

DIALOGUE

STATE CLEAN TRANSPORTATION INITIATIVES

SUMMARY

The United States is experiencing a wave of state-led clean transportation initiatives that are gaining substantial momentum. Faced with insufficient federal action, states started focusing their efforts on the sector that produces the largest percentage of greenhouse gas: transportation. On November 10, 2020, the Environmental Law Institute and Babst, Calland, Clements and Zomnir, P.C. co-hosted a webinar that explored these initiatives, their potential impact, and funding sources. Below, we present a transcript of the discussion, which has been edited for style, clarity, and space considerations.

Caitlin McCarthy is Director of Education, Associates, and Corporate Partnerships at the Environmental Law Institute.

Julie R. Domike (moderator) is a Shareholder with Babst, Calland, Clements and Zomnir, P.C.

James Chen is the Vice President of Public Policy with Rivian.

Gina N. Falaschi is an Associate with Babst, Calland, Clements and Zomnir, P.C.

Chris Hansen is a Colorado State Senator.

Matthew Nelson is the Director of Government Affairs with Electrify America.

Caitlin McCarthy: I would like to welcome today's moderator, Julie Domike, a shareholder in the Environmental, Mobility, Transport and Safety, and Litigation groups of Babst Calland. She has extensive experience in environmental law, particularly regulatory issues arising under the Clean Air Act (CAA).¹ She previously served as an attorney and manager in the Air Enforcement Division of the U.S. Environmental Protection Agency (EPA).

Julie Domike: Today's topic has as its basis the requirements of the CAA—my favorite statute—and the federal-state partnership that the statute establishes. The law requires states to meet federal clean air quality standards within their borders, aided by EPA. To do this, states establish programs and requirements that will result in cleaner air, choosing which sources to regulate and the best approaches for such requirements.

One sector that contributes most significantly to air pollution is the transportation sector, which includes cars, buses, and trucks. The CAA requires EPA to set national

emission standards for vehicles and preempts all states but California from setting their own standards.²

Since the 1950s, California has regulated emissions from vehicles. Thus, when the first federal law authorizing regulation of vehicle emissions at the federal level was passed in 1967, the U.S. Congress waived preemption for any state that had previously adopted vehicle standards. This applied only to California. Under §209 of today's CAA, California alone is permitted to set its own vehicle emission standards. Nonetheless, other states have adopted California's standards. Section 177 of the CAA was added in 1977, and it allows other states to adopt California's motor vehicle standards as long as they are identical to California's. The standards are to give two years leadtime for vehicle manufacturers to comply.

Today, 13 states have adopted California's vehicle standards and others are in the process of doing so.³ One element of California standards for motor vehicles is a zero emission vehicle (ZEV) requirement for passenger cars and light-duty trucks. That requirement has been in place for a number of years, and it also includes an increasing credit percentage requirement. This means that year after year, manufacturers that sell vehicles in California are required to produce and deliver for sale an increasing number of their total passenger cars and light-duty trucks that meet the zero emission standards.

States that have adopted these advanced clean car requirements under §177 have also adopted the annual increase requirement. Thus, over the next decade, these ZEV requirements across the states will effect a substantial change in the composition of vehicles in the transportation

1. 42 U.S.C. §§7401-7671q, ELR STAT. CAA §§101-618.

2. 42 U.S.C. §§7521, 7543(b).

3. Colorado, Connecticut, Delaware, Maine, Maryland, Massachusetts, New Jersey, New York, Oregon, Pennsylvania, Rhode Island, Vermont, and Washington.

sector. Other efforts to reduce emissions from this sector are many, ranging from rules affecting truck emissions, to tax and other federal, state, and private incentives to promote clean transportation. These developments demand infrastructure changes to support the increasing number of electric vehicles (EVs).

Our panelists today will present many of these initiatives. We will hear about them from the points of view of a state regulator, an EV manufacturer, and a company involved in improving the charging network to meet these demands. Let me briefly introduce our panelists, in the order in which they'll be speaking.

Gina Falaschi is an associate with Babst Calland, whose practice areas include environmental law as well as mobility, transport, and emerging technologies. Her work and study about these issues led her to devise the plan for this panel on clean transportation issues. Gina has been identified by the Environmental Law Institute (ELI) as an emerging leader in the field.

Chris Hansen is a leader in the Colorado state government, first as a representative and since early 2020 as a senator. Senator Hansen has 20-plus years' experience in the global energy industry and has spearheaded Colorado's work to expand clean technologies and renewable energy. He also led Colorado's efforts to boost sales of EVs in the state.

Matthew Nelson is the director of government affairs for Electrify America. He previously served as the chief of staff in the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy. Matthew also served for seven years as senior policy advisor for energy, transportation, and climate change to Sen. Dianne Feinstein (D-Cal.).

And last but not least, Jim Chen, vice president for public policy and chief regulatory counsel at Rivian. He previously lent his talents to several EV manufacturers, including Tesla, where he worked for more than five years. In addition to his decade plus of service as in-house counsel and policy advisor to the EV industry, Jim worked more than 15 years in private law practice representing members of the traditional auto industry, and before that was in public service as an attorney in EPA's enforcement office. I will turn this over to Gina.

Gina Falaschi: We're now going to cover a bit of what I see as the impetus for this webinar in the first place: a recognition that state-led clean transportation initiatives have gained substantial momentum in 2020 despite the fact that we have spent most of the year in the midst of a global pandemic. It would have been very easy for states to put off announcing these initiatives, maybe until 2021 or even a later date, but they've chosen not to, and I think that's for a number of reasons.

The first is mounting evidence of a high association between long-term exposure to air pollutants and

increased mortality rates from COVID-19.⁴ The second, as Julie mentioned, is a focus on the transportation sector as the largest generator of greenhouse gas (GHG) emissions. That's at 28% according to EPA in 2018.⁵ And the third is a recognition that there has been what states see as less than adequate federal action on the subject and, therefore, there has been more action at the state level. These initiatives have taken various approaches—some legislation, regulations, and Executive Orders. They fall into a few distinct categories.

The first is more stringent standards for new vehicles. The second is participation in multistate initiatives. The third is EV charging infrastructure development. And the fourth is state investment and long-term planning. I'm going to give a few examples of each of these categories—and this is by no means an exhaustive list.

In terms of stricter standards for new vehicles, these take a number of forms. The most common is a mandatory ZEV percentage of sales requirement for manufacturers, and also the adoption of California standards under §177, as Julie briefly mentioned. We'll start with one of the most important initiatives that has been announced in 2020, and that's the California Advanced Clean Trucks rule.⁶

On June 25, 2020, the California Air Resources Board (CARB) approved the Advanced Clean Trucks regulation, I believe at a webinar board meeting, which was a very appropriate way to approve things in 2020. This regulation is the first of its kind. It requires an increasing percentage of medium- and heavy-duty ZEVs beginning in 2024. While requirements differ by truck classification, the goal of the regulation is to phase out higher-polluting diesel vehicles by 2045. And, of course, California hasn't stopped there.

On September 23, Gov. Gavin Newsom signed an Executive Order targeting emissions from the transportation sector.⁷ This Executive Order requires CARB to develop regulations that would mandate that all in-state sales of new passenger vehicles would be zero-emission by 2035. There are requirements for additional new regulations for heavy-duty, medium-duty, and off-road vehicles as well. The order also requires state agencies to partner with private industry to develop a ZEV market development strategy, and that is expected by early 2021. To put this Executive Order into a bit more context, it was signed about one week after CARB held one of its first public

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4. Harvard T.H. Chan School of Public Health, *Coronavirus and Air Pollution*, <https://www.hsph.harvard.edu/c-change/subtopics/coronavirus-and-pollution/> (last visited Feb. 5, 2021).
 5. U.S. EPA, INVENTORY OF U.S. GREENHOUSE GAS EMISSIONS AND SINKS: 1990 TO 2018 (2018) (EPA-430-R-20-002), <https://www.epa.gov/sites/production/files/2020-04/documents/us-ghg-inventory-2020-main-text.pdf>.
 6. California Air Resources Board, *Advanced Clean Trucks*, <https://ww2.arb.ca.gov/our-work/programs/advanced-clean-trucks> (last visited Jan. 14, 2021).
 7. Press Release, Office of Governor Gavin Newsom, Governor Newsom Announces California Will Phase Out Gasoline-Powered Cars & Drastically Reduce Demand for Fossil Fuel in California's Fight Against Climate Change (Sept. 23, 2020), <https://www.gov.ca.gov/2020/09/23/governor-newsom-announces-california-will-phase-out-gasoline-powered-cars-drastically-reduce-demand-for-fossil-fuel-in-californias-fight-against-climate-change/>.

workshops to solicit input on its Advanced Clean Cars II rulemaking,⁸ which will set emission standards for model year 2026 and beyond. The current regulations go through model year 2025.

Of course, California is not the only state that has taken such initiative. Washington State passed legislation early in 2020 requiring the Department of Ecology to adopt a ZEV requirement.⁹ Washington had previously adopted some of California's standards but had not adopted the ZEV portions of California's rule, and so that is forthcoming. Additionally, other states like Minnesota and Nevada have started the process of adopting California's regulations under §177.¹⁰

The second major category that we'll be discussing is multistate initiatives. These are becoming more common for a number of reasons. One of them is a recognition that just by its nature, air pollution does not stop at state borders. It requires regional, national, and global approaches to combat issues regarding air pollution.

One approach is the Multi-State Medium- and Heavy-Duty Zero Emission Vehicle Memorandum of Understanding.¹¹ It was signed in July by the governors of 15 states and the mayor of the District of Columbia. The goal of this agreement is to foster a market for ZEVs, specifically trucks, vans, and buses in these participating states. The expectation is that this program will be facilitated by an existing organization, the Multi-State ZEV Task Force. Currently, this task force is developing an action plan to consider necessary funding, infrastructure regulations, data collection, and so on, that will be needed to put this program into practice. While the memorandum of understanding considers the adoption of the California Advanced Clean Trucks rule, it's not a requirement of the agreement, though the states hoped to move toward exclusively heavy- and medium-duty ZEVs by 2050, which is five years after the target set by Advanced Clean Trucks.

A second multistate initiative I'll touch on is the Transportation and Climate Initiative (TCI).¹² That's a regional collaboration of northeastern and Mid-Atlantic states that seek to institute a cap-and-trade program for emissions from fossil fuels used in the transportation sector. A

final memorandum of understanding for state signature is expected by the end of 2020.¹³

The last multistate initiative I'll touch on is the West Coast Clean Transit Corridor Initiative.¹⁴ It was commissioned by electric utilities and agencies in California, Oregon, and Washington. The focus of the study is the infrastructure and other needs that will arise given the increase in medium- and heavy-duty vehicles on the roads in these three states. The recommendation of the study is to add a charging network, in two phases, along Interstate 5, which runs the length of the three states. Phase One, which they hoped would be completed by 2025, would include the installation of 27 charging stations for medium-duty vehicles approximately every 50 miles along Interstate 5. And the hope is that Phase Two would build out 14 of those 27 charging stations to accommodate heavy-duty vehicles by 2030. The study also includes recommendations regarding grid preparedness and additional charging sites along roadways that connect with Interstate 5.

This initiative is a good transition to our third major category of initiatives, which is charging infrastructure development. The first I'll touch on is one of the largest and is in California. The California Public Utilities Commission (PUC) approved the Charge Ready 2 program from Southern California Edison,¹⁵ which is an investor-owned utility (IOU) in the Los Angeles region that I believe services about 15 million customers. The \$436 million in funding will fund approximately 37,800 charging ports in southern California. Southern California Edison is going to install and maintain the infrastructure while program participants own, operate, and maintain the charging stations with the help of grants from the company to lower the cost of participation.

Similarly, in New York, the Public Service Commission established the EV Make-Ready Program,¹⁶ providing \$701 million in funding for utilities to invest in EV charging stations over the next five years. Utilities can recoup 90% of their expenses by participating in the program, but 100% of their expenses if they install a charger in low-income communities.

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8. CARB, *Advanced Clean Cars II Meetings & Workshops*, <https://www.arb.ca.gov/advanced-clean-cars-ii-meetings-workshops> (last visited Jan. 14, 2021).
 9. S.B. 5811, 66th Leg., Reg. Sess. (Wash. 2020).
 10. Minnesota Pollution Control Agency, Notice of Intent to Adopt Rules With a Hearing: Proposed Rules Adopting Vehicle Greenhouse Gas Emissions Standards (Dec. 14, 2020), <https://www.pca.state.mn.us/sites/default/files/aq-rule4-10a.pdf>; Maxine Joselow, *Nev. Steers Toward Tougher Tailpipe Standards*, E&E News, June 22, 2020, <https://www.eenews.net/eenewspm/2020/06/22/stories/1063435467>.
 11. Multi-State Medium- and Heavy-Duty Zero Emission Vehicle Memorandum of Understanding (July 10, 2020), <https://www.energy.ca.gov/sites/default/files/2020-08/Multistate-Truck-ZEV-Governors-MOU-20200714-ADA.pdf>.
 12. Transportation and Climate Initiative of the Northeast and Mid-Atlantic States, *Home Page*, <https://www.transportationandclimate.org/> (last visited Jan. 14, 2021).

13. The final TCI Memorandum of Understanding (MOU) creating the Transportation and Climate Initiative Program (TCI-P) was released on December 21, 2020, and signed by the governors of Massachusetts, Connecticut, Rhode Island, and the District of Columbia. For more information and a copy of the final MOU, see Transportation and Climate Initiative of the Northeast and Mid-Atlantic States, Massachusetts, Connecticut, Rhode Island, D.C. Are First to Launch Groundbreaking Program to Cut Transportation Pollution, Invest in Communities (Dec. 21, 2020), <https://www.transportationandclimate.org/final-mou-122020>.
14. West Coast Clean Transit Corridor Initiative, *Home Page*, <https://westcoastcleantransit.com/> (last visited Jan. 14, 2021).
15. Edison International, *Charge Ready: A Plan for California*, <https://www.edison.com/home/innovation/electric-transportation/charge-ready-a-plan-for-california.html> (last visited Jan. 14, 2021).
16. Press Release, Office of Governor Andrew M. Cuomo, Governor Cuomo Announces "Make-Ready" Program for Electric Vehicles (Jan. 17, 2020), <https://www.governor.ny.gov/news/governor-cuomo-announces-make-ready-program-electric-vehicles>.

States like Maine and Michigan have announced similar but smaller pilot programs for charging as well.¹⁷ Moving south a bit, in Florida, Gov. Ron DeSantis signed legislation¹⁸ in June that directed the U.S. Department of Transportation to develop a master plan for EV charging along state interstates and a month later announced that about \$8.5 million in funding would be made available from the Volkswagen (VW) Environmental Mitigation Trust to install fast chargers along the interstate.¹⁹

The last category we'll talk about is state investment, and this takes many forms. Sometimes, it's rebates for consumers for the purchase of EVs. It could be state-owned fleet electrification goals and other issues surrounding state carbon neutrality or clean energy plans. Some funding has become available this year from the VW Environmental Mitigation Trust for the purchase of zero emission trucks so that older and highly polluting vehicles are scrapped and taken off the road. There are state carbon neutrality and renewable energy plans that offer rebates to consumers, infrastructure incentives for charging, and even tax credits for EV manufacturers that locate in the state.

I will touch on one specific example of a state plan. In January 2020, New Jersey Gov. Phil Murphy signed EV legislation that provides a rebate of up to \$5,000 per vehicle purchase depending on the electric range of the vehicle, directs that state-owned vehicles be electric by 2035, and had agencies set additional goals for the electrification of heavy- and medium-duty vehicles, specifically for buses.²⁰

New Jersey additionally announced that it's going to be using some of its funding from its participation in the Regional Greenhouse Gas Initiative, which is a cap-and-trade program for carbon emissions from fossil fuel-fired power plants in the state.²¹ Those funds will be used for electrification of the state's transportation sector.

New Jersey is definitely poised at this point to become a leader in EV adoption. And there's another state that is a leader in EV adoption that I have not mentioned, and that is Colorado—and that is because we are joined by Senator Hansen today. I promised that I would not steal his thunder. So, Senator, I'll hand the floor to you.

Chris Hansen: It's great to join this panel. And yeah, I appreciate you leaving some of the Colorado material for me. I think we've got some good activity here in Colorado. We've taken a number of statutory and administrative moves and many of those are now playing out at the PUC. I am going to share a few of those with you today to give you a sense of the different levers that we're trying to pull to accelerate the EV transition and to improve air quality in the state.

I'd say the context for Colorado is one of a pretty significant political evolution in the state over the past 10 years. We went from a state that has been a swing state in previous presidential elections, kind of "purple," I suppose in the parlance. We are now decidedly a blue state, which I think was reinforced with President Joe Biden winning the state by about 13 points. That has led to Democrats also controlling the House of Representatives, the Senate, and the governor's mansion. And it's given us an opportunity to be much more assertive when it comes to EV policy and environmental protection policy.

One of the key reasons for a political consensus in Colorado is that we have a problem, like many big cities that are up against mountains, where we get inversion layers, and we get significant local air quality issues, high ozone levels, particulates, and so on. Of course, one of the best ways to reduce that problem is to aggressively go after automobile and truck emissions. So, electrification made a lot of sense in the context of air quality on the Front Range, kind of up and down Denver, and in our surrounding metro community.

What does that look like? Well, it means that we've made some really aggressive moves when it comes to charging infrastructure. The VW settlement money has been used significantly for this in the state. One of the bills that I sponsored was Senate Bill 77 from 2019, in which we were able to move forward on allowing the IOUs in the state to bring forward plans to the PUC around increasing charging infrastructure and rate-basing, if it's in the best interest of the customer base. That is what's playing out at the PUC right now. We're expecting tens of millions of dollars per year being spent on behalf of ratepayers to increase charging infrastructure. That, along with private efforts and the VW settlement money, means that we're going to have a very rapid build-out of charging infrastructure in Colorado.

The other big thing we did was pass House Bill 19-1159. It essentially created a rebate program for EVs in the state. It was something that needed to be refreshed and extended. We did that in 2019 when we extended the rebates for customers all the way until 2025 to make sure there's a clear incentive for people to switch over to light-duty vehicles, light-duty trucks; medium- and heavy-duty trucks are also included in that legislation to help with the commercial side, and delivery vans and that type of EV that's rapidly coming to market. Those rebate programs, I think, are going to be a really important foundation for us. And we think rebates plus significant investments in EV charging will make a huge difference.

17. *PUC Approves \$500K for EV Charging Incentives*, E&E NEWS, Feb. 27, 2020, <https://www.eenews.net/energywire/2020/02/27/stories/1062456227>; *Grants to Help Fund Fast-Charging Stations in Mich.*, E&E News, Aug. 11, 2020, <https://www.eenews.net/energywire/2020/08/11/stories/1063710471>.
18. Dory Larsen, *Florida Gov. DeSantis Signs Essential State Infrastructure Bill Into Law*, CLEANENERGY.ORG, June 10, 2020, <https://cleanenergy.org/blog/florida-gov-desantis-signs-essential-state-infrastructure-bill-into-law/>.
19. Press Release, Office of Governor Ron DeSantis, Governor Ron DeSantis Announces Next Steps to Strengthen Florida's Electric Vehicle Infrastructure (July 10, 2020), <https://www.flgov.com/2020/07/10/governor-ron-desantis-announces-next-steps-to-strengthen-floridas-electric-vehicle-infrastructure/>.
20. Press Release, Office of Governor Phil Murphy, Governor Murphy Signs Legislation Establishing Statewide Goals and Incentives for Increased Use of Electric Vehicles and Charging Infrastructure (Jan. 17, 2020), <https://www.nj.gov/governor/news/news/562020/20200117b.shtml>.
21. Regional Greenhouse Gas Initiative, *Home Page*, <https://www.rggi.org/> (last visited Jan. 14, 2021).

The other thing that's happened on the administrative level is the governor's office has pushed forward rules around ZEVs and clear targets for the state where the governor is pushing to have basically a million EVs on the road in Colorado, which would of course be a significant portion of our total fleet, by 2030.²² We're moving very rapidly in that direction with administrative targets.

The other piece that needs to be mentioned is the ability for customers to quickly get new products that are coming to market. I'm pleased to be joined by Jim from Rivian today to talk about their strategy, but of course there are now dozens of EV companies that are rapidly bringing new types of products to market.

I was fortunate to be part of a launch recently of a pickup truck offering from Lordstown Motors, which is really trying to aggressively go after the fleet vehicles for construction companies, oil and gas companies, that type of thing. Of course, the irony was not lost on me that I was at the launch of an upstream oil and gas company switching to EVs. That's pretty exciting. Why did they switch? Well, it's not because they want to stop using oil. It's because it's way cheaper for them to run a fleet of EVs, particularly with the incentives in the charging infrastructure that we have in place.

One of the things that we passed in the pre-COVID-19 part of the 2020 session was a direct sales bill.²³ That allows manufacturers who only make EVs to sell directly to Colorado customers. It's the same thing Tesla has been doing in many jurisdictions, including Colorado, for many years. We've now opened that up to everybody else who's in that category. Tesla was essentially grandfathered in under some old rules. But now that's available to anybody else who wants to come to Colorado, set up shop, and sell directly to customers.

We think that's the best way to offer lots of choice, to make sure that customers can choose from across lots of technologies, lots of offerings, lots of formats. And we think that ultimately is going to increase adoption, along with the other incentives and measures that I mentioned.

Those are some of the big things that we've taken on. As I said, the EV charging plans from the utilities, both from the IOUs as well as some of the smaller co-ops and municipalities, and municipal utilities are going to be playing out, I think, very rapidly over the next couple of years. We've got, of course, private players putting in charging stations as well. ChargePoint is one of the leading firms here in Colorado.

All of that, I think, is the right set of puzzle pieces to bring this together, to see if we can really show that leadership, to join states like California and our friends on the West Coast, and really make this happen sooner rather than later.

It's happening, as I said, because of a very significant movement on environmental policy. That is the backdrop.

I mentioned the air quality standards. It's also important to mention a bill that we passed in 2019, House Bill 19-1261, which set very clear emissions targets for the entire economy in Colorado. Not just the electric sector, not just transportation, but across all parts of the economy, the building sector, and so on. And the result of that then becomes the sectoral goals to reduce carbon emissions. So yes, local air quality, ozone, particulates, and so on. But now there are very clear statutory carbon dioxide (CO₂) goals for the state of Colorado, and we can't get there unless we rapidly electrify the fleet.

We've got a nice set of policy frameworks with top-down goals for the state. They then go into the subsidiary elements sector by sector. And then, of course, there's what we're focusing on in this particular panel, which is what that looks like for EVs in particular. Kind of the same categories that Gina mentioned—I think Colorado is playing on all those keys, on all those different categories. And I think we're going to have great dividends for the state and for the taxpayers as we move this forward.

Matthew Nelson: Electrify America is the largest network of direct current (DC) fast chargers in the United States today, which is quite striking because we didn't have a single station in the ground on January 20, 2018. But since May 2018, we've opened about four stations per week. We opened our 500th station this week. And we have 2,200 ultrafast DC fast chargers or ultrafast charging stations up and running and available to the public. We focused almost entirely on what we refer to as ultrafast charging—this is 100 and 300, 150 and 350 kilowatt charging. For those of you who are not electrical engineers, charging power equals speed.

A 350-kilowatt charger can basically refuel a car seven times faster than the state of the art before we came along, which was a 50-kilowatt charger. This equates to 20 miles of range per minute at an Electrify America charging station. It's not quite the speed of a gas station, but it's approaching it. That's our goal, to make going electric no more inconvenient, no more difficult for the consumer, than a normal internal combustion engine car. Today, with our network, 96% of Americans live within driving distance of an Electrify America station. We're in 46 states. We have two cross-country routes. We are making this as easy as possible.

In the context of state and local government policy, what we have found is that there are a lot of efforts out there. There's a lot being done, but it's very hard to know what really works. The amount of policy that doesn't work is quite significant. And this is a huge barrier to addressing the EV adoption challenge because time and energy and effort get placed into policies that simply haven't been effective.

To make sense of all of this, what I always rely on is the plug-in electric vehicle (PEV) methodology in the PEV Policy Evaluation Rubric, which was developed by the

22. Nic Garcia, *Gov. Jared Polis Pushes Colorado Toward Zero-Emission Vehicles With First Executive Order*, DENVER POST, Jan. 17, 2019, <https://www.denverpost.com/2019/01/17/colorado-jared-polis-zero-emission-standards/>.

23. S.B. 20-167, 73d Gen. Assemb., Reg. Sess. (Colo. 2020).

National Association of State Energy Officials (NASEO).²⁴ It allows you to self-score your community on a 100-point scale looking at which policies are most effective at driving EV adoption in your community. You can also look at what you're missing through that process and figure out where to invest time, energy, and resources. You should note that NASEO did this project with a very clear science-based approach. That is a notable, different way to do this. They looked at what is really effective and gave scores.

I'm going to focus on two state policy areas that are scored highly in the metric and in the rubric and that are critically important to EV adoption. The first is demand-charge mitigation. Most of you who are attorneys probably intentionally went to law school so you didn't have to think through numbers and rates and things of this sort. But this is really important, believe it or not, to the success of EV adoption.

Demand charges are charges that a customer pays to the utility for the maximum amount of power taken at any given time. They were written with commercial customers in mind—factories, buildings, grocery stores—that have a relatively steady amount of demand. The problem is that EV charging stations have an enormous amount of demand when the customer is there and then no demand when the customer leaves. And the faster the station is in refueling the more acute this problem is. To put this in perspective, recent studies have shown that about 90% of the cost of the utility bill for a charging station is utility demand.

I'll give you two random examples I pulled from recent bills that we have looked at. One is from Kentucky, where we had an effective rate of \$3.36 per kilowatt hour delivered. Or to put that in terms any normal person would think about, it was \$23 per gasoline gallon equivalent that we paid the utility. It's very difficult when you're in the charging business to buy a product for \$23 per gallon equivalent and then sell it to the consumer at \$2 per gallon equivalent and have that be a sustainable long-term business.

Another example, just to make the point that it's not cherry-picking, in Virginia, we recently pulled a bill and it was \$2.02 per kilowatt hour, or the equivalent of \$14 per gallon equivalent. Again, buying a product at \$14 equivalent and selling it for \$2 or \$3 per gallon equivalent is not a sustainable business model. But we don't think it's responsible or possible to try to charge EV drivers \$20 or \$30 per gallon equivalent for their fuel. That will not drive EV adoption.

The good news—and a final example, because we're talking a lot about Colorado today—is that the Colorado PUC recently did an analysis of rates in the state of Colorado and found that two neighboring utilities in the same state had a cost to the charging stations, and one was 35 times higher than the other. I can't tell you for sure which of those two rates is just and reasonable, but I can tell you for sure that there is no way they can both be just and rea-

sonable at the same time, when one rate is 35 times higher than the other.

Legislatures and PUCs have acknowledged the problem in California and Colorado. Senator Hansen, of course, is very instrumental in this, having passed legislation directing the PUC to address this issue and develop new rates or to force the utilities to develop new rates that will allow EV adoption to grow.

Massachusetts is considering legislation to do the same; it's in conference committee. But more states need to do this. This is an existential threat to whether EV charging stations, the kind of EV charging stations that people want, will be built in a state. There's no way that you can operate a business buying a product for \$23 and selling it for \$2 and have that be a long-term success.

The second issue that I want to talk about often doesn't get a lot of attention. It's something called the low-carbon fuel standard (LCFS). There is such a standard in California and Oregon today, while Washington State, New York State, and Minnesota are currently considering legislation to establish an LCFS. Most folks think of the LCFS as focused in the biofuels space, but in reality, LCFS programs create incentives to deploy EV charging stations and especially to power them with renewable energy, and, probably most importantly, to attract station use.

The more use you have at your stations, the more benefit you receive. I would say that many states and local programs in the past that have encouraged EV charging station deployment have been focused on mitigating the capital cost upfront, but they don't focus on whether the stations get used. That has created a bit of a problem in our industry where there are a lot of stations put out there and then there aren't the sufficient resources to maintain those stations or to make sure that they are up and running. So, there's a real concern in our industry about reliability.

One of the great things about the LCFS is it rewards reliability. It rewards the station being used a lot. As I've mentioned, it incentivizes you to lower the carbon content of your own fuel. So, it creates an incentive for us to power all of our stations with renewable energy, which we now do in large part because of the LCFS. Most importantly, the LCFS programs are established and provide an incentive for EV adoption and infrastructure deployment without costing any money to taxpayers.

Going back to what I said before, there are a lot of policies out there that can potentially drive EV adoption. We always encourage folks to use the data, to use the science, which have led us to determine the evaluation of policies that are most effective. We lean on the NASEO study to help us navigate that. And we think that two really important areas for focus and attention going forward are demand charge mitigation and the LCFS programs.

I'll turn it over to Jim, an old friend. I don't think that the introduction of Jim was sufficient. Jim has really been one of the leading minds in our space of electrification going back many, many years. There are very few people who have worked at both Tesla and Rivian. Getting these companies off the ground successfully and doing it in two

24. Garth Otto, *NASEO Releases PEV Policy Evaluation Rubric*, NASEO, Sept. 20, 2018, <https://naseo.org/news-article?NewsID=3321>.

places is a notable accomplishment, and Rivian's really on track to great success.

James Chen: Thanks Matt, you definitely oversell me and undersell yourself there. As Matt mentioned, I've been in this space, specifically EVs, for more than a decade now. I've really been encouraged by the progress in technology, products, infrastructure, and policy that are taking place. Unfortunately, much work remains compared to the 100-year head start of the incumbent technology of internal combustion engine-equipped vehicles.

The good news is that in addition to the progress in technology and product offerings, the policy landscape has also changed. Consumer perception has also changed. And there is an understanding of the advantages of electric drive on the zero emission side, the ability to have transportation solutions that are sustainable, and the ability to capitalize on domestic sources of energy.

But there are other reasons as well that go beyond just that consumer advantage for reasons of economics, job creation, national security, and the technology leadership of the United States. After all, at the end of the day, lithium-ion battery technology was invented in the United States by three professors who recently won the Nobel Prize for their work in its invention.²⁵

Recognizing that not everybody knows what Rivian might be, I will give an introduction about the company. Rivian was founded in 2009 by a Ph.D. mechanical engineer out of the Massachusetts Institute of Technology named R.J. Scaringe. R.J. is from Florida originally. He was looking at developing and starting his own EV company. Like most, he started with a fancy sports car, but three years into it, he realized, well, wait a minute, why are we doing a sports car? Tesla's out there, others are certainly out there. Why aren't we addressing the most impactful segment in terms of emissions in the vehicle space, which is pickup trucks and sport utility vehicles (SUVs)? This also by the way happened to go along with his love of being outdoors. So, it was a melding of his vision as well as his personal passions.

He founded Rivian, moved it to Michigan—recognizing that it's the automotive engineering capital of the United States, if not the world—and really built it from there. Since its founding in 2009, we are in excess of 3,500 employees across five U.S. locations and satellite offices in Canada and the United Kingdom. We have our design and vehicle engineering facility in Plymouth, Michigan. We purchased the old Mitsubishi factory in Normal, Illinois. It was 2.4 million square feet of production space. We have expanded that to over three million square feet of space and we're looking to bump that out even further into up to 5 million square feet of space. And we're still running out of space. We have a connected-car and self-driving center in Palo Alto, energy storage and control systems in Irvine, California, a test track facility in Arizona, advance engi-

neering in London, and software development in Vancouver, British Columbia.

We unveiled what will be our first vehicles at the Los Angeles Auto Show in 2018: the R1T pickup truck and the R1S SUV. We're excited that these are vehicles that will have incredible capability. We understood from the get-go that if you were going to get people to switch from the incumbent technology of gas- and diesel-powered vehicles, you had to show them all the benefits of electric drive. While you could get some folks that were really interested in new technology and really going for the zero emissions angle, we had to show the vehicles as not only equivalent, but in many ways superior to the incumbent technology.

So, we have a pickup truck that has an acceleration of zero to 60 in as little as three seconds. That's about as fast as a Porsche 911. You can actually outrun a Porsche 911 in a pickup truck, with a total horsepower of 750.

When you look at our quad-motor design, which is basically a motor at each one of the wheels independently controlled that allows for some incredible torque vectoring, it also allows for something that we call the Rivian "tank turn." It's a unique feature where because we can drive each one of those wheels independently, we can drive torque one way on the vehicles on one side, and drive torque the other way on the wheels on the other side and basically spin the truck on its own axis.

Besides being a really cool thing, a video of which is on YouTube,²⁶ there are practical implications. If you're off-roading and you get to the end of the trailhead, instead of making that 1,000-point turn where you're going back and forth to turn your truck around, you can just turn on Rivian "tank turn" mode and flip the truck around in one, full motion.

We also recognize that range is important, so we are offering an initial version of our truck that will come out in June 2021 as a 300-mile range version; that's 300 miles on a single charge. We'll later offer a 400-mile range extended version. We're also developing technology that will allow us to put in auxiliary modules in the back of that pickup truck bed to be able to provide even further range. And we're looking at compatibility with all our friends out there putting in EV charging. Our charging system is the J1772 combined charging system (CCS)-compatible charger, which will readily plug in to Matt's company's products. You'll be able to use the entire Electrify America charging system, which is great.

At the end of the day, this is still a pickup truck, so it's got to do what pickup trucks do. Our truck will have a 1,000-pound towing rating. The SUV will be slightly less than that. We'll have independent air suspension that allows for up to 14 inches of independent wheel articulation offering superior overall clearance that allows you to climb over some of the steepest, rockiest terrain. Our vehicle, because the battery pack is low and centered to the truck itself, has an incredibly low center of gravity that allows it to climb

25. Press Release, The Nobel Prize, The Nobel Prize in Chemistry 2019 (Oct. 9, 2019), <https://www.nobelprize.org/prizes/chemistry/2019/press-release/>.

26. Rivian, *Tank Turn: Electric Adventure Vehicles*, YouTube (Dec. 25, 2019), <https://www.youtube.com/watch?v=yzwM8KE2L3I>.

a 45-degree gradient. And because all the components are sealed, the vehicle will wade in up to three feet of water without any special snorkels or equipment needed.

In this way, we really believe that the superiority of the truck itself is what will attract folks who are interested in trucks. In fact, what's interesting with our pre-order customers, 70% of them are first-time EV buyers, which tells us we're getting to a segment that has not previously been reached. It's also encouraging that these folks are looking at these vehicles as their primary source vehicles, not as simply single-use commuter cars or limited functioning EVs.

But that's only part of our business. In fact, that's only about half of our business. That's the business-to-consumer side. We're also doing a business-to-business side, and we signed a contract about a year ago with Amazon to develop the world's largest commercial EV fleet. Amazon has committed to ordering 100,000, all-electric delivery vans for their last-mile Prime delivery fleet to be completed by 2030. Production starts at the end of 2021. We plan to have more than 10,000 of these trucks on the road by 2022 and the full 100,000 by the end of 2030.

This is a connected fleet that will improve efficiency and reduce congestion by providing the best routes for these drivers. Instead of seeing that Amazon truck coming down your street four or five times a day, we can improve the efficiency and reduce the number of trips. The fleet itself will save an estimated four million metric tons of CO₂ from the atmosphere each year. Each one of these Amazon vehicles is the equivalent of taking almost 10 passenger vehicles off the road.

In addition, we'll have one of the safest vehicles in the world, with safety features that provide visibility for the drivers, allow for some advanced safety features, and create safety overall for not just the drivers, but pedestrians and other road users as well. This is all based on our R1 skateboard platform. That's a little bit about Rivian.

The focus of this panel has been on what's being done in the policy arena. So, what is Rivian doing in this arena? We are heavily involved with policy. We have a policy team of about a half-dozen individuals. We're looking at both federal and state options. The remainder of my discussion will be on what we're doing on the state issues.

Senator Hansen mentioned the direct sales issue and the bill that he had sponsored. I think he was being a little bit modest when he talked about this. He really was the driver. It allowed, as he mentioned, Rivian, along with other EV-only manufacturers, to be able to seek a dealer license, and to offer their products direct to consumers in Colorado.

Let me back up and say that anyone in the United States today can buy a Rivian in any state. The question is, can you buy it in your home state or do you have to do that as an interstate sale? Colorado has just become one of those states where Colorado residents do not have to go to an Internet site based in another state or phone a California location or an Illinois location. They can now buy this at a retail location within Colorado.

A lot of folks are asking why we are doing this direct sales model. Why we are putting up our own stores? Why

we are investing in the infrastructure? Why we don't just go the franchise dealer route? There are several reasons. One, this is a new technology. There is a different approach with this altogether. Our vehicles, like Tesla's by the way, are connected to Rivian with owner permission. So, if an owner allows us to, we'll be able to monitor that vehicle to ensure it's operating at its optimal level, that the battery is handling electrons appropriately, and that the motors are operating at peak efficiency. And if there's anything wrong with that vehicle, we'll be able to notify that owner before he or she even sees evidence of a problem in the vehicle.

By the way, if the fix can be done by software, instead of having to go to a dealer service center, taking time off from work, sitting in a service station for the day, we could send a software update or a software patch over the air when the car is in the garage, plugged in, connected to Wi-Fi overnight while the owner is sleeping. You wake up with your car already repaired.

We can also send in software updates so that there are new features. Our vehicles will be equipped with a certain level of advanced features like lane departure warning, lane keeping assist, and adaptive cruise control. As more of these features become available and are developed, we can actually add those to existing vehicles through a software update. We cannot do that if we have to go through a franchise dealer network.

Let's also look at the dealer network from a sheer volume standpoint. Currently, the more than 10,000 independent franchise vehicle dealers in the United States today are responsible for the sales of 17 million new cars and trucks in the country each year.²⁷ General Motors alone produces roughly 170,000 to 200,000 vehicles a week.²⁸ So, these manufacturers are producing millions of vehicles and shipping hundreds of thousands of these out to the various tens of thousands of dealers to keep on their lot. This is the business model that allows a customer to come in, pick a vehicle right off the lot, and drive off with it that day.

That is not our system. Even if you look at the most successful EV company today, Tesla, their annual run rate for vehicle production is 500,000.²⁹ There is simply not the volume with EV-only manufacturers to be able to supply hundreds of thousands, millions actually, of vehicles to the tens of thousands of dealers out there to be able to compete with internal combustion engine technology.

This is why you see not only Tesla and Rivian, but others like Lordstown, Lucid, and Arrival, all interested in getting their products out to market in the most efficient way

27. Isabel Wagner, *Auto Dealers in the U.S.—Facts and Statistics*, STATISTA, Sept. 10, 2020, <https://www.statista.com/topics/3594/auto-dealers-in-the-us/>; Michael Wayland, *US Auto Sales Fall in 2019 But Still Top 17 Million for Fifth Consecutive Year*, CNBC, Jan. 6, 2020, <https://www.cnbc.com/2020/01/06/us-auto-sales-down-in-2019-but-still-top-17-million.html#:~:text=For%202020%2C%20analysts%20expect%20U.S.,million%20to%202017.1%20million%20vehicles>.

28. Beauty 101 Boutique, *Question: How Many Cars Does GM Make a Day?*, <https://beauty101boutique.com/qa/how-many-cars-does-gm-make-a-day.html> (last visited Feb. 5, 2021).

29. Press Release, Tesla, *Tesla Q4 2020 Vehicle Production & Deliveries* (Jan. 2, 2021), <https://ir.tesla.com/press-release/tesla-q4-2020-vehicle-deliveries>.

possible. This also allows consumers ultimately to have the choice of how they want to purchase their vehicles.

Traditional franchise dealers aren't really good at selling EVs, not yet at least. As recently as 2019, the Sierra Club did a study where they looked at franchise dealers, and 74% of those dealers did not even offer EVs.³⁰ Of the ones that did, 66% of them did not have a vehicle ready to show to a customer.³¹ They were often found in side lots or in the back areas not fully charged, not ready to display. This is not unique to the Sierra Club. Earlier reports by Consumer Reports,³² Cox Automotive,³³ and even CARB³⁴ doing blind studies show that franchised auto dealers weren't equipped or weren't willing to sell EVs.

By the way, that makes sense. More than one-half of franchise dealer profitability comes from servicing vehicles. Internal combustion engine vehicles have to come back every 3,000 to 5,000 miles for oil changes, air filters, spark plugs, all the things that require routine maintenance. EV maintenance costs, by comparison, are cheaper—one of the panelists mentioned that fleets were really interested in EVs because of this. It's because you do not have that routine maintenance. Really, you just charge up vehicles and go. They're widely appealing to fleets who want to reduce their maintenance costs. Total cost of ownership at the end of the day, when you look at it for an EV, between electricity costs and maintenance, is actually overall lower than an internal combustion engine vehicle.

There is also an issue about state laws requiring the use of a franchise and whether or not this is in fact even legal. Dan Crane, a University of Michigan law professor, recently penned a law review article that talked about the potential legality of state laws that mandate or exclusively require all manufacturers to go through third-party franchise dealers, including issues of constitutionality like due process, equal protection, and the dormant Commerce Clause.³⁵

I spend a lot of time talking about direct sales because that really is the opening into getting these vehicles out there. There are certainly other policy issues that folks have mentioned. Julie talked about the state emission efforts, for example, plus the ZEV mandate, the Advanced Clean Trucks rule, and GHG standards that are out there. Those

are certainly issues that we at Rivian are tracking and supporting, for example the preemption issues under CAA §177 and the Donald Trump Administration's rollback of California's authority. There is a coalition of energy companies, EVSCs (that is, charging stations), and EV manufacturers called the National Coalition for Advanced Transportation (NCAT), of which Rivian is a member, that did file a suit against the Administration to prevent not only that rollback, of California's preemption authority, but the rollback of the federal GHG and Corporate Average Fuel Economy standards.³⁶

We're also involved with state consumer incentive issues like California's Clean Vehicle Rebate Project (CVRP) and Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP) programs that provide consumer incentives to purchasers,³⁷ and the Massachusetts MOR-EV program.³⁸ Currently, a lot of those programs have limits based either on income or manufacturer's suggested retail price (MSRP) caps on vehicles.

Massachusetts, for example, has a limit that a vehicle cannot cost more than \$50,000 before you're allowed to apply as a consumer for a \$2,500 rebate or incentive for that vehicle. Well, \$50,000 might make sense for a sedan, but does it make sense for a pickup truck or an SUV, where the gasoline counterparts of the EVs actually run in the \$50,000 to \$60,000 range already? That's an issue that we're involved with.

We're looking at Massachusetts' Right to Repair provision.³⁹ This is a provision where manufacturers are required by law to provide diagnostic tools to allow third-party service stations to be able to read vehicles. This passed by 75% on November 3, mandating that certain telematics data also be accessible for the diagnostics, repair, and maintenance of vehicles.⁴⁰ Rivian does not have an issue with that type of approach generally, but where we see this as a problem is where we now are starting to run into privacy issues, as well as whether this mandates Rivian to disclose confidential and proprietary business information.

On the privacy side, do we have to throw open the ability for anybody to read a consumer's vehicle? Are we now required to reveal Rivian's source code for the software we put into our vehicles? This would conflict with federal intellectual property laws and may not be appropriate from a conflict of laws standpoint. Other issues mentioned are of course the privacy laws and what's going on with autonomous vehicles and autonomous vehicle legislation not only

30. Hieu Le, *Auto Industry Barely Trying to Sell Electric Cars Despite Consumer Interest*, SIERRA CLUB, Nov. 13, 2019, <https://www.sierraclub.org/articles/2019/11/auto-industry-barely-trying-sell-electric-cars-despite-consumer-interest>.

31. *Id.*

32. *Dealers Not Always Plugged In About Electric Cars, Consumer Reports' Study Reveals*, CONSUMER REPORTS, Apr. 22, 2014, <https://www.consumerreports.org/cro/news/2014/04/dealers-not-always-plugged-in-about-electric-cars-secret-shopper-study-reveals/index.htm>.

33. Press Release, Cox Automotive, Overcoming Electric Vehicle Misconceptions Is Crucial to Converting Consideration to Sales (Aug. 19, 2019), <https://www.coxautoinc.com/news/overcoming-electric-vehicle-misconceptions-is-crucial-to-converting-consideration-to-sales/>.

34. Matt Richtel, *A Car Dealers Won't Sell: It's Electric*, N.Y. TIMES, Nov. 24, 2015, <https://www.nytimes.com/2015/12/01/science/electric-car-auto-dealers.html>.

35. Daniel A. Crane, *Tesla, Dealer Franchise Laws, and the Politics of Crony Capitalism* (U. of Mich. L. & Econ. Research Paper No. 15-009, 2015), available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2566436.

36. Ellen M. Gilmer, *Tesla, Electric Car Backers Join California Auto Emissions Case*, BLOOMBERG LAW, Nov. 18, 2019, <https://news.bloomberglaw.com/environment-and-energy/tesla-electric-car-backers-join-california-auto-emissions-case>.

37. California Clean Vehicle Rebate Project, *Home Page*, <https://cleanvehiclerbate.org/eng> (last visited Jan. 14, 2021); California Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project, *Home Page*, <https://www.californiahvip.org/> (last visited Jan. 14, 2021).

38. MOR-EV, *Home Page*, <https://mor-ev.org/> (last visited Jan. 14, 2021).

39. Ballotpedia, *Massachusetts Question 1, "Right to Repair Law" Vehicle Data Access Requirement Initiative (2020)*, [https://ballotpedia.org/Massachusetts_Question_1,_%22Right_to_Repair_Law%22_Vehicle_Data_Access_Requirement_Initiative_\(2020\)](https://ballotpedia.org/Massachusetts_Question_1,_%22Right_to_Repair_Law%22_Vehicle_Data_Access_Requirement_Initiative_(2020)) (last visited Feb. 5, 2021).

40. *Id.*

at the federal level, but on the state level, as every state starts to look at what they're willing to allow.

So, to wrap up, there's a myriad of policy issues, and I am really excited about what the states are doing. I think there's a lot going on in this issue. Frankly, to bring this full circle back to what I said earlier about the atmosphere and the policy landscape, I think times have changed, people are recognizing the importance of EVs, not just from the zero emission side, but for all the policy reasons I've mentioned. We really are moving into a new era where a lot of these issues are being debated and discussed.

Julie Domike: That was a very stimulating and informative panel, and I appreciate everybody's participation. I hope Caitlin has received some questions.

Caitlin McCarthy: One of our participants asks, has any legislation tried to address getting car dealerships to be more knowledgeable and to better market EVs? I have heard that this is an issue because car salespeople and dealerships don't know about EVs and are not effectively selling them.

Chris Hansen: That was not the approach we took in Colorado. We thought the better thing to do was to open up competition. If the existing dealerships wanted to have market share, they were going to have to get better. I don't think there's really a right role for a statute to say that a certain business has to do a certain thing. Obviously, there are safety requirements and disclosures, and all that type of regulation. But we obviously couldn't make the dealerships do a better job selling EVs. The alternative was to let other market entrants come in and provide competition. We think that's the quickest way to solve that problem.

James Chen: I agree with Senator Hansen. As a free market proponent, I am not a big fan of government dictating to private businesses what they should sell, what they shouldn't sell, and how they should run. The best way to do that is through competition. I think dealers have an opportunity here. Dealers are seeing folks like Tesla and soon Rivian in states like Colorado, California, Illinois, and Oregon. There are states that allow direct sales. And, of course, there is the ability to sell through interstate processes, and this will, hopefully, put pressure on dealers.

Let's be clear. For Rivian, and myself personally, this is not some anti-franchise dealer mission that we're on. This is about getting EVs out there and doing this in the most market-friendly approach possible. Our bill, our push, our policy on this gives consumers the choice. They can still go to their dealers. We're not advocating to state legislatures that they should shut down franchise dealers. We're saying open up the marketplace and let consumers decide.

Caitlin McCarthy: A participant asks, are you running into issues with right-of-way prohibitions on commercial-use EV chargers in rest areas or other areas?

Matthew Nelson: It's a great question. For those of you who don't know this issue inside and out, the commercialization of the highway corridors in the United States is prohibited. This takes many forms. For instance, in most parts of the country, billboards are prohibited in the highway corridor. You will never drive down the road and see the AMBER alert sign flashing an advertisement when there is not an active AMBER alert because the federal government has tried to prohibit commercialization in the highway corridor.

This extends to rest stops. If you pull off at a rest stop that was built basically after 1967, it will include vending machines and bathrooms, and usually a tourism information booth, and that's it. There are no other allowable commercial activities that can happen at that rest stop, including charging. This is a long-standing principle that has prevented companies like us from putting charging stations at rest stops. The exceptions to these are the older stops, mostly on the East Coast—the ones that might have a McDonald's and a gas station. We can build there. But we cannot build at the more traditional rest stop. It's federal law.

The most recent time it was considered, the U.S. Senate considered it during the original Fixing America's Surface Transportation (FAST) Act authorization, and to change this rule received nine votes, and the opposition was more than 90 votes. It's a very difficult rule to change, and the reason for that is straight commercial interests; the truck stop operators who operate on private land do not want to compete with the stations at federally owned or state-owned rest stops. So they have advocated for this.

Our solution to this is that we build right off the exit. We build at truck stops, but we also build at other types of retailers right off the exit, so it's just as convenient as using a rest stop. We don't build in the rest stop themselves. It would be great if this got fixed. But in reality, most rest stops don't have the power capacity on-site anyway to build high-powered charging stations. Even if we were allowed, most rest stops would be impracticable. But the law is the current barrier.

Caitlin McCarthy: Another participant brings up the issue that criticisms of EVs often lie in their climate impacts. She's asking if any of the panelists want to speak on how you would respond to a critic who feels that there is just as many emissions put out through the manufacturing of EV vehicles as they may reduce in emissions from their use.

Chris Hansen: There has been a huge amount of life-cycle analysis done on this question. Of course, there's some dependency on what the makeup of the portfolio is on the grid side. Is the electricity coming from a coal plant or from wind and solar? That obviously makes a big difference. But even if it's coal, it's still better than the internal combustion engine. Even in the worst case on the electricity side, if you do the full life-cycle analysis, you're still reducing emissions when you go with an EV. I think we have to take a really close look at that life-cycle analysis. Obviously, there are emissions with the batteries, and of course the steel, and

the fiber, and all the plastics that go into any car. But from what I understand, from the life-cycle analysis I've read, it's still not even close. EVs always come out ahead.

James Chen: Let me address the manufacturing side. First and foremost, I think Senator Hansen got it exactly right, the fact that there are numerous studies out there that folks can read, including one from the Union of Concerned Scientists that examined the energy outlook for EVs and their overall emissions profile from well to wheels of the electricity.⁴¹ Yes, even with coal, the equivalent EV comes out better than the average sedan. I might be mistaken. It might even be better than a traditional hybrid vehicle.

With respect to the manufacturer, no product is going to have perfectly zero impact. By the very fact that we're all alive, we're generating CO₂. But what we can do is be more responsible about our external emission profiles—like from the type of transportation we utilize. Lithium-ion batteries, for example, from the manufacturing standpoint, is a better option than constantly consuming petroleum, which is a finite resource. Electricity, of course, as we move to more sustainable options, shows more promise in renewability. Lithium-ion batteries themselves do not consume any of the precious metals that are used to make up those batteries.

Rivian, for example, has a recycling program where we work with the recycler. Lithium is not consumed. The cobalt, the iron, all the other metals, they are not consumed. It's all about moving electrons back and forth, and, at some point, the efficiency of the electron movement is no longer capable.

First and foremost, we design our batteries to be second-life. So, when you look at an average vehicle life-span as long as 10 years, you get 10 years out of that battery for transportation use. Our batteries are designed to be taken out of the vehicle and put right into stationary application without any further remanufacturing or modification. Each one of our batteries comes with approximately nine modules. Each module comes with a battery-management system, a computer electronic control unit that controls that, and they're stackable. So, you can take that battery and stick it in a stationary storage, and now you've got backup power for a sustainable solar array or wind array for a building.

In fact, in June 2019 we entered into a partnership with the Honnold Foundation, a charitable organization run by Alex Honnold, to donate to him used batteries from our test vehicles. Those are now being used as backup power sources in Puerto Rico, in certain critical infrastructure buildings. I believe it's being used at a day care and a nursing home facility.

So, that's another 10 years you get out of a battery. That's 20 years, and then after that, like I said, the metals are not

consumed. You send it to a recycler. We have an arrangement with a recycler that we pay to take our battery. They give us a rebate based on how much of the metal they recover in the process. Pretty much, they take apart the battery. They remove the printed circuit boards. They can recycle those. They pull out everything that's usable—the wiring, the copper from the wire—and then they shred it, and they pull out the metals that are in there, mechanically and chemically, and then they sell those metals. Again, we get a rebate based on how much money they make off of each pack. Today, we are near even or maybe just a few cents over what we're paying for each one of those batteries. This technology and this process will only mature as more and more of these batteries get on the ground.

There are issues of critical minerals, and how those minerals are mined. We are very cognizant of that. That has more to do with perhaps geopolitical issues than it does with availability or access. Right now, for example, certain critical minerals, the rare-earth minerals that make up batteries, for example, 90% of those are produced in China not because they don't exist anywhere else, but because the Chinese government has so heavily subsidized that industry. If we were to form policies that got behind supporting domestic production because there is actually a mine mining these minerals in the United States, then we could see more availability.

Finally, it's up to the manufacturers to decide how they want to do it in terms of responsibility. We have something called the Ocean Plastics Initiative, where we are actively working with companies that are diverting used plastics, oftentimes water bottles at resorts, from going into the waste stream, diverting them from the ocean and turning those into totes, wraps, and other things that support our manufacturing facility in Normal, Illinois. We are actually using waste plastics to help build the infrastructure for our factory.

We're also looking at the plastics that are used in shipping lithium-ion batteries because lithium-ion batteries are heavily regulated. We buy the cells from overseas. They have to be packaged in plastic trays. They have to be put in cardboard boxes. They have to be put in wooden crates. This, again, is all United Nations requirements to ensure safety of the transport. When we get those, we naturally recycle all the wood, all the cardboard, and the plastics. We have a program on-site where we have equipment that turns that plastic into pellets. We form those pellets into body panels that we are actually using for the Amazon delivery trucks. So, not only are we reusing plastics where we can for support of manufacturing, we're actually putting them into our vehicles.

Matthew Nelson: The most important thing to note is that it's getting better. The climate impact of EVs is getting better every year as the grid gets cleaner every year.

The second thing to note is that for us, I mentioned it in passing, because the LCFS incentivizes low-carbon fuels, we power our stations with 100% renewable energy in California and Oregon. We are in the process of taking that nationwide. We are truly zero emission. If you bring in an

41. David Reichmuth, *Are Electric Vehicles Really Better for the Climate? Yes. Here's Why*, UNION OF CONCERNED SCIENTISTS BLOG (Feb. 11, 2020, 2:08 PM), <https://blog.ucsusa.org/dave-reichmuth/are-electric-vehicles-really-better-for-the-climate-yes-heres-why>.

electric car to an Electrify America charging station and fuel up, your use of our electricity will have zero emissions.

Caitlin McCarthy: It sounds like we're going to need to invite you all back in a year and talk about circular economies, because you are just about there. We do have another question from a participant who asks, of the policy initiatives meant to increase deployment of EV infrastructure, what is best done at the state level, and what is best addressed at the federal level?

Chris Hansen: We are coming out of a four-year period where the federal government was not very interested in this. That required state-level leadership. I'm all for the Tenth Amendment, as you might expect a state senator to say. And that's what was required in California, Colorado, Massachusetts, and New York, and states have led on this. They'll continue to lead because they know what works in their state. They know where charging infrastructure is needed. They've got mechanisms to be able to drive those investments. What I would say is that we could rapidly advance this if the federal government would get serious about providing some temporary rebates to kick-start parts of this market.

The other thing I would love to see is the federal government to get more serious about investing in better transmission infrastructure for the whole country. We need an integrated regional transmission organization (RTO) for the West. We need it for the East. Eventually, we need an RTO for the entire North American grid. That is another way we can rapidly accelerate decarbonization and make it much easier to electrify transport and everything else, which frankly is the only way we're going to hit our carbon targets and our emissions targets. That's it. The federal government should do those big things that it is best able to do and leave the rest for the states.

Matthew Nelson: I spent some time talking about demand charges during my presentation. Utility rates are a state matter. They have been a state matter under our federalist system for a very long time. The federal government does give broad guidance under the Public Utility Regulatory Policies Act (PURPA) §111(d). But the only thing that PURPA §111(d) does is direct the commissions on what they must consider. The rate-setting itself is going to stay at the state and local levels—local when it's a municipal utility and state when it's an IOU. In that area, states have a huge opportunity to make themselves more attractive for third-party investment by addressing the rate structures and making sure that they attract investments, so that cost doesn't fall to taxpayers and ratepayers.

Caitlin McCarthy: We do have a couple of minutes, so if each of you want to give one-minute closing remarks, anything that's been percolating in your mind as we've been presenting.

Julie Domike: I really appreciate the breadth of knowledge and information and depth of what we've been hearing

today from our panelists. I have been much more educated in the past hour-and-a-half than I have been at any point in time regardless of all the articles I've been reading over the past couple of years.

2020 has been a formative year, in my opinion, for clean transportation initiatives. It's been aided by the absence of action at the federal level and with the vacuum being filled by the states. Thank you, Senator Hansen, for ably representing what the states can and have been doing. Also action has been taken at the company level, such as Electrify America, which has a huge investment out there to assist with the electrification of vehicle fleets.

Gina Falaschi: I would like to follow up on the last question we answered and say that I agree with Senator Hansen. If we look at what should be done at the federal level versus what should be done at the state level, 2020 has proven that states are very adept at advocating for their citizens and putting programs into effect that will be beneficial. Even if we see significant action at the federal level for EVs, I really hope that it doesn't stifle state efforts. Progress is progress, and incentives are incentives. I think any action in the direction of EV adoption is helpful, and I really hope that states continue to partner with industry, and industry continues to partner with states, to increase EV adoption nationally.

Chris Hansen: We've got products coming to market that are better, cheaper, and faster. Remember when you all had a flip phone in your hand? How long did it take to switch to a smartphone? It turns out it took the entire U.S. population less than three years to make that transition, and it speeds up faster and faster with every better, cheaper, faster product that's coming to market.

That's where we are now. We've got pickup trucks. We've got SUVs. We've got sedans. We've got the entire slate of delivery vehicles. Now we're seeing semi-trucks. It looks like the market is going to be filled in by this technology. It's better. It's cheaper. It's faster. We're going to switch really fast. And I think our job is to make sure the policy environment enables that, doesn't slow it down, and customers are going to choose better products.

Matthew Nelson: I'll go back to that this is one of these danger moments where there is so much interest and energy behind doing something, and it can be a wasted opportunity. If I learned anything in 12 years in the federal government, it's that wasted opportunity really can't ever be reattained. I'll finish with where I started.

There is evidence out there of what works and what doesn't at the state and local levels. I think we should be very conscious of that, and we should really focus our energy, effort, attention, and time on what has proven to work, and avoid the temptation to get too focused on the shiny new object as the new policy idea that might or might not work. Because we know it works, and where each of this set of policies has been implemented, EV adoption has taken off.

It's the things that we've talked about today. It is direct sales. It is the ZEV mandate. It is incentives. It is all of the

things that Colorado, quite frankly, has done in the past three years. They've gone from a no-policy environment to what the conditions are for a reasonable growth in EV adoption. If other states do the same, if they look at that bag of tricks and pull a few items out of that bag, they can have the same effect. So, let's not get distracted by the big new idea, and really focus in on what the research shows works, and put our time, energy, and effort into that.

James Chen: I'll reiterate that it's been great being here on this panel, with all of these leaders. Every one of them is a leader in this space.

Senator Hansen, I hope we really are seeing that faster switch, and we really do need to persist. I think Matt is exactly right. We are at an inflection point. This is a tipping point for a complete paradigm shift on how we look

at transportation, and even beyond transportation, energy, and, you know, autonomy. Autonomy is the gateway to artificial intelligence, so we really are in the cusp not just for transportation, but energy and artificial intelligence.

This is an exciting time, but as Matt noted, it's an inflection point. We can either keep pushing forward and following leaders like Senator Hansen and others in the states, Gina McCarthy of course, or we could fall back and say that the job is done when it's not even there.

We cannot take our foot off the accelerator—not the gas, on the accelerator—to keep us moving forward. I'm proud and honored to be a part of this team that has been able to present today and look forward to working with everyone more into the future as we try to bring about this cleaner, smarter, better future for all of us.