE in gasoline decades ago. Let's avoid repeating these mistakes.

In particular, some states have called for banning internal combustion engines. This would be a bad policy mistake for a number of reasons.

First, if combustion engines are banned, investments to find ways to take carbon out of the operation of those engines will be stunted. No one wants to make major investments in research in a technology that has been given a death sentence. American ingenuity remains one of the most powerful forces we have at our disposal. If people have a way to make money, they are remarkably good at finding ways to make that happen. We should use that potential rather than shutting it down.

Second, renewable fuels have already delivered most of the decarbonization gains we have made in the transportation sector to date. One study from the Bio-technology Innovation Organization estimated that renewables had reduced carbon emissions by 589 million tons over 10 years.<sup>3</sup> Renewables help reduce carbon emissions and could be a larger part of the fuel mix to deliver additional decarbonization gains. Banning internal combustion engines means killing off the renewable fuels that are helping us keep carbon out of the atmosphere.

Third, a ban on internal combustion engines would have significant negative consequences for agriculture and rural America. Many farmers grow crops that produce renewable transportation fuels today. This is a huge market and losing it would dramatically reduce the prices of some farm commodities and leave many growers without an adequate market.

Fourth, no matter how rapidly electric vehicles are adopted, we will have large numbers of people driving traditional cars and trucks for a long time. Recent projections from the consulting firm McKinsey & Co. demonstrate that we need to keep making advances in traditional technologies. Experts from McKinsey project that by 2030, 50 percent of new vehicles sold in the United States will be electric. That is a large, aggressive number but it also comports with goals laid out by many political leaders looking to move to EVs. But, even at that level, it means that EVs will only be around 17 percent of the total vehicle mix in the United States. This is because some of those new EV sales will be replacing older EVs and people keep driving internal combustion engine cars for a long time.

And, even with those numbers, overall gasoline consumption will only decline at that point by four percent. Why? Because EVs tend to be purchased and used as second cars and people drive their combustion engine vehicles more miles each year. Even among the EV sales that replace combustion engine cars, most of those will replace cars that are relatively fuel-efficient while the least efficient vehicles stay on the road longer. These projections demonstrate that we must continue to invest in getting more efficiency out of combustion engines. Electrifying transportation alone simply doesn't do enough.

Fifth, electricity has more emissions than many people assume. The transportation sector accounts for more carbon emissions than any other sector of the U.S. economy. But, the second highest sector for emissions is—electricity generation. In light of the emissions attributable to EV batteries, it takes 7 or 8 years of driving for an EV to make up for carbon emissions involved in batteries and produce overall reductions compared to today's internal combustion engine vehicles. Further advances in carbon output from combustion engines—for example from the use of higher concentrations of renewable fuels and engines that take advantage of those fuels—could change that balance. If our goal is to reduce carbon in the environment, then we should be open to those gains no matter where they come from.

The bottom line is that competition among technologies that can help us achieve our climate goals should be a positive dynamic for us to use to our advantage. Banning internal combustion engines takes that positive dynamic off the table and undermines the renewable fuels industry in a way that would be bad for the environment and bad for agricultural economies and communities.

<sup>3</sup>See *New Study: Biofuel Use Saved 589.3 Million Tons of Carbon Emissions Over the Past Decade—BIO* (<https://archive.bio.org/media/press-release/new-study-biofuel-use-saved-5893-million-tons-carbon-emissions-over-past-decade>).

### VIII. Policy Solutions

Finally, there are inherent challenges in shifting our transportation fuel from the liquid marketplace of today, where retailers have the ability to price shop among a variety of suppliers, toward a market with one power provider operating in a regulated environment. Without injecting competitive forces throughout the fuel supply chain, fuel retailers will be limited in their ability to lower the prices to the consumer. Congress can help alleviate that challenge by ensuring that utilities sell power to EV charging retailers at their own internal transfer price. Demand charges, which set our rates exorbitantly high during peak demand times, are another impediment to make the EV business case for retailers. Again, demand charges do not make sense for refueling on the go. A driver should not be penalized for needing to refuel at certain times of the day and fuel retailers should not be penalized for providing the fuel this Committee wants sold. Addressing the cost-prohibitive demand charge model will be beneficial to building the business case for investment by our industry.

The Committee should consider policy mechanisms to address these concerns, including:

- Ensure Federal funding does not block private sector investment by compounding the problem of utilities charging all their customers more for chargers and not putting capital at risk.
- End the electricity pricing problem of demand charges that make the business case unattractive for retailers to sell electricity.
- Prioritize credit regimes and/or tax incentives that make alternative energy less expensive for the end user, thereby providing a stable economic case for upstream investment. Tax credits and other incentives targeting the underlying economics of different fuels are a far more efficient, effective way to incentivize behavior than grant and rebate programs.
- Permit all EV charging station owners to generate a profit by selling electricity to EV owners without being subject to regulation as a utility. This allowance is essential if fuel retailers are to have any incentive to invest in EV charging technology.
- Adopting uniform retail pricing measurements (*e.g.*, dollars per kilowatt-hour) and requirements for consumer-friendly price disclosures.

### IX. Conclusion

We believe decarbonization efforts should incentivize private sector investments in the desired behavior—offering alternatives that reduce carbon output. To be effective, any alternative—including electricity—should be offered in an open, competitive market that gives American consumers the fullest economic benefits of robust price competition. This has worked well for consumers for nearly one hundred years with liquid fuels because the market had a business case to invest to meet consumer needs. It can work for alternative energy sources in the future if we follow those lessons.

Our industry is eager to work with the Committee to help it achieve this objective and place critical guardrails on any programs the Committee may pursue to decarbonize the transportation sector.

The CHAIRMAN. Thank you very much, Mr. Walter.  
Mr. Cooper, please begin when you are ready.

### STATEMENT OF GEOFF COOPER, PRESIDENT AND CHIEF EXECUTIVE OFFICER, RENEWABLE FUELS ASSOCIATION, ELLISVILLE, MO

Mr. COOPER. Thank you, and good morning, Chairman Scott, Ranking Member Thompson, and Members of the Committee. My name is Geoff Cooper, and I am President and CEO of the Renewable Fuels Association. We are the leading trade association for America's ethanol industry. Thank you for convening this timely and important hearing today, and I appreciate the opportunity to share our industry's unique perspective.

The emergence of electric vehicles and the push to decarbonize transportation could have important implications for farm country, and we commend the Committee for thinking carefully about those



issues. As you know, the massive increase in public and private investment in electric vehicles is being driven by the need to reduce greenhouse gas emissions and achieve economy-wide carbon neutrality by 2050. Transportation is the leading source of greenhouse gas emissions in the U.S., accounting for nearly  $\frac{1}{3}$  of our nation's total emissions. Thus, any strategy to achieve net-zero emissions by mid century must include measures that rapidly decarbonize the transportation sector.

We agree that electric vehicles will be an important part of that strategy, but given the time needed to transition the light duty vehicle fleet, continued reliance on fossil fuels for electricity generation, the difficulty of electrifying medium and heavy-duty vehicles, and other barriers, electric vehicles alone will not get our transportation sector to net-zero emissions by 2050.

Today, there are more than 267 million light duty vehicles in the U.S. Just 2.3 million of those vehicles—that is less than one percent—are battery electric or plug-in hybrid EVs. The other 99 percent run on liquid fuels, and the Energy Information Administration projects that four out of five new vehicles sold in 2050 will still be internal combustion engines requiring liquid fuels. So, even with increased electric vehicle sales in the years ahead, it would take decades to turn over the fleet. And that means hundreds of billions of gallons of liquid fuels will continue to be burned for years, for decades to come.

So, given these realities, other complementary solutions clearly will be needed to decarbonize transportation by mid-century, and that is where agriculture comes in.

Through increased production and use of renewable fuels like ethanol, the agriculture sector offers an effective and immediate solution for decarbonizing all segments of the transportation sector. Today's corn ethanol already cuts greenhouse gas emissions by approximately 50 percent compared to gasoline, according to the Department of Energy, Harvard University, and others. With increased adoption of low-carbon farming practices, carbon capture, sequestration and storage, and other technologies, we are well on our way to producing zero carbon corn ethanol. In fact, the members of my organization are so confident about this that they adopted a resolution last July, pledging to achieve a net-zero carbon footprint for corn ethanol by 2050 or sooner.

But for this vision to become a reality, we need fairness and consistency in how the carbon footprint of different fuels and vehicles is measured. For ethanol's carbon footprint, regulators count the emissions associated with every step in the supply chain, from planting the seed all the way to delivering the fuel to the consumer at retail. For the carbon footprint of electric vehicles, however, the upstream emissions associated with electricity generation and battery manufacturing are often overlooked, giving the false impression that electric vehicles are zero emission vehicles. These overlooked emissions can be quite significant. In fact, analyses we have conducted shows that a Ford F-150 flex fuel vehicle, which happens to be what I drive, running on an 85 percent ethanol blend will generate far fewer greenhouse gas emissions over its lifetime than a new Ford F-150 Lightning electric vehicle running on fossil-generated electricity.

We believe any future decarbonization policy should take a technology-neutral, performance-based approach that focuses strictly on greenhouse gas emissions reduction, and increasing fuel efficiency without dictating the use of specific fuels and vehicles to achieve those reductions. That is why we support the concept of a national Low Carbon Fuel Standard. We also support the Next Generation Fuels Act of 2021 (H.R. 5089) that was introduced by Congresswoman Bustos, which establishes carbon performance and minimum octane standards for liquid fuels, again without dictating what fuels would be used.

In closing, we believe electric vehicles will play a key role in reducing emissions over the long-term, but if we are serious about achieving a carbon neutral transportation sector by 2050, we must take a comprehensive approach that also capitalizes on the ability of agriculture to deliver low- and zero-carbon renewable fuels.

Thank you, and I look forward to your questions.  
[The prepared statement of Mr. Cooper follows:]

PREPARED STATEMENT OF GEOFF COOPER, PRESIDENT AND CHIEF EXECUTIVE OFFICER, RENEWABLE FUELS ASSOCIATION, ELLISVILLE, MO

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

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

We thank the Committee for convening this timely hearing, and I appreciate the opportunity to share our industry's unique perspective. RFA believes the emergence of electric vehicles and the push to decarbonize the transportation sector could have important implications for the farm economy and rural America, and we commend the Committee for thinking carefully about these issues.

**I. Summary of Testimony**

The massive increase in public and private investment in electric vehicles is being driven by the urgent need to reduce greenhouse gas (GHG) emissions and achieve economy-wide carbon neutrality by 2050. While increased deployment of electric vehicles will indeed play a vital role in reducing GHG emissions from transportation, other complementary solutions will also be required to truly decarbonize the sector by mid-century.

That's where agriculture comes in. Through the increased production and use of low-carbon renewable fuels like ethanol, the U.S. agriculture sector offers an effective and immediate solution for further reducing carbon emissions from liquid fuels across all segments of the transportation sector.

Today's corn-based ethanol already cuts GHG emissions by approximately 50 percent, on average, compared to gasoline. With the increased adoption of low-carbon farming practices and carbon capture, utilization, and storage (CCUS) technologies, the U.S. ethanol industry is well on its way to producing zero-carbon corn ethanol. In fact, in a July 2021 letter to President Biden, RFA's member companies pledged that ethanol will achieve a 70 percent GHG reduction, on average, compared to gasoline by 2030 and a net-zero carbon footprint for ethanol by 2050 or sooner.<sup>1</sup>

But for this vision to become a reality, the biofuels industry needs smart policy and regulation, including:

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

<sup>1</sup>Letter from RFA member companies to President Joseph R. Biden. July 27, 2021. <https://ethanolrfa.org/file/2036/RFA-Net-Zero-Commitment-Letter-to-President-Biden--1.pdf>.

- investment in storage and distribution infrastructure for higher ethanol blends like E15 and flex fuels like E85;
- implementation of strong Renewable Fuel Standard volume requirements in 2023 and beyond;
- equitable incentives for the production of flex-fuel vehicles that can operate on fuels containing up to 85 percent ethanol; and
- a nationwide technology-neutral, performance-based low carbon fuel standard.

In addition to its environmental benefits, ethanol also makes a vital contribution to our nation's economy. The 206 ethanol biorefineries across the country serve as crucial drivers of employment in the communities in which they operate. Even as the COVID-19 pandemic continued to disrupt the U.S. economy and world energy markets in 2021, the production of 15 billion gallons of ethanol directly employed 73,000 American workers in the manufacturing and agriculture sectors. In addition, the ethanol industry supported 330,000 indirect and induced jobs across all sectors of the economy. Meanwhile, the industry generated \$29 billion in household income and contributed \$52 billion to the national Gross Domestic Product (GDP) in 2021.<sup>2</sup> These significant employment impacts and economic contributions should be taken into consideration by Congress as it examines potential future energy and climate policies that may impact the biofuels sector.

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

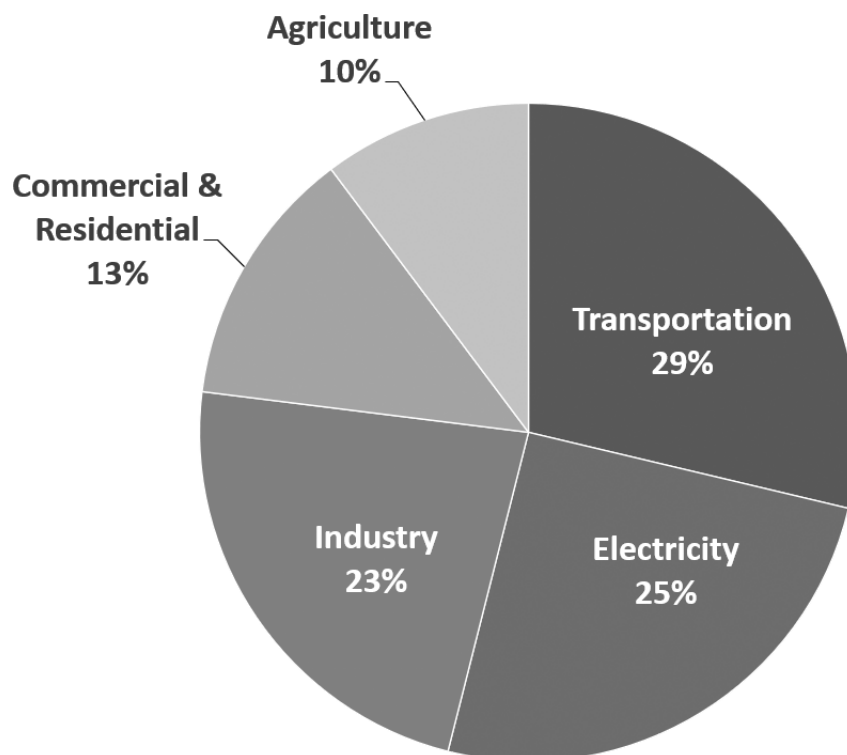
According to the U.S. Environmental Protection Agency (EPA), the United States was responsible for 6.56 billion metric tons of carbon dioxide equivalent (MT CO<sub>2</sub>e) in 2019.<sup>3</sup> As shown in the chart below, the transportation sector accounted for approximately 29 percent of total U.S. GHG emissions, followed by the electricity generation sector at 25 percent.

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<sup>2</sup>J.M. Urbanchuk (ABF Economics). "Contribution of the Ethanol Industry to the Economy of the United States in 2021." Forthcoming (February 2022).

<sup>3</sup>U.S. EPA. "Sources of Greenhouse Gas Emissions." Viewed Jan. 8, 2022. <https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions>.

**Total U.S. Greenhouse Gas Emissions by Economic Sector in 2019**



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

GHG emissions from transportation primarily result from the burning of fossil fuels (mainly petroleum) in passenger cars, trucks, ships, trains, and planes. The increased use of renewable fuels like ethanol has already helped reduce GHG emissions from the transportation sector, and EPA notes that “using renewable fuels such as low-carbon biofuels” is an important GHG “reduction opportunity” for the sector.<sup>4</sup> After peaking at 1.98 billion metric tons of carbon dioxide equivalent (MT CO<sub>2</sub>e) in 2006, transportation-related GHG emissions fell 12 percent to 1.75 billion MT CO<sub>2</sub>e in 2012 and stood at 1.88 billion MT CO<sub>2</sub>e in 2019.<sup>5</sup> Recent research shows that the use of biofuels under the Renewable Fuel Standard resulted in the cumulative avoidance of nearly 1 billion metric tons of GHG emissions from the transportation sector between 2008 and 2020, equivalent to 75 million MT CO<sub>2</sub>e per year.<sup>6</sup>

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

<sup>4</sup>*Id.*

<sup>5</sup>U.S. EPA. “Greenhouse Gas Inventory Data Explorer.” Viewed Jan. 8, 2022. <https://cfpub.epa.gov/ghgdata/inventoryexplorer/>.

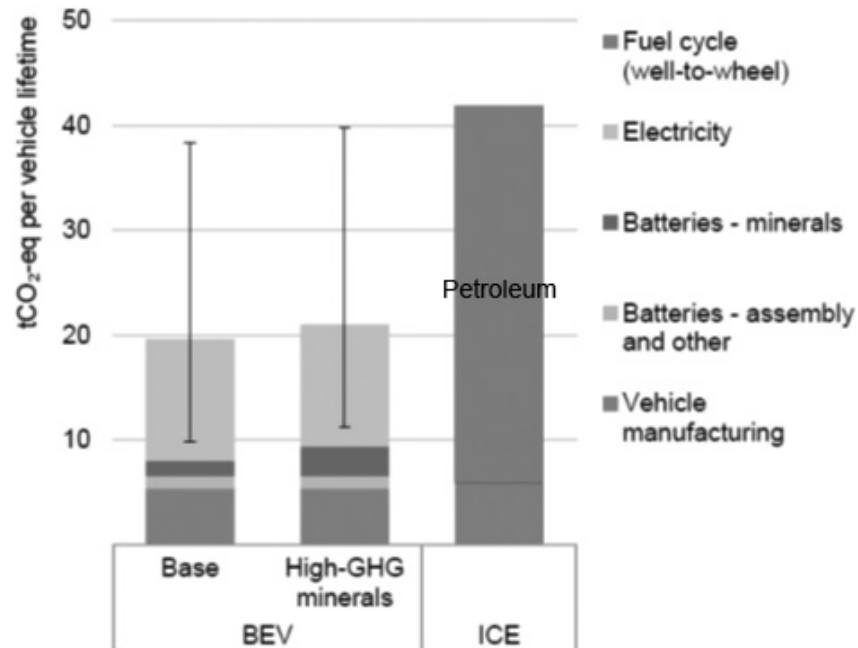
<sup>6</sup>S. Unnasch and D. Parida. “GHG Reductions from the RFS2—A 2020 Update.” Life Cycle Associates Report LCA.6145.213.2021. February 11, 2021. Prepared for Renewable Fuels Association. [https://ethanolrfa.org/file/748/LCA\\_-\\_RFS2-GHG-Update\\_2020.pdf](https://ethanolrfa.org/file/748/LCA_-_RFS2-GHG-Update_2020.pdf).

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

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

As shown in the chart below from the International Energy Agency (IEA), mid-sized battery electric vehicles (BEV) are found to reduce lifetime GHG emissions by about 50 percent, on average, compared to an internal combustion engine (ICE) vehicle operating on petroleum.<sup>7</sup> It is notable, however, that the magnitude of the GHG reduction achieved by the BEV can vary from just seven percent to 77 percent, according to IEA, depending on the source of electricity used to charge the vehicle's battery and the origin of the minerals used in the manufacture of the battery.

**Life-cycle GHG Emissions of a BEV and ICE Vehicle**



IEA. All rights reserved.  
Source: International Energy Agency (2021).

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

Still, the contribution of electric vehicles to decarbonization efforts will be constrained—especially in the near-term—due to the sheer size and scale of the U.S. light-duty vehicle fleet and the amount of time required for the fleet to turn over. On average, consumers keep their vehicles for more than 12 years, meaning that

<sup>7</sup> International Energy Agency. “The Role of Critical Minerals in Clean Energy Transitions.” May 2021. <https://www.iea.org/reports/the-role-of-critical-minerals-in-clean-energy-transitions>.

an ICE vehicle purchased today will likely still be in use well beyond 2030.<sup>8</sup> Today, there are more than 267 million passenger cars, SUVs, pick-ups, vans, and other light-duty vehicles registered in the United States.<sup>9</sup> Just 2.3 million of those vehicles—less than one percent—are battery electric or plug-in hybrid electric vehicles,<sup>10</sup> meaning the other 99 percent are ICE vehicles that operate on liquid fuels.

While electric vehicle sales are growing, they continue to represent a relatively small share of overall light-duty vehicles sales (*i.e.*, electric vehicles accounted for 1.7 percent of light-duty vehicle sales in 2020<sup>11</sup> and were expected to account for roughly four percent in 2021<sup>12</sup>). Growth in electric vehicle sales is expected to continue in the decades ahead, but there is significant uncertainty and debate around the rate of growth. For example, the Energy Information Administration’s (EIA) *Annual Energy Outlook 2021* forecast that roughly 80 percent of new light-duty vehicles sold in the U.S. in 2050 will be powered by an ICE that requires liquid fuel.<sup>13</sup>

Even with increased electric vehicle sales expected in the years ahead, it would take decades to entirely turn over the fleet. As such, hundreds of billions of gallons of liquid fuel will continue to be used in ICE vehicles for many years to come. To achieve true carbon neutrality in the U.S. transportation system by mid-century, strategies focused on decarbonizing those liquid fuels will need to be undertaken. This reality was recognized in a recent study published by the Rhodium Group, which concluded, “While efficiency improvements and vehicle electrification can cut transport emissions by up to  $\frac{2}{3}$  by 2050, low-GHG liquid fuels are needed to fill the remaining gap and achieve net-zero emissions in the transportation sector by mid-century.”<sup>14</sup>

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

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

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

Today’s corn ethanol already reduces GHG emissions by roughly half, on average, compared to gasoline (*i.e.*, similar to the GHG reduction offered by BEVs, according to the IEA study cited above). According to the Department of Energy’s Argonne National Laboratory, typical corn ethanol provides a 44–52 percent GHG savings compared to gasoline.<sup>15</sup> Similarly, researchers affiliated with Harvard University, MIT, and Tufts University concluded that today’s corn ethanol offers an average GHG reduction of 46 percent *versus* gasoline.<sup>16</sup> In addition, the California Air Resources Board found that from 2011 to 2020, the use of ethanol cut GHG emissions from

<sup>8</sup> IHS Markit. “Average age of cars and light trucks in the U.S. rises to 12.1 years, accelerated by COVID-19.” June 14, 2021. <https://ihsmarkit.com/research-analysis/average-age-of-cars-and-light-trucks-in-the-us-rises.html>.

<sup>9</sup> Federal Highway Administration. Highway Statistics 2020. “State Motor-Vehicle Registrations—2020.” <https://www.fhwa.dot.gov/policyinformation/statistics/2020/mv1.cfm>. (Note: 8.3 million motorcycles and one million buses are excluded from the 267 million figure.)

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

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

<sup>12</sup> ING. “Slow start for U.S. electric vehicles, but times are changing.” Dec. 1, 2021. <https://think.ing.com/articles/slow-start-for-electric-vehicles-in-the-us-but-times-are-changing/>.

<sup>13</sup> S. EIA. “Annual Energy Outlook 2021: Transportation.” Feb. 3, 2021. <https://www.eia.gov/outlooks/aeo/pdf/05%20AEO2021%20Transportation.pdf>.

<sup>14</sup> Rhodium Group. “Closing the Transportation Emissions Gap with Clean Fuels.” Jan. 15, 2021. <https://rhg.com/research/closing-the-transportation-emissions-gap-with-clean-fuels/>.

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

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

the California transportation sector by 27 million MT CO<sub>2</sub>e, more than any other fuel used to meet the state’s Low Carbon Fuel Standard requirements.<sup>17</sup>

With the rapid emergence of new technologies and more efficient practices, even greater GHG reductions are coming to the corn ethanol sector. In fact, analysis by USDA found that some biorefineries could produce corn ethanol that offers a 70 percent GHG reduction *versus* gasoline as soon as this year.<sup>18</sup>

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

Clearly, the U.S. agriculture sector—through increased production and use of ethanol and other biofuels—has the ability to jumpstart decarbonization efforts now. America’s farmers and biofuel producers offer an effective and economical solution for drastically reducing the carbon impacts of liquid fuels across all segments of the transportation sector, including light-, medium-, and heavy-duty vehicles; the marine sector; and even the aviation sector, through the utilization of ethanol as a feedstock in the production of sustainable aviation fuels (SAF).

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

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

For typical measurements of corn ethanol’s carbon footprint, emissions associated with every step in the supply chain—from planting the seed all the way to delivering the fuel to a retail gas station—are included. For the carbon footprint of electric vehicles, however, the upstream emissions associated with electricity generation and battery manufacturing are often underestimated or entirely overlooked, giving the false impression that electric vehicles are “zero-emissions vehicles.”

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

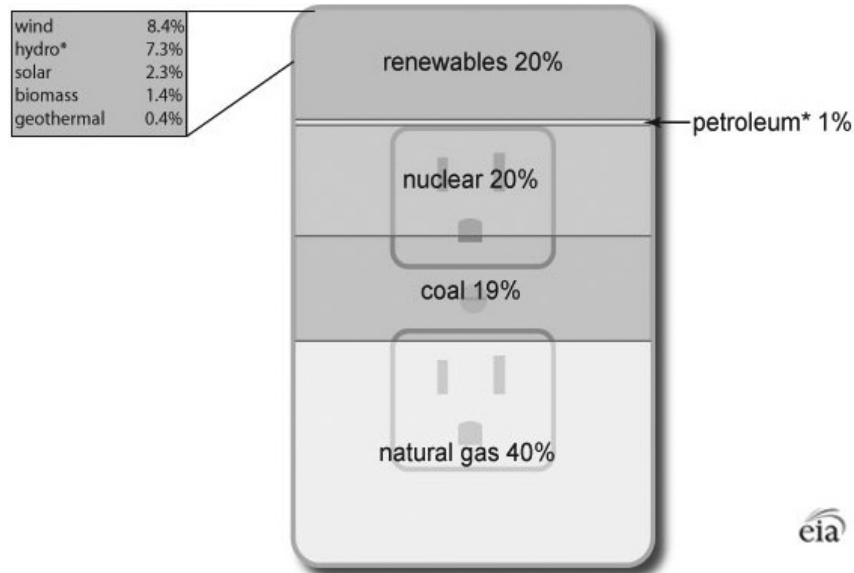
<sup>17</sup>CARB. “Low Carbon Fuel Standard Reporting Tool Quarterly Summaries.” Viewed Nov. 20, 2021. <https://ww2.arb.ca.gov/resources/documents/low-carbon-fuel-standard-reporting-tool-quarterly-summaries>.

<sup>18</sup>Jan Lewandrowski, Jeffrey Rosenfeld, Diana Pape, Tommy Hendrickson, Kirsten Jaglo & Katrin Moffroid (2020) *The greenhouse gas benefits of corn ethanol—assessing recent evidence*, *BIOFUELS*, 11:3, 361–375, DOI: 10.1080/17597269.2018.1546488 <https://www.tandfonline.com/doi/full/10.1080/17597269.2018.1546488>.

<sup>19</sup>U.S. EIA. “Electricity explained: Electricity in the United States.” Viewed Jan. 7, 2022. <https://www.eia.gov/energyexplained/electricity/electricity-in-the-us.php>.

**Sources of U.S. electricity generation, 2020**

Total = 4.12 trillion kilowatt-hours



Note: Electricity generation from utility-scale generators. \*Hydro is conventional hydroelectric; petroleum includes petroleum liquids and petroleum coke, other gases, hydroelectric pumped storage, and other sources.

Source: U.S. Energy Information Administration, *Electric Power Monthly*, February 2021, preliminary data.

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

To further underscore the importance of accurate carbon footprint measurements, analysis recently conducted by RFA shows that a Ford F-150 flex-fuel vehicle (FFV) running on an 85 percent corn ethanol blend (E85) will generate far fewer GHG emissions over its lifetime than Ford's new electric F-150 Lightning running on fossil fuel-generated electricity. Yet, certain policies and regulations—like EPA's light-duty vehicle GHG standards—strongly incentivize the production of electric vehicles by treating them as “zero-emission vehicles” regardless of the source of electricity, while discouraging production of flex-fuel vehicles that can operate on high concentrations of low-carbon ethanol.

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

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

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

First, removal of EPA's arcane fuel volatility barrier would facilitate the rapid expansion of E15 in the marketplace. Not only does E15 typically sell for 5–10¢ per gallon less than regular gasoline with ten percent ethanol (E10), it also reduces lifecycle GHG emissions. Simply switching from E10 to E15 would reduce the annual GHG emissions from a typical passenger car by seven percent. If E15 replaced E10 nationwide, annual GHG emissions from the transportation sector would be reduced by nearly 18 million MT CO<sub>2</sub>e. RFA supports the *Year-Round Fuel Choice Act of 2021* (H.R. 4410), introduced by Reps. Angie Craig (D-MN) and Adrian Smith (R-NE), which would remove the illogical volatility barrier to E15 expansion. We also



support administrative action to address this obstacle, and we have recently encouraged EPA to undertake such action.<sup>20</sup>

Second, implementation of strong Renewable Fuel Standard (RFS) volume requirements in 2023 and beyond will ensure low-carbon biofuels have access to a growing market. This year is the final year for statutorily prescribed RFS volume requirements, and EPA is expected to propose RFS requirements for 2023 and beyond this summer. In order to maximize the GHG emissions benefits of the RFS program, we believe EPA must implement future RFS volume requirements that continue to grow beyond the levels proposed for 2022.

Third, our nation cannot fully capitalize on ethanol's low-carbon benefits unless more vehicles are produced that can run on flex fuels like E85. Over the course of a year, a flex fuel vehicle (FFV) running on E85 made from today's typical corn ethanol will reduce GHG emissions by roughly 29 percent compared to the same vehicle model operating on E10. Indeed, if all 21 million FFVs on American roadways were using E85 *in lieu of* E10, annual GHG emissions would be reduced by some 32 million MT CO<sub>2</sub>e. Accordingly, RFA strongly supports the *Clean Fuels Vehicle Act* (S. 2267) introduced in the Senate by Sens. Klobuchar (D-MN) and Ernst (R-IA), which would encourage increased production and deployment of flex-fuel vehicles by creating a \$200 refundable tax credit for each light-duty FFV manufactured for a period of 10 years. The legislation would also restore certain Corporate Average Fuel Economy credits that were previously available to automakers for producing FFVs.

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

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

## VII. Conclusion

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

The CHAIRMAN. Thank you very much.  
And now, Mr. Nassar, you are recognized.

## STATEMENT OF JOSH NASSAR, LEGISLATIVE DIRECTOR, INTERNATIONAL UNION, UNITED AUTOMOBILE, AEROSPACE AND AGRICULTURAL IMPLEMENT WORKERS OF AMERICA, WASHINGTON, D.C.

Mr. NASSAR. Thank you, Chairman Scott, and I want to thank you, Ranking Member Thompson, and Members of the Committee for the chance to testify today on behalf of UAW's one million members and retirees, and our Executive Board President, Ray Curry.

Just first of all, I want to say that our membership and retirees, their livelihoods depend on having a healthy auto industry, and the reality is, is that there is a global transformation going to electric vehicles. We have countries like China and the European Union

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

that have already made massive public investments to establish their industries, and frankly, they are beating us. So, we do really—but as has been said by other witnesses, it is going to take time. So, I think it is really important that we do look to biofuels and other things to also reduce carbon emissions and we also support the Next Generation Fuels Act of 2021 very strongly.

But there are things that I would encourage everyone to keep in mind, too. One is that the agricultural implement industry is also moving forward with electrification and autonomous vehicles. John Deere just made a recent announcement about an autonomous tractor that is going to be online pretty soon. So, electrification is going to impact manufacturing kind of across the board, and I think that is something that we need to take into account. In fact, we have over 15,000 members who work in the agricultural implement industry.

Now, back to electric vehicles. It is—in order to have—so, the bottom line for us is that companies our members work for, and the industry at large, have made huge investments, and those investments if they fail will be bad for our economy and will be bad for our members, and for working families across the board. So, we need this transition to work, and part of that is going to be having—we need a strong domestic market. We are not going to export our way into having a strong EV market. We need people in the U.S. buying them. And that is only going to happen if we have a strong infrastructure the infrastructure laws start in that direction. We also need strong policies to help the transition when it comes to retooling and things like that. I should add, some of that is in the infrastructure laws in the Build Back Better. We also need strong consumer incentives, and we commend Representative Kildee, and frankly the House of Representatives for including provisions which would add extra incentives for vehicles built by union workers, and we think that is really important because the reality is, is that auto jobs, auto manufacturing jobs really helped establish manufacturing jobs as middle class jobs some time ago. But that is really changing. It is really going in the wrong direction. Adjusted for inflation, real wages have dropped roughly 20 percent over the past 15 years for auto workers and auto parts. So, we are not—a lot of the jobs are not what they used to be. And a big way to change that is to allow workers the free choice to join unions. It is true that unionized workers comparative fields have a ten percent—usually ten percent higher wages. So, I mean, there is serious economic impacts for the workers for joining a union. And, one thing that we have seen is that a lot of foreign-based automakers who are unionized pretty much everywhere around the world, when they come to the U.S. they end up being quite opposed to unionization.

So, we need to do a few things in our view. One is, we need to pass the Next Generation Fuels Act. We think that is going to be helpful. We also need to move forward on these three prongs in order for the EV transition to work. I mean, our view is that the transition is—I mean, and that is what all the analysts say, too, is that it is coming whether we like it or not. So, it is better to be in the race and to have a strong auto industry making EVs than

not. And the only way that is going to happen is if there is—with public policy as well as the private investments.

So, I am very much looking forward to answering questions and really appreciate the opportunity. Thanks again.

[The prepared statement of Mr. Nassar follows:]

PREPARED STATEMENT OF JOSH NASSAR, LEGISLATIVE DIRECTOR, INTERNATIONAL UNION, UNITED AUTOMOBILE, AEROSPACE AND AGRICULTURAL IMPLEMENT WORKERS OF AMERICA, WASHINGTON, D.C.

Chairman Scott, Ranking Member Thompson, and Members of the Committee, on behalf of the over one million active and retired members of the International Union, United Automobile, Aerospace, and Agricultural Implement Workers of America (UAW), UAW President Ray Curry, and the UAW International Executive Board (IEB), I want to thank you for the opportunity to share our perspective on the implications of electric vehicle investments for agriculture and rural communities. It is my honor to appear before you today.

#### **Importance of the U.S. Motor Vehicle Industry**

The United States' motor vehicle industry is advanced, competitive, and a cornerstone of American manufacturing. The domestic vehicle assembly and parts industries are vital to our manufacturing base, and it is imperative that we stay strong and competitive now and into the future.

A majority of our members and retirees work in or have retired from the auto industry. They are directly impacted by decisions made in Washington, D.C., and corporate board rooms regarding this critical sector of our economy.

By extension, investments in motor vehicle manufacturing jobs impact workers, their families, and communities. Over 900,000 people work in the auto and auto parts manufacturing sectors.<sup>1</sup> Of course, the economic impact of the auto industry reaches far beyond the workers employed at the plants and their families. It has been estimated by the Center for Automotive Research that when jobs from other linked industries are considered, the auto industry is responsible for over 7.25 million jobs nationwide.<sup>2</sup> The long-term health of the industry is critically important to both workers and the economy at large.

Furthermore, auto manufacturing is not a regional issue and extends far beyond the upper Midwest. For example, in recent months, significant investments in motor vehicle and battery manufacturing have been made in Tennessee, Georgia, and Kentucky.

The UAW supports a coordinated industrial policy centered on maintaining and growing high-quality jobs in U.S. manufacturing while combating climate change and advancing equity. As we work toward the future of clean transportation, it will be critical to ensure this transition benefits American workers, enhances U.S. competitiveness, and promotes economic security. Unless comprehensive policies are adopted which focus on raising standards for U.S. workers and boosting domestic manufacturing, we will continue to fall behind in the production of EVs and union jobs in the auto sector will be eroded even further.

#### **Union Difference**

The difference between being in a union *versus* not being in a union is significant. According to the Economic Policy Institute (EPI), unionized workers earn on average 10.2% more than their non-union counterparts.<sup>3</sup> Union workers are more likely to have paid sick days and health insurance compared to non-union workers. 94% of union workers participate in a retirement plan compared with 67% of non-union workers. Policies that strengthen labor standards and support workers' right to collectively bargain is foundational to building a strong middle class.

#### **Electric Vehicles (EVs) Are Coming**

EV sales have grown steadily over the past decade, but they still represent a fraction of vehicle sales. EVs and PHEVs (Plug-in Hybrids) combined represent just 4%

<sup>1</sup>Bureau of Labor Statistics, "Automotive Industry: Employment, Earnings, and Hours", <https://www.bls.gov/iag/tgs/iagauto.htm>.

<sup>2</sup>Hill, Kim, Deb Menk, Joshua Cregger, and Michael Schultz. "Contribution of the Automotive Industry to the Economies of All Fifty States and the United States." Center for Automotive Research. January 2015.

<sup>3</sup>Economic Policy Institute. *Unions Help Reduce Disparities and Strengthen Our Democracy*, April 2021.

of U.S. auto sales in 2021.<sup>4</sup> And EVs face several hurdles to mass-adoption. EVs are more expensive to produce, making them less profitable and dependent on consumer incentives. In most parts of the country, EV charging infrastructure is woefully inadequate, and the electrical grid is unprepared. And moreover, consumers shopping for an EV face barriers in battery range and charging speed, as well as a limited selection of models and segments. To be clear, this transition will take time and will occur at different rates throughout our country and world.

The industry is preparing for EVs to be a much larger part of the market going forward, both in the U.S. and abroad. Major automakers around the world have announced several billion in EV investments and ambitious new product plans and target dates. As automakers improve technology, decrease battery costs, and produce at scale, EVs will become more competitive with ICEs (Internal Combustion Engine). And in the coming years, automakers plan to launch EVs in the segments that are most popular with American consumers: CUVs, SUVs, and pickups.

Union workers must lead this transition and in fact, UAW members are currently building the vehicles of the future. Our members currently make advanced technology vehicles that include battery electric (Chevy Bolt, GMC Hummer), plug-in hybrids (Jeep Wrangler PHEV, Ford Escape PHEV), and autonomous vehicles (Cruise AV (Autonomous Vehicle)). UAW employers have announced plans to make EVs and PHEVs at UAW plants in a range of segments, including CUVs, SUVs, pickups, and delivery vans. This year will also see production launches by several start-ups. If new entrants are hostile to unions and provide subpar wages & benefits, it will further erode job quality in the industry.

Electrification is not limited to the auto industry. The UAW also represents over 15,000 workers who manufacture farm, construction, and mining equipment. These manufacturers are also investing in future technologies for electrification and autonomy, including those in the agricultural equipment sector. For example, John Deere Senior Vice President Pierre Guyot has said that “*John Deere is committed to a future with zero emissions propulsion systems and is investing in and developing technologies for batteries as a sole- or hybrid-propulsion system for vehicles.*”<sup>5</sup> Just last week, John Deere revealed a fully autonomous tractor that will be available to farmers later this year and is ready for mass production.<sup>6</sup> The over 10,000 UAW members who build John Deere equipment, most of whom are working and living in Iowa and Illinois, are ready and able to build the latest agricultural equipment that helps feed the nation. But we need policies that ensure industry invests to produce advanced technologies domestically and creates quality manufacturing jobs that sustain communities across the country.

As the Committee is aware, climate change presents significant challenges for the agricultural sector. A large body of scientific research predicted for decades that climate change would increase the number and strength of extreme weather and climate events such as heat waves and droughts. Unfortunately, these predictions regarding climate change are proving correct right before our eyes, and we all have a responsibility to take action to mitigate its impacts. We need cleaner and more efficient vehicles on the road and jobs building these cleaner vehicles must pay family and community-sustaining wages and provide benefits that workers can count on to care for themselves and their loved ones.

The U.S. is far behind other nations in public and private investments needed to make the U.S. a competitive player in vehicle electrification. China has invested more than \$60 billion to support EV manufacturing. Chinese firms, either owned or supported by the Chinese Government, currently produce 60% of passenger EVs sold around the globe and produce almost 70% of battery cells.<sup>7</sup> China also controls some 80% of the supply of rare earth minerals—which are essential for aerospace, defense, and EV production—and may impose export controls on these vital materials.<sup>8</sup> The European Union (EU) has established the European Battery Alliance to

<sup>4</sup>Wards Intelligence. Jan. 2022. “U.S. Light Vehicle Sales, December 2021”: <https://wardsintelligence.informa.com/WI966151/US-Light-Vehicle-Sales-December-2021>.

<sup>5</sup><https://www.deere.com/en/our-company/news-and-announcements/newsroom/kreisel-announcement/>.

<sup>6</sup><https://www.deere.com/en/our-company/news-and-announcements/news-releases/2022/agriculture/autonomous-tractor-reveal/>.

<sup>7</sup>The New York Times, “The U.S. Auto Industry Bets Its Future on Batteries,” February 16, 2021. *The Auto Industry Bets Its Future on Batteries*—THE NEW YORK TIMES (<https://www.nytimes.com/2021/02/16/business/energy-environment/electric-car-batteries-investment.html>).

<sup>8</sup>Financial Times, *China targets rare earth export curbs to hobble U.S. defence industry*, February 16, 2021. Available Online: *China targets rare earth export curbs to hobble U.S. defence industry*—FINANCIAL TIMES ([ft.com](https://www.ft.com)).

promote the production of batteries and key components within EU.<sup>9</sup> South Korea is home to LG Chem, the world's largest producer of lithium-ion batteries for electric vehicles, with a 24.6% market share. The company has plans to triple its battery production.<sup>10</sup>

The global market is moving towards ever more efficient vehicles, including hybrid and electric vehicles. Global electric car registrations increased by 41% in 2020, despite the pandemic-related worldwide downturn in car sales, in which global car sales dropped 6%.<sup>11</sup> It has been projected that by 2040, over 50% of new car sales globally will be electric.<sup>12</sup> If the U.S. fails to make public investments and adopt smart public policies to encourage and attract investment in the growing electric vehicle market, companies will locate production and supply facilities in countries that are making these investments. The greener vehicles of the future are going to be made somewhere and other countries are preparing for these innovative technologies. We could see the U.S. auto industry fall behind on advanced technology, hurting the American economy and American workers. Ignoring these realities is not an option because it cedes the future to other nations that have a significant auto manufacturing footprint.

We are at a pivotal crossroads as automakers transition many of their fleets from gas- and diesel-powered vehicles to electric ones. The shift to EVs cannot come at the expense of good wages and benefits and it is critical that we do not leave workers behind as the industry transitions to electrification.

The EV transition reinforces the continued importance of putting in place policies that facilitate vehicle and parts production in the United States and easing impediments to workers at non-union automakers to organize. As the nation invests in a transition to innovative technology, we must seize upon these opportunities to preserve and increase quality jobs. We have an opportunity, right now, to ensure that future EV investments incentivize production of EVs in the United States, made by union workers.

A three-pronged approach is needed to achieve these goals including robust investments in EV infrastructure such as charging stations; supporting tax subsidies to incentivize consumers to purchase EV's; and targeting investments towards retooling facilities. We commend Congress and the Biden Administration for passing the bipartisan Infrastructure Investment and Jobs Act (IIJA) which contains historic investments in EV infrastructure including \$7.5 billion for EV charger infrastructure, \$5 billion for EV school buses and \$3 billion over 5 years for battery processing. Furthermore, we commend the House of Representatives for approving the Build Back Better Act (BBBA). The Build Back Better Act includes the Kildee-Stabenow EV consumer tax credit which makes historic investments in domestic electric vehicle production that are good for the environment, our economy, and working families. IIJA and BBBA, together, address all three prongs that are needed for a successful transition. The UAW believes that government subsidies and tax breaks must be paired with a commitment to locate these jobs in the U.S. at comparable wages and benefits to the jobs they replace. Fortunately, the Kildee-Stabenow amendment in the BBBA continues a \$7,000 consumer credit for EVs and adds a \$4,500 bonus for autos assembled in the U.S. by unionized workers as well as a \$500 domestic battery bonus. It is our hope that the Senate passes BBBA and maintains this provision to reward good jobs.

### **Future of the EV Manufacturing in the United States**

While EV sales have grown steadily over the past decade, but they still represent a fraction of vehicle sales. EVs and PHEVs combined represent just 4% of U.S. auto sales in 2021.<sup>13</sup> And EVs face several hurdles to mass-adoption. EVs are more expensive to produce, making them less profitable and dependent on consumer incentives. In most parts of the country, EV charging infrastructure is woefully inadequate, and the electrical grid is unprepared. And consumers shopping for an EV,

<sup>9</sup>European Battery Alliance, "EBA 250," accessed Jan. 15, 2020. Available online: [www.eba250.com/about-EBA250?cn-reloaded=1](http://www.eba250.com/about-EBA250?cn-reloaded=1).

<sup>10</sup>Reuters, "LG Chem to Triple its EV Battery Production Capacity," October 21, 2020. Available online: [LG Chem to triple its EV battery production capacity \(autoblog.com \(https://www.autoblog.com/2020/10/21/lg-chem-to-triple-ev-battery-production/\)\)](https://www.autoblog.com/2020/10/21/lg-chem-to-triple-ev-battery-production/).

<sup>11</sup>International Energy Agency, "Global EV Outlook 2021." <https://www.iea.org/reports/global-ev-outlook-2021>.

<sup>12</sup>BloombergNEF, "Electric Vehicle Outlook 2020." <https://about.bnef.com/electric-vehicle-outlook/>.

<sup>13</sup>Wards Intelligence. Jan 2022. "U.S. Light Vehicle Sales, December 2021": <https://wardsintelligence.informa.com/WI966151/US-Light-Vehicle-Sales-December-2021>.

face barriers in battery range and charging speed, as well as a limited selection of models and segments.

### Global Challenges

The ongoing pandemic has a direct impact on the topics before us today. According to John Hopkins University, the U.S. now averages more than 700,000 new COVID (coronavirus disease) cases per day, far more than any previous point in the pandemic. By just April of last year, more than 35% of the U.S. population had been infected by COVID-19, putting the current death toll over 830,000 Americans.<sup>14</sup> Of course, the pandemic has impacted both production and demand. As we are all painfully aware, the global coronavirus pandemic is by no means over and will take many years until we fully appreciate the profound impact it has had on our country and the world.

Regarding the motor vehicle sector, lack of resilience in our global supply chains has painfully demonstrated that the slightest disruption can have significant impacts on working people and the economy. Our members have been severely impacted by the pandemic-driven shortage of automotive-grade semiconductors. Production at numerous U.S. plants have been idled and tens of thousands of workers have been laid off, with ripple effects across the automotive value chain.

The current shortage is relevant to the discussion of electric vehicles (EVs) and autonomous vehicles (AVs). EVs and AVs are heavily reliant on semiconductors. It is estimated that an EV autonomous vehicle will have over a thousand dollars' worth of semiconductors. This increase in semiconductor usage comes at a time when U.S. semiconductor manufacturing has been in decline. The total number of U.S. fabrication plants have decreased from 123 in 2007 to 95,<sup>15</sup> while the industry employs 100,000 fewer production workers than it did at the turn of the century.<sup>16</sup> Currently, U.S. manufacturers account for only 13% of the global semiconductor supply. This is because the U.S. is no longer attracting new fabs. In 2011, of 27 high-volume fabs built worldwide, only one was in the U.S.; 18 were in China and four in Taiwan. In 2018, 20 new fab projects were announced in China, with total investment exceeding \$10 billion.<sup>17</sup>

We applaud Congress for passing the *Creating Helpful Incentives to Produce Semiconductors (CHIPS) for America Act* in the FY 2021 National Defense Authorization Act which included funding to address the semiconductor shortage facing auto manufacturing, but more work remains. We urge the House to pass the *CHIPS for America Act provisions* from the U.S. Innovation and Competition Act (USICA), providing more than \$52 billion to fully implement this program aimed at spurring domestic production of semiconductors that are crucial for auto manufacturing and a host of other sectors.

### Need to Create and Maintain Good Jobs

U.S. manufacturing workers face serious headwinds, including weak labor laws that fail to protect workers' rights to join a union, bad trade deals that put interests of investors before workers, and misguided tax incentives that allow corporations to pay fewer U.S. taxes on profits earned overseas than those earned within our borders and some to pay no corporate taxes at all. Over the past fifteen years, U.S. automotive production workers' wages have fallen significantly. When adjusting for inflation, average hourly earnings for production workers in auto assembly have declined by 21%, while wages in the auto parts sector have declined by 19%.<sup>18</sup> The *status quo* is unacceptable.

Labor law reform is desperately needed. In fact, the National Labor Relations Act (NLRA) has not been strengthened since becoming law over 85 years ago. Our laws must ensure workers are able to collectively bargain for better wages, safer worker conditions and a dignified retirement. We urge the Senate to pass the *Protecting the Right to Organize (PRO) Act*. The PRO ACT could help raise job standards in the motor vehicle industry. We applaud the House for passing it in the 117th and 116th Congresses on a bipartisan basis. If signed into law, the PRO Act will protect a worker's right to join a union by strengthening penalties against corporations that

<sup>14</sup> "COVID Tracker." Center for Disease Control, January 10, 2021.

<sup>15</sup> MForesight, "Manufacturing Prosperity: A Bold Strategy for National Wealth and Security", June 2018: <http://mforesight.org/download/7817/>.

<sup>16</sup> BLS, *Quarterly Census of Employment and Wages (QCEW) for NAICS 334413*, <http://www.bls.gov/cew/>.

<sup>17</sup> MForesight, "Manufacturing Prosperity: A Bold Strategy for National Wealth and Security", June 2018: <http://mforesight.org/download/7817/>.

<sup>18</sup> Bureau of Labor Statistics. "Average hourly earnings of production and supervisory employees." Series CEU3133610008 & CEU3133630008, Data from January 2006–January 2021. Adjusted using BLS CPI Inflation Calculator.

violate workers' rights, provide for mediation and arbitration of first contracts, eliminate right to work laws, prohibit captive audience meetings, and support workers' right to strike. Passing the PRO Act will go a long way in strengthening outdated labor laws and rebuilding our nation's middle class. We call on the Senate to swiftly pass the bill.

As Congress deliberates on legislation aimed at improving the environment and ensuring that jobs of the future are good jobs, it is incumbent to incorporate provisions related to shoring up domestic supply chains and strengthening labor standards. Consumer and deployment incentives must support domestic assembly and high domestic content requirements. Lawmakers should include U.S. domestic content requirements for key vehicle components, like those considered super-core components in the USMCA (United States-Mexico-Canada Agreement), focusing on domestic EV batteries, plug-in hybrid engines, hybrid transmissions, and electric motors. Companies that fail to meet labor standards and U.S. final assembly requirements will still be able to sell their automobiles, they just should not get taxpayer assistance.

President Biden has rightfully prioritized buying American products, made here by American workers by signing the Executive Order to Strengthen Buy America provisions. We commend the Biden Administration for emphasizing the importance of building out and re-shore critical supply chains, including medical equipment, semiconductors, energy and grid resilience technologies, key electronics and related technologies, telecommunications infrastructure, and key raw materials. These initiatives have the potential to create new jobs and protect U.S. supply chains against national security threats. We urge you to work with the Administration to strengthen domestic supply chains and support U.S. made products.

#### **Conclusion**

We do not have to choose between protecting our environment and economic prosperity. This is a false choice that hinders our ability to tackle real dangers and build a better future. In fact, to effectively combat climate change and strengthen our middle class, we must do both. To lead the future, electric vehicles and other green technologies must create good U.S. jobs where workers have a voice on the job. It is important to ensure all manufacturing workers can join a union free from intimidation by employers seeking to maintain the *status quo*.

The transition from traditional gas-powered engines will require patience and public resources. Even with billions in planned investments, auto companies are relying on public subsidies and other policies to promote sales, transform production capacity, and speed up profitability for EVs. Strategic government support is a crucial tool for strengthening American innovation and manufacturing capacity. But if the public is going to foot the bill, the public must get economic benefits in return, in the form of domestic investments and quality jobs. To make EVs work for American workers, we need policies that promote domestic manufacturing and quality union jobs.

We stand ready to work with you and all other stakeholders to ensure the transition is good for working people, the U.S. economy, and our planet. Thank you for considering our views. I look forward to answering your questions.

The CHAIRMAN. Thank you very much.

And now, Mr. Mills, you are recognized. You may need—oh, go right ahead.

#### **STATEMENT OF MARK P. MILLS, SENIOR FELLOW, MANHATTAN INSTITUTE, CHEVY CHASE, MD**

Mr. MILLS. Thank you, Mr. Chairman, and good afternoon. Thank you for the opportunity to testify.

As you probably know, my work focuses on technology forecasting, so I would be remiss in not starting out by noting that I just published a new book about America's broad-based and exciting technology and economic future, with a subtitle, *The Roaring 2020s*. So, you might imagine, I am pretty optimistic about America's future.

But onto the subject today. As the Committee knows, so far despite rapid growth in EV sales, batteries power only about 0.6 percent of the vehicles on America's roads, and it is at least ten times

lower than that in rural areas. So, the issue is whether the rural/urban asymmetry is amenable to policies that would incentivize greater rural EV use and, of course, at what cost? Also relevant is whether or not greater EV use in rural America would significantly impact global carbon dioxide emissions.

So, let me focus on summarizing three key realities. First, as great as the new EVs are, they still can't meet the overall practical performance requirements, especially in rural areas. The conventional wisdom is that consumers' reluctance to embrace EVs in general, and especially for rural use, arises primarily from so-called range anxiety, and of course, cost. The former, it is argued, can be solved with more charging stations; the latter, we are told, can be fixed with subsidies that would soon become unnecessary because of expectations of the inevitable decline in costs for batteries.

But the facts suggest otherwise. Most EVs today offer range comparable to a conventional car, including the newly announced GM offering and Ford's Lightning, both have 400 mile range batteries. The practical problem is the time it takes to refuel a battery. Instead of 5 minutes to fill up a pickup truck's tank, a standard level to charge it takes about 10 hours. The so-called super charger can drop that to 40 minutes, but that is obviously still nearly ten times longer than normal. So, providing the same consumer experience means installing at least ten-fold more electric pumps, super chargers, than exist as gas pumps. And the former super chargers cost about twice as much as a gasoline pump. So, that 20-fold higher infrastructure cost per consumer served is only part of the story. Super chargers operate at about ten-fold higher power levels than standard chargers, so the rural electrical distribution infrastructure will have to be upgraded radically, and it is an infrastructure that is already far more expensive per household than in urban areas.

Then there are hidden costs. Of course, rural grid outages are about 50 percent more frequent than in urban areas. Today, a rural resident can ensure travel is possible during an outage, whatever the cause of the outage, by spending a few hundred dollars on enough gasoline storage capacity to fill up a pickup truck's tank. But if a grid outage happened when, let's say, a Ford Lightning is only half charged, that homeowner will have to spend over \$30,000 on a home-based battery storage system that could hold enough backup power to fill up just half of the pickup truck's battery.

So, that brings me to the assumption that EV subsidies will become unnecessary because of the expectation that batteries will soon become far cheaper. The fact is that the mass adoption of EVs will dramatically stress global supply chains and lead probably to higher, not lower, prices for batteries in the coming years. The global plans to expand battery production, along with solar and wind construction, are parallel. Studies have shown, including from the IEA, that they expect demand to increase from 400 percent to over 4,000 percent for the various critical minerals that are needed to build all the planned hardware. On average, it is important to note that compared to a gasoline vehicle, an EV entails at least 1,000 percent increase in the overall tonnage of materials that are extracted from the Earth to deliver the same lifetime miles.



So, the growth in demand for materials will be far greater right now than the rate at which the world's miners are planning or likely able to supply, and keep in mind, the global average to open a new mine is 16 years, and it is far longer in the United States. So, in basic commodity economics, this demand for EV battery minerals up strips supply, it will fuel a price increase, not the decrease that is assumed by many enthusiasts. Commodities alone comprise 60 to 70 percent of the cost to fabricate a battery.

Even with energy mineral supply chain that is not yet fully stressed, because remember, EVs still account for under five percent of new vehicle purchases. Even then, the overall price for the sort of suite of EV battery metals, the price for those commodities is up 200 percent over the past 2 years. What that has done is caused last year's lithium battery costs to decline by barely six percent. The dramatic slowdown from sort of the decadal trends, and the current forecast to see lithium battery costs rise next year as commodity inflation continues.

So, the future price for batteries is now determined mainly by the mining and the commodities markets. And it bears noting that most of the primary minerals and the chemical processing of those minerals takes place overseas. The issue of foreign dependencies on energy materials used to be something that Congress worried about. Today, Chinese firms dominate the critical mineral mining and processing supply chains, and the majority of growth in the mining and processing is expected offshore. Just for the record, the U.S. depends on imports for 100 percent of some 17 critical minerals and for over half of the supply of another 28 minerals. It goes without saying that the inverse is the case for—

The CHAIRMAN. Mr. Mills, your time is expiring.

Mr. MILLS. Oh, let me just say as a final point that the data shows that EVs will only have a trivial impact in global oil use, maybe three percent reduction of rural oil use, and in fact, potentially lead to increased carbon dioxide emissions when the fabrication of batteries is counted.

Thank you.

[The prepared statement of Mr. Mills follows:]

PREPARED STATEMENT OF MARK P. MILLS, SENIOR FELLOW, MANHATTAN INSTITUTE,  
CHEVY CHASE, MD

Good afternoon. Thank you for the opportunity to testify. I'm a Senior Fellow at the Manhattan Institute where I focus on science, technology, and energy issues. I am also a Faculty Fellow at the McCormick School of Engineering at Northwestern University where my focus is on supply chain systems and future manufacturing technologies. And, for the record, I'm a strategic partner in a venture fund focused on software startups in energy.

Since the purpose of this hearing is to explore actions that might be directed at "*the needed infrastructure and possible impediments to electric vehicle (EV) adoption in rural America*," permit me to highlight some of the infrastructure realities and some of the impediments emerging from the underlying engineering and physics of EVs, in particular for rural markets.

I should begin by pointing out the obvious. Without regard to government interventions or incentives, we will see a lot more EVs on roads in the future. Electric cars are now a viable consumer product. This transformation happened because of the combination of the unheralded advances in high-power semiconductors along with the far more heralded, forty-year-ago, invention of lithium battery chemistry. It bears noting that these twin technology revolutions emerged without government intervention or policies. The ultimate extent to which EVs can displace internal

combustion engines, and how soon, will be determined, ultimately, by the limits of the technologies that now exist.

As the Committee knows, while in recent years we've seen rapid growth in consumer purchases of EVs, the total number of EVs in use today remains, overall, at about a 0.6% share of all light duty vehicles on America's roads. And, relevant to this hearing, the EV share of vehicles in rural America is at least ten times *lower* than that. At issue is whether that rural-urban asymmetry is amenable to policies that would incentivize greater rural EV penetration, and at what cost. Also relevant to this exploration is whether subsidizing greater EV use in rural America would make a significant difference in global carbon dioxide emissions. I'll focus on three key realities.

*EVs still can't meet overall practical performance requirements, especially in rural areas.*

It is well-known and obvious that rural residents drive more miles, on average about 40%<sup>1</sup> more per person per year than urban drivers. And similarly well-known is the fact that pickup trucks make up about 40%<sup>2</sup> of the share of new car purchases in rural areas, compared to a 20% share nationally. Manufacturers are rushing to offer all-electric pickups. Rural consumers will soon have that option.

The conventional wisdom has it that consumer reluctance to embrace EVs in general, and especially in rural areas, arises primarily from so-called "range anxiety," and cost. The former, it is commonly argued, can be solved with more charging stations. The latter we're told can be alleviated with subsidies while awaiting ostensibly inevitable declines in costs. The facts, however, suggest otherwise.

Most EVs available today, or announced, offer a range comparable to a conventional car's full gasoline tank, including for example the new Ford F-150 Lightning pickup truck, as well as GM's emerging offering. Both the latter have 400 mile range batteries. The practical problem is the time it takes to refuel a battery. While that's an issue that can be ameliorated, solutions come at great cost both for the consumer and for the electrical infrastructure. And in the time frames proposed in aspirational policies, there's no visible path to refueling a battery even close to as fast as filling up a gasoline tank.

A standard gas station pump can fill a 26 gallon F-150 fuel tank in about 5 minutes. Meanwhile, charging an EV with a standard Level 2 charger (which constitutes the majority of both public and home chargers today) takes about 10 hours.<sup>3</sup> A so-called supercharger can drop that time to 40 minutes, which is still nearly ten times longer than filling up a gas tank. Set aside the inconvenience for most drivers, most of the time, of a 40 minute fill-up, using superchargers has critical infrastructure implications. In order for an EV filling station to provide the same functional utility consumers experience for their vehicles today, far more electric 'pumps' will be needed than gas pumps; maybe ten-fold more. And the capital *cost*<sup>4</sup> of a supercharger is roughly double the cost of a *gasoline*<sup>5</sup> pump. Thus, in rough terms, that constitutes a 20-fold higher infrastructure cost per consumer served to provide the same functional utility. That cost differential is anchored in basic electric equipment realities that are not subject to profound or rapid cost reductions.

Then there are the incremental costs for the local electrical distribution infrastructure. In order to achieve a faster charge rate, superchargers operate at about a ten-fold higher power level. Supporting that kind of power, especially for multiple superchargers operating simultaneously, will require a radical and expensive upgrade to the existing rural power distribution infrastructure. Such upgrade costs are often ignored but are unavoidable and particularly impactful in rural areas where distribution infrastructure costs are far greater per household than in urban areas.

It is very unlikely that a significant share of either rural or urban households will spend the 20-fold higher costs to have a so-called Level 3 superchargers. The more common Level 2 chargers that take overnight to refill pose other practical challenges in rural areas where the frequency of grid outages is, on average, about 50%<sup>6</sup> higher than for urban and suburban grids. In order to ensure the ability to travel during outages—which, if caused by weather or natural disasters, is even more im-

<sup>1</sup> [https://vtc.rutgers.edu/wp-content/uploads/2014/04/Articles.Urban-Rural\\_differences.pdf](https://vtc.rutgers.edu/wp-content/uploads/2014/04/Articles.Urban-Rural_differences.pdf).

<sup>2</sup> <https://www.eesi.org/articles/view/beyond-cities-breaking-through-barriers-to-rural-electric-vehicle-adoption>.

<sup>3</sup> <https://www.forbes.com/wheels/news/2022-ford-f-150-lightning-ev-pickup-debuts-300-mile-range-priced-at-40k/>.

<sup>4</sup> <https://blog.carvana.com/2021/07/how-much-does-it-cost-to-install-an-ev-charger/>.

<sup>5</sup> <https://www.commtank.com/uqaqs/how-much-does-a-gas-station-fuel-pump-cost/>.

<sup>6</sup> <https://www.eaton.com/content/dam/eaton/products/medium-voltage-power-distribution-control-systems/reclosers/distribution-system-reliability-and-outage-rate-analysis-td280026en.pdf>.

portant—rural homeowners using gasoline vehicles can spend a few hundred dollars on a storage tank that can hold enough gasoline to fill an F150's tank. But in the event of a grid outage with an F150 Lightning that's, say, only half charged, one would need to have an onsite a Generac or Tesla Powerwall with enough stored power to fill up the pickup's battery. A Powerwall with that much storage—half a 'tank'—costs over \$30,000.<sup>7</sup> The other alternative for that rural homeowner of course would be to keep a small tank of fuel on hand and a \$5,000 generator to charge the truck.

Finally, none of this says anything about the practical utility of a truck with a fuel system—the battery—that weighs 1 ton instead of 150 pounds. The latter is the weight of full gasoline tank for a conventional truck with the same range. Of course, for rural homeowners with two vehicles, it is possible many people would choose to own second vehicle with limited emergency fuel capability, and more limited cargo capacity, if there were no cost penalty because of subsidies.

Which brings us to the ubiquitous policy assumption that EV subsidies can decline and soon become unnecessary because of the expectation that batteries will soon become far cheaper. Whether costs decline at the rate assumed, or at all, is an issue anchored in supply chains.

*Mass adoption of EVs will stress global supply chains and lead to higher, not lower, prices.*

The energy transition, as it's conceived today will create an upstream demand for tens of gigatons of materials to be mined in order to fabricate car batteries. In addition, gigatons more will be needed for the grid storage batteries contemplated, and yet more to build solar and wind machines. Using batteries entails at least a 1,000% increase in the tonnage of materials extracted from the earth to deliver the same mile driven by a gasoline vehicle. Given the integration of the transition proposals, it is relevant that a similar increase in materials is associated with using solar and wind to replace hydrocarbons to make the same unit of electricity to charge the battery. The IEA has observed that the transition is a "shift from a fuel-intensive to a material-intensive energy system." This unavoidable, physical reality has profound implications for costs, not to mention the implications in environmental and geopolitical domains.

So far, the upstream, energy minerals supply chain has yet to be fully stressed with EVs still accounting for well below 5% of new vehicle purchases. The increase in demand for materials to build EVs at the rate proposed by governments around the world will be far greater than the rate at which the world's miners are planning, or likely able to expand supply.

The contemplated increase in solar/wind/battery construction is estimated to create a jump in demand for the various critical energy minerals from 400% to over 4,000%. In a nearly 300 page *report*<sup>8</sup> issued last year by the IEA, that agency's analysts observed that an energy transition plan that is more ambitious than implied by the Paris Accord, but one that remains far short of eliminating hydrocarbons, would increase demand for minerals such as lithium, graphite, nickel and cobalt rare earths by 4,200%, 2,500%, 1,900% and 700%, respectively, by 2040.

The fact that an EV uses, for example, about 300 to 400% more copper than a conventional car has yet to impact global supply chain because EVs still account for such a small share of global auto production. Producing EVs at scale, along with plans for grid batteries as well as for wind and solar machines, will push the "clean energy" sector up to consuming over half of all global copper (from today's 20% level). For nickel and cobalt, to note two other relevant minerals, energy transition aspirations will *push*<sup>9</sup> clean energy use of those two metals up from a negligible share today of global demand for all other purposes, to 60% and 70%, respectively, of all demand.

Relevant to the transportation sector alone is a recent analysis from Wood Mackenzie of the mineral demands to fabricate automotive batteries to meet the goal to have EVs account for 2/3 of all new car purchases by 2030. Such a goal would create a demand for lithium, nickel and copper, requiring dozens of new mines to be opened, before 2030, each the size of the world's biggest in each category today. Such a possibility is fantastical considering, as the IEA reported, that the global *average* is 16 years to open a new mine. That average timeline is far longer in the U.S., and often infinite.

As demand for EV battery minerals rises—and that increase occurs contemporaneously with rising demand for minerals for grid batteries, and for solar and wind

<sup>7</sup> <https://sunwatts.com/13-5-kwh-generac-purcell-energy-storage-system/>.

<sup>8</sup> <https://www.iea.org/reports/the-role-of-critical-minerals-in-clean-energy-transitions>.

<sup>9</sup> <https://www.iea.org/reports/the-role-of-critical-minerals-in-clean-energy-transitions>.

machines—it will inevitably lead to price increases in those commodity markets, not the decreases that are assumed in nearly all forecasts. Few analysts seemed to have incorporated that fact in the assumptions about the future cost of the necessary minerals for a far producing a far greater quantity of batteries.

The commodity materials alone comprise 60[%] to 70% of the cost to produce a battery. This is a testament to the incredible progress on reducing costs in the engineering and manufacturing of battery cells and systems. But it also means that modest rises in commodity prices can now wipe out future gains in reducing the far smaller share of costs associated with the electronics and labor. The IEA has noted as much in its report, concluding that future mineral price escalations could “eat up the anticipated” reductions in manufacturing costs expected from the “learning effects” in further scaling up of battery production.

It is notable that 2021 saw a rise in commodity material costs, and that led directly to a dramatic slow-down in the decadal trend of declining battery costs. Lithium battery costs declined by only 6% last year. And the *current forecast*<sup>10</sup> is for batteries to *rise* in cost in 2022, again because of the ongoing increases in materials commodities prices. The overall *price index*<sup>11</sup> for the suite of EV battery metals is up some 200% over the past 2 years. And that trend comes with EVs still at only about 5% of new car sales. The future price direction for batteries is now determined mainly by the mining and commodities markets and not by the manufacturing.

Commodity inflation has begun to escalate the cost to build solar and wind machines as well, also slowing or reversing long-run cost declines. Solar module prices were up *nearly 50%*<sup>12</sup> last year over 2020. Progress in manufacturing efficacy has reduced those costs so much that commodity inputs now make up about 70%<sup>13</sup> of the cost of solar modules.

Producers do respond to higher prices by adding more supply, in every business. But for infrastructure-scale supplies of minerals and metals it takes at least a decade, under ideal circumstances, from discovery and decision to see production emerge from new mines. And even then, expansion typically begins a while after producers come to believe that prices will stay escalated long enough to recover multi-billion-dollar investments.

Finally, it bears noting that most of the primary minerals and the chemical processing of those minerals takes place overseas. The issue of foreign dependencies on energy materials used to be something that Congress worried about because of both practical supply chain exposures and geopolitical challenges. The U.S. is today *dependent*<sup>14</sup> on imports for 100% of some 17 critical minerals and, for 28 others, net imports account for more than half of existing domestic demand. Insufficient attention has been afforded the impact of accelerating adoption of EVs and the resultant realignments of energy-material supply chains. Shifting the United States from hydrocarbon energy self-sufficiency to energy-mineral dependency entails some obvious consequences, and almost certainly some wildcards that are not obvious today.

As it stands today, Chinese firms dominate the production and processing of many critical rare earth elements, and nearly all the growth in mining is expected offshore, increasingly in fragile, biodiverse wilderness areas. More mining can be done in an environmentally responsible way, but so far there’s little evidence of support for a massive expansion of new mines in America. The path the United States is proposing with EVs is the practical, economic, and geopolitical equivalent of building conventional cars in America but importing nearly 100% of all gasoline.

This brings me to my final point regarding the off-shoring of energy materials. Mining and processing minerals is an energy-intensive activity that is dominated by the use of fuel-burning machinery. Since the primary, if not sole motivation for incentivizing the purchase of EVs is to reduce carbon dioxide emissions, there has been insufficient attention afforded the issue of the offshore and out-of-sight emissions from accessing, processing, and transporting all the associated materials to fabricate the batteries themselves.

*EVs will reduce oil use only slightly, and have an even smaller impact on carbon dioxide emissions.*

The question of how much carbon dioxide—as opposed to how much oil—is eliminated by using an EV is not one solely about counting the emissions resulting from

<sup>10</sup> <https://about.bnef.com/blog/battery-pack-prices-fall-to-an-average-of-132-kwh-but-rising-commodity-prices-start-to-bite/>.

<sup>11</sup> <https://www.mining.com/mining-com-launches-ev-battery-metals-index/>.

<sup>12</sup> <https://www.pv-magazine.com/2022/01/04/higher-pv-module-prices-may-point-to-stable-demand-and-more-sustainable-pricing-trends/>.

<sup>13</sup> <https://www.pv-magazine.com/2021/12/11/the-weekend-read-solar-pv-development-disrupted/>.

<sup>14</sup> <https://pubs.er.usgs.gov/publication/mcs2020>.

producing the electricity to charge the battery. Instead, it's dominated by what know about the "embodied" emissions arising from the labyrinthine supply chains to obtain and process all the materials needed to fabricate batteries.

When considering all the factors in mining the necessary minerals to fabricate a battery, fabricating a *single* 1 ton EV battery for a pickup truck can entail digging up and moving a total of about 500 tons of earth. After that, an aggregate total of roughly 100 tons of ore are transported and processed to separate out the targeted minerals. That's where all the hidden, upstream energy and emissions come from.

As a benchmark, the technical *literature*<sup>15</sup> shows that the *embodied*<sup>16</sup> energy associated with all that industrial activity ranges from two to six *barrels of oil* (in energy-equivalent terms) *needed*<sup>17</sup> to fabricate a battery that can store the energy-equivalent of 1 *gallon* of gasoline.

Embodied emissions can be difficult to accurately quantify. And unlike the petroleum fuel cycle, nowhere are there more complexities and uncertainties than with EVs. For example, one *review*<sup>18</sup> of fifty academic studies found estimates for embodied emissions to fabricate a *single* EV battery ranged from a low of about 8 tons to as high as 20 tons of CO<sub>2</sub>. And that's for a battery that is half the size of what is used in an electric pickup truck. The high end of that ranges is nearly as much CO<sub>2</sub> as is produced by the lifetime of fuel burned by an efficient conventional car. Again, that's before the EV is delivered to a customer and driven its first mile and does not include emissions associated with producing the electricity to charge the battery.

The uncertainties come from inherent—and likely unresolvable—variabilities in both the quantity and type of energy used in the battery fuel cycle with factors that depend on geography and process choices, many of which are proprietary. Thus, any calculation or claim about emissions saved by using an EV is necessarily an *estimate* based on myriad *assumptions*.

The embodied energy is also impacted by a mine's location, something that is in theory knowable today but is a guessing-game regarding the future. Remote mining sites typically involve more trucking and depend on more off-grid electricity, the latter commonly supplied by diesel generators. As it stands today, the mineral sector alone accounts for nearly 40%<sup>19</sup> of global industrial energy use. And over ½ of the world's batteries or the key battery chemicals are produced in Asia with its coal-dominated electric grids. Despite hopes for more factories in Europe and North America, every forecast sees *Asia*<sup>20</sup> utterly dominating that supply chain for a long time, a part of the supply chain where coal produces over half of the electricity used.

Some forecasts of emissions savings from EVs *explicitly*<sup>21</sup> *assume*<sup>22</sup> that the future battery supply chain will be *located*<sup>23</sup> in the country where the EVs operate. One widely cited *analysis*<sup>24</sup> assumed aluminum demand for U.S. EVs would be met by domestic smelters and powered mainly from hydro dams. While that may be theoretically possible, it doesn't reflect reality. The U.S., for example, produces just 6%<sup>25</sup> of global aluminum. If one assumes instead the industrial processes are located in Asia, the calculated lifecycle emissions are 150%<sup>26</sup> higher.

For EV carbon accounting, the problem is that there are no reporting mechanisms or standards equivalent to the transparency with which petroleum is obtained, refined, and used. *Researchers*<sup>27</sup> are aware of this issue, even if concerns don't show up in popularized claims. One often finds cautionary statements *such*<sup>28</sup> as a "greater understanding of the energy required to manufacture Li-ion battery cells is crucial for properly assessing the environmental implications of a rapidly increasing use of Li-ion batteries." Or in another *paper*:<sup>29</sup> "Unfortunately, industry data for the

<sup>15</sup> <https://kundoc.com/pdf-the-environmental-impact-of-li-ion-batteries-and-the-role-of-key-parameters-a-re.html>.

<sup>16</sup> <https://www.sciencedirect.com/science/article/pii/S0306261917305433>.

<sup>17</sup> <https://www.mdpi.com/2313-0105/5/2/48>.

<sup>18</sup> <https://www.mdpi.com/1996-1073/13/23/6345>.

<sup>19</sup> <https://discovery.ucl.ac.uk/id/eprint/1528681/>.

<sup>20</sup> <https://www.woodmac.com/press-releases/global-lithium-ion-cell-manufacturing-capacity-to-quadruple-to-1.3-twh-by-2030/>.

<sup>21</sup> [https://theicct.org/sites/default/files/publications/Global-LCA-passenger-cars-jul2021\\_0.pdf](https://theicct.org/sites/default/files/publications/Global-LCA-passenger-cars-jul2021_0.pdf).

<sup>22</sup> <https://link.springer.com/content/pdf/10.1007/s11027-019-09869-2.pdf>.

<sup>23</sup> <https://www.mdpi.com/2313-0105/5/2/48>.

<sup>24</sup> <https://www.mdpi.com/2313-0105/5/2/48>.

<sup>25</sup> <https://www.world-aluminium.org/statistics/>.

<sup>26</sup> <https://link.springer.com/content/pdf/10.1007/s11027-019-09869-2.pdf>.

<sup>27</sup> <https://www.iul.se/download/18.14d7b12e16e3c5c36271070/1574923989017/C444.pdf>.

<sup>28</sup> <https://iopscience.iop.org/article/10.1088/2515-7620/ab5e1e#fnref-ercab5e1ebib8>.

<sup>29</sup> <https://www.mdpi.com/2313-0105/5/2/48>.

rest of the battery materials remain meager to nonexistent, forcing LCA [lifecycle analysis] researchers to resort to engineering calculations or approximations to fill the data gaps.”

As the IEA report also observes, the direction of global mining is toward a higher “emissions intensity,” because the energy-use-per-pound of mining is rising because of long-standing declines in ore grades. If mineral demands accelerate, miners will necessarily chase ever lower grade ores, and increasingly in more remote locations. The IEA sees, for example, a 300% to 600% *increase* in emissions to produce each pound of lithium and nickel respectively.

Those realities mean that as the world’s mineral supply chain expands to support the production of tens of millions more EVs, the future embodied emissions could easily mean there are nearly trivial decreases—and even an increase—in overall transportation carbon dioxide emissions.

For the record, a world going from today’s ten million to having 500 million EVs on the roads would eliminate only about 15% of world oil use. And, bringing the realities back to rural America: if half of all rural homeowners could be induced to replace their second vehicle with an electric pickup truck, that would reduce U.S. oil consumption by barely 3%, and world oil consumption by about 0.5%. And it would have even less impact, perhaps none, on global carbon dioxide emissions.

The CHAIRMAN. Thank you very much.

At this time, Members will be recognized for questions in order of seniority, alternating between Majority and Minority Members. You will be recognized for 5 minutes each in order to allow us to get in as many questions as possible. And please, keep your microphones muted until you are recognized in order to minimize background noise.

I now recognize myself for 5 minutes.

Mr. David Strickland with General Motors, Mr. Strickland, you mention in your testimony plans for General Motors to bring 20 different—let me remind Members, please, mute yourselves. Thank you very much.

And now, Mr. Strickland, you mention in your testimony plans for General Motors to bring 20 different models to the United States auto market by 2025, including your announcement last week for a new electric pickup truck. Let me ask you, how are the needs of rural America taken into consideration when you at General Motors were designing these vehicles?

Mr. STRICKLAND. Mr. Chairman, we have a responsibility to continue to fulfill our customers and the market that we serve, and as America’s largest automaker, we really do embrace the fact of servicing a full line of products and capabilities.

As an example, the Silverado EV has a range of 400 miles, and it has 664 horsepower, which is comparable performance-wise to what you see in a dealership today for a Silverado. We have every expectation to be able to meet the wants and the needs of rural America and for farmers to have that same capability.

In addition to that you gain some advantages with an electric vehicle, because it also, out in the field—if it comes an individual power supply or power plant for other farm instruments and tools that may need to be charged. So, in addition to having the typical capability that you are looking for, there is actually some advantages it has as well.

The CHAIRMAN. Thank you very much. I really appreciate that.

Now, to you, Mr. Lincoln Wood, with Southern Company. How prepared is the electric grid to handle an influx of EV—and again, Members, mute your phones. Thank you. How prepared is the electric grid to handle this influx of EV users? What steps are our elec-

tric utility companies taking to prepare for additional demand on the grid, particularly in regards to outdated infrastructure in rural areas?

Mr. WOOD. Thank you, Chairman Scott, for the question.

First, utilities have a track record of integrating technology over the past 50, 60 years, air conditioning comes to mind of integrating that technology into our electric grid successfully. In particular at Georgia Power, we have a \$1.3 billion grid investment plan, and that is looking at the grid holistically to figure out how we can increase its reliability, because electric vehicles are not the only reason to make investments into the grid. Whether it be severe weather, whether it be cyber concerns, renewables or energy efficiency, utilities are constantly looking at the electric grid to upgrade or make it more resilient for all these reasons.

But a couple specific activities that we are working on, automated line devices so that we can isolate the source of an outage and make it a smaller impact to the grid itself. It could be maintenance at a substation or rebuilding the entire substation, if needed, to increase reliability. It could be even for our transmission system, even rebuilding the structures if those are needed. It could be adding alternate circuits—go ahead. I see you have a question.

The CHAIRMAN. Yes. I have a minute left, and I have another important question. However, we will make sure we get in touch with you to get your full answer. All right.

Mr. WOOD. Of course.

The CHAIRMAN. It is very important for us to have the UAW here, this distinguished member of that very distinguished union. They provide the workers. They are the ones that put it together.

So, Mr. Nassar, what will be the impact in terms of jobs for your union members?

Mr. NASSAR. Well, that really depends on how successful the EV transition is and how many people are buying them, and how that is going to work out as far as the marketplace. It is also dependent on what we are going to do as far as the battery manufacturing. Are we going to do the manufacturing here in the U.S.? So, there are quite a few open questions about what kind of jobs will be produced by this changeover to EVs.

And a lot of it has to do also with our economic policy. I want to point out that we have had big problems throughout manufacturing, many industries, because of a semiconductor shortage, which was, in our opinion, a real self-inflicted wound because we really didn't have policies to make sure that production was here.

So, we encourage the House to pass portions of USICA (S. 1260, United States Innovation and Competition Act of 2021) that has—for the semiconductors, but overall job impact, it is really going to be dependent on if workers have a voice, and what kind of policies we have to support the transition.

The CHAIRMAN. Thank you very much.

The gentleman from Georgia, Mr. Austin Scott, is recognized for 5 minutes.

Mr. AUSTIN SCOTT of Georgia. Thank you, Mr. Chairman, and my first question is for you, Mr. Strickland.

The vehicle behind you will be available in late 2023, is that correct, fall of 2023?

Mr. STRICKLAND. Yes, sir, it is. Yes, sir.

Mr. AUSTIN SCOTT of Georgia. For most of us in rural America, we don't just use our vehicles to move from place to place. They are tools, I mean, for us, and if we weigh them down towing trailers and other things, certainly that impacts the fuel economy that we get in a normal pickup truck. What does that do to the range of the vehicle? I would assume it would reduce it, so if I am hauling a trailer, do I go from 400 to 300 miles? What is the impact on the range?

Mr. STRICKLAND. Well, sir, it certainly can't defy the laws of physics, but just like it impacts the fuel economy of the internal combustion engine vehicle. We are working very hard on new battery technology. Our old TM platform is one of the foundational things that we are doing to—not only are we very excited about the performance long-term, but it is going to get better. And I think when you think iteratively about the technology, we are going to have to recognize the fact that these are working vehicles. We supply America's work truck, and so yes, absolutely. We have to sort of think through those things, but that is very much in our engineering planning and we are very bullish on the opportunity to be able to provide a vehicle that is a true working vehicle for farmers and everybody else.

Mr. AUSTIN SCOTT of Georgia. And if I use a super charger to charge the vehicle, what does it cost me to charge it, approximately?

Mr. STRICKLAND. I have to get to you on that answer. Yes, sir, I don't know the exact answer to how much for a super charger, but I will certainly get back to you on the record.

[The information referred to is located on p. 109.]

Mr. AUSTIN SCOTT of Georgia. Well, thank you for that. That is one of the questions I have is what does it cost to recharge, especially if we are using a super charger.

I can see where electric vehicles would be very valuable for people who just need a daily vehicle to commute. They start and stop at the same place every time. For some of us who are on the road significantly more, I think that we will probably stick with the internal combustion engines for the foreseeable future.

I am concerned, as Mr. Wood talked about becoming more and more dependent on China with regard to natural resources. Mr. Wood—I am sorry, it was not Mr. Wood that said that. It was Mr. Mills who was talking about that. So, Mr. Mills, the rare earth elements, a lot of them were mined from the Middle East and from Africa, if I am not mistaken, but the mines are controlled by China. Could you expand on where the raw materials are mined and how China has embedded themselves in the supply chain?

Mr. MILLS. Certainly, thanks for the question.

First, the rare earth minerals, specifically China has about a 90 percent global market dominance on the critical minerals that are not called rare earths, this would be nickel, cobalt, and so forth. So, China has a market dominance in refining those materials, like carbon and graphite and cobalt. Russia is a big player in nickel. South American firms are, African firms. China is one of the largest investors globally, particularly in Africa in mines, and in the processing industries that are associated with taking the raw ore



and turning it into useful minerals. So, it is a completely focused—they are an OPEC of battery minerals. Instead of a big portfolio of countries, you would have just three countries. Fortunately, a couple of them included are France and Canada—being a Canadian, I am happy to say that—and of course, Australia, but their market share is very small compared to the rest of the world.

Mr. AUSTIN SCOTT of Georgia. So, Mr. Laughridge, you drove from Atlanta to D.C. in an electric vehicle, is that correct?

Mr. LAUGHRIDGE. I believe that was—

Mr. WOOD. No, that was me, Lincoln Wood.

Mr. AUSTIN SCOTT of Georgia. And so, how many times did you have to recharge on the way?

Mr. WOOD. Four.

Mr. AUSTIN SCOTT of Georgia. Four, okay, and how long did it take you each time to recharge?

Mr. WOOD. Half an hour.

Mr. AUSTIN SCOTT of Georgia. Half an hour, and what did it cost for a recharge?

Mr. WOOD. In this particular model, it was free.

Mr. AUSTIN SCOTT of Georgia. It was free to recharge. You expect that would be the trend, going forward?

Mr. WOOD. I cannot say, but it was offered in this particular model for free.

Mr. AUSTIN SCOTT of Georgia. To recharge. Where did you recharge?

Mr. WOOD. Two of them were actually at Sheetz stations, and then two were just in the community based on—one was in Glen Allen, Virginia at a Target.

The CHAIRMAN. Mr. Scott, your time—

Mr. AUSTIN SCOTT of Georgia. My time has expired. Thank you, Mr. Chairman.

The CHAIRMAN. Yes.

And now, I recognize the gentlewoman from North Carolina, Ms. Adams, who is also the Vice Chair of our Committee, 5 minutes.

Ms. ADAMS. Thank you, Mr. Chairman. Ranking Member, thank you as well for hosting today's hearing, and my thanks as well to the witnesses for their testimony.

The climate crisis presents a significant challenge to everyone, not just a select few. And so, as we continue to transition towards clean energy and transportation, we must focus on equitable distribution of the charging infrastructure and not forget our rural and traditionally underserved communities. Which is why I applaud my colleagues and the Biden Administration for enacting the bipartisan Infrastructure Investment and Jobs Act (Pub. L. 117-58). This bill will fight the climate crisis and advance equality, while also creating high quality U.S. manufacturing jobs.

My question, first of all, Mr. Strickland. Rural drivers often have different driving needs than their urban counterparts. They need heavy duty vehicles such as utility vans or trucks with hauling capacity, and they drive longer distances.

So, Mr. Strickland, how is GM taking that into account as it transitions to electric vehicles?

Mr. STRICKLAND. Ms. Adams, again, we have focused on being a full line manufacturer across the range of vehicles that we cur-

rently provide, including medium-duty and heavy-duty vehicles in the pickup line, and we also have a partnership with BrightDrop, which provides commercial vehicles as well.

The goal once again—and as you alluded to for the IIJA, is being able to have the money for the infrastructure bill that will be very, very important to being able to have the resources to be able to provide consumer incentives. And being able to think thoughtfully about how we implement charging strategies for rural communities, and those are all incredibly important. And we are looking forward to working with you and the rest of the Committee Members on hopefully getting that money distributed, and then, once again, being able to port rural communities to not only the vehicles that they need, but also the ability to charge them in a thoughtful way.

Ms. ADAMS. Okay. Well, thank you.

I will follow up with what can we do as Congress to ensure socially disadvantaged farmers and ranchers have the access to electric vehicles and charging stations? Did you want to expound on that anymore?

Mr. STRICKLAND. Oh, yes, ma'am. Absolutely. One of the things that we are working on, and we have a climate equity fund, which is providing \$25 million to actually support the ability to deal with—to disadvantaged communities and communities that are frankly electric deserts. So, it isn't just simply working with our partners and providing charging stations, but it is making that investment in communities to make sure that that \$25 million—and I am sure it will be more as the years go on for us—to be able to address those social gaps and those disparate impacts for folks that don't have those opportunities. We are very committed, as we said, to make sure that everybody comes along for this journey.

Ms. ADAMS. Right.

Mr. STRICKLAND. And we have to pay attention to those communities especially.

Ms. ADAMS. Okay.

Mr. Laughridge, my State, North Carolina, currently falls behind other parts of the country when it come to the adoption of electric vehicles. Drivers are concerned with charging barriers and limited range of the vehicles. Have you seen a shift in the knowledge of or added toward electric vehicles when interacting with consumers at your dealerships, and what are the most common misperceptions, and what do you foresee as the biggest barrier for consumers to switch to electric vehicles?

Mr. LAUGHRIDGE. Thank you, Representative Adams, for the question.

To go to the last part of your question, the barriers. The biggest barrier we see is education. So, part of what I believe is the essential part of dealerships being involved in distributing the EVs is educating the customer about their needs and assessments of what type of vehicle that they would want to buy, whether EV is the proper vehicle or internal combustion engines is the proper vehicle.

But we are all in, in making sure that the customer gets the availability, the affordable pricing, and make sure that we are able to give them the correct information that fits them and their family's needs.

Ms. ADAMS. Well, thank you.

Very quickly, Mr. Mills, what do you suggest we do to lower carbon dioxide emissions?

Mr. MILLS. Thank you, Madam Congressman.

I think if we are serious about lowering the emissions, the cheapest, fastest way, if we want to spend Congressional money on subsidies, would be to incentivize the purchase of far more efficient internal combustion engines. It is much cheaper, much faster, and easy to document. And we know that all the automakers make pickup trucks, full size trucks that are close to 50 percent more fuel efficient than their sort of low average.

So, it would be a very fast way to do it, much, much cheaper, and easy to document, frankly.

Ms. ADAMS. Great, thank you.

The CHAIRMAN. The gentlelady's time has expired.

Ms. ADAMS. Mr. Chairman, I am out of time and I am going to yield back. Yes, sir. Thank you.

The CHAIRMAN. I now recognize the gentleman from Arkansas, Mr. Crawford, for 5 minutes.

Mr. CRAWFORD. Thank you, Mr. Chairman. I appreciate it.

Mr. Strickland, as you well know, Democrats continue to try to pick winners and losers by subsidizing EV purchases using taxpayer dollars. The current proposal would give up to \$12,500 for individuals making less than \$800,000. Now, to me, someone making that kind of money doesn't really need any free money to purchase a new vehicle. What is more, these credits threaten the economic livelihood of small businesses in Arkansas and elsewhere in the country who rely on distributing and selling traditional motor fuels.

I also wonder why we subsidize EVs when they don't contribute to the Highway Trust Fund? All vehicle owners and operators, no matter what fuel type they choose, including electric vehicles, should pay their fair share for road maintenance and repair.

So, my question is, how will subsidizing EV purchases impose economic hardships on small business fuel and energy marketers across the country?

Mr. STRICKLAND. I think that the perspective of a number of folks in dealing with climate transition sees that there is, frankly, more opportunities and more opportunities for jobs and job creation with a green agenda, and including the evolution and transition into electric vehicles.

The issue in terms of providing support from a consumer demand to be able to get the EV consumer demand up actually will drive down the cost of battery production. It will actually provide a broader ability to be able to support these vehicles long-term, and we think that the overall economic prospects of making that transition is positive.

With that being said, we do understand that road maintenance and road issues are certainly very important, and we are certainly willing to work with Congress to figure out ways to be able to make sure that we figure out those equities and making sure that the roads continue to be maintained, since this is going to be impacted by moving off of a possible fuel support system.

Mr. CRAWFORD. Yes, I want to make sure that we ensure that EVs are paying their fair share for the wear and tear that they impart on our highways.

I don't know if you are open to suggestions or not, but I am wondering why the industry hasn't developed some sort of a more efficient sort of a battery exchange type model where you could—like for example, when you exchange your propane tanks at a local retailer for your gas grill or whatever. It just seems to expedite the process. Those retailers are already prepared to collect the associated taxes. How hard would that be to—I know we are making progress in the electric vehicle space, but there just doesn't seem to be much consideration about how we address this collection of taxes with regard to the Highway Trust Fund. I am just wondering if maybe a battery exchange type approach might be more effective. What are your thoughts? Is that even a viable consideration for EVs?

Mr. STRICKLAND. There are a number of prospective ways to think about collecting the user fees in order to be able to support the highway system. We would be happy to engage with you and your office in that particular idea. Clearly thinking about battery exchanges or changing batteries definitely has some pluses and minuses in terms of vehicle design and rigidity and things of that nature, but we are all in for trying to figure out the most equitable way to make sure that we continue to support our road system.

Mr. CRAWFORD. Thank you. I also think it probably expedites the process as opposed to pulling into a charging station and being forced to wait 30, 40 minutes for your batteries to charge, where you could do a quick change and be on your way. That maybe helps expedite the process in addition to creating a better collection model.

So, I appreciate your comments, and Mr. Chairman, I appreciate the hearing, and to all the witnesses, thank you.

I will yield back.

The CHAIRMAN. Thank you.

The gentlewoman from Virginia, Ms. Spanberger, who is also the chair of the Subcommittee on Conservation and Forestry, is recognized for 5 minutes.

Ms. SPANBERGER. Thank you so very much, Mr. Chairman, and to our guests who are here today, thank you so much.

Mr. Wood, I would just note that when you stopped to charge your vehicle in Glen Allen, Virginia, you were doing so in the wonderful 7th District of Virginia. So, I hope you enjoyed the stop and perhaps even added to our local economy.

Mr. Strickland, I am very pleased to hear about the many steps that General Motors is taking to help deploy EV charging infrastructure to rural communities. But I also strongly agree that the U.S. must really step up to the plate through some targeted public investments.

In your testimony, you welcome the opportunity to, as you put it, to leverage existing USDA programs to further support EV charging stations and charging infrastructure. Could you elaborate a little on why that might be especially helpful in rural areas, and how legislation like the Electric Vehicle Charging Infrastructure for Farmers Act (H.R. 6390), could really help build momentum and

build on the momentum that General Motors has generated in addressing rural EV charging deserts?

Mr. STRICKLAND. Well, Ms. Spanberger, bottom line being is the USDA recognizes the needs of rural America. That is the agency that serves that entire population of those communities. So, being able to leverage existing resources, and frankly, the expertise of the USDA in terms of thinking about ways to support and ways to deploy would be essential in trying to make sure of a successful rural development program in terms of the expansion of charging stations.

So, we are happy to work with you and your office and the other Members on this important legislation, and we think it is a very thoughtful approach on how we really address the specific needs for rural communities.

Ms. SPANBERGER. Thank you so very much for those answers. I really do appreciate, when we are thinking about how we can compete with other nations in the EV market and we think about the role of manufacturing, can you explain a bit more how the investments in the deployment of domestic charging infrastructures are, in fact, really essential towards competing internationally in the EV space, again, from your perspective?

Mr. STRICKLAND. It is foundational. When we think about our international competition dealing with our competitors, whether it is China, whether it is Europe, to be able to build it out and have a successful charging infrastructure, which supports the ability for people to buy and use these vehicles. That is how we maintain our competitiveness long-term as, frankly, the world's best automotive manufacturer.

We need to have all those elements in there to have that success and to compete, and having that opportunity to be able to build that out is foundational.

Ms. SPANBERGER. Thank you.

Well, I am really proud of the fact that I will be introducing legislation, bipartisan legislation today to expand the USDA's Rural Energy for America Program to include electric vehicle supply equipment as an eligible expense for farmers and agribusinesses that apply for that support. So, certainly, Congresswoman Adams, I will be in touch with your office because it might get it, some of the questions that, ma'am, you asked in your 5 minutes. I do firmly believe that this change will help ensure that our farmers and agribusinesses, and by extension, our rural communities have greater access to EV charging infrastructure while leveraging the existing relationships of USDA's Office of Rural Development and the on-the-ground relationships that they have.

Mr. Strickland, you were kind to comment on the bill that my legislation, Electric Charging Infrastructure for Farmers Act, it is really starting to gain support across a range of stakeholders, because its supporters include other car manufacturers such as Ford Motor Company, the National Resources Defense Council, Environmental Working Group, and the Zero Emissions Transportation Association. I would also really like to thank my colleague, Republican Tom Rice of South Carolina, for recognizing the value of this legislation to our communities, to industries in our districts, and certainly to our farmers and producers across the country.

I am coming up on time, but Mr. Strickland, if I could just ask one more general question. From the perspective of car manufacturers, certainly many of the things that you all have mentioned, the investments that General Motors is making in electric vehicles also in the equity priorities that the company maintains. Looking down the line, many of the decisions presumably that you as a company are making are based on where the market is going, being responsive to what consumers want. And so, could you just comment a little bit on really what made it so that that beautiful vehicle, the Silverado behind you, is one of the top priorities, is a vehicle that you are going to be producing, and why for those of us in Congress who are trying to be responsive, might hear from you as to how you reached that place?

Mr. STRICKLAND. The future of—oh, I am un-muted.

The future around transportation is electrification, period. The world has recognized it, too. It isn't just us. It is Europe, it is China, it is Asia. And bottom line being is that people who are exposed to electric vehicles, the power—

The CHAIRMAN. The gentlelady's time has expired. We have many that want to ask questions.

Ms. SPANBERGER. Thank you, Mr. Chairman, and thank you to our witnesses. I yield back.

The CHAIRMAN. Yes. The gentleman from California, Mr. LaMalfa, is recognized for 5 minutes.

Mr. LAMALFA. Thank you, Mr. Chairman. I appreciate it.

I just wanted to—let's just go with Mr. Wood here, please. I wanted to ask a question on looking at the grid realities I have in northern California and all of our State of California really, we have some pretty big challenges. Just for example, this winter—now, this is after a summer of fire and 1 million acres in just one fire, and several hundred thousand in others affecting the grid and generation, *et cetera*. Now we have had recently some kind of unprecedented level of snow at lower elevations. It has knocked out a lot of our power grid to constituents like Nevada County and Sierra County, and others in the Sierras in general. So, many people were left without power for weeks, and so, with what we are looking at, combined with in the summer months, for example, the public safety power shutoffs. If people on the Committee don't know what that means, they intentionally shut the power off in the summertime when there is going to be high winds because of the fear that tree branches and trees might blow into power lines and do blackouts and cause fires, which keeps happening, right? The Dixie Fire, almost 1 million acres. In this case, it was a tree that fell into a power line that had a bad root system that was undetected, but in other times, it is the same thing.

So, what you are looking at is a grid that is already in question, and even without the shutoffs from a public safety aspect, when it gets really hot in California, they ask people to shut off manufacturing plants and others that are already prepositioned to shut off in order to make the grid carry through the hottest days, as well as an edict right after these electric cars are getting so popular supposedly, they had an edict asking people not to charge their electric cars between 3:00 and 9:00 p.m. So, I would really tend to wonder, is the market driving this thing with new electric cars, or

is it really government and a lot of hype by media? Because I don't know people that are just that hot to get electric cars as—in their areas, especially those on limited incomes.

So, Mr. Wood, they are looking at charging—so, as I mentioned, charging EVs during the non-peak period in order to avoid rolling power outages. With the condition of the grid as I have mentioned in California, they are pulling—they want to pull hydroelectric plants off. They want to tear down at least five dams and make hydropower. We have lost a nuclear power plant in the San Diego area, which is about nine percent of the grid. They are going to take down the San Luis Obispo Juan Diablo Canyon within a couple years. That is another nine percent of the grid. Where the hell is the power supposed to come from to run all this?

Mr. WOOD. Thank you so much for the question, and I will acknowledge that California is not an area where Southern Company serves electricity, so I am happy to make connections offline with utilities in the area for further follow up. I will also add in general that electric vehicles won't all charge at the same time. That is generally incremental, charged off peak or at different times of the day, and that if the same thing happens if we—for hurricanes in the Southeast, for example. If people are getting gas to evacuate, sometimes we have issues with stations running out of gas. Catastrophes happen for sure, and I am happy to connect you with my colleagues in California that can give you more information.

Mr. LAMALFA. Okay.

Let me shift over to Mr. Mills here. You had a recent piece that was published on carbon accounting. So, what are the assumptions that if we are idling combustion vehicles and switching to an electrical grid? What is the whole accounting of this and supposedly saving CO<sub>2</sub> and other forms of pollutants that are the concern in converting over to a grid like that, especially when the alternatives to power being generated are being limited?

Mr. MILLS. Thank you, Congressman.

I will just summarize quickly that in the technical literature, not so much in the popularized literature, there is lot of working going on looking at the so-called fuel cycle, where the minerals are mined, how they are processed and transported. And what we know is that to build a battery, counting everything up-stream, we don't know precisely how much carbon dioxide emissions occur in the process of mining minerals, moving and processing them, but we know the range. So, people who say they know that it will—what the exact emissions reductions are, it is actually—truth is, it is a guess. It is a number somewhere between 8 and 20 tons of CO<sub>2</sub> to fabricate a battery for one car. For a pickup truck it is—you can double that. And that is the lifetime emissions of carbon dioxide from driving a regular automobile—

The CHAIRMAN. The time of the gentleman has expired. The witness may provide an answer in writing. Thank you.

The gentlewoman from Connecticut, Mrs. Hayes, who is also the Chairwoman of our Subcommittee on Nutrition, Oversight, and Department Operations, is recognized for 5 minutes.

Mrs. HAYES. Thank you, Mr. Chairman, and thank you for having this very important hearing today.

Outside of this Committee, I have worked tirelessly to expand access to electric vehicles. In my first year in Congress, I co-led the Clean School Bus Act of 2019 (H.R. 3973) with now Vice President Kamala Harris, which would allocate \$1 billion over 5 years to replace diesel school buses with electric ones. Since then, I have worked to ensure robust investments in electric vehicles have been included in any infrastructure legislation that has come to the House floor. With Representative Cárdenas, I co-led the Clean Commute for Kids Act (H.R. 2721), which laid the blueprint for clean school bus provisions of the Infrastructure Investments and Jobs Act. Ultimately, we were able to secure about \$5 billion for the replacement of diesel school buses with electric ones across this country.

A key component for any plan for electric vehicle expansion is the grid. Expanding our national grid will not only benefit individual consumers, but communities at large. As you can tell, this issue is very important to me, having had a career for 15 years as a public school teacher and stood in many bus lines and taught many kids who were affected by the harmful impacts of breathing in diesel fumes.

So, my questions today are for—well, my first question is for Mr. Wood. One problem I have heard in conversations about electric vehicles is their applicability in rural areas: enormous, mountainous rural areas where there must be special consideration for larger charger placement and range. What can the Federal Government do to incentivize utilities to build charging infrastructure in rural communities, and is there any technical expertise you think would be helpful for Federal agencies to provide in that process?

Mr. WOOD. Thank you so much for the question. I will first say, utilities have an obligation to serve all customers, in urban and rural areas, and that is part of our public service mission. So, to your point, electric school buses are already an important aspect of our electrification plan. It is something we are already looking at. Some of my contacts throughout the industry when I have talked to in transit agencies, and when they switched to electric buses have told me about their testing procedures, which might be loading the bus down, running it in very cold temperatures, very hot temperatures with a lot of weight in it. So, some of those research methods are already in flight.

I think additional assistance from DOE for modeling for what the batteries would look like, for the amount of energy consumed, any of that could be helpful. But I would say, as I said earlier in my opening comments, the infrastructure, EV infrastructure that has already been passed is of great help. If you want to carve out for electric school buses, especially get the first cost problem down, is more of the issue for the school bus problem of if the school district needs five school buses but they can only afford three because electric may cost more, that, to me, is where I see more of the challenge *versus* the infrastructure itself.

Mrs. HAYES. Thank you, and I know that expanding our electric grid not only provides opportunities for zero carbon transportation, but an array of other zero carbon infrastructure and resources.



Mr. Wood, can you expand on what the agricultural industry specifically stands to gain from a national expansion of our electric grid?

Mr. WOOD. When you think about electrification and agriculture, the electrification typically knows that piece of equipment is very, very precise. So, if you drive an EV, for example, and you barely press the accelerator, the vehicle barely moves forward. You don't have the idle that pulls you forward. So, if you are thinking about planting a certain number of crops or you need to see a certain number of crops in a certain area to make a particular harvest, having more precise, more precision, or if you have that equipment that becomes autonomous and being able to control it, those are all benefits of how the agriculture industry can gain from electrification. We just have to be able to get there and understand what those implications are.

Mrs. HAYES. Thank you so much, and I don't really have time for my last question, but I am sure I will hear the answer at some point. I am just interested to know what investments and resources can Congress provide to address the increased demand for EVs, and how can we help to build out the pipeline for manufacturers who produce these electric vehicles?

There is not really enough time to answer, but hopefully throughout the rest of this hearing that will be incorporated in answers as we go along.

Mr. Chairman, I yield back. Thank you.

The CHAIRMAN. Thank you, Mrs. Hayes.

And now, the gentleman from Illinois, Mr. Davis, recognized for 5 minutes.

Mr. DAVIS. Thank you, Chairman Scott, and also Ranking Member Thompson for holding this hearing on electric vehicles.

I am also the Ranking Member of the Transportation and Infrastructure Committee, Highways and Transit Subcommittee. It happens to be the largest subcommittee in Congress. I am glad that other committees are also discussing the Biden Administration's Build Back Broke scheme to further bankrupt American families.

With inflation over seven percent and President Biden's anti-work policies, the average family in my district would struggle to afford a new car, let alone a more costly electric vehicle. Not to mention the CDC's fluctuating whims that restrict the average working-class family's ability to go to work and earn a living. It kind of makes you wonder why the Biden Administration is making such a push for EVs when they would rather have every American locked inside their house.

For those that can afford a new car, due to supply chain constraints, begs the question of whether anyone looking to buy a car could even find one on the lot if they wanted, let alone an EV. Reducing emissions is not synonymous to electrifying the entire fleet. We have the tools and technology to reduce emissions right now. For example, Clear Flame, a company in Illinois, is already producing the technology to retrofit engines to run on cleaner conventional fuels, like ethanol. They are working with companies like John Deere to ramp up this technology and bring it to the marketplace. We don't have to wait until 2050, bankrupt our constituents

by taking away consumer choice when shopping for vehicles, or break the law by undercutting the Renewable Fuel Standard.

So, when you look at a rough estimate, a rough estimate suggests that it costs the average American to buy an electric vehicle *versus* the most affordable conventional vehicle on the market, cost difference is around \$38,000.

So, I want to get to my questions and I want to start with Mr. Cooper.

Mr. Cooper, did you see the report that *Reuters* issued this morning stating that the Biden Administration is considering lowering the 2022 ethanol blending mandate below the proposed \$15 billion that was set to be increased over the cut levels from 2020 to 2021?

Mr. COOPER. Well, thank you for the question, Congressman Davis, and I did happen to see that article actually as I was sitting here. I saw that come across the wire.

Certainly, it is of great concern if those rumors are true. We do have plenty of experience with rumors being reported in the news, sometimes not quite accurately. But we would be greatly concerned if EPA is backtracking on its very recent proposal to make sure that we return to that 15 billion gallon statutory requirement for conventional fuels, renewable fuels in 2022. So, we are going to try to get to the bottom of those rumors, and we will be absolutely insisting that EPA and this Administration follow through on their commitment to restore that 15 billion gallon commitment for 2022 and beyond.

Mr. DAVIS. Mr. Chairman, I ask unanimous consent to actually insert this report into the record today.

The CHAIRMAN. Without objection.

[The article referred to is located on p. 105.]

Mr. DAVIS. Thank you.

Mr. Cooper, if the Biden Administration is intent on reducing emissions and using cleaner fuels like ethanol and biodiesel, and using those fuels get us there immediately, why do you think they broke the law and cut the RFS, jeopardizing the demand for biofuels for our farmers in rural America?

Mr. COOPER. Well, we certainly hope that doesn't happen, because again, we believe the Renewable Fuel Standard is the best near-term opportunity we have for reducing carbon emissions from the transportation sector. It is law that has been on the books for more than 15 years now. We have seen significant greenhouse gas emissions reductions result from the Renewable Fuel Standard. In fact, one study estimates we have seen nearly 1 billion tons of greenhouse gas emissions avoided because of the Renewable Fuel Standard and the use of biofuels under that program.

So, we agree that a strong RFS that is consistent with the statutory intent of the program is fundamental to decarbonizing transportation, and that is why we support a strong RFS in 2022, but well beyond as EPA begins the process to determine those volumes as well.

Mr. DAVIS. Great. One quick question for Mr. Strickland. How many vehicles that will be internal combustion engine vehicles does GM expect to produce between now and 2035?

Mr. STRICKLAND. We expect to produce 30 to 40 million.

Mr. DAVIS. Well, if you putting 30 to 40 million internal combustion vehicles on the roadways, I mean, that is where this disconnect seems to be we need cleaner fuels, I yield back.

The CHAIRMAN. The gentleman's time has expired.

The witness, please, you have the opportunity to provide him with an answer in writing. Thank you.

Mr. STRICKLAND. Yes, Mr. Chairman.

The CHAIRMAN. And now, we recognize the gentlewoman from Ohio, Ms. Brown, for 5 minutes.

Ms. BROWN. Thank you, Chairman Scott and Ranking Member Thompson for holding this hearing, and thank you to all the witnesses for joining us today.

We are currently at a great inflection point. How we approach the next 10, 20 years will determine how we will be in the next 50. The existential threat of climate change to humankind is clearer than ever. People in Ohio and around the country are experiencing the dire consequences of climate change. Devastating hurricanes in Louisiana, raging wildfires in California, harmful algae blooms in Lake Erie, and rising sea levels in south Florida, to name a few.

The generally accepted agreement that greenhouse gas emissions contribute to the threats has led many to electric vehicles, which are likely to have lower emissions than internal combustion engine vehicles. While the U.S. auto sales declined 23 percent in 2020, the sales share of EVs increased two percent. My home State of Ohio has also seen a steady increase in EV registration in recent years. The EV market is only going to continue to grow as consumer demands for technology increases. It is prudent to begin examining this technology so we adequately address the needs of all stakeholders in America: urban, suburban, and rural.

As we work to transition to a clean energy economy, we owe it to our farmers and auto workers to ensure that they are not left behind. Many of them have spent generations feeding and powering our country, and their work has every bit as much dignity as the work of an EV battery manufacturer. I am confident that the investment in EVs is a step in the right direction. It will supercharge America's efforts to lead the electric future that will allow us to remain competitive and strong in the days to come.

I would like to acknowledge that Chairman Scott and Congresswoman Adams asked and answered one of the questions that I have, so I would like to acknowledge Mr. Josh Nassar from the UAW.

In your testimony, you spoke to the environmental benefits of an EV transition and the importance of also ensuring this transition benefits American workers. What policies should be in place to ensure those benefits?

Mr. NASSAR. Well first, thank you for the question, Congresswoman.

First of all, we should make sure taxpayer dollars are used to support good jobs and responsible employers, and that should be done across the board with public dollars. The second thing is that we need to focus—we are talking about the battery supply chain. It is very true that China dominates, but they dominate from getting a lot of rare earth minerals from other countries. And what

we need to do is we really need to get way more involved and engage in that, plus we need to do the actual battery manufacturing here, not just the packing of the batteries, the last step in the process, because that is not too many jobs at all. The real jobs have to do with the other processing.

So, we are just—we are seriously behind. The truth is that China and the European Union were focused on this well before, but it is not too late, and we can't give up on fighting to be part of this transition. Because if we do, what is going to ultimately happen is as EVs become a larger share of the market, fewer and fewer of them will be made—fewer car manufacturing jobs will be in the U.S. So, I think really engaging fully in the entire supply chain is incredibly important, and making sure that there are conditions on taxpayer dollars.

Ms. BROWN. Thank you so much.

Mr. Wood, Lincoln Wood. What type of coordination among utilities do you think will be necessary to ensure that rural communities are not left behind in the transition towards transportation electrification, and the other as a follow up, how can communities work best with their utility partners to educate customers about charging during off peak period and public charging opportunities?

Mr. WOOD. Thank you for the questions.

So, you may have seen a couple weeks ago the Edison Electric Institute announced the National Electric Highway Coalition, and that is a group of utilities from across the U.S. that all focused on really—think of it as the EV brain trust from each utility in a room trying to figure out how we roll out charging infrastructure in an equitable way across the U.S. I think that is a good first step. I think a best practice is to always involve your utility early and often, and utilities typically have really good relationships with their communities all across their service territory, and so, we have relationships with dealers and with local governments and others to help communicate the benefits of electric vehicles as well as other electric technologies, and those efforts are ongoing. But certainly, we are always open to more engagement. I think a meeting just like this one of all stakeholders to have a discussion is a great first step.

Ms. BROWN. Thank you so much, and my time is expiring, so I yield back. Thank you.

The CHAIRMAN. Thank you.

The gentleman from Pennsylvania, our distinguished Ranking Member Thompson, is recognized for 5 minutes.

Mr. THOMPSON. Mr. Chairman, thank you very much. Thanks again to all the witnesses for your testimony, it is very informative.

My first question is for Mr. Mills. Mr. Mills, as you mentioned in your testimony, it seems like our analysis of EV supply chains' environmental footprint is often incomplete. Why is it so hard to account for these activities when measuring the greenness of an activity, and why does an accurate accounting matter?

Mr. MILLS. Well, thank you, Ranking Member.

The greenness is determined entirely—and by that portion, I mean carbon dioxide emissions—by where and how materials are mined and processed. And as a consequence, we are talking about a vast global industry, thousands of businesses around the world,

not in the United States. So, we have some knowledge of it, but it is very hard to track down what a propriety process is among proprietary industries, and frankly, a lot of secret, we will call them—not secret illegal, just secret transactions that go on. It matters because the data shows and the research shows that the total emissions from accessing the minerals and producing materials can easily equal all of the savings from not using gasoline, from not burning the gasoline. So, the idea that we are dealing with zero emissions vehicles is just flat wrong.

The only question is how much the emissions are reduced? Even Volvo and Volkswagen recently issued studies on their own websites showing that the emissions reductions based on assumptions about the supply chain are rather modest, very small. So, they are sort of warning everybody to be careful about these assumptions.

Mr. THOMPSON. I want to follow up to maybe one example. I know there is a study you are familiar with from the International Energy Agency. The study is the role of critical minerals and clean energy transition, which examines the changing mining patterns for critical minerals resulting from increased electrification. The question is, how will the predictions made by the IEA with respect to declining ore quality and increased resource demand impact the carbon accounting, and with this new calculus change the case for EVs, whether in rural America or elsewhere?

Mr. MILLS. That is a very good question, Congressman.

The fact is, the IEA pointed out, as have other analysts, that as you increase demand for minerals like copper and nickel, the common ones, you have to choose lower ore grades. That is the technical way of talking about there is less copper as a percentage of the actual ore, means you have to dig up more rock, use more energy, and cause more emissions. As they have pointed out, the expectation is that the carbon dioxide emissions associated with, for example, accessing lithium will increase several hundred percent. So, as we chase more and more lithium to put into lithium batteries, the emissions from producing the lithium are rising in the future as we chase more of these minerals not going down.

And this is an indisputable sort of geophysical fact that no one, bizarrely, is including in any of their forecasts about carbon dioxide emissions from making batteries.

Mr. THOMPSON. Very good. My next question is for Mr. Walter.

First of all, Mr. Walter, I can't tell you how happy I and pleased I am to have a fellow Bald Eagle Area alumni testifying today, and also, congratulations on your career. I want to thank you for your testimony.

You closed your written testimony by noting something I think is important. "Any alternative, including electricity, should be offered in an open competitive market that gives American consumers the fullest economic benefits of robust price competition. This has worked well for consumers for nearly 100 years with liquid fuels, because the markets had a business case to invest to meet consumer needs." So, why is it so important that any new motor vehicle fuel, and indeed, any engine technology, was subject to the pressures of an open and competitive market?

Mr. WALTER. Thank you, Ranking Member Thompson.

An open market provides the lowest cost to consumers. Any time markets operate with opaqueness, it typically creates higher costs for consumers across the board, and the traditional fuel market today is an open, highly competitive marketplace with many competing factors, not only from the sale at retail for physical fuels, but also in various geographic pockets there is high competition amongst wholesalers of traditional fuels.

In today's world, there is a tremendous amount of opaqueness that exists around EV charging costs. Some will highlight, like Mr. Wood highlighted, that he paid zero for charging and first, I just want to say thank you to Lincoln for stopping at Sheetz on his path. But I mean, that cost in the future will be higher for EV vehicles, and I think a lot of people today are not working on—

The CHAIRMAN. The gentleman's time has expired. The witness may provide an answer in writing. Thank you.

[The information referred to is located on p. 117.]

And now, the gentleman from Illinois, Mr. Rush, is recognized for 5 minutes.

Mr. RUSH. I certainly want to thank you, Mr. Chairman, for holding this important hearing, and I really want to let you know that I sincerely appreciate your kind remarks that you had for me at the beginning of the hearing.

As the Chairman of the Energy and Commerce Committee's Subcommittee on Energy, I have been proud to champion electric vehicle infrastructure modeling, and specifically infrastructure for urban and rural underserved areas. I was proud, Mr. Chairman, to negotiate provisions to advance electric vehicle infrastructure and adoption which was ultimately included in the House-passed Build Back Better Act, and I am very, very hopeful and optimistic that these provisions will be signed into law soon.

Mr. Strickland, so good to see you again, and once again, I just want to thank you so much for your sincere and heartfelt remarks. I am so proud of you, man, of all of your multitudinous accomplishments over your relatively young years. So, man, you make my heart glad and warm just to see you and knowing that you are such an amazing individual and amazing success.

Mr. STRICKLAND. Thank you, sir.

Mr. RUSH. I have a few questions for you.

I have spent much of my professional career fighting for the health and the wealth of Black and Brown Americans. As you know, disproportionately we live in an area where there is a higher level of harmful emissions, and I am absolutely worried that once again, these needs of these same communities will be overlooked as they were catering to a more affluent White consumer base. My question to you is, what policies should the Federal Government implement to ensure that minority consumers are incentivized to purchase electric vehicles, and what specific plans do you see on the horizon that would ensure that these electric charging stations will also be amply supplied in these disadvantaged communities?

Mr. STRICKLAND. Mr. Rush, I know your passion for this subject, and in our conversations so long ago, you know my passion for the very same subject across a number of things that impact our community.

I think foundationally we need to get the money from the IJJA distributed to support overall infrastructure investment, charging investment, and also providing consumer demand. General Motors is committed to having affordable vehicles across our chain. In addition to the Chevy Volt, which was our first and most successful, and widest deployed affordable long-range vehicle, we also announced the Chevrolet Equinox, which will be a \$30,000 vehicle, which we will be also introducing into the market in a couple of years.

I want to talk about the Climate Equity Fund that GM has made in obligations. We have \$25 million to support, frankly, equity issues in the distribution of charging stations to support communities to be able to make sure that we leave no one behind. That is in addition to the \$10 million that we have invested in racial justice and equity funds to help close gaps addressing communities that are adversely impacted by climate change, and in addition to supporting the 357 U.S.-based nonprofits for that goal. So, we need to make that investment because that not only helps every community, but it especially helps our community, and General Motors has an immense focus on making sure that diversity and equity issues are full and foremost made available to every community, rural, urban, Black, and Brown. We want to make sure that everybody is along for this ride, and nobody gets left behind.

Mr. RUSH. I believe in you. I believe in you. I believe in you, man.

All right. Mr. Nassar, what percentage of electric vehicles are currently being manufactured by union workers?

Mr. NASSAR. I don't know the exact percentage of, but I can tell you, in addition to the vetting models that were talked about by Mr. Strickland, Ford and—

The CHAIRMAN. Unfortunately, the gentleman's time has expired. We have many that want to ask their questions. The witness may provide an answer in writing. Thank you.

[The information referred to is located on p. 118.]

The CHAIRMAN. And now, the gentleman from Georgia, Mr. Allen, you are recognized for 5 minutes.

Mr. ALLEN. Thank you, Mr. Chairman, and thank you. I think this has been very informative, but I am a little troubled by the fact that we are sitting here talking about things in the future and what it looks like.

Let me tell you what is going on, on main street right now. How many of my colleagues have been into a grocery store in the last 2 or 3 days here in Washington, D.C.? I mean, the shelves are empty. I mean, this is a real problem. When you talk about energy policy, over the holidays we get together with family, and of course, a lot of questions are asked. Where is this thing going? And frankly, I said, based on the fact that when you pull into a service station today, you don't know if that service station—the energy policy of this Administration is so incompetent. You don't know if this service station has any gasoline to put in your automobile. I mean, we have all seen it. We have seen the plastic covers over the dispensers. And so, I said, we probably all need to have at least one of our automobiles electric to ensure that we can get from point A to point B. I mean, this is main street, folks.

The other thing I mentioned to my friend from General Motors, Mr. Strickland, we have a three-generation Cadillac dealer in my hometown of Augusta, Georgia. Cadillac just came to them and said you are going all electric, and this is what you are going to have to invest or we are going to buy you out. They ran the numbers and there was no way economically they could do that. I understand there are over 400 Cadillac dealers across this nation that have closed because of this policy of General Motors Corporation. Just in my community that is 32 very high paying jobs gone. This is what is going on, on main street, and here we are talking about the future.

So, Mr. Mills, my first question is this. This new religion of climate change, if we do everything that the Biden Administration says that we need to do to fix this, how much are we going to lower the temperature of this planet? Does anybody have any idea?

Mr. MILLS. Congressman, I would just say that based on the published data, what we do know is that if the United States dramatically continues to reduce its carbon dioxide emissions, the world carbon dioxide emissions are going to continue to rise. That is because of what is going on in China, India, the rest of the Asian countries and Africa. And that is just the IEA and IPCC forecast. So, we know that is what is actually happening on main streets all over the world. Emissions are going up, not down. So, and that will happen without regard to what the United States does, frankly. So, even if we impoverished ourselves by not existing, there would still be rising carbon dioxide emissions. That is an elliptical way of saying that would mean essentially no measurable impact on the forecast temperature of the planet.

Mr. ALLEN. So, what you are saying is we are putting our entire economy in jeopardy over this new religion, and we have absolutely no idea of the consequences?

Mr. MILLS. We are obviously guessing about consequences about what the future will be with respect to the climate. The climate—as any climate scientist will tell you, the climate is obviously changing. It is indisputable that the planet is warmer, and by the way, it is also indisputable that human activities have something to do with it. The dispute is over two things: how much warmer, how fast, what effects that has, and so, that is a science there, and the other that an area that is independent of climate science. What can one do about energy? What is possible with batteries, for example, is anchored in the physical chemistry, the physics of batteries. It is not amenable to government policy. We know the limits. We know what batteries can and can't do. They can do a lot, but they aren't going to replace all combustion engines anytime in the foreseeable future. So, this is—I mean, this is not a knock against what GM has done. GM is making a great truck. I have owned lots of Suburbans. I love them. I am ready to buy an electric truck to commute in on the farm. But an electric truck has a 1 ton battery by definition that reduces by 1 ton what you could have done with an identical vehicle with a gasoline tank.

Mr. ALLEN. Well, I am out of time and I am going to have to yield back. But the audacity to believe that we actually have control of this, this is mind boggling to me, and I thank you for, Mr. Chairman—



The CHAIRMAN. The time of the gentleman has expired.

Mr. ALLEN. Thank you, sir.

The CHAIRMAN. The gentlewoman from Illinois, Mrs. Bustos, who is Chair of the Subcommittee on General Farm Commodities and Risk Management, is recognized now for 5 minutes.

Mrs. BUSTOS. Thank you very much, Mr. Scott, and I also want to thank our Ranking Member Thompson for putting this together today.

Obviously, the future of electric transportation is bright, and certainly we appreciate all the witnesses for their input today, and especially how we can make sure that rural America is not left behind as we continue this conversation.

So, let me look at it this way, and I know we have talked about it a little bit. But obviously, we have electric vehicles, as I see it, as many of us see it, a major positive step toward decarbonization in the transportation sector. And really, we, as has been acknowledged, there is going to be a little bit of time before we get to this, full EV and every vehicle that is coming off the lot is an electric vehicle.

So, the climate is calling for us to bring down carbon emissions now. That is not something that we can continue to just put off, and I appreciate our witnesses, a couple of who mentioned a bill that we have written out of my office, the Next Generation Fuels Act (H.R. 5089). I am really happy that we have bipartisan support for that, so thank you for our Republicans and Democrats who have signed on to this.

And just very briefly, this is a bill that has support of many of our witnesses today, but it would require automakers to optimize their vehicles' engines to run on high octane, low-carbon fuel, so like E20 and E30. There has been a recent analysis out of the University of Illinois in my home state, University of Illinois at Chicago, that says that the Next Generation Fuels Act would reduce greenhouse gas emissions by 2 billion—2 billion—metric tons by the year 2040, and that would save nearly \$100 billion in climate-related property damage and public health issues.

So, this question can be answered by Mr. Strickland, Mr. Nassar, Mr. Cooper, Mr. Walter, and if one has something to add before or after the next, please do. But can you talk about how a new era of low-carbon, high octane liquid fuels in the Next Generation Fuels Act specifically would impact your businesses and your members as we continue to transition to electric vehicles? And why don't we start with Mr. Strickland, and then go to Nassar, Cooper, Walter, whatever you have to add on that, please.

Mr. STRICKLAND. Well, Mrs. Bustos, clearly before we get to our all-electric future in 2035, we are going to be selling internal combustion engines. So, as I noted earlier, we will be selling 30 to 40 million of those vehicles, and the ability and the opportunity of being able to use lower carbon fuels such as higher octane is incredibly important. There are advantages there where you can get three to nine percent better fuel efficiency with higher compression and higher octane fuels and biofuels. And we believe that the path to zero is going to be inclusive of that particular pathway. We are looking forward to working with you and the Members on your important legislation.

Mrs. BUSTOS. Thank you very much.

Mr. NASSAR. Thank you for the question. Well, first of all, it is going to be very helpful for the agricultural implement sector, because it is really going to help increase demand for farming equipment. So, it will certainly be helpful on that score.

It would also be helpful, in meeting the CAFE standards, which we are supportive of the moderate standards that were put forward, finalized by the Biden Administration with support from automakers. But this will help comply with those standards.

So, this is kind of an overlooked area is the fuels when it comes to having—how that could really improve reduced carbon emissions and improve manufacturing employment. So, that is important.

Mrs. BUSTOS. Very good. Thank you, Josh.

Mr. COOPER. May I add?

Mrs. BUSTOS. Yes, please.

Mr. COOPER. Yes. Thanks, Congresswoman, for the question. This is certainly a piece of legislation that we strongly support in the ethanol industry. We do think it marks a huge step toward decarbonizing our liquid fuels. You are right. It is going to take a long time for the fleet to turn over to electric vehicles. We ought to be doing something in the interim, and your bill would move us a long way down that road toward decarbonizing those fuels.

And the other thing we like about it is not only is it requiring higher octane in our motor fuels, but it is requiring lower carbon as well. It is really marrying those two aspects together, and it just so happens that ethanol is the highest octane, lowest carbon fuel source available on the market today. So, we do see the bill as a significant opportunity for our industry, and frankly, a significant opportunity for consumers because it would make a meaningful dent in emissions from the transportation sector.

Mrs. BUSTOS. All right. Mr. Walter, I would love to have chime in, but I think we are out of time, and we will hear from you. We will hear from you at another time.

Thank you very much, Mr. Chairman, and I yield back.

[The information referred to is located on p. 117.]

The CHAIRMAN. Thank you.

And now, we recognize the gentleman from South Dakota, Mr. Johnson, for 5 minutes.

Mr. JOHNSON. Thank you, Mr. Chairman, and it is pretty clear to me that EVs will play a role, obviously, in the transportation sector of the future. But there are other technologies that have been proven ways to offset carbon or to minimize the carbon footprint, and of course, biofuels is a huge one. And although I am still not sure why we haven't had a committee hearing on biofuels yet in the 117th, I do want to thank the Chairman and his team for having Mr. Cooper, because I think his testimony helps to round out the record a little bit. And when I talk about proven technology, I mean, that is no joke. Between 2008 and 2020, biofuels offset 1 billion tons of carbon. I will just mention that again. That is a billion metric tons of carbon, and I think that is obviously worth noting at the committee level.

So, I do have a question for Mr. Cooper. You talked a little bit about E15, sir, in your testimony. I want you to put a little more meat on that bone, if you will. What does the path forward look

like for E15? What should it look like, as well as for E20 and higher blends for non-flex-fuel vehicles?

Mr. COOPER. Sure. Thank you for the question, Congressman, and I am happy to answer it.

We absolutely believe that E15 is one of the best near-term opportunities we have for really jump-starting decarbonization in the transportation fuels marketplace. Analyses we have done and others have done shows that simply moving from the current gasoline blend, which is ten percent ethanol, to E15 nationwide would reduce carbon emissions by about 18 to 20 million metric tons per year, just that simple switch. And virtually every car on the road today is legally approved to use E15. We have a number of retailers already offering the fuel. My friend, from Sheetz, who is also a witness today, is among the leaders in offering E15 to consumers. So, we do see that as the next logical step in this transition.

However, we have some key barriers in place that need to be resolved. The most prominent of those is this ridiculous volatility regulation that prevents retailers from offering E15 during the summer months in about  $\frac{2}{3}$  of the country. We felt like we had that problem resolved when EPA adopted regulations to fix it a few years ago. The refiners didn't like it. They sued EPA. That regulation was recently overturned. The Supreme Court declined to review it, so we are right back where we started where we have this summertime ban on E15. So, that has to be fixed. We know there has been legislation introduced in both chambers to rectify that situation. We strongly support that, but there are other things EPA can do administratively to fix that problem as well.

Mr. JOHNSON. Yes, of course, and Mr. Cooper, the Reid vapor pressure for E15 is actually lower than it is for E10, so there is no technical reason the E15 wouldn't be made available year-round.

And just quickly, because I do have another line of questioning. It is not just about E15, right? I mean, I do think we also want to think about what is the sweet spot for non-flex fuel vehicles E20 or some other blend, right?

Mr. COOPER. It absolutely is, and that really gets to the Next Generation Fuels Act and the need for those mid-level blends. That is the sweet spot. The E25, E30 range is where ethanol's properties are really leveraged, that high octane content, that low carbon attribute. And so, if we have high octane fuels like an E25—

Mr. JOHNSON. Mr. Cooper, I have to reclaim. I am sorry, I just have a minute and I do want to get a sense from Mr. Strickland.

Mr. Strickland, I am from South Dakota and I appreciate the incredible technological advances batteries have made, but of course, all batteries still substantially under-perform in cold weather. And I don't want everyone to think that South Dakota is always a tundra. Three of the seasons are wonderful, but winter is terrible. It might be 50° there today, but last week there were a few days where it was 40° below freezing.

So, Mr. Strickland, that is clearly a real technical limitation to widespread EV use during the winter months. Tell me about how General Motors views that.

Mr. STRICKLAND. We don't actually—long-term, we do not see that as a long-term technical barrier. We are working through and doing our testing in extreme climates. Our Altium battery chem-

istry addresses a number of these things long-term, and yes, we recognize the fact that what we have seen in past years in terms of reduced performance, we recognize that as a company and our engineers are working to make sure we address that. Actually, I had a conversation with Senator Thune before I left the Commerce Committee about this very similar thing, and yes, you are right. South Dakota isn't always a frozen tundra.

Mr. JOHNSON. Well, let's follow up, because I am interested in learning more, but I am out of time, and I want to thank the Chairman for his indulgence. Mr. Strickland, let's follow up because I want to learn more.

I yield back.

Mr. STRICKLAND. Yes, sir. Thank you.

The CHAIRMAN. The gentleman from Arizona, Mr. O'Halleran, is recognized for 5 minutes.

Mr. O'HALLERAN. Thank you, Chairman Scott, Ranking Member Thompson. I appreciate the opportunity. This is a very good hearing today.

As excited as we should be by the increase in EVs, it is important to emphasize the importance of EVs in rural communities as we have talked about today. Like much of Arizona, in my Arizona district oftentimes discussions about electric vehicles center around consumers and businesses in urban, suburban, or exurban settings. However, the move to electric and clean energy vehicles can provide profound economic opportunity for rural communities, and we are already seeing these benefits in Arizona.

My district is the proud home to the manufacturing centers of two major clean energy startups. Lucid Motors, which began delivering electric vehicles to consumers in October 2021, was built—has a massive factory in Casa Grande in southern Arizona, and plans on continuing investing in the community. Another clean energy vehicle startup, Nikola Motors, builds its zero emissions heavy-duty trucks in Coolidge, Arizona, utilizing hydrogen fuel cells to deliver vehicles that will help further reduce emissions from vehicles on the roads. These two companies will bring much needed American manufacturing to Arizona and provide good-paying jobs with sustainable economic growth for the region, as well as the development of the electric grid and the other clean energy sources that will be built throughout America and rural America.

Most recently, Congress passed the Infrastructure Investment and Jobs Act legislation that included \$7.5 billion for electric vehicle charging. The text includes some of the language that I helped develop to determine where these electric vehicle charging stations should be located, specifically ensuring that the needs of communities like Native American communities and rural communities are incorporated. While the Infrastructure Investment Act includes funds to modernize and upgrade transmission and other electrical grid, more needs to be done to ensure that these charging stations, particularly those in rural and Tribal communities, have the power to meet their specific electric vehicle needs and the needs of our economy.

Mr. Strickland, thank you so much for being here. What sorts of infrastructure is needed to ensure that rural and underserved communities like Native American communities can purchase and ef-

fectively utilize EVs, not just in their day-to-day life, but in their industries and the ability to be able to have the economies that they need so dearly?

Mr. STRICKLAND. Well, Representative, the IIJA implementation is incredibly important to get those resources out to support charging stations, but also, the Build Back Better Act, which also includes the EV tax credit and the consumer side pull to make those vehicles affordable for, frankly, everybody in rural communities and other communities of color, including Native American communities, is especially important.

GM has made a commitment for the production and the sale of affordable electric vehicles, whether we talk about the Volt or the Equinox, but foundationally speaking, we need a commitment from Federal, state, and local to partner with all of us in terms of implementing charging infrastructure everywhere that it is needed, and getting that support. We are willing to make those investments in partnership with our 4,000 dealers, and frankly, it is going to be making sure we get, not only the IIJA implemented and all the things that are there, but also getting Build Back Better done, which has also those other consumer pulls and those other supports that we need to make sure that electric vehicles are available to all.

Mr. O'HALLERAN. Thank you.

When I am pulling my horse trailer or somebody is doing their RV for tourism across my district and across America, and trucks are long hauling it across our country, it is going to be critical that we really understand completely what this grid is going to have to look like and what the charging stations are going to have to be, and how this all works together.

Mr. STRICKLAND. Yes, sir.

Mr. O'HALLERAN. As of right now, I don't know that. I think we are moving in a direction that is going to bring about a tremendous amount of technological change to get us where we need to be, but we do have to be careful as we move forward.

With that, Mr. Chairman, I yield back.

The CHAIRMAN. Thank you, Mr. O'Halleran. Well stated.

Now, the gentleman from Indiana, Mr. Baird, is recognized for 5 minutes.

Mr. BAIRD. Thank you, Mr. Chairman, and I appreciate all the witnesses being here today talking about this important issue.

As you all know, it is important to agriculture and a district like I represent from Indiana. And, we hear a lot about the vast decrease in the carbon output because of electric vehicles, but rarely about the total lifecycle and the carbon footprint of these vehicles when we compare to combustion engines. So, our nation, in our latest attempt to rise to the vehicle electrification often seems forced, especially given the viable and practical middle step of biofuel adoption.

So, Mr. Cooper, how do the biofuels play into this transition and the broader decarbonization of American transportation, and how does this carbon footprint compare, and how do crop yield improvements and the conversion of conservation practices of farmers impact the carbon intensity of biofuels? Mr. Cooper?

Mr. COOPER. Well, thank you for the question, Congressman, and we agree completely that the carbon footprint and the way it is measured matters very much to the decision making around where we go with the future of our transportation sector. The IEA study that was mentioned earlier by the Ranking Member actually shows that yes, on average, when you consider the source of minerals and the source of electricity generation, electric vehicles are about 50 percent cleaner than a petroleum-fueled internal combustion engine. That can range a lot from a seven percent reduction to a 77 percent reduction.

With biofuels and corn ethanol specifically, we are also already at a 50 percent reduction compared to gasoline, and we have some member companies that are producing ethanol that is 70 percent, 75 percent better than gasoline.

So, again, if the goal here is to reduce emissions from the transportation sector, there is more than one way to do it. Ethanol is here. It is available today. It is available now to immediately jumpstart decarbonization efforts, and the first step is getting more ethanol into the blend, E15, E20, E30.

So, again, I just can't say enough about the importance about using the same measuring stick when we look at the carbon footprint of these various fuels in vehicles.

Mr. BAIRD. Especially when considering the tremendous impact that sudden change can have on our agricultural industry.

So, Mr. Mills, do you have any comments in this same regard?

Mr. MILLS. I think I will just reinforce the fact that the IEA study does show the estimated 50 percent reduction counting all the emissions from fabricating the batteries, chemicals, and mining. But the IEA also points out that the trajectory for the future is for the reduction in emissions to go down, but as the emissions from producing the materials are rising, not declining, that is sort of locked into the geophysics of materials.

The International Clean Car Transportation Council has also looked at this fuel cycle issue, looked at it from country to country, and they find that to the point that Mr. Cooper made, that the emissions reductions can range from as little as seven percent to as much as 70 percent. But this is all based on today's practices. We are talking about increasing the demand for minerals to make batteries by over 1,000 percent. That will put so much pressure on the rural mining. I would just be happy to predict—not happy, but willing to predict that we are going to see a kind of road block—no pun intended—to expanding battery production globally, long before any of the aspirations for the level of EV penetration happens. That will lead to higher prices, not just for batteries, but higher prices for all the commodities that are made from copper and nickel and cobalt, the same minerals. So, it is a very serious inflationary pressure on the broader economy, which is being underestimated and completely ignored.

Mr. BAIRD. Well, thank you very much.

Mr. Walter, would you care to elaborate in terms of the company you work for, as well as the association you work for, and how the biofuels impact your industry?

Mr. WALTER. Yes. So, the c-store industry operates 120,000 locations offering motor fuels, but specifically, the environmental sav-

ings have been highlighted by Mr. Cooper. But in terms of Sheetz, since 2019, E15 sales have grown 92 percent, and since 2017, they have grown 300 percent. And that is really off the backdrop that ethanol is able to be procured cheaper than gasoline, and we are able—

The CHAIRMAN. The time of the gentleman has expired, but you may provide an answer in writing. Thank you.

[The information referred to is located on p. 118.]

Mr. BAIRD. Thank you, Mr. Chairman. I yield back.

The CHAIRMAN. Yes, sir.

The gentleman from Florida, Mr. Lawson, 5 minutes.

Mr. LAWSON. Thank you, Mr. Chairman, and to you and the Ranking Member, this is a great hearing that we are having today. And also, I would just like to give a shout-out to Congressman Austin Scott from Georgia, winning in the national championship. They don't want to talk about it last time, but this time around is a proud alumnus of the University of Georgia. They finally were able to beat Alabama.

As billions of dollars in investments have been made in EVs, and the required infrastructure needed to sustain them, the U.S. must invest in workforce to meet the demands of an electrified future. The first question—this question is for all panelists. What type of academic programs and training are necessary to prepare for future workforce, and how can the industry prepare HBCUs to meet this demand?

Mr. STRICKLAND. No, Josh, go ahead. No, go ahead, Josh.

Mr. NASSAR. Oh, sorry.

Well, first of all, we need to in general have more of a focus on trade schools and those kind of jobs regarding manufacturing and really supporting those as a career option. As far as auto workers being able to work—existing auto workers on electric vehicles, that is not something that is of major concern. Workers are used to transitioning from vehicle to vehicle, platform to platform. But really, we need a lot more when it comes to encouraging people to work in manufacturing, and making them good jobs really helps.

Thanks.

Mr. LAWSON. Anyone else on the panel?

Mr. STRICKLAND. Yes, sir. We at GM are definitely making that same investment in terms of training and protecting our workforce. We have about 1.3 million years—1.4 million years of collective experience, and not only sort of dealing with the entire vehicle that we have an essential workforce. And looking at our initiatives long-term for training, we definitely have that same focus as Josh mentioned in his response, and it is a partnership that is best served for us to be able to bring our workforce along and make those opportunities available.

And just another note of personal privilege, also go Dogs. I am from Atlanta.

Mr. LAWSON. Okay. Anyone else before I ask the next question?

Mr. WOOD. I have one more thing to add, if I may?

Mr. LAWSON. Go ahead.

Mr. WOOD. So, some of the work that Southern Company has done particularly with the University of Georgia is developing e-Mobility certificate that will be housed in the College of Engineer-

ing, but it is cross-functional with aspects of public policy from the business school, from public health, with the idea that electric transportation itself is a budding industry and it is growing, and you may need to know aspects of it in other jobs that you get.

So, that is in flight now, but also with in conversations with university systems of Georgia, with our technical colleges system, I tend to break this out into three kind of big buckets: the infrastructure itself and understanding how that needs to be installed; vehicles and autonomy, and what that means for the second piece; and the third piece will be on the corporate side. For example, if you work in a fleet electrification capacity for a large package delivery company, you still need to understand how electric vehicles work and how those are different than maybe traditional fleet vehicles. So, that is a big focus for us.

Mr. LAWSON. Okay, and I know that this next question I will try to get in is that as we look across America and we see all of the hurricanes, tornadoes, and stuff that have caused so much damage, and it is always sometimes weeks and so forth for electric utilities to get back up. What type of relationship would this have on vehicles, especially in rural areas, when electrification is down and at the same time, people won't have transportation if we have more electric vehicles and not using any fossil fuel for them to get around? Has that been taken into consideration when you all are looking at getting more charging stations and so forth?

Look at the recent tornado that we had and the devastation that it caused in Kentucky and other places.

Mr. WOOD. Yes, that is actually a great question. I have a couple points on that. One being if the power is out, yes, electric vehicles will be at a bit of a disadvantage, but also, gasoline vehicles will too because pumps won't operate without electricity. However, one of the main thrusts of states is that they are planning for the Infrastructure Investment and Jobs Act formula funding that is coming is putting together a statewide plan. Some states, such as Florida, have already published a statewide plan with hurricane evacuations and whatnot already in that plan as it relates to electric vehicles, and more and more states are doing that. Utilities are also doing that.

The CHAIRMAN. Thank you. The time of the gentleman has expired.

The gentleman from Iowa, Mr. Feenstra, is recognized now for 5 minutes.

Mr. FEENSTRA. Thank you, Chairman Scott and Ranking Member Thompson.

Supporting innovation that will create jobs at home and lower our emissions in the transportation sector is obviously all our goal, and in efforts to reach this vision, there are many steps that we need to take. However, I do want everyone to remember—and this is so critical—that the consumer dictates the demand for vehicle purchases, not government, and I think so often we put that cart before the horse. Electronic vehicles obviously represent one potential opportunity, but we should not let biofuels, carbon capture, and other technologies get swept under during this discussion.

I believe accurate information is always necessary, factual information, to provide industry with the tools needed to innovate in



this space. It is one the reasons that I introduced the COST Act (H.R. 5621, Comparison of Sustainable Transportation Act), which would examine the cost of the lifecycle of emissions of fully electrifying the Federal fleet *versus* transitioning it to a flex-fuel vehicle fleet.

Mr. Mills, I appreciate your insight from the research challenges related to electric vehicles, carbon accounting. In your testimony, you noted that there are no reporting mechanisms or standards equivalent to the transparency with which petroleum is obtained, refined, and used. How may we establish reporting mechanisms or standards to perform this research, leading to more accurate information and a lifecycle of carbon emissions?

Mr. MILLS. Well, thank you, Congressman. That is a challenge. I think the model we have might be in the mineral space. You recall some years ago concern about so-called conflict diamonds, knowing where diamonds came from and not from abusive labor practices. It is a very difficult issue, because the industries, businesses, and the people who are engaged in mining, virtually all the minerals are not under the jurisdiction of American firms, American legislators, regulators. So, we can ask, and I think we should ask manufacturers to be more transparent in the supply chain. Many of them are trying. Let me just give credit to companies like GM and Mercedes Benz and others. They are making the attempt to document the supply chain where practices are abusive. It is very difficult. I think we just have to demand more.

But the same thing would be applying to where these things are being produced, the labor to the point we heard earlier, the labor in the mining and the processing is all overseas. Assembling electric cars here is no different than assembling internal combustion engines here and having all the fuel and all the labor to make the fuel for gasoline overseas. That is exactly where we are with electric vehicles.

Mr. FEENSTRA. Thank you. Thank you so much for that answer, and I agree with you.

My next question, many of the convenience stores in my district serve communities with populations of only a few hundred people. Most communities, it is the main area. It is the one store they have, and it is so important to me that these convenience stores continue their operations for years to come. Mr. Walter, do you have concerns for the viability of these local stores, and how can we ensure that these businesses continue to operate without undue burdens?

Mr. WALTER. Yes, thank you for the question, Congressman.

I think, the c-store industry as a whole wants just a level playing field that is open, that is highly competitive, and as you know, we serve many customers every single day, millions across the country, and what we really want is an open level playing field with price discovery that is apparent across the board.

As I mentioned earlier, the fuel market is highly competitive, and today the EV market or the charging—for charging is very much opaque. And so, at the end of the day, we are here for our rural communities. We want to serve them, and we want to serve them at the lowest cost possible.

Mr. FEENSTRA. Thank you, and you are exactly right. I mean, every one of my communities, the convenience stores are a vital part and vital economic engine for our main streets, so thank you for those things.

As we continue to discuss investments and cleaner transportation, we must avoid putting all our eggs in one basket. As I said before, this current Administration put out a report projecting that four out of every five vehicles purchased by 2050 will still run on liquid fuels, and taxes of liquid fuels are paramount when you talk about maintaining our rural roads, and that is a whole other discussion. To achieve our vision and reduce greenhouse gas emissions in the transportation sector, we must also be looking at supporting biofuels by allowing year-round E15, supporting the deployment of carbon capture technologies, and considering a nationwide Low Carbon Fuel Standard.

And with that, I yield back.

The CHAIRMAN. The gentlewoman from Iowa, Mrs. Axne, is recognized for 5 minutes.

Mrs. AXNE. Thank you, Chairman Scott, and thank you to all of our witnesses for being here today and lending your expertise to another biofuels discussion.

I just wanted to correct the record here. We did have a CEEC biofuels subcommittee hearing last November, so we have been addressing biofuels, and for me, it is a key priority. So, I am glad we are here again.

A little less than a year ago, this Committee held its first hearing of the new Congress on the topic of climate change, and the potentially devastating impact on agriculture and rural communities. And from, of course, increased uncertainty to unpredictability of weather patterns to more powerful storms like we have seen in Iowa with the derecho and floods, *et cetera*, of course, many of our farmers are on the front lines dealing with the issues related to climate change.

So, within the transportation sector, which contributes the largest share of our nation's greenhouse gas emissions, we have a couple of key tools here to reduce those emissions, electric vehicles and biofuels. And gosh darn it, if I didn't just find out today that the first electric vehicle was made by a Des Moines guy in Iowa a long, long time ago. I did a little bit of history there. So, we have some—a history in that, Representative Feenstra, that I wasn't aware of.

But as a new and promising technology, we know that electric vehicles have received a heck of a lot of attention lately, including significant funding in the bipartisan infrastructure law. So, I am looking forward to seeing how those investments build out necessary infrastructure for greater electric vehicle use, benefitting both urban and rural communities.

However, the dire need for carbon reduction can't wait and be achieved when we have electric vehicles alone as the only option, and we can't wait for this to get to scale. We have to capitalize on the carbon benefits possible today through the use of biofuels. And as was pointed out through Mr. Cooper's testimony, Americans will continue to consume hundreds of billions of gallons of liquid fuel for years to come. So, if we are taking the climate crisis seriously,

we have to replace as much of those gallons as possible with higher blends of biofuels.

And thankfully, our farmers and biofuel producers are doing their jobs and providing billions of gallons of clean-burning biofuels. In fact, your members have even committed to being net-zero carbon footprint by 2050, so this is exciting.

So, my first question goes to you, Mr. Cooper. As you noted in your testimony, it is going to take some time, decades, for the vehicle fleet to convert to electric technologies, and some heavy-duty uses may never find an electric solution. So, that is another reason to look at biofuels. So, could you please expand on how biofuels will be able to make significant contributions to lower the carbon transportation sooner than electric vehicles?

Mr. COOPER. I am happy to, and thanks for the question, Congresswoman.

We agree completely. If the goal here is decarbonization, we have to get started now. We cannot afford to wait decades for more electric vehicles to penetrate the light duty vehicle fleet. And so, we need a few things in order for that to transition to really kick start with biofuels, and one of those is more infrastructure. We can't allow consumers to capture the full benefits of low-carbon biofuels unless retailers are offering those fuels, and so, we need to see more infrastructure in place that would allow for dispensers and storage tanks and other equipment compatible with these fuels, and that is why we strongly supported your work to include some funding in the House-passed Build Back Better bill for biofuel infrastructure, nearly \$1 billion. That is quite significant and would really help in this transition.

But you are absolutely right. Corn ethanol today already offers a 50 percent greenhouse gas reduction. We have a lot of ethanol in the marketplace. In fact, the California Air Resources Board has certified that some ethanol is already 70 percent better than gasoline, and we are well on our way to net-zero emissions for corn ethanol. So, that transition is well underway, and we just need continued support to make sure that happens.

Mrs. AXNE. Thank you for that, and speaking of continued support, I want to move to another policy I am working on.

Earlier this week, the Supreme Court denied to review a district court decision last year that jeopardizes the ability for fuel retailers to provide year-round E15 for consumers. And so, if we don't pass the bill that I have done along with Representative Angie Craig, the Year-Round Fuel Choice Act (H.R. 4410), and allow the sale of year-round E15, what are the consequences of this decision, both in terms of rural communities and carbon output?

Mr. COOPER. Well, it would have a significant impact. We have already noted that transitioning to E15 would reduce emissions by about 20 million metric tons nationwide, and we have heard from retailers that say if they can't sell the fuel year-round, they are unlikely to offer it. So, it is a huge barrier that needs to be resolved.

Mrs. AXNE. Thank you.

The CHAIRMAN. The time of the gentlelady has expired. Of course, feel free to respond in writing.

Mr. COOPER. Thank you.

The CHAIRMAN. The gentleman from New York, Mr. Jacobs, is now recognized for 5 minutes.

Mr. JACOBS. Thank you, Mr. Chairman.

My question is for Mr. Strickland and Mr. Nassar: there is an issue that has been raised here in my community. I represent the outskirts of Buffalo, New York. We have, in my district, a Ford stamping plant and just outside my district, a GM powertrain plant. Between the two of them, they employ well over 2,000 people, very good paying jobs. It has been a staple of our industrial base for a long time, plus many, many suppliers, the old Harrison Radiator plant, which is in Lockport, also has about 1,000 employees which supplies a lot of GM products.

But in our area, due to the fact that I look across the Niagara River to Canada, we have had a really robust and successful binational automotive manufacturing sector for years. NAFTA played a role in that. That was a very good part of the NAFTA, even though it was an imperfect trade deal, and both those plants rely very much on their proximity to Canada. The stamping plant stamps and then they ship that up to Oakfield up in Ontario where they add to that and it comes back down, and actually multiple trips back and forth in the production process.

What I am raising is a concern that has been highlighted in the Build Back Better plan, Build Back Better Act that would provide the 12,500 electric incentive credit, in that it is only for American-made cars. And there is a concern that this would be harmful to these manufacturers up here which rely so strongly on a binational model. And there has also been concerns raised that this may be a violation of the new USMCA, which I am very concerned by, because of the fact that we are trying to remedy some of the problems that we have had with Canada not adhering to reducing the dairy tariffs that are in the USMCA.

Anyway, we all support green energy. We all support the movement to have an added mix of electric cars, but it is very important to do that in a way that is not harmful to our employees and the significant employers that have really been a part of it, the automotive manufacturing fabric in this community for so long.

If there is any comment on how we can do this to make sure that policies are not harmful to the employees and employers in a region like ours, which is a real binational region?

Mr. NASSAR. I am happy to answer that. Thank you for that question.

A few things. First of all, the provision that you are talking about, it would be in 5 years, not allowing imported EVs to get tax credits. We very much agree that the supply chain work between Canada and the U.S. in your region and other areas is really important to maintain, and we are so, I agree with you on that.

I think the whole thing, though, is that, first of all, as we have talked about EVs, they are four percent of sales. They are about two percent or less of the cars on the road. So, I think we need to take a deep breath and put things in perspective a little bit.

Second of all, it is in 5 years, so there is time if it were to become law to try to work on some of these trade issues. But I think the other thing that—to look at is do we want to subsidize floods of EVs coming from China, from Mexico, from all over the place with

U.S. taxpayer dollars? Our position at UAW is we don't think that is prudent. We think that we should focus U.S. taxpayer dollars on promoting U.S. manufacturing.

So, one last thing. The EV tax credit stuff that doesn't—there is an extra bonus for batteries made in the U.S., but besides that, it is not a content-related provision. So, the supply chain impacts should—we need to keep that in mind when we are analyzing it. Thank you.

Mr. JACOBS. Okay.

The CHAIRMAN. Does the gentleman yield back?

Mr. JACOBS. Just to conclude, I just wanted to say that I understand and agree completely about flooding from China. A product I would say that differentiate a bit between Canada and Mexico were part of the USMCA, and that part of that agreement was to make sure that the wages are significantly raised if they are to participate—

The CHAIRMAN. The time of the gentleman has expired, and the witness may respond in writing. Thank you very much.

And now, I recognize the gentlewoman from Washington. Ms. Schrier is recognized for 5 minutes.

Ms. SCHRIER. Thank you, Mr. Chairman, and thank you to all of our witnesses. I have listened carefully to all of your comments and find this a very interesting discussion. I am really happy that we are discussing electric vehicles and that role in rural America, because this topic has come up several times in recent weeks as I have been out and about in my district.

The first discussion was a bit of an eye-roll by a farmer explaining that the economics of running a farm are so tight right now between labor and feeling squeezed by buyers that the notion of investing in an electric tractor or electric semi was just not a realistic one. The second was a discussion with wheat farmers who told me that because of economics, they generally buy used trucks. They have their own semis and would be in no position to buy an electric semi. The third was interesting. It was actually a fruit farmer in my district who has made the investment and ordered a Tesla semi, and he sees that the country is headed in this direction. He made some calculations and determined that he will save enough in diesel costs and truck maintenance to make up some of the expense, and he also expects that he will be able to do something previously unheard of, which is back the truck right into the warehouse for loading, which will streamline the process, save a step, save time, and money. And you can't do that with a diesel truck.

And then the last conversation was actually with Puget Sound Energy, and we were talking about what it takes to site electric vehicle charging stations. And we think from paying rent on parking spaces to siting transmission lines and installing transformers and payment systems, and it is really complex. And as one of our witnesses pointed out, really expensive. In fact, Mr. Mills, you noted that.

I would also like to acknowledge Mr. Mills' comments about personal electric vehicles in rural America, and some potential challenges, including power outages. And so today, I would like to focus more on the electrification of semis and medium- and heavy-duty trucks, which make up just five percent of vehicles in the country,

but contribute 25 percent of vehicle greenhouse gas emissions, and I believe 70 percent of particulate pollution. So, this in rural America is really where we get the most bang for the buck.

So, Mr. Strickland and Mr. Wood, I want to get to you with questions about charging infrastructure. In the City of Wenatchee that is in my district, apple capital of the world, they invested in an electric bus system with an inductive charging system, which is amazing. The bus can come by, drive over this thing, charge up in 5 minutes, and get going again, and I would imagine that is the kind of thing we are going to need for electric semis.

So, Mr. Wood, do you have an opinion based on your experience about what the smartest way is to develop charging infrastructure for buses and these semis and medium-, heavy-duty trucks?

Mr. WOOD. Thank you for the question.

So, what we have done at Southern Company thus far, especially to your question around electrification of medium- and heavy-duty vehicles, the first thing we did was look at our footprint across Georgia, Alabama, and Mississippi, and mapped out, for example, in the case of fleet electrification, where our warehouses are and—which are often in rural areas with access to interstates. But if you think of a warehouse, it may have air conditioning and lighting for a small office space, for example, but not for the amount of energy that 50 trucks can just show up outside and charge, for example. So, our first action really was looking at our electric grid and seeing where we have excess capacity, where we have maybe some constraints where we may need to do additional upgrading to figure out how we can assist customers, step one.

Beyond that, there are challenges at each depot depending on the amount of vehicles, how it needs to electrify, what the end result or end goals of that customer are.

So, to my earlier comment of involving the utility early, that is how, I guess, the smartest way to start is to make sure that you engage that conversation up front so the utilities can start to respond and understand what the implications are in that particular area for the grid.

Beyond that, there are some interesting technologies. We have the Ray down in southwest Georgia. Allie Kelly is the Executive Director where she is investigating inductive charge and that exact thing, so it is definitely a technology that is up and coming. While more work is needed, it is definitely an interesting concept and I will be happy to connect you with Allie if you like.

Ms. SCHRIER. Topic with my limited time, Mr. Strickland. I am wondering since you are dealing with fleets of electric vehicles with FedEx, for example, is there a way to have the same kind of charging infrastructure that would apply to fleets of delivery vehicles and semi-trucks and buses?

Mr. STRICKLAND. Representative, I will certainly get back with my group of very talented engineers and planners. They are probably better positioned to answer that than I, but our work group—on our commercial vehicle side, thinking about how we can provide—

The CHAIRMAN. The time of the gentlelady has expired, but please do respond in writing to her inquiry.

[The information referred to is located on p. 109.]

The CHAIRMAN. And now, the gentlelady from Minnesota, Mrs. Fischbach, is recognized for 5 minutes.

Mrs. FISCHBACH. Thank you, Mr. Chairman, and Mr. Chairman, I do appreciate a lot of the discussion or the comments that have been made regarding the biofuels, but I am still not sure quite what to make about the hearing.

The hearing comes after the Majority's push through the partisan \$2 billion—\$2 trillion, excuse me—package that picks the winners in EVs at the expense of my district's farmers and biofuels producers. Now, we are here today and we are exploring whether this investment would work for rural America, and despite my colleagues already have picked a side.

And Mr. Chairman, I would like to insert for the record the article from Wanda Patsche, a farmer in southern Minnesota, about what an EV mandate would mean for their livelihoods and the economic lifeblood of my state.

The CHAIRMAN. Without objection.

[The article referred to is located on p. 108.]

Mrs. FISCHBACH. Thank you, Mr. Chairman.

I agree with Mr. Cooper that liquid fuels are still here to stay, but because of that, biofuels will play an important role in reducing carbon emissions. Unfortunately, President Biden's Build Back Better Act doesn't agree, providing more than 15 times the amount of EV incentives than for biofuels.

Even further, I also saw the reports this morning that President Biden may be considering going back on his promise to producers in my district for annual biofuels volumes in Fiscal Year 2022. I can't help but see a trend of what the future holds for the biofuels industry that is so important in my State of Minnesota.

There have been some comments about the credits that were included in the Build Back Better, but I would like to ask Mr. Strickland and Mr. Laughridge about the recently passed Build Back Better, which all of my colleagues on the other side voted for. It did provide several credits for the purchase of electric vehicles and plug-in or hybrid vehicles. Are you aware of any similar credits for flex-fuel vehicles that were included in the BBB that we passed recently?

Mr. STRICKLAND. Well, Representative, I am aware currently of the electric vehicle credits, but I am not as closely tied to BBB. I will get back to you on that, but I am not aware of it at this point.

Mr. LAUGHRIDGE. Thank you, Congresswoman. I am not strictly aware of the exact credits, but I do know we consider that everything should be a level playing field, and to achieve that widespread EV adoption, we really need to be looking at how that affects everyone equally.

So, to me, I think it goes to the broad application of EV tax credits, but it should be a level playing field.

Mrs. FISCHBACH. Well, 15 times more the investment doesn't seem like a level playing field.

Mr. Cooper, could you respond to that same question?

Mr. COOPER. I would be happy to, Congresswoman, and again, I am going to sound like a broken record here. But if the goal is to reduce carbon emissions from transportation, we ought not be picking technology winners and losers, and we really should be

incentivizing the behavior to reduce emissions without regard to what fuels and vehicles are doing that. And then step back out of the way and let the market determine what the lowest cost, most economic way of reducing emissions is.

We believe it is through flex-fuel vehicles in the near-term. When you put corn ethanol, 85 percent ethanol blend into an FFV, you are getting a significant reduction in greenhouse gas emissions. You are correct. There was no incentive included in the Build Back Better plan for flex-fuel vehicles. We were optimistic when a bill was introduced in the Senate last year by Senators Klobuchar and Ernst that would have created a flex-fuel vehicle credit. Unfortunately, that was not included in either the infrastructure plan or Build Back Better. So, we are hoping that can be picked back up this year.

Mrs. FISCHBACH. And Mr. Cooper, just finally, I just have a few more seconds, but are you aware of any statements or inclinations from the Biden Administration that they would support these same incentives be extended to vehicles that use higher blends of biofuels?

Mr. COOPER. I am not aware of really the Administration's position on FFVs at this point. We know there are also things EPA can do through its fuel economy or actually its tailpipe emissions standards to help incentivize FFV production. That is what led to the 22 million FFVs we have on the road today was the EPA and NHTSA standards. Those credits are no longer available to automakers, and so yes, EPA plays a role in this as well and would love to see those CAFE credits restored for flex fuel vehicles.

Mrs. FISCHBACH. Thank you, Mr. Cooper, and with that, I yield back, Mr. Chairman.

The CHAIRMAN. The gentleman from Georgia, Mr. Bishop, is recognized for 5 minutes.

Mr. BISHOP. Thank you very much, Mr. Chairman. I want to certainly thank you for holding this hearing, and for your leadership on these pivotal issues that are so timely. And I want to just thank you also for the breadth and the broad scope of the witnesses that are here to talk about it, because there are definitely pros and cons on this issue. I think this is important for the Committee to hear all sides of this, because it is so very, very important.

Let me go to an area—many of the questions that I had have been asked over the past couple of hours, but I want to deal with the utility company rate structure issue. Because energy demand—let me direct this to Mr. Wood from the Southern Company. Since energy demand is much lower at night, some of the utility companies reduce their electricity rates at that time. But transition to electric vehicles will lead to a significant long-term increase in the demand for electricity. How do you anticipate that this load growth will impact electricity rates? Should rural customers, especially those who don't own electric vehicles, should they be concerned that their utility rates will go up higher, even though they are not utilizing the electric vehicles to the same extent? And does the Southern Company, or do you think others similarly situated to the Southern Company will support the creation of a new rate structure, such as real time pricing or time of use rates to impact customer behavior?



Mr. WOOD. Thank you, Congressman, for the question.

So, Georgia Power actually offers a time of use EV charging rate for 1¢ per kilowatt hour from 11:00 p.m. to 7:00 a.m. incentive for EV charging, and that is a whole house rate. So, it is not sub-metered. So, theoretically, wash your clothes and run your dishwasher at the same time. And it is a time of use rate, so the rest of the time is off peak except for 2:00 p.m. to 7:00 p.m. in the afternoon.

Similarly, Alabama Power also offers an EV charging rate for residential and also for public fast charging, business electric vehicle rates that eliminates demand charges that we think will be helpful for the convenience store industry as we have continuing dialogue with them. And those are happening already today.

So, I guess in answer to your question, I don't look at it as a future issue. I think it is a today issue, and utilities are already navigating through that, especially considering this will be an incremental adoption of electric vehicles. I think we have plenty of time to have a dialogue and to see what the impacts will be. But to date, we haven't seen that.

Mr. BISHOP. Thank you very much for that.

Let me go to Mr. Walter regarding some of the fuel retailer incentives. I think you indicated in your testimony that one of the major factors deterring consumers from transitioning to electric vehicles is concern about where they will or won't be able to refuel. It seems that people will continue to get their car's energy, whether it is diesel or biofuel or electricity, from refilling stations, and especially so if they don't have access to a charging station at their residence.

With fuel retailers being such an essential piece of the puzzle to help increase the adoption of electric vehicles, let me ask you if you can give us a sense of the size of your industry, how many charging stations your industry might have the capacity to provide if the right incentives were there, and could you just touch a little bit more on how we can incentivize the fuel retailers and the convenience stores to invest in new technology, and how we ensure that those incentives are flowing to our rural communities?

Mr. WALTER. Thank you, Congressman.

As I mentioned before, we have 150,000 constituents and 120,000 of them selling motor fuels today. I don't have the exact count of how many offer EV chargers to date, but I can tell you at Sheetz specifically, we have 78 locations that offer EV charging, which represents around 12 percent of our overall store portfolio. And what we really need is a clear economics around what it takes to provide energy to consumers through their ability to charge and them to have a guaranteed rate of what they will be charged at a convenience store like ours.

If you look across the platform for our industry, there are widespread prices on the pylon that clearly tell you and state what the price of fuel is on any given day. That does not exist today for EV charging, and while we note that the growth of—

The CHAIRMAN. The time of the gentleman has expired, unfortunately, but please respond in writing to Mr. Bishop. Thank you.

[The information referred to is located on p. 118.]

Mr. BISHOP. Thank you, Mr. Chairman.

The CHAIRMAN. The gentlewoman from Maine, Ms. Pingree, is recognized now for 5 minutes.

Ms. PINGREE. Thank you very much, Mr. Chairman, and thank you so much to all of our witnesses. You have been here with us for a long time, and I appreciate the time you have taken with us and your ability to describe this from your perspective.

I want to say a couple of things before I ask my questions. I come from Maine. I come from one of the most rural districts. Even though we tend to think about rural districts being somewhere else in the country, I represent a lot of farmers and fishermen, and I have many conversations with people who drive Ford, GMC, Chevrolet trucks, virtually everybody does in my community, who can't wait to have the opportunity to have an electric truck. They can't wait to be done with the maintenance. They can't wait to have these changes and opportunities and see some of the new trucks coming off the line as having all the power they need, whether it is pulling a trailer or putting a big load on, or using it at a job site for a generator. I mean, we keep talking about these in a negative way as if people are running in the opposite direction. I know there are affordability issues. I know we want to make sure that our electricity comes from renewable fuel, but these are going to be a great opportunity in rural America.

I also know that to the extent that people have the opportunity to put solar panels on their houses because of the reduced cost of solar power and the credits available, people are anxious to stop having to pay their utility bills and be able to pull their truck in, use their solar power, and power their trucks that way and be independent in that way.

So, we keep talking about this in a negative way, but I think it is important to think about the great opportunities this offers up, the opportunities for agricultural equipment as we discussed a little bit, precision agriculture, some of those opportunities. And also even on the convenience store side, I was glad to hear Mr. Bishop's questions and appreciate your response on those.

But frankly, when you have to plug in your electric car at a convenience store down the road, you have just that much more time to stop in, get some food, do a little shopping. I think it is a great market opportunity for them as well, and I understand some of the challenges about understanding what the pricing will be and getting some uniformity in what is a very new technology, really, of these plug-in stations. And I know they need to be, there needs to be some different standards, but that is why we are making these investments now so there can be uniformity and availability. And frankly, I am just very excited about what we have in front of us, and really, thank you all for lending your thoughts to that.

Mr. Nassar, you have spoken about this a little bit, and in your testimony, you talked about the three-pronged approach to ensure competitiveness in electric vehicles and the infrastructure, and you sort of talked about the importance of the fact that we have already passed the bipartisan infrastructure bill, but also how it fits in with the Build Back Better bill, and why that will make a big difference. Do you mind just talking a little bit more about that?

Mr. NASSAR. Sure.

So, the new law, it does have the funds for infrastructure—some funding for EV infrastructure and also for incentivizing electric buses, and it also includes some funds for helping—for DOE funds helping plants upgrade and change to be able to have more efficient products, basically. But, it didn't address anything about consumer incentives and consumer price, and that is going to be a big part of it. And also, more needs to be done on the what I would say the supply side. So, basically those things to really make sure that the battery production is here. So, we don't have all three prongs in play, to put it bluntly.

Ms. PINGREE. Great, and I appreciate that because we do want all of that—those jobs to be in America and that manufacturing capacity to be here.

Mr. Strickland, thank you so much, and we love seeing the beautiful pickup truck behind you there. I hope that is on the road soon.

You talked a little bit about—or I guess it was in your testimony about GM being interested in leveraging some of the USDA programs to support EV charging structure, and I know there has already been a question or two about that. But do you have any specific programs in mind, and can you talk about how that might help to fill the gaps since that is some of the work of our Committee?

Mr. STRICKLAND. I can definitely make sure that my team [inaudible] by USDA, but I know the Rural Electrification Program grants I don't know which part of USDA could be some of that helps leveraging. But more importantly, I think having the advice and the expertise of the USDA in sort of dealing with rural communities and being able to help identify parts and places where we can think about laying out infrastructure is very important. But I will certainly get back to you in writing in terms of where we see those opportunities within USDA to be leveraged.

Ms. PINGREE. Perfect timing. I yield back the rest of my time, as I am out of time. Thank you, Mr. Chairman.

The CHAIRMAN. The gentleman from California, Mr. Carbajal, is recognized for 5 minutes.

Mr. CARBAJAL. Thank you, Mr. Chairman. I appreciate the opportunity, and thank you to all the witnesses here today.

Climate change certainly poses an immense threat, and we must invest in renewable energy infrastructure, obviously, to protect our planet. Electric vehicles are an important part of modernizing our transportation sector. EVs—not only does this transformation benefit the environment, but it also significantly benefits the economy.

Mr. Wood, the bipartisan infrastructure law will fund 500,000 EV charging stations across the country to reduce emissions. Can you discuss how EVs and EV infrastructure will translate into jobs and workforce development in different parts of the country?

Mr. WOOD. Thank you for the question.

So, as we think about the entire supply chain around EV infrastructure, and even the vehicles themselves of the components that it takes to make each of the pieces of the infrastructure or the vehicles, all—if you think about manufacturing plants, there is a supply chain that rolls into those, and there is a distributive supply chain beyond the product that you see. So, as we gain momentum, as we roll out more infrastructure, as we have a demand for in-

creased charging, for increased materials, like wire conduit that will supply the electricity, for example, for vehicles that need to use that charging. There will naturally be a rising tide lifts all boats in that regard of more jobs, but it is also around workforce development, specialized training, people that understand this technology, how it works. For example, battery chemistry, what the next generation of batteries looks like. All of that will come as this charging gets rolled out and demand increases.

Mr. CARBAJAL. Thank you.

In addition to the possibilities that EVs present, renewable natural gas, RNG, is a naturally occurring biomethane that can be captured during production at dairies, poultry operations, and hog farms. When cleaned up, it can be put into existing natural gas infrastructure and used as a carbon neutral or carbon negative transportation fuel. In 2020, California fleets fueled with California-produced RNG were carbon negative.

Capturing RNG can address a couple of different issues. It captures harmful emissions from farms while providing a clean transportation fuel available to rural America today. What role do you see for RNG in providing clean fuels for rural America?

Mr. WOOD. So, as part of my work with Georgia Clean Cities, we talk a lot about carbon intensity and the alternatives. So, as we think about electrification—and yes, I know that is where our focus is today—sometimes there is not an electric alternative for a particular duty cycle or piece of equipment. In that case, sometimes it may make more sense to convert from gasoline or diesel to natural gas, for example, if there is equipment available. And that is a switch that can be made today *versus* waiting for a new piece of equipment 2, 3, 4, 5 years out. So, I think there is definitely a role for RNG to play. That is a role that can be played today as we move forward with the public policy goal in mind of reducing carbon emissions.

Mr. CARBAJAL. Thank you very much. Madam Chair, I yield back. Mr. Chairman, I yield back.

The CHAIRMAN. Thank you.

The gentlelady from Illinois, Mrs. Miller, is recognized for 5 minutes. Mrs. Miller, you may need to un-mute.

Mrs. MILLER. Thank you. Thank you, Mr. Chairman and witnesses.

I cannot embrace President Biden's radical Green New Deal agenda that forces American taxpayers to pay for electric vehicle infrastructure at a time when our farm families are struggling to heat their homes. High electricity demand breeds high stress on our power grid, as Californians and Texans have found out with rolling blackouts and calls to reduce energy consumption. I cannot embrace this agenda which is a taxpayer-funded handout to China.

A typical electric vehicle needs six times the mineral inputs as manufacturing a conventional car, according to the International Energy Agency. The vast majority of these minerals are mined in China with very low standards in labor and environmental protections. The Biden Administration's environmental agenda also ignores the global context of climate change. China emits twice as much as America. It is unfair to force American taxpayers to subsidize electric vehicle infrastructure for what seems to be President

Biden's top two priorities: punishing rural America, and helping China. We have to hold China accountable, which is why I am introducing my bill today to ban Chinese purchases of our agricultural land.

And with that, I have a question for Mr. Mills. Mr. Mills, rare earth elements are considered critical to modern batteries and electronics, yet United States is almost wholly dependent on China to supply our factories with these critical minerals. Just a few years ago, there was a real palpable concern that China would use its control of rare earth element production to further its geopolitical aims by restricting the export to the United States. If that happens, how would we build batteries, solar cells, wind turbines, and all the other tools of modern life? So, is rare earth mining more environmentally damaging than mining for other materials?

The CHAIRMAN. Does the gentlelady yield back?

Mrs. MILLER. Well, did Mr. Mills—could he answer my question?

The CHAIRMAN. Oh, Mr. Mills, did you hear the question?

Mrs. MILLER. Maybe I ran into it too fast.

The CLERK. Mr. Mills is no longer on camera.

The CHAIRMAN. Mr. Mills, you may want to un-mute.

The CLERK. Ask if there is anybody on the panel that would like to address the question.

The CHAIRMAN. Is there anybody on the panel that might want to pitch in?

Well, thank you, gentlelady. You have 2 minutes remaining. Do you yield back?

Mrs. MILLER. Does Mr. Mills not want to answer that question?

The CHAIRMAN. We have not been able to locate him on the panel.

[The information referred to is located on p. 119.]

Mrs. MILLER. Oh, okay. Well, then I yield back. Thank you.

The CHAIRMAN. Perhaps he has stepped off. Thank you.

And now, we recognize the gentleman from California, Mr. Costa, who is also the Chairman of the Subcommittee on Livestock and Foreign Agriculture, for 5 minutes.

Mr. COSTA. Well, thank you very much, Mr. Chairman, for this good hearing that we are having today and the diversity of witnesses. I must, once again, congratulate you on national championship. It certainly has been a good year for Georgia, not only with the Braves, but also with the Bulldogs. Since we have Bulldogs out in California at Fresno State, I am happy to cheer you folks on.

I want to try to focus on the big picture here. Mr. Strickland, I was at a meeting with one of your primary competitors, another major automotive company there in Detroit. It sets goals for 2030 of over the majority of their automotive production would be electrical vehicles. What similar goals do you have beyond the Volt and some of the other vehicles you are producing now as General Motors looks at the next 10, 15 years of automobile production?

Mr. STRICKLAND. Yes, sir. We have 20 electric vehicles across our entire sales line, and we are going to be introducing over the window of when we are going to be fully electric by 2035. We are planning on selling one million electric vehicles by 2025, so we are very much fully invested. We are very much all in, and we align with the President's—

Mr. COSTA. I think it is important to put that in perspective, because General Motors, Ford Motor Company, the major automotive manufacturers not only here but in Europe all have similar targeted goals, it appears to me, as we are trying to look at how we go through this transition.

Mr. Cooper, because we are talking here about electrical vehicles, but you talked in a comment earlier about being neutral as it relates to reducing carbon footprints in terms of choice of fuels. Would you care to comment in terms of what role hydrogen and there was a mention earlier by my colleague in California about what we are doing in dairy and we have turnkey operations on methane production today that are very successful economically. But what role other fuels may have as we make this transition?

Mr. COOPER. Absolutely, and thank you for the question, Congressman.

We think right there in California you have an excellent example of what can happen when you put a policy signal out to reduce carbon emissions, and with the Low Carbon Fuel Standard in California, the response you have seen from the marketplace is a combination of low-carbon fuels that have increased their presence in the market to achieve the reduction goals of the program. The same thing could happen at the national level with a similar type program, and you are right. Renewable natural gas has made a significant contribution to meeting the objectives of the LCFS in California, not only as a transportation fuel itself, as was mentioned earlier, but also as a process fuel to make ethanol and other biofuels. There are some ethanol plants in California that have invested in taking, capturing methane from dairies, digesting it, and using it to replace natural gas—

Mr. COSTA. What do you think about hydrogen?

Mr. COOPER. We think hydrogen is another phenomenal opportunity for ethanol. Ethanol is a hydrogen-rich molecule. It is an excellent carrier of hydrogen, and we think ethanol could be a major source for fuel cell electric vehicles further down the road.

Mr. COSTA. My time is running out here, but I want to get a perspective here with the \$7½ billion for the bipartisan infrastructure package on EV charging stations. And we look at rural America that I have grown up in, and I think back to our family's farming operation. When we talked about EV connections, members of my family and friends already have EV vehicles. They charge them at home. Our farming operation, we had two gas pumps, regular and premium, and we had a separate diesel tank.

For a lot of our ag producers in my area, they are going to set up their own separate refueling methods for tractors and for other equipment that they are going to need to use. My time is running out, but I would like to see how we break this down in terms of American agriculture doing its part.

The CHAIRMAN. The gentleman's time has expired.

And now, I recognize the gentlelady from Louisiana, Ms. Letlow, for 5 minutes.

Ms. LETLOW. Thank you, Chairman Scott, and thank you to all the witnesses for your participation today in discussing the implications of electric vehicle investments on agriculture and rural America.

The 5th District of Louisiana is the definition of rural America. Agriculture and small businesses play an essential role in the local economies that serve the residents of our rural communities. In addition, the oil and natural gas industry is one of the leading industries in the State of Louisiana in terms of economic impact, taxes paid, and people employed. According to a 2020 report, the industry provided \$73 billion to the state GDP, and supported 249,800 jobs in 2019. However, the Louisiana Department of Natural Resources recently estimated that the state lost 12,256 oil and gas industry jobs between March 1, 2020 and November 15, 2021. In my opinion, that is a substantial reduction to a sector that is so vital to our state's economy.

Mr. Mills, as Members of the House Agriculture Committee, we often remind the public that the United States is the global leader in producing affordable and abundant food, fiber, and energy in a sustainable way. How could this Administration's top-down approach on policies up end our manufacturing, energy, and agriculture industries? Specifically, do you see premature investment in electric vehicles increasing costs and impacting jobs for our rural residents and lower income households?

Mr. MILLS. Well, thank you, Congresswoman. I think the problems we have amounts to almost unserious examination of the whole fuel cycle, and I will come back sounding like a broken record on this, but the—America's mining industry is rural. America's oil and gas industry is rural. Its food industry is rural. These are rural industries. We have provided for several decades massive disincentives to the mining industry, so all the mining jobs and all the chemical processing jobs, which would otherwise be rural, that would be needed to make the battery cells to assemble vehicles here are going to be overseas. They are already overseas. We are going to increase them overseas. We are a net exporter of food, as you know in America, we are also a net exporter of hydrocarbon fuels. So, that goes away as we provide disincentives for that industry.

It would be almost like disincentivizing the entire agriculture industry, and providing incentives to bankers, but importing all our wheat and banning wheat production in America. This is the path we are on with EVs.

I think EVs are great. There is phenomenal technology. GM's products are wonderful. Ford's products are wonderful. They still don't have the functionality of a gasoline-powered vehicle for most of the uses that they are put to in rural America. So, it is a very odd asymmetry and a lack of recognition of the profound advantaging of other countries' industries over ours with these mandates that are being created here.

Ms. LETLOW. Thank you so much, Mr. Mills.

Mr. Walter, one of the principles in your testimony is to ensure fair treatment so all households are not forced to subsidize alternative energy users. Can you expand on this principle? Who pays for charging stations in rural communities, and why does it matter?

Mr. WALTER. In today's world, I mean, charging stations can be subsidized through utilities and the like. I mean, we in the convenience store industry, we are really focused on pricing our products

at a fair market price. We sell commodities across the board, and that is really—if I could just speak to E15 briefly. We have undercut or priced E15 *versus* 87, a regular grade gasoline by 20¢ to 25¢ across the industry, and we do so at a time while that brings on cost savings to the consumer.

But in today's world, EV charging, *per se*, is being subsidized at a state level and at a national level, and we have not found EV charging implementation as an organization to be profitable at this time. And so, really, there is a lot more work that needs to be done until you can find an adequate return on invested capital in this space.

Ms. LETLOW. Thank you so much to the witnesses.

Mr. Chairman, I yield back.

The CHAIRMAN. Thank you.

The gentlewoman from New Hampshire, Ms. Kuster, is now recognized for 5 minutes.

Ms. KUSTER. Thank you, Mr. Chairman, and thank you again for hosting this important hearing.

The transportation sector is the number one source of carbon emissions in the United States, and as we decarbonize our electric grid, transitioning to electric vehicles will help our country reduce carbon emissions and harmful pollutants, and thereby save our planet.

To support electric vehicles, we need to build out a robust network of charging stations around the country, including in rural areas. These charging stations can be isolated. Urban areas need to adopt these charging stations so that people who live there can experience the benefits of electric vehicles in my district to be important for our poor constituents and lower class. And visitors can feel confident traveling to and spending their dollars in rural communities.

So, in short, we must ensure that rural Americans have just as much incentive to buy EVs as Americans living in cities and suburbs. But one of the main challenges to building out public electric vehicle charging infrastructure are demand charges. Demand charges are a monthly fee you pay to the electric utility in order to maintain the infrastructure needed for the power to reach your house or building. These demand charges are one way for utilities to recoup the costs they incur to maintain an electric system necessary to meet peak demand.

However, many utilities have yet to adjust electric rates to ensure that demand charges levied against electric vehicle charging infrastructure accurately reflect the costs chargers impose on the electric system, and this means electric vehicle charging service providers pay more for electricity than they should. As a result, high costs must either be passed along to consumers, or eaten by charging service operation. Gas stations that include electric vehicle charging infrastructure. Can you explain to the Committee how high demand charges impact this space for having electric chargers, especially in rural communities?

The CHAIRMAN. Ms. Kuster, you may want to repeat the person who you are referring—

Ms. KUSTER. I am sorry. My apologies. I am having trouble with my connection. Can you hear me, Mr. Chairman?



The CHAIRMAN. Yes. Who did you direct your question towards?

Ms. KUSTER. Mr. Walter. Mr. Walter from Sheetz.

The CHAIRMAN. Thank you.

Ms. KUSTER. Thank you.

Mr. WALTER. Thank you, Congresswoman.

I mean, first and foremost, Americans are not going to put up with surprise fluctuations in the cost of energy at a retail location like ourselves unless there is clear price discovery that exists.

You know, essentially price gouging or peak demand charges could negatively affect the consumer in many ways, and also potentially attract the authorities for passing on elevated costs. So, we are really not in a position to be able to pass on direct costs to consumers in today's environment. And I would liken it back to events where we have hurricanes whereby we are not able to raise the price of retail fuel, even though the physical product might be increasing at price in the physical markets. There are many laws on state of emergencies that are put forth that prohibit us from doing so.

And then one last thing, in terms of some of these environmental concerns around national disasters, our industry is one of the first to come back online. We have backup generators in place with fuel to bring our industry back if and when possible.

The CHAIRMAN. Thank you, Ms. Kuster. We hear Ms. Kuster is having difficulty, and so, now we will hear from the gentleman from Texas, Mr. Cloud, for 5 minutes.

Mr. CLOUD. Thank you, Mr. Chairman, I appreciate it.

Just one quick question right off the top. Mr. Nassar, you mentioned that people should be free to choose to join a union, and I appreciate that. Would you agree that membership to a union should not be mandated?

Mr. NASSAR. No. I think that if you are benefitting from a collective bargaining contract, you should be part of the organization just like most other systems and organizations.

Mr. CLOUD. So, when you said people should be free to choose, you didn't really mean people should be free to choose?

Mr. NASSAR. No, I did mean that. What I meant was in the beginning about whether to decide—whether joining a union or not. In 90 percent of organizing—these captive audience meetings where employers daily lecture workers about the fact of dangers of joining unions—

Mr. CLOUD. It is a yes or no question. I got a lot of ground to cover.

But do you know how much the price of automobiles has gone up in the last year?

Mr. NASSAR. I don't know precisely, no.

Mr. CLOUD. It is about 11 percent for new cars, 38 for used cars. Food has gone up about six percent as the official stat. When I talk to people, they will say it is more like 30 or 40 percent what they are experiencing at the grocery store. Energy costs have gone up 30 percent, and frankly, I am a techie kind of guy. I appreciate this discussion on electric cars, but the discussion seems a little bit like we are putting the cart before the horse, to use an agricultural reference for the moment that we are in.

Just to kind of bring this discussion into a little bit of context, I want to read this from the 2005, the Director of National Intelligence published a report, and it said this. “In terms of size, speed, and directional flow, the transfer of **global wealth and economic power** now underway—roughly from West to East—is without precedent in modern history. This shift derives from two sources. First, increases in oil and commodity prices have generated wind-fall profits for the Gulf states and Russia. Second, lower costs combined with government policies have shifted the locus of manufacturing and some services to Asia.”\* And so, right now, we are in an unprecedented shift where everything that the American worker is working for has been shifting overseas in terms of economic influence and in terms of wealth and prosperity, and we are having this discussion.

It is notable that when we have produced energy exports here in the United States, what we don’t see is other nations going green. What we see them doing is buying oil and gas from people who produce it much less responsibly. And so, one thing you mentioned is that China is ahead of us in electric vehicle technology, and that we are not going to be able to export our way into it. We are certainly not going to be able to import our way out of it as well when it comes to us being reliant on their rare earth minerals. They are also ahead of us in hypersonic missiles at the moment. They are also ahead of us when it comes to producing coal. And so, a lot of what we are talking about has to do with us being reliant on China. Meanwhile, they are producing more coal plants each and every year to make us have to meet the stated goals of the policy that we are talking about today.

I also find it interesting that right now, California is asking people not to charge their electrical cars just to keep up with the electric shortage. Meanwhile, we are talking about putting much more of a tax upon that.

A couple more points. I would point out that we used to produce ag products emissions free, and I see technology that we brought to scale with each successive generation that has allowed us to come to this point in history where we are, for the first time actually producing more food than the world needs. Now, we have some infrastructure issues in getting that food where it needs to go, obviously, and some geopolitical barriers and such, but it is the technology that has been brought to bear that is helping us to meet that need and to bring food to an affordable level. And right now, we see such a demand on the American household right now, and then what is proposed right now is this \$12,500 credit for electrical cars. So, we are saying we are going to take money from the American people so that we can give it back to them after a modest Federal bureaucracy handling fee to purchase electric vehicles.

And so, I am all for the free market. I think they are cool. I hope to one day have one, but it is important that we look at these discussions in the proper context, and certainly that we don’t play into China’s hands when it comes to this messaging that they are trying to get us to buy into it.

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\* **Editor’s note:** the quotation is from *Global Trends 2025: A Transformed World*, (emphasis as in original) available online at: [https://www.dni.gov/files/documents/Newsroom/Reports%20and%20Pubs/2025\\_Global\\_Trends\\_Final\\_Report.pdf](https://www.dni.gov/files/documents/Newsroom/Reports%20and%20Pubs/2025_Global_Trends_Final_Report.pdf).

Mr. Mills—

The CHAIRMAN. The gentleman's time has expired, unfortunately. However, please, you can respond in writing.

Mr. CLOUD. Thank you.

The CHAIRMAN. And now, we recognize the gentlelady from Florida, Mrs. Cammack, is recognized for 5 minutes.

Mrs. CAMMACK. Well, thank you, Chairman Scott, Ranking Member Thompson, and first, I would like to associate myself with the comments and remarks from my colleagues, Representative Cloud, as well as earlier from Representative Allen.

We are dealing with very serious supply chain crises all around the country, and Representative Allen hit the nail on the head earlier talking about how here in Washington, D.C., we have empty grocery store shelves. And so, while this is an important topic, I think there are far more pressing items in the face of what we are experiencing with historic record-breaking inflation.

But I will jump right into it. I know several of these topics have already been covered, and I am going to direct this to Mr. Mills to bring it back to the farmer for a minute.

Our farm equipment needs to function in all weather conditions, which can be a challenge in Florida's climate. EV batteries experience difficulties in extreme cold and heat, drastically reducing range and serving as a fire hazard in inclement weather and flood water. Florida, on average, we get about 56" of rain a year and that is without a hurricane, and we know we are prone to those. We are seeing that EV vehicles such as transit buses often rely on auxiliary heat and power systems, resulting in unintended emissions.

So, Mr. Mills, rather than hoping that a battery works in warm or cold temperatures or relying on polluting auxiliary systems, doesn't it make sense or more sense to explore other forms of energy like the capture of farm emissions and use them in renewable natural gas-powered vehicles?

Mr. MILLS. Well, Congresswoman, thank you.

I think the short answer is yes. I will elaborate slightly by pointing out that I am actually very optimistic about the progress we made in solving some of the problems you described for batteries. I was an interim CEO of a large format lithium battery factory and I am fairly familiar where their technology is going.

I will just repeat a point I made in my original testimony. The real challenge, especially for big vehicles, trucks and farm vehicles, is the charging, the time it takes to charge, and the cost of the charging systems. A super charger, the kind that Sheetz would like to install, they are about \$50,000 each, more than double the cost of a gasoline pump. Those aren't good enough for charging quickly a Deere-sized combine. There will be \$100,000 kind of costs for the charger to charge these multi-megawatt level of systems that are required to do reasonably fast charging.

So, it is fundamentally—and I hate to use the word—*convenience* problem. Convenience is more than convenience when it comes to rural America. It is operational lifestyle. So, these are non-trivial barriers. It will take a very long time to solve, and cost a lot of money.

Mrs. CAMMACK. Well, I appreciate that, and you just mentioned, in your experience as CEO in dealing with lithium batteries, we take a little bit of a broader geo-strategic look at things.

This all relies heavily on foreign suppliers to make this initiative work, and so, we know in the United States, especially under this Administration, mining has become an extraordinarily over-regulated industry and has created some very, very tough situations for folks as we try to reassert our independence on multiple fronts. Now, especially in places with lax regulations, like China, for example, that can cause severe environmental degradation, and I would argue that no one does this safer, better, more efficiently than the United States, yet it seems that we are exporting our dirty work to places like China in the name of green energy. Would you agree?

Mr. MILLS. Well, that is exactly what we are doing. We are exporting the carbon dioxide emissions. We are exporting the jobs, and we are exporting the revenues. And we are subject to the vicissitudes of the commodity market prices from other players. Just to repeat a fact that I put in my testimony, that 60 to 70 percent of the cost to make a battery for a car or a truck is the cost of the commodities. We don't control that because it is all foreign markets, foreign revenues, and foreign politics, frankly.

Mrs. CAMMACK. Thank you, Mr. Mills.

Now, Mr. Strickland, I am going to redirect to you, and very quickly.

As a growing purchaser of many of these foreign-sourced commodities, what steps is GM taking to ensure America's desire to make it like better here doesn't result in environmental catastrophe over there? What steps are you all taking?

Mr. STRICKLAND. Well, we are working on our battery chemistry so that we have 70 percent reduction in cobalt, as one example. We are members of the Institute for Responsible Mining Assurance, which is another element to make sure that our partners in our supply chain basically align to act with integrity and with safety. And also, we are working right now in California with Salt and Sea to be able to access supplies of lithium.

So, we recognize the fact that we have to have great jobs here. We have to make sure that we are not dependent on these foreign sources, and we are working very hard to achieve that goal.

Mrs. CAMMACK. Thank you.

My time is expired. I yield back.

The CHAIRMAN. Thank you very much.

And now, ladies and gentlemen, we are approaching the end of this fantastic hearing. Let me just say how much we all appreciate this. Each of you have opened our eyes and our minds to much of what we were only dimly aware when it comes to this issue of making sure that we have electric vehicles for everyone, especially in our rural communities, which have for so many situations been unfortunately left behind. We will not, we must not, and we cannot do with them the way we have been doing in bringing rural broadband. But thank God, we have about \$68 billion on the way to finally get rural broadband. Thank you.

But before I get my closing statements, I would like to recognize our Ranking Member for any comments he would like to make.

Mr. THOMPSON. Well, thank you very much, Mr. Chairman. Thank you to you for this hearing. I look forward to lots more hearings. On our side of the aisle, we will clear our schedule for hearings. We really, as you heard a little bit of frustration seep through because of the supply chain issues, the agriculture issues, the oversight on the farm bill, and so, I appreciate today, but really, we really got to put our shoulder to the plow. I will describe it that way, and get to work on really ag-centric issues.

I appreciate the nature of this, looking at the impact of rural America, the impact on agriculture. I want to thank our witnesses. I thought we got great witnesses, very balanced, and great experience that they brought to the task. And thanks to our Members, because participation was excellent, and that is always important, right? We need our farm team to show up, and they did today.

You know, this really was, in the end, a climate-driven discussion because it is a climate-driven issue, and we all know that our goal should be in everything that we do, we work to decrease CO<sub>2</sub> emissions. There is no industry that does that better anywhere in the world, certainly anywhere in this nation, than agriculture. The U.S. farmer is a climate champion, a climate hero—our U.S. farmers and ranchers and foresters. But, we know that we can't have a healthier climate or a healthier environment without a healthier economy. It is counterintuitive, doesn't work. If you compromise one for the other, it is going to fail, and I think this unilateral electric vehicle push, not to impose electric vehicles, but doing that at the cost of everything else, it compromises that principle.

Today, we heard a balanced discussion on the topic of electric vehicles. Lots of questions have been raised and I think these questions and the information that was shared should instruct the Federal Government proceeding with any additional investments with electric vehicles. I think the American people deserve to have answers to the questions that were raised here by some of our witnesses, and certainly some of our Members.

Now, I am pleased with the information that was shed on the role of agriculture, and specifically renewable fuels, in making America the world leader in reducing greenhouse gases. I thought that was nicely showcased and highlighted today, and that is a story we need to keep telling and bragging about. Top-down Washington dictates on to consumers is a flawed strategy. Science, technology, and innovation is critical to addressing the challenges, I think all of the challenges our nation is facing.

Today, we are in the context of transportation, but we also know that science, technology, and innovation is critical for agriculture. It is because of science, technology, and innovation that America is leading the world in reduction of greenhouse gases.

So, I do think in the end on this issue of electric vehicles, government can do what government will do, but consumers will be the deciding factor. They are going to make the decisions in the end.

So, thanks again for the hearing, and I yield back.

The CHAIRMAN. Thank you so much, and I want to thank you, Ranking Member, for our bipartisanship work that we have done together. We have moved to make sure that we got rural broadband now moving to finally get into rural America, and now we are dedicating ourselves to this.

But first of all, in my closing comments, I want to just thank each of you. You have brought great wisdom to us, and you can see from the interchange and the discussions and the caliber of questions that our Committee Members asked that we are determined to provide the necessary leadership in making sure that our rural communities, our agriculture industry have a seat at the table when it comes to this. Billions and billions of dollars are being allocated for this effort, and you all with your excellent testimonies have helped us to make sure that we will not and we cannot leave rural America behind here. We are committed to that.

So, to you, Mr. David Strickland with the General Motors Company, thank you. To you, Mr. Lincoln Wood, Electrification Policy Manager with the Southern Company, Georgia Power Company, thank you. And for you, Mr. Matthew Laughridge, owner and Managing Director of the Terry Reid Automotive Group in Cartersville, Georgia, on behalf of all of our national automobile dealers. And to you, Mr. Trevor Walter, Vice President of Petroleum Supply Management, the Sheetz company, on behalf of our National Association of Convenience Stores. As you so eloquently mentioned, our convenience stores play a critical role in making sure we have the charging stations adequately and effectively placed in rural America, as well as urban America. And to you, Mr. Geoff Cooper, thank you. You offer some tremendous points that needed to be discussed, and we are going to take those into consideration. Thank you so much. And to you, Mr. Josh Nassar, Legislative Director of our very great International Union, the UAW. I say that with heartfelt feelings, because I worked closely with the UAW for 20 years in the Georgia legislature, as well as here in Congress. And to you, Mr. Mark Mills, Senior Fellow of the Manhattan Institute, thank you, and thank each of you for this extraordinary and very helpful hearing. Thank you.

And now, I think I have a bit of housekeeping to take. Under the Rules of the Committee, the record of today's hearing will remain open for 10 calendar days to receive additional information, supplementary written responses from our witnesses to any questions posed by a Member. And of course, I want to thank our staff. Didn't they do a wonderful job in bringing together this excellent hearing? Thank you, staff, and thank you, Anne, who is the director of our staff. Thank you. She works awfully hard.

And now, this hearing of this Committee of Agriculture is adjourned.

[Whereupon, at 1:57 p.m., the Committee was adjourned.]

[Material submitted for inclusion in the record follows:]

SUBMITTED ARTICLE BY HON. DAVID SCOTT, A REPRESENTATIVE IN CONGRESS FROM  
GEORGIA

## The Atlanta Journal-Constitution

[<https://www.ajc.com/news/georgia-tries-to-become-leader-in-an-industry-thats-no-sure-thing/F6WTUWIEBJHDTL66J7SNJSJDC4/>]

### Georgia tries to become leader in an industry that's no sure thing



Credit: Ben Gray.

News <sup>1</sup>

By ANDY PETERS, *The Atlanta Journal-Constitution*  
Dec. 23, 2021

#### *Electric vehicles may be future but EVs, charging stations still rare*

Georgia officials want the state to be a leader in manufacturing electric vehicles, which could very well be the next big thing.

When it comes to seeing EVs on the state's highways and backroads, though, Georgia's got a long way to go.

EV manufacturers flocking to Georgia? Check. A surge in consumer sales of EVs and charging stations blanketing the state? Nope.

Rivian will start building a *\$5 billion factory*<sup>2</sup> next summer in Atlanta's eastern exurbs to manufacture electric trucks and SUVs, in what Gov. Brian Kemp has called the largest economic development project in state history. SK Battery America is nearing completion of a *\$2.6 billion EV battery plant*<sup>3</sup> northeast of the city. Many EV suppliers are expected to follow close behind.

But only about one in 50 cars sold in the U.S. these days is an EV, and Georgia is no different. An EV also is more expensive to buy than gasoline-fueled cars. And if you want to buy a new one, it might not arrive for weeks or months. Rivian's R1T truck starts at around \$70,000—and if you order it now, *you won't get it until 2023*.<sup>4</sup>

Georgia has 1,500 EV charging stations, seventh out of 50 states and the District of Columbia. Metro Atlanta has about 1,110 of them, the third-highest among U.S. metro areas, according to real estate data provider Yardi Matrix.

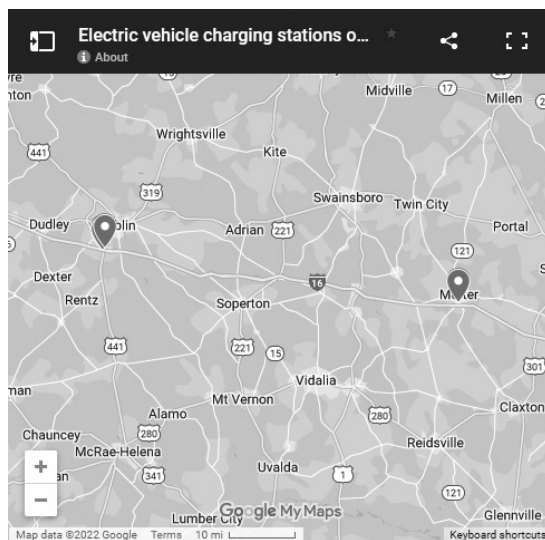
Outside Atlanta, good luck. On I-16 between Macon and Savannah, a 170-mile stretch, drivers pass only four charging stations just off the interstate, according to the website PlugShare.

<sup>1</sup><https://www.ajc.com/news/>.

<sup>2</sup><https://www.ajc.com/news/rivian-confirms-ev-factory-thousands-of-jobs-coming-to-georgia/ CUH7ZNS5URG0DNQG7CEUU2FCVY/>.

<sup>3</sup><https://www.ajc.com/news/battery-maker-sk-eyes-faster-hiring-potential-growth-in-georgia/YB47RMLA6RDUHGZQEJZIPURWKQ/>.

<sup>4</sup><https://www.ajc.com/news/rivian-losing-money-as-it-struggles-to-meet-fast-rising-ev-orders/JTQE6KYPDQZGZHFVAIEW717XDNE/>.



Vanessa Miller, an attorney in Detroit who advises automotive companies on supply chain issues, said a chicken-or-egg situation is holding things back.

“It’s hard to get the momentum you need because a driver isn’t going to buy an EV until they know they can keep it running,” she said. Companies won’t install more charging stations “because you don’t know how many EVs there are going to be.”

State, Federal Governments make electric push

Kemp has made EV a priority, *forming an EV task force*<sup>5</sup> in July to “ensure that our state is positioned to continue leading the nation in the rapidly growing electric mobility industry.” The group’s report may be released in early 2022.

Georgia gave SK Battery \$300 million in *grants, tax breaks and free land*.<sup>6</sup> The state has probably offered<sup>7</sup> a larger bounty to Rivian, though details haven’t been disclosed. Georgia has only one combustion-engine auto plant, Kia, after rivals chose neighboring states to build traditional auto plants.

Wall Street investors and automotive industry analysts predict the EV market will soon be red hot. Industry tracker IHS Markit projects that *EVs on U.S. roads*<sup>8</sup> will rise from 1.5 million vehicles now to 9.3 million by 2026.

<sup>5</sup> <https://gov.georgia.gov/press-releases/2021-07-20/gov-kemp-announces-statewide-initiative-accelerate-georgias-electric>.

<sup>6</sup> <https://www.ajc.com/news/local-govt--politics/what-did-georgia-promise-win-korean-battery-plant/V0FQc9fmGXvujzIX7Ocm2M/>.

<sup>7</sup> <https://www.ajc.com/politics/georgia-would-offer-a-bounty-of-perks-for-rivian-project/OMRLP3ZLRVWDE66BSJTQQLDOA/>.

<sup>8</sup> <https://cleanenergynews.ihsmarkit.com/research-analysis/US-infrastructure-bill-will-support-400000-new-EV-chargers.html>.





Credit: Steve Schaefer.

At Tesla, the largest EV maker, yearly revenue grew from less than half a billion dollars in 2012 to more than \$30 billion last year. It reported its first quarterly profit this summer. Rivian's November IPO valued the company at more than \$100 billion, more than either Ford or General Motors.

Governments have set lofty goals for converting to EVs in a push to combat climate change. President Joe Biden wants to *cut greenhouse gas emissions*<sup>9</sup> by half from 2005 levels by 2030, in part by cutting the price of EVs by \$12,500.

Corporations want to oblige. Amazon has ordered 100,000 electric vans from Rivian. UPS will buy 10,000 electric vans from British company Arrival. Hertz and Enterprise Rent-a-Car have said they'll add more EVs to their fleets.

A Federal infrastructure program will provide \$7.5 billion to install hundreds of thousands of EV charging stations nationwide. Funds will likely be available first-come, first-serve, though details haven't been released, said Brandon Jacobs, regional vice president of sales at charging station provider Blink.

But there's no guarantee EVs will become the dominant mode of vehicle transportation in the U.S., or at least not as quickly as some predict, Jeremy Michalek, head of the Vehicle Electrification Group at Carnegie Mellon University, wrote in a recent column for *MarketWatch*.<sup>10</sup>

Ford, GM, Mercedes-Benz and other automakers with big EV plans may run into production problems that delay product launches or force recalls. Volkswagen delayed the release of its *ID.Buzz*<sup>11</sup> electric microbus from 2022 to 2023. Chevrolet in August recalled all 141,00 Chevy Bolt EVs due to fire risks. *Rivian warned in December*<sup>12</sup> it would fall short of its 2021 production target, sending its stock price lower.

EV sales have already captured the low-hanging fruit of consumers who are early adopters of new technology, Michalek said. Other customers may put up more resistance, especially if the price remains high. The gas-powered Hyundai Kona SUV starts at \$20,950. The electric version starts at \$34,000.

Mainstream consumers "aren't as driven by environmental and technology-oriented lifestyles and have other priorities and constraints," Michalek wrote.

<sup>9</sup> <https://www.whitehouse.gov/briefing-room/statements-releases/2021/11/01/fact-sheet-president-biden-renews-u-s-leadership-on-world-stage-at-u-n-climate-conference-cop26/>.

<sup>10</sup> <https://www.marketwatch.com/story/im-an-ev-expert-and-im-skeptical-about-how-quickly-electric-cars-will-go-mainstream-in-the-u-s-11623770187>.

<sup>11</sup> <http://id.buzz/>.

<sup>12</sup> <https://www.ajc.com/news/rivians-evs-get-plaudits-but-tesla-others-pose-tough-competition/52L7Y2BFafa2RBSE6U6B4HNZRI/>.

EV drivers face plenty of speed bumps

Today's market for EV sedans and trucks is so tiny that it barely registers. In Georgia, EVs are 1% of all vehicles, and the nationwide state average is 1.5%, according to the U.S. Department of Energy. New EV sales account for 2% of all vehicles, according to Automotive News.

California is tops with about 5.2% of all vehicles powered by electricity. In Georgia's neighboring states, it's exceedingly rare to see an EV on the road. In South Carolina, 0.5% of vehicles are EVs, and in Alabama it's 0.4%.

EV companies say it's mandatory that charging stations become more accessible and not just inside wealthy consumers' home garages. Charging stations "must be conveniently located where drivers live, work and play," EVBox, a Dutch maker of charging stations, said in a recent regulatory filing.

The average range for all EVs is about 194 miles, according to EVBox. That's not too far behind gas-powered cars, which can travel 300 miles or more before running on empty. And EV range is expected to keep climbing. Tesla models top 300 miles and Rivian vehicles are expected to have a range of at least 300 miles.

But unlike gas stations, many parts of Georgia are EV charging deserts. No charging stations are located along four-lane U.S. Highway 441 from McRae to the Florida state line, a 116-mile drive. That's one mile more than the range for an electric Mini Cooper SE that is fully charged.

The dearth of charging stations has given rise to range anxiety.

Marshall Norseng drives his 2021 Tesla Model Y Long Range 50 miles a day commuting from his Midtown home to his Duluth office at Banyan Hills Technologies. His home charger provides enough juice to last two or three days and he's never run out of power on the road.

Interstate travel offers a much-bumpier ride. On a recent trip to the Midwest, Norseng carefully planned his stops for recharges. Those stops turned out to be unlike a quick trip to a gas station.

"If you're driving to the Midwest and you stop in Chattanooga at a charging station and they're all full, you have to sit and wait," he said. "You don't have a choice."

Some waits at EV charging stations can be royal time sucks.

A gas-powered vehicle typically takes fewer than 10 minutes to refuel. An EV plugged into a high-speed charger takes about 50 minutes. So-called Level 2 chargers, the most common type, can take six to 10 hours to recharge an EV.

"You're not going to have people who are going to want to hang out at a rest stop for two hours waiting for their car to be recharged," said Miller, the attorney.

Experts say that charge times will become less of an issue if there are more charging stations. An army of startup companies are competing to capture that market by selling to homeowners, local governments, retail establishments, hospitals, apartment complex owners and others.

SemaConnect has focused on placing Level 2 chargers in disadvantaged communities since they're cheaper than fast-charging models, said Stephen Carroll, vice president of marketing. "Level 2 charging stations will be key to making EVs available" to those communities, he said.

The Bowie, Maryland, company declined to disclose the price of its Level 2 charging station, but said its at-home charger is priced at \$699.

Cox Automotive, a unit of Cox Enterprises, last year *installed 32 charging stations*<sup>13</sup> at the Metropolitan Parkway location of fleet management provider Pivet. It's one of the biggest charging stations on Atlanta's southside.

Cox Enterprises, owner of *The Atlanta Journal-Constitution*, owns a 4.7% stake in Rivian and supplies services to Rivian. Sandy Schwartz, a Cox executive who oversees the AJC, is on Rivian's board of directors and holds stock personally. He does not take part in the AJC's coverage of Rivian.

More charging stations are coming, said Rich Simmons, a research engineer at Georgia Tech's Strategic Energy Institute. The recently approved federal infrastructure bill has earmarked \$135 million to Georgia for installations.

Other incentives are available. Georgia Power and Cobb EMC offer \$250 rebates for the purchase of at-home EV charging stations and offer discounted rates to residential customers for overnight power if used to recharge EVs.

<sup>13</sup> <https://www.ajc.com/news/business/electric-vehicle-charging-station-opens-on-southside/36WK3QSNF5G6TGFZMH2UAKXN7U/>.

### Georgia's mixed messages on electric vehicles

The state has encouraged the electric vehicle market on some occasions and has introduced impediments at other times:

#### *Georgia incentives*

**10% state tax credit** for a business that buys an EV charging station and makes it available to public

**\$250 rebate** from Georgia Power and Cobb EMC for residential customers who install an EV charging station

**Discounted rate** for Georgia Power customers who charge EVs overnight

**Free power** for Cobb EMC customers who charge EVs overnight

#### *Georgia disincentives*

EVs **charged an extra \$213.70** for yearly vehicle registration

In 2015, the state **ended a \$5,000 tax credit** for EV purchases

Sources: U.S. Dept of Energy and Georgia Power.

But Georgia doesn't make it easy for consumers to purchase EVs. State lawmakers *blocked legislation*<sup>14</sup> that would allow EV makers to sell locally without going through a franchise dealer. Politically powerful auto dealers lobbied to kill the proposal. State lawmakers granted Tesla a waiver in 2015 letting it sell cars directly to consumers. In exchange, Tesla agreed to open no more than five stores in Georgia.

In 2015, Georgia lawmakers declined to renew a \$5,000 tax incentive for EV purchases and added a new \$214 yearly registration fee on top of the \$20 yearly fee assessed on gas vehicles. Lawmakers added the EV fee to make up for owners not paying gasoline fuel taxes.

Buying a new EV is a case study in delayed gratification. Used Teslas and Nissan Leafs are being offered for sale around metro Atlanta. But if you want a fresh one from the factory, the wait for the cheapest Tesla sedan can be up to 10 months. Consumers must wait weeks or months for other EVs, too.

Ultimately, if the potential Rivian manufacturing facility near Covington is to be successful, Georgia and the nation need to get things up to speed, said Miller, the automotive attorney.

"I don't know which comes first, more charging stations or more EV sales," she said. "But they both need to be moving forward and they need to be moving forward more quickly than they are."

#### *About the Author*

Andy Peters<sup>15</sup>

Andy Peters covers commercial real estate, economic development, banking and financial services.

SUBMITTED STATEMENT BY HON. ANTONIO DELGADO, A REPRESENTATIVE IN CONGRESS FROM NEW YORK; ON BEHALF OF AMERICAN PUBLIC POWER ASSOCIATION, *ET AL.*\*

#### **Introduction**

This statement is submitted on behalf of the American Public Power Association, the Edison Electric Institute, and the National Rural Electric Cooperative Association. Together, we represent the nation's investor-owned electric companies, public power utilities, and electric cooperatives.

Our members provide safe, reliable, and affordable energy to more than 300 million Americans. The electric power industry supports more than seven million American jobs and contributes \$880 billion annually to U.S. gross domestic product, about five percent of the total. Each year, our industry invests more than \$110 billion, on average, to make the energy grid stronger, smarter, cleaner, more dynamic, and more secure. These investments enable us to integrate more clean energy and new

<sup>14</sup><https://www.ajc.com/politics/georgia-would-offer-a-bounty-of-perks-for-rivian-project/OMRLP3ZLRVWDE66BSJTQQLDOA/>.

<sup>15</sup><https://www.ajc.com/staff/andy-peters/>.

\* American Public Power Association, Edison Electric Institute, National Rural Electric Cooperative Association.

technologies into our electric systems, including electric vehicles (EVs), to benefit customers.

### **Federal Investment in Electric Vehicle Charging Infrastructure and Supply Equipment Is Needed**

We write in support of Federal investment in EV charging infrastructure, which includes everything from installing the supply equipment (charging station) to performing any energy grid upgrades or modifications that may be needed. To help incorporate increased EV penetration on U.S. roads, it is important that we invest in and deploy more charging infrastructure. Building this infrastructure will require public-private partnerships, and our members are critical to that effort, in part because they employ a highly skilled workforce that builds and maintains the energy grid. A collaboration between the Federal Government and our sector will help to create additional jobs and will help spur economic growth.

Our members already are partnering with their customers to overcome barriers to deploying charging infrastructure. Some of our members own and operate EV charging stations in a variety of locations and for all types of EV customers, which is particularly beneficial to consumers who prefer not to procure and maintain charging infrastructure and seek a turnkey solution. Some of our members install the “make-ready” infrastructure that connects to the charging station, leaving it to the customer to own and maintain the charging station. And other members offer rebate programs to offset the costs to install charging infrastructure or partner with third parties to provide charging services. Regardless of the approach, each of these solutions is critical to building charging infrastructure that helps to spur the EV market and benefit communities.

Our members continue to work with local stakeholders and are best positioned to understand and maximize the value of different technologies and systems that can help optimize the operation of the grid, integrate EVs, and recover more quickly from natural disasters. This is particularly true in areas, including many rural communities, where private investment in EV charging stations historically has been lacking. It is important that all communities have access to the benefits of EVs, and our members are investing in underserved communities, in electrifying car-sharing and public transportation systems that serve those who do not own vehicles, in electrifying commercial vehicles such as delivery trucks that operate within neighborhoods, and assuring that Americans can charge their vehicles coast-to-coast in urban, suburban, and rural communities. Any Federal policy for EV infrastructure must maintain flexibility for states and localities to determine the most effective public-private partnership structure that meets their needs. We do not support efforts to restrict Federal program flexibilities and limit stakeholder participation.

### **Federal Investment Can Complement and Leverage Public-Private Partnerships**

Federal investment in charging infrastructure can leverage and amplify the progress that the nation’s investor-owned electric companies, public power utilities, and electric cooperatives are already making in deploying charging infrastructure. For example, some of our members launched a nationwide collaborative to help ensure the availability of EV charging for travel along major corridors by the end of 2023.<sup>1</sup> The Federal Government is a key partner in the development of a nationwide EV charging network and technical and financial assistance can help accelerate EV deployment by filling in gaps or providing cost-share to complement the efforts already underway. **We support efforts that would include financial assistance for EV supply equipment, including grid upgrades and modifications, as part of a larger effort to support EV infrastructure.**

In addition, electric transportation options are extending beyond light-duty vehicles, with many fleet operators looking to diversify their medium- and heavy-duty vehicle mix to include zero-emission options. Our members will be crucial partners in the building and maintaining of infrastructure—including charging depots—needed for an increasingly clean medium- and heavy-duty fleet market. We support Federal efforts to help address up-front costs for the deployment of these vehicles and necessary infrastructure as it nears commercial viability.

While our members are investing in electric vehicle infrastructure, additional information regarding when and where public charging stations will be needed, particularly in areas that have not yet seen significant saturation or rural areas that may serve to connect communities. Mapping this demand, based on data such as regional commute and travel patterns, can improve upon the investment decisions our members are making in charging infrastructure. **We support technical and**

<sup>1</sup> <https://www.eei.org/issuesandpolicy/Pages/NEHC.aspx>.

***financial assistance to help public and private entities, including utilities, map the demand for EV charging.***

#### **Conclusion**

Thank you for your consideration of these proposals. We look forward to working with you and to our continued partnership in advancing electric vehicle infrastructure.

#### **Organizations**

##### *The American Public Power Association*

The American Public Power Association is the voice of not-for-profit, community-owned utilities that power 2,000 towns and cities nationwide. We represent public power before the Federal Government to protect the interests of the more than 49 million people that public power utilities serve, and the 96,000 people they employ. Our association advocates and advises on electricity policy, technology, trends, training, and operations. Our members strengthen their communities by providing superior service, engaging citizens, and instilling pride in community-owned power.

##### *Edison Electric Institute*

The Edison Electric Institute (EEI) is the association that represents all U.S. investor-owned electric companies. Our members provide electricity for 220 million Americans and operate in all 50 states and the District of Columbia. As a whole, the electric power industry supports more than seven million jobs in communities across the United States. In addition to our U.S. members, EEI has more than 65 international electric companies as International Members, and hundreds of industry suppliers and related organizations as Associate Members.

##### *National Rural Electric Cooperative Association*

The National Rural Electric Cooperative Association (NRECA) represents more than 900 electric cooperatives. America's electric cooperatives are energy providers and engines of economic development for more than 20 million American homes, businesses, farms and schools across 48 states. Electric cooperatives play a vital role in transforming local communities.

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SUBMITTED ARTICLE BY HON. RODNEY DAVIS, A REPRESENTATIVE IN CONGRESS FROM ILLINOIS



[<https://www.reuters.com/business/energy/exclusive-biden-weighing-cuts-2022-ethanol-blending-mandate-proposal-sources-2022-01-12/>]

January 12, 2022 11:44 p.m. EST

Last Updated 7 days ago

Energy<sup>1</sup>

**Exclusive: Biden weighing cuts to 2022 ethanol blending mandate proposal**

By JARRETT RENSHAW and STEPHANIE KELLY

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<sup>1</sup><https://www.reuters.com/business/energy>.



An ethanol plant with its giant corn silos next to a cornfield in Windsor, Colorado July 7, 2006./File Photo.



Ethanol fuel is shown being pumped into a vehicle at a gas station selling alternative fuels in the town of Nevada, Iowa, December 6, 2007. *Reuters/* Jason Reed/File Photo.

Jan. 12 (*Reuters*)—The Biden Administration is considering lowering the 2022 ethanol blending mandate below the proposed 15 billion gallons amid backlash from

the oil refining lobby and unions arguing the shrinking U.S. ethanol industry can no longer support the target, according to two sources familiar with the Administration's thinking.

U.S. President Joe Biden vowed to bring some normalcy back to laws requiring refiners to blend biofuels like corn-based ethanol into the nation's gasoline pool after his predecessor, Donald Trump, took unprecedented steps to relieve refiners from the requirement.

But Biden is finding it difficult to live up to his promise. The COVID-19 pandemic has dampened fuel consumption and triggered a handful of ethanol plant shut-downs. Higher regulatory costs have refiners threatening to close refineries and shed high-paying union jobs.

In December, the Environmental Protection Agency issued a long-awaited biofuel blending mandate proposal that cut ethanol requirements for 2020 and 2021 but restored them to 15 billion gallons for 2022. Farmers and biofuel producers criticized the rollbacks but welcomed the restoration this year.

But, in recent weeks, Administration officials have considered rolling back the 15 billion gallon mandate when the final rule is issued later this year, the two sources told *Reuters*.

"EPA remains committed to the growth of biofuels in America," said Nick Conger, an EPA spokesperson. "We look forward to reviewing the robust comments that we receive from all stakeholders before finalizing our rulemaking later this year."

The Administration had initially planned to set the 2022 ethanol mandate at 14.1 billion gallons, *Reuters* previously reported,<sup>2</sup> but went with 15 billion gallons under pressure from Farm-Belt Democrats like Senator Tammy Duckworth of Illinois.

"The White House is caught between a rock and a hard place. On one hand, they want to support the agricultural and biofuel industry, but they have been bombarded by unions and refiners who say there's not enough ethanol and they are listening," said one of the sources familiar with the discussions.

Under the Renewable Fuel Standard, refiners must blend biofuels like ethanol into their fuel pool or buy tradable credits, known as RINs, from refiners who do. Merchant refiners like PBF Energy (*PBF.N*)<sup>3</sup> and Monroe Energy have long complained that the cost of purchasing RINs threatens their plants.

While cuts to the 2020 and 2021 ethanol mandate briefly lowered RIN costs, they have since rebounded. RINs are trading about 50% higher from the around 80¢ after the mandates were announced in December.

After *Reuters* reported the news on Wednesday, RIN prices fell about 6% to \$1.20 each. Margins to produce gasoline fell to an intraday low of \$17 per barrel, before recovering.

Mike Burnside, Policy Analyst at the American Fuel & Petrochemical Manufacturers, a leading refining trade group, told the EPA during a hearing on the blending mandate proposal that its 2022 targets are out of step with demand.

"EIA (the Energy Information Administration) projects that gasoline consumption in 2022 will be below 2019 demand, so it is unreasonable to propose 15 billion gallons for conventional biofuel in 2022 as if the pandemic never happened and we are back to normal," Burnside said.

### Ethanol Plants Shut

The U.S. ethanol industry has seen a number of facilities shut down in the last few years, and the industry had to deal with reduced fuel demand because of the coronavirus pandemic. There were 197 U.S. ethanol plants at the beginning of 2021, down from 201 a year earlier, EIA data showed.

Some ethanol companies have strayed from production of the corn-based fuel.

For instance, a company formerly known as Pacific Ethanol Inc said in 2020 it would change its name to reflect its focus on specialty alcohols used in beverages and sanitizers instead of fuel. It is now Alto Ingredients Inc. (*ALTO.O*).<sup>4</sup>

"I don't see anyone running to invest more," said Ed Hirs, who teaches energy economics at the University of Houston.

Still, the ethanol industry enjoyed higher margins and increased production in the later half of 2021.

In November, margins to produce ethanol in the Corn Belt increased to \$1.82 per gallon, the highest since 2014, Refinitiv Eikon data showed. They have since fallen to about 37¢ per gallon.

<sup>2</sup><https://www.reuters.com/business/energy/exclusive-us-epa-considering-cuts-biofuel-blending-obligations-2020-2021-2022-2021-09-22>.

<sup>3</sup><https://www.reuters.com/companies/PBF.N>.

<sup>4</sup><https://www.reuters.com/companies/ALTO.O>.

U.S. ethanol production in October rose to the most since 2017, according to the EIA.

“The Administration has indicated blending requirements will remain strong and at 15 billion gallons for 2022, and we have every expectation that they will deliver on that promise,” said Growth Energy Chief Executive Emily Skor, in response to the news on Wednesday.

*Reporting By Jarrett Renshaw and Stephanie Kelly, Editing by Chizu Nomiyama and Marguerita Choy*

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SUBMITTED BLOG BY HON. MICHELLE FISCHBACH, A REPRESENTATIVE IN CONGRESS FROM MINNESOTA



[<https://www.mnfarmliving.com/2021/08/electric-vehicles-mandate.html>]

### **Electric Vehicle Mandates Crafted in California Weren't Made for Minnesota's Farmers**

August 14, 2021 By *Wanda Patsche*<sup>1</sup>

As a rooster and a bull have completely different needs, so do the constituents of states across our country. Here in Minnesota, a place far different than California, we are fighting against a “one-size-fits-all” policy that will serve, when implemented, as a detriment to our agricultural community for decades to come. Electric vehicle mandates adversely affect the farming communities in Minnesota and I, as a lifelong Minnesota farmer, urge the state to reconsider this harmful mandate. At the upcoming annual Minnesota FarmFest in Redwood Falls, fellow farmers should raise awareness about this electric car mandate’s negative consequences on our community.

Government leaders at all levels have put an emphasis on our nation’s transition to electric vehicles. These politicians are positioning these policies as crucial, immediate steps that need to be taken to reduce carbon emissions from the transportation sector. From *President Biden’s \$170 billion dollar earmark*<sup>2</sup> in his infrastructure bill, to states like Minnesota and others across the country proposing mandates and additional subsidies for these vehicles and their infrastructure, the momentum is building. And while we all can agree a clean environment and less greenhouse gas emissions should be prioritized, government electric vehicle mandates are not the best path forward. The push to fully transition to EVs comes with serious drawbacks that would inherently limit consumer choice and burden consumers with higher costs—especially here in Minnesota.

If Governor Tim Walz’s Administration gets its way, unelected officials in California will control the future of automotive emissions policies in our state—not Minnesota’s elected leaders. The result? A stringent electric vehicle mandate that will harm our state’s farmers, automakers and dealers, consumers, energy suppliers, among other constituencies. Starting in 2024, Minnesota would be forced to require an ever-growing percentage of EVs and vehicle retailers would have to stock an arbitrary number of non-combustion vehicles whether consumers want them or not. This would not only raise the cost of vehicles for Minnesota families and businesses, it would hamstring farmers and rural populations by forcing vehicle choices that make little sense for them. As written, the proposal falls far short of sound policy and common sense.

As for the agricultural community and the biofuels industry in Minnesota, instituting California’s combustion engine vehicle ban would disproportionately harm these sectors. Minnesota is currently the fourth largest ethanol producer in the United States with over 1.3 billion gallons of ethanol produced annually from 18 ethanol plants. In Minnesota, here are roughly 19,000 full-time jobs, and millions in tax revenue that is supported by the ethanol industry alone. An *Agricultural Retailers Association study*<sup>3</sup> found that if Minnesota puts a ban on combustion-powered vehicles, total U.S. net farm income could decrease up to \$27 billion, and both corn and soybean prices would be nearly cut in half. These numbers speak louder

<sup>1</sup> <https://www.mnfarmliving.com/author/wpatschegmail-com>.

<sup>2</sup> <https://www.whitehouse.gov/briefing-room/legislation/2021/01/20/president-biden-announces-american-rescue-plan/>.

<sup>3</sup> <https://www.aradc.org/news/ag-biofuels-study>.



than any environmental opinion; Minnesota's agricultural community must be prioritized for the sake of our entire nation.

Beyond the economic harm, this bill could cause in the future, there have been further injurious effects that have already come from this issue. Governor Walz bypassed the State Senate by forcing through the mandate administrative sanction. Governor Walz neglected his own state legislature's input and is holding Minnesotans to standards set by the legislators of other, vastly different states. The democratic rights of Minnesota constituents have been not only ignored but completely circumvented in what is supposed to be a well-represented, legislative system.

While electric vehicles are more popular than ever, they still only makeup roughly 1.8% of the market<sup>4</sup> and are far less cost-effective than traditional, gas-powered vehicles. The mandate would force automakers to ship more zero-emissions vehicles to Minnesota, regardless of actual demand. Minnesota currently sees 2,000 electric vehicles sold per year, and under the new mandate, dealers would have more than 18,000 electric vehicles dropped annually onto their lots. Demand and infrastructure limitations in Minnesota currently cannot support such an artificially high supply. While the mandate's benefit to the environment is not clear, the harm caused to everyday Minnesotans will be heavily consequential.

The electricity used to power electric vehicles is a source for increased carbon emissions. In Minnesota about 31%<sup>5</sup> of utility-scale electricity generation still came from coal-fired electric power plants in 2019. Additionally, until batteries can be recycled, battery disposal will remain an issue similar to nuclear waste storage. This fact underscores the larger concerns surrounding electric vehicles and how they are not a silver bullet for addressing environmental challenges.

I have spent my entire life in southern Minnesota. If this mandate were to culminate in full effect, I would see our state undergo a change that will hurt my fellow farmers for decades to come. Government policies should work for all Minnesotans, while supporting consumer choice, instead of picking winners and losers. This mandate is not the answer to becoming more climate-friendly. Please rethink this mandate and its impact on the farming community. The Minnesota legislature should repeal the rule. To put it simply: please don't impose California values on my Minnesota.

*Note:* Blog post was published in *Redwood Falls Gazette* on August 2.

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SUPPLEMENTARY MATERIAL SUBMITTED BY HON. DAVID STRICKLAND, J.D., VICE PRESIDENT FOR GLOBAL REGULATORY AFFAIRS AND TRANSPORTATION TECHNOLOGY POLICY, GENERAL MOTORS

**Insert 1**

Mr. AUSTIN SCOTT of Georgia. And if I use a super charger to charge the vehicle, what does it cost me to charge it, approximately?

Mr. STRICKLAND. I have to get to you on that answer. Yes, sir, I don't know the exact answer to how much for a super charger, but I will certainly get back to you on the record.

Thank you for that question, Representative Scott. The cost of charging for an EV driver will vary depending on several factors, including the **amount** of charge (kilowatt-hours), **speed** of the charge (kilowatt), and the charging **network** setting the pricing. Fast charging a Bolt EV (from near 0 to 100% capacity) at a typical station today is estimated at approximately in the range of \$20-\$30, though pricing will vary by site and by state, as is true with gas stations. There are several key cost drivers behind the scenes affecting customer pricing and the overall charging business model, including but not limited to electricity rates. We are working with utilities and regulators to keep the cost of public charging low through better electricity rates as well as "vehicle-grid integration" programs that minimize grid impacts and maximize savings for all. We are also working with policymakers and industry leaders to improve the customer experience for fast charging, including more transparency on pricing and power levels.

**Insert 2**

Ms. SCHRIER. Topic with my limited time, Mr. Strickland. I am wondering since you are dealing with fleets of electric vehicles with FedEx, for example,

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<sup>4</sup> [https://news.ihsmarkit.com/prviewer/release\\_only/slug/bizwire-2021-2-19-electric-vehicle-share-in-the-us-reaches-record-levels-in-2020-according-to-ihsmarkit](https://news.ihsmarkit.com/prviewer/release_only/slug/bizwire-2021-2-19-electric-vehicle-share-in-the-us-reaches-record-levels-in-2020-according-to-ihsmarkit).

<sup>5</sup> <https://www.eia.gov/state/?sid=MN>.

is there a way to have the same kind of charging infrastructure that would apply to fleets of delivery vehicles and semi-trucks and buses?

Mr. STRICKLAND. Representative, I will certainly get back with my group of very talented engineers and planners. They are probably better positioned to answer that than I, but our work group—on our commercial vehicle side, thinking about how we can provide—

The CHAIRMAN. The time of the gentlelady has expired, but please do respond in writing to her inquiry.

Representative Schrier, thank you for that question. One of the objectives for charging infrastructure should be to develop a set of common standards that can meet the needs for all classes of vehicles. In the light duty space, the Society of Automotive Engineers (SAE) Standard J1772 already applies to Level 1 and Level 2 charging, and the SAE Combo Charging System (CCS) is the industry standard used by almost all manufacturers for fast charging in the U.S. We also use these standard interfaces currently for our medium-duty BrightDrop delivery vehicles which launched late last year.

The largest commercial trucks and buses (with larger battery capacities) may need access to higher power charging technologies depending on their routes and charging needs. There is an existing overhead pantograph charging system used by some buses today, and there are also efforts underway to develop a Megawatt Charging System to accommodate ultra-high power charging applications. Industry stakeholders continue to work on standardization to minimize the number of “plugs” and maximize interoperability.

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SUPPLEMENTARY MATERIAL SUBMITTED BY LINCOLN E. WOOD, ELECTRIFICATION  
POLICY MANAGER, SOUTHERN COMPANY

January 21, 2022

Hon. DAVID SCOTT,  
*Chairman,*  
Committee on Agriculture,  
U.S. House of Representatives,  
Washington, D.C.

Dear Chairman Scott:

On behalf of Southern Company, thanks to you, Ranking Member Thompson, and Members of the Committee for the opportunity to testify regarding electric vehicles (EVs) and their implications for rural and agriculture applications.

Following up from discussion during the hearing, I wanted to expand my remarks on grid readiness for electric vehicles. EV charging is not the only reason to upgrade the electric grid and expand capacity. As a vertically integrated utility, Southern Company’s electric subsidiaries regularly upgrade the transmission and distribution grid infrastructure to ensure we meet the commitment to our customers to provide clean, safe, reliable, and affordable electricity. Some examples of other grid upgrades include generation resources such as renewables, and upgrades to ensure the reliability and sufficient capacity to meet customer demand. For example, Georgia Power is beginning a \$1.3 billion grid investment plan to upgrade the Company’s electric grid in the following areas:

- (1) Adding automated line devices that isolate power outages to a smaller portion of the grid
- (2) Adding connections to nearby power lines, so there is an alternative source of power available
- (3) Relocating lines that are hard to access
- (4) Line strengthening where needed
- (5) Placing wires underground
- (6) Replacing wires and/or structures
- (7) Substation maintenance, including replacing equipment or completely rebuilding the substation as needed

Additionally, although the U.S. population is more familiar with our current petroleum fueling system, it is not without challenges during power outages. In fact, some of the same concerns expressed about electric vehicles are present in today’s fueling industry. When natural disasters cause power outages, all fueling infrastructure that has an electric component, such as gasoline pumps or compressed natural

gas, will also be unavailable. Similarly, natural disasters often create fuel shortages during mass evacuations and when pipeline flows are interrupted.


Switching from petroleum-based fuels to electricity is an industry disruption. Tremendous teamwork from all sides is necessary for a successful transition. Considering the central role utilities play in providing electricity to customers, it is critical to include them early in the conversation. Southern Company welcomes the opportunity to partner with all players in the transportation ecosystem in providing EV charging wherever it is needed.

The cost of EV charging is another key element of the transition to an electrified transportation future. According to *energy.gov*,<sup>1</sup> the U.S. average price per gallon of gas is \$2.85 as of January 18, 2022. Similarly, the average equivalent of EV charging, the ‘eGallon’, is \$1.16. In general, driving an EV costs half as much as a similar gasoline-fueled vehicle. Coupled with reduced maintenance needs—no oil changes or tune ups, and reduced frequency of brake service due to electric regenerative braking, electric vehicles represent a compelling value proposition for drivers of all types.

Finally, I have included additional information on eMobility efforts at the University of Georgia and the University of Alabama. Southern Company is committed to preparing the next generation of workers for electrification technologies and is sponsoring eMobility activities at both institutions.

Should the Committee have further questions, or if Southern Company can be a resource to the Committee, it would be our pleasure to serve.

Sincerely,



LINCOLN E. WOOD.

ATTACHMENT 1



## UGA TODAY

TODAY'S TOP NEWS FROM THE UNIVERSITY OF GEORGIA

[<https://news.uga.edu/electric-mobility-initiative-taps-into-evolving-tech-field/>]

Campus News<sup>1</sup> • Science & Technology<sup>2</sup>

### Electric Mobility Initiative taps into evolving tech field

6 days ago [January 19, 2022]

By Rod Guajardo<sup>3</sup>

<sup>1</sup>eGallon: What It Is and Why It's Important, (<https://www.energy.gov/articles/egallon-what-it-and-why-it-s-important>) Department of Energy.

<sup>1</sup><https://news.uga.edu/topics/campus/>.

<sup>2</sup><https://news.uga.edu/topics/science-technology/>.

<sup>3</sup><https://news.uga.edu/author/rg16532/>.



*Campus-wide effort will develop applications within electric transportation*

**With the goal of enhancing research, education and outreach opportunities** in a rapidly developing technological field, the University of Georgia has established a campus-wide Electric Mobility Initiative that will provide seed funding for new projects and bring together thought leaders to discuss innovative approaches to electric mobility across Georgia and the region.

Electric mobility refers to vehicles like cars, trucks, bicycles, boats and aircraft that use electric powertrain technologies for propulsion. The field of electric mobility has grown significantly in recent years with the development of smart infrastructure, wireless communications, and most importantly, efficient energy storage technology such as high-capacity batteries. These developments have converged to make electric mobility competitive with vehicles powered by internal combustion engines.

“We’re pleased to announce that the University of Georgia will be leading this comprehensive Electric Mobility Initiative in an effort to understand the wide range of impacts associated with the electrification of transportation infrastructure,” said S. Jack Hu, the university’s senior vice president for academic affairs and provost. “This initiative will span our entire campus and allow for all academic units to contribute to this exciting, developing tech space.”

Initial partners in the UGA Electric Mobility Initiative include faculty, staff and students from the College of Engineering, the School of Public and International Affairs, the Carl Vinson Institute of Government and the Terry College of Business.

- The College of Engineering will assess the opportunities and challenges associated with advanced electric energy technology, smart infrastructure and interconnected communications on the integrated transportation network.
- The School of Public and International Affairs will explore energy security, regulatory and public financing facets of electric mobility.
- The Terry College of Business will examine the economic, human and natural capital impact of scaling electric mobility and its effects on sustainable development goals.
- The Vinson Institute will use its extensive statewide network to understand how electric vehicle technology will impact communities in Georgia and enhance the economic competitiveness of the state.

These initiatives will seed other efforts on campus that leverage the comprehensive land-grant mission of UGA, while also seeking to partner with industry throughout the state.

“The potential applications of this developing technology are endless and could greatly impact communities across the state of Georgia in so many ways,” said Jennifer Frum, vice president for UGA Public Service and Outreach. “Electric mobility

technology will play an important role in the state and nation going forward, and UGA's involvement is a testament toward our ongoing goal to connect the university's expertise with communities and partners across the state."

UGA will invest \$1 million in seed funding over the next 5 years to initiate new projects, including the development of educational programs such as the E-Mobility Certificate and research activities in battery re-use and recycling, including the creation of a laboratory that will be housed in the new Interdisciplinary STEM Research Complex. Private support has already been obtained for faculty development, student projects and efforts to enhance the health and resilience of vulnerable communities.

An Electric Mobility Summit is planned April 28–29 on the UGA campus in Athens to bring together industry, educational institutions and government agencies to assess the state of electric mobility in Georgia and the region. Participants will discuss existing and future education programs to support workforce development and assess the economic impact of future electric transportation technologies in communities across Georgia.

## ATTACHMENT 2



Mercedes-Benz

[Press Release]

**University of Alabama Teams with Alabama Power, Mercedes-Benz U.S. International for Mobility and Power Center**

**Press Information**

Contact	Telephone
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Adam Jones (UA)	+1 205 348 4328

Date: November 9, 2021

**Tuscaloosa, Ala.**—A strong partnership between The University of Alabama, Alabama Power Company and Mercedes-Benz U.S. International, Inc. fuels a newly-formed research and workforce development center designed to meet the needs of the booming electric vehicle market.

The Board of Trustees of The University of Alabama recently approved forming the Alabama Mobility and Power Center to be a world-class research and development hub for creating and sustaining modern mobility and power technologies, developing charging infrastructure and managing power delivery to support large-scale growth in electric vehicles.

"This partnership in the areas of mobility and power technologies is a chance for the talented researchers at the University to support prominent industries in our state while growing opportunities for our students to apply their skills here after graduation," said UA President Stuart R. Bell. "We are grateful for how both these companies support the University's mission."

There is a substantial automotive industry ecosystem within the state with a corresponding commitment to electrification. Alabama is third in the nation for auto exports, with \$7.5 billion in Alabama-made vehicles and parts exported in 2018. MBUSI is undergoing a \$1 billion expansion to support electric vehicle production, and other auto manufacturers in the state are embracing this technology, as well.

"Mercedes-Benz is getting ready to go all electric by the end of the decade, where market conditions allow and we are moving swiftly toward an emissions-free and software-driven future," said Michael Goebel, President and CEO of Mercedes-Benz U.S. International, Inc. "Our location here in Alabama is among the Mercedes-Benz locations on three continents that next year will build electric vehicles and highly efficient battery systems. Our partnership with the University of Alabama and Alabama Power through the AMP Center is a collaboration that will help position Alabama to be a leader in electric vehicle innovation."

A critical mass of faculty and staff experts will be built at UA to support both private and government investment on new battery technologies and secure an efficient infrastructure to charge electric vehicles. The AMP Center will be organized

under the Alabama Transportation Institute at UA and housed in the recently approved *Smart Communities and Innovation Building*.<sup>1</sup>

“High-quality jobs are the key to helping Alabamians live better lives, and this targeted research center, focused on solving challenges and capitalizing on the opportunities facing our state’s automotive industry, is essential to driving our state’s economic growth,” said Tony Smoke, senior vice president for marketing and economic development for Alabama Power.

MBUSI and Alabama Power are each supporting the AMP Center with in-kind support as well as personnel support and employee consultation to enhance projects.

The partnership will benefit students through expanded mentoring, intern and career possibilities while providing opportunities for these students to participate in world-class research that is on the cutting edge of industry. These activities will lead to the development of the mobility and power workforce and create future leaders in the electrification of the transportation network.

“This partnership will be a nationwide leader in mobility and powered research that aims to tackle relevant challenges faced by industry and infuse a highly skilled and educated workforce into the state as a boost to Alabama’s economy,” said Dr. Russell J. Mumper, UA vice president for research and economic development.

Four themes of the AMP Center at UA include:

- Preparing the electric vehicle workforce
- Driving collaborations between industry and UA
- Creating innovations in battery manufacturing and use
- Developing effective and sustainable vehicle charge infrastructure

Partnerships will be developed between UA and other auto manufacturers in the state that could benefit from the expertise and workforce developed at UA. As part of the agreement, UA will establish a national training center for students, state and local officials, and the electric vehicle workforce.

“Alabama has the potential to be among the nation’s leaders in transportation electrification—if we have adequate skilled workforce and a commitment to leadership in electric vehicle and supporting power grid technologies,” said Dan Blakley, associate vice president for economic and business engagement. “The AMP provides a great opportunity for a strong coalition of partners to address innovation, workforce development and commercialization in mobility and power research.”

**For more details about Alabama Mobility and Power Center, visit:**  
*Amp.ua.edu.*

ATTACHMENT 3



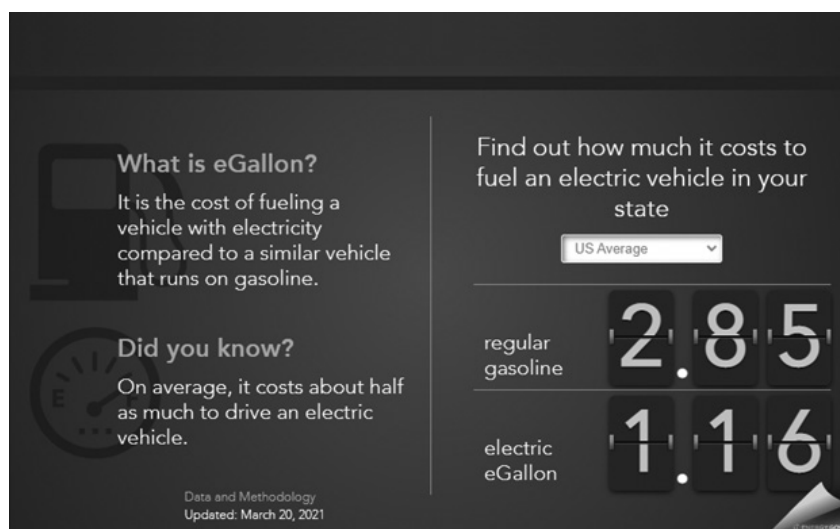
[<https://www.energy.gov/articles/egallon-what-it-and-why-it-s-important>]

**eGallon: What It Is and Why It’s Important**

June 11, 2013

*Energy.gov*

<sup>1</sup><https://news.ua.edu/2021/07/transformation-ua-alabama-power-mercedes-initiative-moving-forward-with-state-support/>.

**eGallon: Compare the costs of driving with electricity**

**Editor's note:** this is an interactive graphic with a drop-down selection menu. The graphic's Data and Methodology was updated March 20, 2021. An animation capturing the comparisons is retained in Committee file.

The eGallon price is calculated using the most recently available state by state residential electricity prices. The state gasoline price above is either the statewide average retail price or a multi-state regional average price reported by EIA. The latest gasoline pricing data is available on EIA's webpage. Find out more at [www.energy.gov/eGallon](http://www.energy.gov/eGallon).

For most drivers, a trip to the fuel pump is an easy reminder of the day-to-day cost of gasoline or diesel. But for electric vehicle (EV) drivers, who typically charge their car at home, there isn't a similar measurement to determine the cost of driving on electricity. To help both current and potential EV drivers better understand the cost of driving an EV, the Energy Department created the *eGallon*.<sup>1</sup>

**What is the eGallon?**

The eGallon represents the cost of fueling a vehicle with electricity compared to a similar vehicle that runs on gasoline. For example, if gasoline costs \$3.60 a gallon in your state and the eGallon price for your state is \$1.20, that means that for \$1.20 worth of electricity you can drive the same distance as you would for \$3.60 worth of gasoline.

**How is eGallon calculated?**

To determine the eGallon price for each state, the Department of Energy calculates how much electricity the most popular electric vehicles would require to travel the same distance as similar models of gasoline-fueled vehicles would travel on a gallon of gasoline. That amount of electricity is then multiplied by the average cost of electricity for the state. This gives consumers a clear comparison of the cost of driving on electricity vs. a similar sized car that uses gasoline.

For more on how eGallon is calculated, download the eGallon methodology.

**Why do gasoline prices swing so wildly? Does the same thing happen with eGallon prices?**

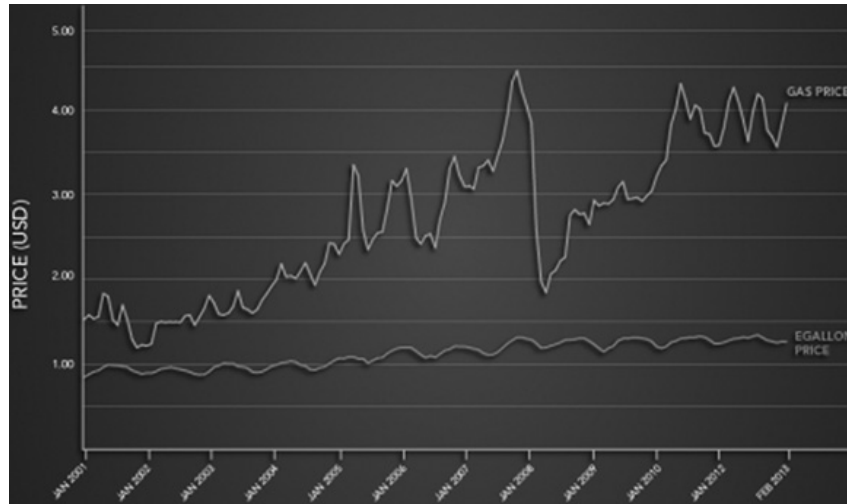
Gasoline prices are tied to the global oil market, which is driven by international events that are difficult to predict, control or prepare for. Unrest in an oil producing country on the other side of the world can drive up the price of gasoline in your neighborhood, seemingly overnight.

In contrast, the price of electricity is determined by local markets or state utility commissions. This means that electricity prices tend to be very stable over time-creating a lot less uncertainty about fuel costs for an electric vehicle. The chart below

<sup>1</sup> <https://www.energy.gov/articles/egallon-how-much-cheaper-it-drive-electricity>.

shows how the prices of gasoline (the green line) and electricity (the blue line) have fluctuated over the past 10 years.

*Gasoline vs. eGallon Prices, 2001–Present*



**Editor's note:** the chart is not present on the DOE's website as there is a html coding error. The chart is posted on the EV News Report site: <https://evnewsreport.com/ev-fuel-savings-by-state-doe/>.

*Why does the price of an eGallon vary by state?*

Just like the price of gasoline, the average electricity price is different for each state. Electricity is generally produced close to its customer base, and different regions have different regulations and resources (*e.g.*, coal, natural gas, wind, *etc.*) that affect the cost of electricity production. Traditionally, the cheapest way to produce electricity is through “mass production”—at a large scale. So each region may have only one electricity company. Local governments work with this company to set a price for electricity that is reasonable for consumers. In many places across the U.S., electricity prices are set by regulators, not the market.

*How does “off-peak” charging affect the eGallon price?*

In some places consumers are charged “off-peak” rates for fueling their electric vehicles at night when electricity demand is low. This “off-peak” electricity rate leads to even bigger cost savings for driving on electricity. The eGallon is based on the average cost of electricity for residential consumers.

*Why do we need eGallon?*

The cost of driving an EV depends on the cost of electricity, which is measured in kilowatt hours. Yet, when consumers think of the cost of driving, it is usually determined by the price of a gallon of fuel. The eGallon provides a metric that is easily comparable to the traditional gallon of unleaded fuel—the dominant fuel choice for vehicles in the U.S.

*How is eGallon related to the EPA's MPGe rating?*

eGallon and MPGe are not related. eGallon is a measurement of the cost to drive a comparable vehicle the same distance you could go on a gallon of gasoline. MPGe is a measurement of how efficiently a vehicle uses energy based on the number of British Thermal Units (BTUs) in the fuel.

*How often is the eGallon price updated? What about the gasoline prices listed with eGallon?*

*Energy.gov* will release the state and national averages for eGallon in coordination with the Energy Information Administration's (EIA) monthly reports on electricity prices. The eGallon price is calculated using the most recently available state-by-state residential electricity prices. The state gasoline price above is either the state-



wide average retail price or a multi-state regional average price reported by EIA. The *latest gasoline pricing data*<sup>2</sup> is available on EIA's webpage.

**More on eGallon:** Read the *eGallon blog post*.<sup>3</sup>  
Download the *eGallon Methodology*<sup>4</sup> to learn how it is calculated.

SUPPLEMENTARY MATERIAL SUBMITTED BY TREVOR WALTER, VICE PRESIDENT OF PETROLEUM SUPPLY MANAGEMENT, SHEETZ, INC., ALTOONA, PA; ON BEHALF OF NATIONAL ASSOCIATION OF CONVENIENCE STORES

#### Insert 1

Mr. THOMPSON. Very good. My next question is for Mr. Walter.

First of all, Mr. Walter, I can't tell you how happy I and pleased I am to have a fellow Bellefonte area alumnus testifying today, and also, congratulations on your career. I want to thank you for your testimony.

You closed your written testimony by noting something I think is important. "Any alternative, including electricity, should be offered in an open competitive market that gives American consumers the fullest economic benefits or robust price competition. This has worked well for consumers for nearly 100 years with liquid fuels, because the markets had a business case to invest to meet consumer needs." So, why is it so important that any new motor vehicle fuel, and indeed, any engine technology, was subject to the pressures of an open and competitive market?

Mr. WALTER. Thank you, Ranking Member Thompson.

And open market provides the lowest cost to consumers. Any time markets operate with opaqueness, it typically creates higher costs for consumers across the board, and the traditional fuel market today is an open, highly competitive marketplace with many competing factors, not only from the sale at retail for physical fuels, but also in various geographic pockets there is high competition amongst wholesalers of traditional fuels.

In today's world, there is a tremendous amount of opaqueness that exists around EV charging costs. Some will highlight, like Mr. Wood highlighted, that he paid zero for charging and first, I just want to say thank you to Lincoln for stopping at Sheetz on his path. But I mean, that cost in the future will be higher for EV vehicles, and I think a lot of people today are not working on—

The CHAIRMAN. The gentleman's time has expired. The witness may provide an answer in writing. Thank you.

Producing energy costs money. And, all of it, even renewable energy, results in carbon emissions. That is certainly true for the production of electricity. To incentivize the behaviors we want, we need to keep those things in mind. We need free market mechanisms to allow businesses to recover the costs of producing and delivering all forms of energy and to have the chance to make a profit doing it. If that doesn't happen, we will never be able to make and sustain the investments we need to give people access to that energy. That is why we need to ensure there is an open and competitive market. Without it, the supply of and demand for the energy we need will never match. We need to ensure peoples' energy needs are met—both for the health of our economy and for the health of our environment.

#### Insert 2

Mrs. BUSTOS. . . .

But can you talk about how a new era of low carbon, high octane liquid fuels in the Next Generation Fuels Act specifically would impact your businesses and your members as we continue to transition to electric vehicles? And why don't we start with Mr. Strickland, and then go to Nassar, Cooper, Walter, whatever you have to add on that, please.

\* \* \* \* \*

Mrs. BUSTOS. All right. Mr. Walter, I would love to have chime in, but I think we are out of time, and we will hear from you. We will hear from you at another time.

Thank you very much, Mr. Chairman, and I yield back

We see promise in the idea that advances in liquid fuels can improve the emissions of internal combustion engines. Of course, we need to be sure that policy does

<sup>2</sup> [http://www.eia.gov/dnav/pet/pet\\_pri\\_gnd\\_a\\_epmr\\_pte\\_dpgal\\_w.htm](http://www.eia.gov/dnav/pet/pet_pri_gnd_a_epmr_pte_dpgal_w.htm).

<sup>3</sup> <https://www.energy.gov/articles/egallon-how-much-cheaper-it-drive-electricity>.

<sup>4</sup> <https://www.energy.gov/downloads/egallon-methodology>.

not send a market signal that those engines and liquid fuels will be regulated out of existence. If we do that, we remove any incentives for new innovations in those products that could improve emissions. That will hurt, not help, emissions and climate change. We need to push for continued innovation across all energy sources and engine types rather than picking technology winners and losers.

**Insert 3**

Mr. BAIRD. Well, thank you very much.

Mr. Walter, would you care to elaborate in terms of the company you work for, as well as the association you work for, and how the biofuels impact your industry?

Mr. WALTER. Yes. So, the c-store industry operates 120,000 locations offering motor fuels, but specifically, the environmental savings have been highlighted by Mr. Cooper. But in terms of Sheetz, since 2019, E15 sales have grown 92 percent, and since 2017, they have grown 300 percent. And that is really off the backdrop that ethanol is able to be procured cheaper than gasoline, and we are able—

The CHAIRMAN. The time of the gentleman has expired, but you may provide an answer in writing. Thank you.

I would just add that biofuels are an essential part of the fuels market and provide benefits not only to that market but to the emissions picture relating to fuels. We need to consider that when looking at policy choices relating to the internal combustion engine and electric vehicles. Specifically, we should be sure to provide room in the policy equation for continued advances that improve the emissions picture for engines that use biofuels and other liquid fuels.

**Insert 4**

Mr. BISHOP. . . .

With fuel retailers being such an essential piece of the puzzle to help increase the adoption of electric vehicles, let me ask you if you can give us a sense of the size of your industry, how many charging stations your industry might have the capacity to provide if the right incentives were there, and could you just touch a little bit more on how we can incentivize the fuel retailers and the convenience stores to invest in new technology, and how we ensure that those incentives are flow to our rural communities?

Mr. WALTER. Thank you, Congressman.

As I mentioned before, we have 150,000 constituents and 120,000 of them selling motor fuels today. I don't have the exact count of how many offer EV chargers to date, but I can tell you at Sheetz specifically, we have 78 locations that offer EV charging, which represents around 12 percent of our overall store portfolio. And what we really need is a clear economics around what it takes to provide energy to consumers through their ability to charge and them to have a guaranteed rate of what they will be charged at a convenience store like ours.

If you look across the platform for our industry, there are widespread prices on the pylon that clearly tell you and state what the price of fuel is on any given day. That does not exist today for EV charging, and while we note that the growth of—

The CHAIRMAN. The time of the gentleman has expired, unfortunately, but please respond in writing to Mr. Bishop. Thank you.

The bottom line is that, if there is a business case for providing EV charging, our industry can supply all of the needs that we have—now and in the future—for that charging. The key is ensuring there is a free market and making sure that anachronisms of the local regulated monopolies on the sale of electricity, including things like demand charges, do not undercut that free market.

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SUPPLEMENTARY MATERIAL SUBMITTED BY JOSH NASSAR, LEGISLATIVE DIRECTOR, INTERNATIONAL UNION, UNITED AUTOMOBILE, AEROSPACE AND AGRICULTURAL IMPLEMENT WORKERS OF AMERICA

**Insert**

Mr. RUSH. . . .

All right. Mr. Nassar, what percentage of electric vehicles are currently being manufactured by union workers?

Mr. NASSAR. I don't know the exact percentage of, but I can tell you, in addition to the vetting models that were talked about by Mr. Strickland, Ford and—

The CHAIRMAN. Unfortunately, the gentleman's time has expired. We have many that want to ask their questions. The witness may provide an answer in writing. Thank you.

Thank you for the question. We are proud to already be building the vehicles of the future. UAW members are building advanced technology vehicles and their components for a variety of applications and powertrain types—including hybrids, plug-in hybrids, battery electric vehicles, and increasingly efficient gasoline vehicles.

UAW-made plug-in hybrids (PHEV) and full electric vehicles (BEV) include the BEV CUV Chevy Bolt, Chevy Bolt EUV, and Cruise Autonomous Vehicle (Orion, MI), BEV GMC Hummer pickup (Detroit, MI), PHEV Jeep Wrangler SUV (Toledo, OH), PHEV Lincoln Aviator SUV (Chicago, IL) and PHEV Ford Escape & Lincoln Corsair CUVs (Louisville, KY). In addition to passenger vehicles, UAW members are building electric and plug-in hybrid vehicles for commercial and heavy-duty applications, such as the BEV Ford E-Transit commercial van (Kansas City, MO), BEV Thomas Built Saf-T-Liner C2 Jouley school bus (High Point, NC), BEV Volvo VNR Class 8 truck (Dublin, VA), and the BEV Mack LR refuse truck (Macungie, PA).

In addition to current vehicles, UAW employers have announced ambitious product plans for plug-in vehicles across various segment. Publicly announced production plans include the BEV F-150 Lightning pickup (Dearborn, MI),<sup>1</sup>\* BEV Cadillac Lyriq CUV (Spring Hill, TN),<sup>2</sup> BEV GMC Hummer SUV (Detroit, MI),<sup>3</sup> BEV Chevy Silverado pickup (Detroit & Orion, MI),<sup>4</sup> BEV GMC Sierra pickup (Orion, MI),<sup>5</sup> BEV Cruise Origin autonomous shuttle (Detroit, MI),<sup>6</sup> and the PHEV Grand Cherokee SUV (Detroit, MI).<sup>7</sup>

UAW members continue to work on cutting edge technology. Besides publicly announced production plans, automakers and heavy-duty truck manufacturers have a deep pipeline of BEV and PHEV vehicles under development, with production locations yet to be announced. With major future investments at stake, it is crucial that we have policies that promote the domestic production of advanced technology vehicles. The UAW will continue to work with policymakers and major manufacturers to secure future quality jobs for American workers.

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SUPPLEMENTARY MATERIAL SUBMITTED BY MARK P. MILLS, SENIOR FELLOW,  
MANHATTAN INSTITUTE

#### Insert

Mrs. MILLER. . . .

And with that, I have a question for Mr. Mills. Mr. Mills, rare earth elements are considered critical to modern batteries and electronics, yet United States is almost wholly dependent on China to supply our factories with these critical minerals. Just a few years ago, there was a real palpable concern that China would use its control of rare earth element production to further its geopolitical aims by restricting the export to the United States. If that happens, how would we build batteries, solar cells, wind turbines, and all the other tools of modern life? So, is rare earth mining more environmentally damaging than mining for other materials?

The CHAIRMAN. Does the gentlelady yield back?

Mrs. MILLER. Well, did Mr. Mills—could he answer my question?

The CHAIRMAN. Oh, Mr. Mills, did you hear the question?

Mrs. MILLER. Maybe I ran into it too fast.

The CLERK. Mr. Mills is no longer on camera.

The CHAIRMAN. Mr. Mills, you may want to un-mute.

The CLERK. Ask if there is anybody on the panel that would like to address the question.

The CHAIRMAN. Is there anybody on the panel that might want to pitch in?

<sup>1</sup> <https://media.ford.com/content/fordmedia/fna/us/en/news/2022/01/04/ford-planning-to-nearly-double-all-electric-f-150-lightning-production-150000-units.html>.†

\* **Editor's note:** footnotes annotated with † are retained in Committee file.

<sup>2</sup> <https://media.gm.com/media/us/en/gm/news.detail.html/content/Pages/news/us/en/2020/oct/1020-event.html>.†

<sup>3</sup> <https://www.gm.com/stories/factory-zero-supertruck-hummer-detroit>.†

<sup>4</sup> <https://media.gm.com/media/us/en/gm/news.detail.html/content/Pages/news/us/en/2021/apr/0406-factory0.html>,† <https://investor.gm.com/news-releases/news-release-details/gm-accelerates-its-drive-lead-ev-industry-7-billion-investment>.†

<sup>5</sup> <https://investor.gm.com/news-releases/news-release-details/gm-accelerates-its-drive-lead-ev-industry-7-billion-investment>.†

<sup>6</sup> <https://www.gm.com/stories/factory-zero-first-dedicated-ev-plant>.†

<sup>7</sup> <https://media.stellantisnorthamerica.com/newsrelease.do?id=23497&mid=1>.†

Well, thank you, gentlelady. You have 2 minutes remaining. Do you yield back?

Mrs. MILLER. Does Mr. Mills not want to answer that question?

The CHAIRMAN. We have not been able to locate him on the panel.

The United States is profoundly dependent on imports for not only rare earths, but all manner of minerals. As the USGS reports, the United States today *is dependent on imports*<sup>1\*</sup> for 100% of some 17 critical minerals, and for 28 others net imports account for more than half of existing domestic demand. For many tech (and military) products that require those minerals, whether the products are purchased, or even assembled, in the United States—from smartphones to electric car batteries—the fact is the critical supply chains entail off-shoring of most mining, and in particular most of the related mineral processing. China, for example, refines the majority of the world's cobalt that is, mainly, mined elsewhere. While Congress, and many Administrations, have over many decades episodically studied mineral dependencies, relatively little action has been taken to encourage—rather than discourage—domestic mining and processing. In fact, in February this year, the Biden Administration canceled a long-sought permit to open a new copper and nickel mine in Minnesota. While neither of those are “rare” elements, both are essential for building electric vehicles and much else. Rare earths are, for the record, not physically “rare,” rather those elements possess “rare” properties that are very valuable for high-tech products. The United States has extensive rare earth resources. And the mining of rare earths is itself is not more environmentally challenging than mining for other minerals. However, the environmental challenges (which modern industry can easily meet) are associated with the subsequent, essential, chemical processes needed to separate and [refine] the rare earths from the ore.

SUBMITTED LETTER BY KURT KOVARIK, VICE PRESIDENT, FEDERAL AFFAIRS,  
NATIONAL BIODIESEL BOARD

Dear Chairman Scott, Ranking Member Thompson, and Honorable Committee Members,

Thank you for considering the testimony of America's clean fuel producers, who play a pivotal role in supporting the rural economy and meeting the nation's environmental goals in many of the hardest-to-decarbonize transportation and industrial sectors.

The National Biodiesel Board (NBB)—soon to become Clean Fuels Alliance America—represents the cleanest, lowest carbon fuels available for use today at a commercial scale. Our members include biodiesel, renewable diesel, Bioheat® fuel, and sustainable aviation fuel (SAF) producers as well as soybean growers and waste fats and oil processors. NBB is the industry's central coordinating entity for technical, environmental, and quality assurance programs and the strongest voice for its advocacy, communications, and market development.

These fuels are better, cleaner and widely available now to achieve reductions in the nation's carbon emissions—which showed a 6% increase in 2021. Reducing carbon emissions today is crucial to turn the trajectory of global climate change. Reductions today are far more valuable even than greater reductions in the future. America can rely on the clean fuels industry now and in the future to achieve these reductions. Congress should ensure that there are equivalent, stable and forward-looking investments in clean fuels development, infrastructure and market expansion alongside EVs.

#### **Jobs and Economic Growth**

The U.S. transportation market today uses more than 3 billion gallons of these clean fuels—which supports more than 65,000 jobs across the country and generates more than \$17 billion in economic opportunity. Our industry includes many small biodiesel producers in addition to large, integrated companies. In many rural areas of the country, small biodiesel plants are a driving force of the local economy, supporting the employment of plant operators, technicians and engineers as well as local construction workers, truck drivers and farmers.

According to a November 2021 report, *Union Jobs in Ethanol & Biodiesel Industries: An American Success Story*, more than 30,000 union members are working directly for, and in supplier industries to, the ethanol and biodiesel industries. “Per-

<sup>1</sup> <https://pubs.usgs.gov/periodicals/mcs2020/mcs2020.pdf>.

\* **Editor's note:** the report entitled, *Mineral Commodity Summaries 2020*, is retained in Committee file.

haps most striking is that union gains are found in farm country and among agricultural workers, both areas where union membership has historically lagged,” the authors state. The Energy Futures Initiative found a union density rate of seven percent in the ethanol and biodiesel industries in 2019, above the estimated national workforce average of six percent.

Our industry is on a path to sustainably grow domestic production to 6 billion gallons annually by the end of this decade. Every 100 million gallon increase in U.S. production supports an additional 3,200 jobs and \$780 million in economic activity—not just in rural communities, but across the country—and can eliminate an additional metric ton of greenhouse gas emissions each year.

The economic opportunities demonstrate biodiesel’s, farmers’, and rural communities’ potential to contribute to meeting the nation’s climate goals. With advancements in feedstock, the market can reach 15 billion gallons by 2050. The United States will need these fuels in the future to meet the nation’s clean air, energy, and agriculture goals.

The House Climate Crisis Select Committee’s report, *Solving the Climate Crisis*, found, “For heavy-duty freight trucks, technology options like electrification may not be available in the short or medium term, given the need to carry weight and travel longer distances.”

#### **Value Added to the Ag Economy**

Our industry’s clean fuels are made from an increasingly diverse mix of resources, including recycled cooking oil and animal fats as well as surplus soybean, canola and distillers corn oils. Our fuels add value to fats, oils and greases that might otherwise be treated as waste or as a cost for other industries.

For example, soybean oil is separated from soybean meal through oilseed crushing. Demand for the meal as a high protein animal feed has been the traditional driver of soybean production, which reached 4.4 billion bushels in the 2020–21 marketing year. This growth created an ever-increasing surplus of oil.

About 60 percent of the separated oil is currently used in U.S. food production, with some additional exports. However, the volume of oil for food and exports has been stable over the past decade without any growth. Growth in biodiesel and renewable diesel production has always absorbed the surplus of soybean oil and is now providing market signals to increase domestic production and capture more value. Approximately half of the biodiesel produced in the U.S. comes from soybean oil.

Traditionally, roughly half of all U.S.-grown soybeans have been exported each year—and crushed overseas—to meet animal feed demand. Instability in these markets—including trade wars—combined with growing markets for renewable fuels in the United States are encouraging investment in more U.S. crush capacity to keep the value of soybean oil here at home. Domestic soybean crushing is projected to expand by 13%—increasing processing by 350 million bushels—in the next few years to match growth in the clean fuels sector. The increased production will support food and animal feed demand along with 500 million additional gallons of clean fuels.

StoneX estimates that without biodiesel and renewable diesel production, the value of every bushel of soybeans grown in the United States could fall as much as 13 percent. The bottom line is that farmers receive better value for their soybeans thanks to their partnerships with biodiesel and renewable diesel producers.

Rural livestock producers also benefit from increased biodiesel production. By boosting the value of surplus soybean oil—which would otherwise represent a loss to crushers—biodiesel production provides a counterweight to the price of soybean meal and the cost of raising poultry and livestock. As more surplus soybean oil is processed for biodiesel production, farmers can grow and crushers can process more soybean meal for animal feed at a lower price. Informa Economics has estimated livestock producers pay \$21 per ton less for soybean meal due to increased biodiesel production and use.

Approximately  $\frac{1}{4}$  of all animal fats produced in the U.S. now go into biodiesel. Higher demand has led to increased value for those fats.

#### **Environmental Health Contributions**

Clean fuel use lowers the impacts and costs of carbon and particulate emissions. Biodiesel and renewable diesel reduce greenhouse gas emissions on average by 74% compared to petroleum diesel, according to the newest Argonne National Labs data. In difficult-to-decarbonize transportation applications—the majority of diesel end uses—these clean fuels immediately and substantially reduce greenhouse gas emissions. Additionally, they significantly reduce criteria pollutants from diesel transpor-

tation and other end uses, which can have direct benefits for both rural and urban communities.

Biodiesel and renewable diesel have reduced U.S. emissions by 143.8 million metric tons since 2010, when the Renewable Fuel Standard first included biomass-based diesel obligations. These fuels have also made significant contributions to the carbon reduction goals of many states. For instance, California's total biodiesel and renewable diesel volume grew to 855 million gallons in 2020, meeting nearly 24% of the state's total diesel demand for the year. These fuels have reduced the state's greenhouse gas emissions by 32.3 million metric tons since 2011.

In the Northeast, biodiesel and Bioheat® fuel will be required to meet the states' carbon reduction goals. Currently, one in five existing homes in the Northeast (around 4.5 million) rely on oilheat, using more than 2.3 billion gallons yearly. The region's biodiesel and Bioheat® fuel use annually avoids more than 1.5 million tons of CO<sub>2</sub> emissions, equivalent to removing 320,000 vehicles from the road or the emissions from annual energy use by 180,000 homes. New York, Connecticut and Rhode Island this year adopted goals to increase use of Bioheat® fuel.

In addition to having one of the lowest carbon intensities of any liquid fuel, biodiesel also significantly reduces criteria pollutants from diesel transportation and other end-uses. Major trucking corridors, warehouse distribution centers and other diesel hot spots close to population centers can inflict serious harms to human health and often highlight disparities in the impacts of transportation pollution burdens as a result of emissions from petroleum fuel. Since biodiesel and renewable diesel cut these harmful emissions by half, their use can generate immediate health benefits for disadvantaged communities.

A recent study, conducted by Trinity Consultants on behalf of our trade association, shows that converting from petroleum-based diesel to 100 percent biodiesel (B100) results in a multitude of health benefits at the Census-tract level, including lowering cancer risk, reducing premature deaths, and decreasing asthma attacks.

The study found that switching to B100 in the home heating oil and transportation sectors would provide immediate community health improvements that can be measured in reduced medical costs and health care benefits, including approximately 50,000 fewer sick days in the study demographics.

In the transportation sector, benefits included a potential 44 percent reduction in cancer risk when heavy-duty trucks use B100, resulting in 203,000 fewer or lessened asthma attacks for the communities studied. When biodiesel is used for home heating oil, the study found an 86 percent reduced cancer risk and 17,000 fewer lung problems for the communities studied.

These are benefits that can be achieved today with available production of biodiesel, renewable diesel and Bioheat® fuel. Since the study focused on only 13 communities, it represents the tip of the iceberg in what can be accomplished this decade through growth of the clean fuels industry.

### **Supportive Federal Policies**

As Congress considers legislation to address the nation's infrastructure, climate and economic priorities, we ask that you ensure a level playing field for the continued growth of the biodiesel and renewable diesel industry. The Renewable Fuel Standard and biodiesel tax incentive have supported the growth of our industry to 3 billion gallons. Extension and optimization of these policies is crucial to our industry.

Our industry grows and creates jobs when the biodiesel tax incentive is stable and forward-looking. For example, in 2020 and 2021 the U.S. market for biodiesel and renewable diesel increased even while the coronavirus pandemic reduced overall demand for transportation fuel. This was largely due to the biodiesel tax incentive.

NBB and its members appreciate the leadership of Rep. Cindy Axne (D-IA) and many others for advocating a long-term extension of the biodiesel tax incentive in the Build Back Better Act. This provision grew out of bipartisan legislation—H.R. 3472—that she cosponsored with Rep. Mike Kelly (R-PA) and 41 other Members of the House. The policy enjoys bicameral support with companion legislation, introduced by Senators Grassley and Cantwell and cosponsored by 12 other Senators. We ask that Congress maintain an equitable balance in duration and value for the policy in relation to other renewable energy incentives.

NBB and its members also applaud efforts to continue the Federal matching grant program supporting higher blends of biodiesel. USDA's Higher Blends Infrastructure Incentive Program continues to be a huge success, providing a tremendous return at a very low cost. To date, 1/3 of the program's announced grants have been awarded to 24 biodiesel projects, which received a combined \$25 million. Completion of these projects will increase consumer access to nearly 1 billion gallons of biodiesel while eliminating 9.4 million metric tons of greenhouse gas emissions every year at

a 1 year cost of only \$2.67 per ton. Continuing the program will help the industry build or retrofit terminals, storage, and rail capacity to extend access to these clean, low-carbon fuels.

We thank Reps. Angie Craig (D–MN) and Axne for championing a 10 year authorization and funding of this grant program and support its inclusion in the Build Back Better Act. The proposal evolved from bipartisan, bicameral legislation cosponsored by Reps. Rodney Davis (R–IL) and Dusty Johnson (R–SD) as well as Sens. Amy Klobuchar (D–MN) and Joni Ernst (R–IA). It promises to be an effective way to expand consumer access to cleaner, low-carbon transportation options.

Additionally, Congress can work with the Environmental Protection Agency to optimize the Renewable Fuel Standard to achieve carbon emission reductions. While we appreciate the rule that EPA recently proposed, it can only have a retroactive impact. The agency continues to fall behind its statutory annual deadlines to set volumes.

EPA's delays in rulemaking create uncertainty for the biodiesel and renewable diesel industry, which hampers growth and opportunities within the rural economy. The delays allow refiners to manipulate the RFS rules and create uncertainty for renewable fuel producers. And uncertainty among biodiesel producers could impact jobs and economic growth opportunities throughout America.


Congress must encourage EPA and the Administration to support sustainable, achievable growth in RFS volumes, issue annual rules in a timely manner, and increase the transparency of the small refinery exemption process.

### Conclusion

NBB and its members thank the Committee for holding this hearing and considering this written testimony. The clean fuels industry creates jobs and value-added markets for agricultural partners. Biodiesel and renewable diesel use can improve environmental health and reduce associated costs for disadvantaged communities.

Cleaner, better fuels highlight the contribution that the agricultural sector can make to the nation's overall climate and carbon reduction goals. They are here, commercially available and in use today, achieving significant reductions in carbon emissions. Their increasing use today will do more to avoid climate change impacts than incentives that electrify transportation and other sectors down the road.

We look forward to working with Congress on policies that maximize these benefits.



KURT KOVARIK,  
VP Federal Affairs,  
National Biodiesel Board.

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SUBMITTED LETTER BY PRAVEEN PENMETS, CHIEF EXECUTIVE OFFICER AND CO-  
FOUNDER, ZIMENO INC. D/B/A MONARCH TRACTOR

01/21/22

House Agriculture Committee  
Washington, D.C.

Monarch Tractor appreciates the opportunity to submit comments regarding the January 12th, 2022 House Agriculture Committee Hearing on the *Implications of Electric Vehicle Investments for Agriculture and Rural America*. We strongly support initiatives to expand electrification and EV infrastructure, especially in high impact areas like the agricultural sector.

### About Monarch Tractor

Monarch Tractor is an innovative, mission-driven company, headquartered in Livermore, California developing driver-optional electric tractors. We are committed to enabling clean, efficient, and sustainable farming practices by making them economically viable. The Monarch Tractor brings together the benefits of electrification, automation, and insightful data to enable farmers to transition to more productive, precise, and sustainable farming practices. Providing a superior platform for farmers, Monarch Tractor is focused on delivering meaningful change for today's farmers and the generations of farmers to come.

The Monarch Tractor MK5 is the world's first fully electric, driver optional, smart tractor. It enhances farmer's existing operations, alleviating labor shortages and maximizing yields. The award-winning Monarch Tractor combines electrification,

automation, machine learning, and data analysis to set a new standard in tractor technology and capabilities.

Providing 40 horsepower continuously and peaks up to 70 horsepower, a category 1 three-point hitch, 6 Spline 540 rpm PTO, and 16 gpm standard hydraulic hookups, the Monarch Tractor can accomplish everything a traditional diesel tractor can and more. This power is packed into a compact footprint resulting in best in class plow, till, and hauling capabilities. Optional four-wheel drive and front implement compatibility extend the Monarch Tractor's functionality even further.

Monarch's Compact Tractor is an attractive platform for significantly reducing criteria and greenhouse gas emissions in the agricultural sector. The compact tractor segment offers the opportunity for some of the most significant and cost-effective diesel emissions reductions due to its high volume, high utilization, and significant annual growth.

Throughout the company's home state of California, Monarch has been working with both local and state government agencies and programs to accurately incentivize and deploy fully electric farm equipment. Various California State Legislators and officials have toured Monarch's California Headquarters and experienced a demonstration of the technology in a local vineyard. Monarch has already partnered with air districts to complete a variety of zero emission tractor deployments in North Central California.

#### **Farm Electrification is Primed for Federal Support**

Farm EV technology isn't in development, it's already here. Thanks to significant public and private investment in on-road electrification, high voltage battery technology has improved vastly in the last decade. Now, farm EV's provide a zero-compromise solution for farmers looking to replace aging or high-polluting equipment. Agriculture is responsible for a significant amount of overall greenhouse gas emissions which makes the industry an ideal candidate for sustainability initiatives and one of the most effective on a cost of emission reduction basis.

Electrification is quickly expanding in the farming sector; government participation can ensure the benefits of this technological shift are both swift and equitable. Farmers looking to adopt ZEVs currently face expensive upgrades to existing electrical infrastructure, poor or no financial incentives to replace their equipment with ZEVs, and other transitory challenges. This is compounded in rural communities that have not had the need, nor the opportunity, to install the necessary infrastructure to support electric vehicle usage and charging. As both equipment and implement manufacturers are moving toward an electric future, rural areas are at risk of being left behind without appropriate support to aid in adopting these new technologies. Infrastructure investments to facilitate rural electrification need to be made urgently so farmers have the ability to choose an Electric Farm Vehicle as their next equipment purchase.

Monarch Tractor is dedicated to facilitating the future of our food ecosystem; one that is electrified and sustainable. We are looking forward to collaborating with the House Agriculture Committee on initiatives that help further sustainability in the agricultural sector.

Sincerely,

PRAVEEN PENMETSU,  
*CEO and Co-Founder.*

