VELOZ SUMMIT SERIES: Navigating the EV Ecosystem

Wednesday, July 27, 2022 | 10 a.m. – 2:30 p.m. (PT) | Virtual

SUMMIT TRANSCRIPT

Josh D. Boone, Veloz Executive Director (00:00:02):

Good morning and happy summer, everyone. Welcome to the Veloz summit series on navigating the EV ecosystem. Thank you all so much for being here today. My name is Josh Boone and I am the executive director of Veloz. I have a few remarks, and then we look forward to an excellent program today. For those of you who are new to velos, we're a 40-plus-member nonprofit that connects private and public sector organizations to accelerate and communicate the value of transportation electrification for all our members include state and local government automakers utilities, environmental NGOs, charging providers, ride share companies and many others. Today's summit is our annual member event where all keynote speakers, panelists, and moderators come from Veloz member organizations. Many of our speakers come from the Veloz board. We are thrilled to feature the thought leadership of our membership and invite each of you to consider joining the Veloz movement.

Josh D. Boone, Veloz (00:00:58):

We are at a critical tipping point in the EV industry. California has surpassed 16% EB market share. And nationally that number is almost 6% with fast rising consumer demand and influx of federal and state funding for charging to spur even more adoption and new vehicle makes and models being released every day. We are also facing some challenges with setbacks to federal climate legislation and choke supply chains due to COVID and the war in Ukraine. In today's summit, we will check in with specific parts of the EV ecosystem, automakers utilities, ride share providers, charging companies, and others to discuss the exciting opportunities. And also, the specific barriers we are facing with strategies to overcome them. Our panelists will talk about how to best leverage these upcoming investments, the progress of their electrification efforts to date and how to ensure that transportation electrification is equitable at velos.

Josh D. Boone, Veloz (00:01:53):

We believe that we can move faster and more effectively when we work together. And the goal of this summit series is to drive dialogue around policy and education by bringing together industry experts and timely topics to all of you doing such excellent work out in the industry. Now, before we get to the content, I do have a few housekeeping notes. Today's summit is being recorded and will be available after the event. It will be a continuous zoom webinar link. So, you can use the same link for the duration of today's summit. It is important to share what you learned today. Follow velos on Twitter, share key points and tag at lets Veloz again. Our hashtag is at lets Veloz. Lastly, my colleague Moony Krishna, which is velos strategic partnership director will MC today's summit. You'll meet her a little bit later. So, let's jump right in. It is my honor to welcome the chair of the velos board of directors and the senior vice president of corporate affairs at Southern California Edison and Edison international Caroline Choi. Caroline is responsible for overseeing government affairs, public affairs, corporate communications, and corporate philanthropy on a national state and local levels for one of the nation's largest electric utilities. Welcome Caroline.

Caroline Choi, Southern California Edison and Edison International Senior Vice President of Corporate Affairs (00:03:08):

Thank you so much. Josh and good morning to everyone. It's a pleasure to be with you today and what an exciting time to be working in mobility. So, I'm just going to cover a few things in my remarks. I want to quickly cover the progress made since we really rarely take time to pause and celebrate that I'll touch on the opportunities we have to advance transportation electrification at a scale and speed that's really necessary to achieve the ambitious climate and clean energy climate and clean air goals we have. And then I'll talk some about what's in the California Edison is doing to meet the future of electric transportation. So how are you doing, you know, according to Bloomberg analysis of adoption rates around the world, the us is the latest country to pass. What's a critical EV tipping point and that's 5% of new car sales powered only by electricity.

Caroline Choi, Southern California Edison and Edison International (00:03:56):

So that threshold signals the start of mass EV adoption when technological preferences rapidly flip. And we're seeing that as customers come talk to us, so we've reached a nearly 6% adoption rate in the United States, which is just tremendous and here in California, of course continue to make progress. At the end of May, we had over 1.1 million EVs registered in the state and we had about 372,000 of those in Southern California Edison service area. I'm the owner of one of those vehicles. So, with the cost of gas up recently electric vehicles are certainly beginning to look more and more like the budget friendly option. And the cost of electric is, is really dropping with many automakers like Chevrolet Nissan Hyundai dropping the price for the entry level models. And then there's competition in the EV space with new vehicles coming to market around the $45,000 price point like the Hyundai ionic five, the Kia EV six and the Volkswagen ID four.

Caroline Choi, Southern California Edison and Edison International (00:04:59):

So, I'm really excited. My lease is actually coming due soon. And so, I'm already out there looking at new vehicles and, and what I might get into they're also really helpful policies that are driving vehicle adoption, which is great to see beyond the federal tracks credits customers whether you're buying or leasing a vehicle can take advantage of state local and even utility programs. And then with Volkswagen Ford, and you're going to hear from Cynthia Williams here in a minute, BMW, they're each targeting 50% or more of their global sales to be fully electric. By the end of the decade, we really are excited about the continued growth in this market, the trajectory that we're on as auto makers and suppliers ramp up production. So really fantastic place to be in at the moment, but always room for improvement, right?

Caroline Choi, Southern California Edison and Edison International (00:05:53):

And so, while progress has been made and certainly here in California, policy makers and stakeholders, all of you realize that we need to increase the pace of electric vehicle adoption and supportive infrastructure to meet the state's ambitious 20, 30 and 2045 goals. SES analysis shows that for California to meet the 20, 30 and 2045 climate goals affordably, the state needs 80 gigawatts of large scale, renewable energy and 30 gigawatts of distributed renewables as well as 30 gigawatts of large scale energy storage and 10 gigawatts of distributed energy storage and leveraging all that clean energy that the electric utilities are delivering to reduce emissions in other sectors of the economy, like the electrification of transportation and buildings, which are the two largest sources of greenhouse gases in the state of California. And so, in the vehicle

space, we see the need for electrification of three quarters of passenger vehicles and two thirds of medium duty and one third of heavy-duty vehicles and California highways by 2045.

Caroline Choi, Southern California Edison and Edison International (00:06:58):

So, a tremendous amount of electrification needs to happen in the transportation sector in not that many years. And that equates to 26 million cars, right? We're at 1.1-ish we need to get to 26 million passenger vehicles, 900,000 medium duties in 170,000 heavy duty vehicles by 2045. So, to achieve that level of electrification, we're estimating an investment need of 175 billion in clean energy, plus another 75 billion in transmission distribution grid investment. And that sounds like a lot of costs, which it definitely is. It also translates into well-paying jobs and the clean energy and clean tech space. It's a decline as well in spending on fossil fuels like gasoline, diesel and natural gas and the customer's energy share of wallet should actually decline over that timeframe. And that sizeable investment may seem to be overshadowed if we don't pick up the pace by the growing cost of inaction in the form of damage, that's been resulting from increasing number of destructive natural disasters that had been driven by climate change.

Caroline Choi, Southern California Edison and Edison International (00:08:06):

So as advanced the clean energy economy, California and other places as well need the right policies investments in incentives to make the transformation a reality. And so, for example, what California is on track to surpass its goal of 1.5 million, zero emission vehicles on state roadways by 2025, the state is behind in providing the charging infrastructure needed to support the growing segment. You know, we know that the EV market, as it moves from early adopters to the more mainstream buyers, the charging infrastructure needs to be there to help drivers shift to EVs as their primary vehicle. And so, to achieve eight-man, zero emission vehicles by 2030, which carve has identified as what is needed. We also need approximately 1.2 million share chargers to support the expected intra region travel demands. And so, when you count for what's planned today, the current estimates indicate that there's going to be 193,000 chargers in statewide in 2025.

Caroline Choi, Southern California Edison and Edison International (00:09:07):

So that means that by 2030 California needs almost a million more additional chargers to meet the Chan charging demand that we see for the 8 million vehicles. Another need we see is ample funding. And while we applaud California's actions to step up efforts to meet the climate challenge one year of ample funding, isn't going to do it that said definitely should celebrate what was passed in the 2022 state budget with approximately 10 billion over multiple years, including 600 million in 2022 for medium heavy duty, zero emission vehicle trucks and buses 76 million for low income light duty zero emission vehicle incentives and then 383 million for infrastructure particularly in low income communities. And that will definitely go a long way in getting towards that one point million over 1 million chargers that we okay. So just that we needed ample funding that there was a great opportunity in 2022.

Caroline Choi, Southern California Edison and Edison International (00:10:12):

And we really applaud the state for the budget that was passed with approximately 10 billion over multiple years, including 600 million for medium heavy duties, zero emission buses and trucks 76 million for low income, light duty, zero emission vehicle incentives and 383 million for zero emission vehicle infrastructure and low-income communities, which is really going to be helpful to meeting that need for the additional

chargers. And while we're awaiting some details, we definitely see the increase focused on emissions, free transportation as a really wonderful thing. So last year when we released this paper, we called it mine, the gap, which contains policy recommendations to accelerate the rate of emission reductions necessary for California to achieve its 2030 greenhouse gas emissions target. And while California has achieved a 1% average reduction each year to hit its 2020 target, which you all know is the 1990 emissions level, which is great given that California had economic growth in that timeframe, the rate of emission reductions it needs to achieve between now and 2030 is quadruple that because we have a 40% below 1990 level target to hit in seven and a half years.

Caroline Choi, Southern California Edison and Edison International (00:11:23):

So, at the state level, we had some recommended policies which include developing a plan for achieving the 2030 targets, including vehicle and supportive infrastructure adopting infrastructure targets of the 1.15 million chargers. So, it's going to be needed to hit the 8 million vehicle target by 2030. And to incorporate that in state policies and agency decisions related to infrastructure and planning providing funding to governments and communities to identify their infrastructure needs to advance and accelerate transportation electrification in their areas, developing a state level plan, a total funding to cover the infrastructure gap. So, while the 2022 budget certainly is a great step forward along with the federal infrastructure law that will send billions of dollars to California, we don't really have a clear picture of what's going to be needed through 2030, and definitely streamlining and prioritizing infrastructure build out.

Caroline Choi, Southern California Edison and Edison International (00:12:18):

This is going to take collaboration with our local and regional governments as well. Increasing vehicle incentives and making the incentives multi-year to help improve market certainty and then making the vehicle incentives redeemable at the point of sale, which has been done. The California clean fuel rewards program does that, but the incentive has dropped because of the demand and it hasn't been matched by the funding source. So would definitely like to see that funding come back. And so, while I spoke to these state level policies, they're also federal government policies as well, and I'm not going to touch on those given the time constraints, but those are also in the white paper that you can check out at the se.com. So now I'm going to talk about the role of utilities. You know, our vision at S international is to lead the transformation of the electric utility industry.

Caroline Choi, Southern California Edison and Edison International (00:13:06):

And that includes accelerating the adoption of clean technologies like electric vehicles. And we think investor utilities are critical partners to charting a course to achieve the objective of reliability, climate adaptation and decarbonization while maintaining affordability of the product. So, couple ways of doing that. One is through our EV programs, Southern California Edison has a suite of charging programs under the umbrella of charge ready EV and together they are the largest utility led programs in the country and through charge ready, which is over a $800 million of EV charging infrastructure and rebates to support charging at public and multi-family locations. And for medium heavy ed trucks, school and transit buses, port equipment, and other industrial uses. So as customers come in to explore those opportunities, we want them to have certainly a positive experience on their electric transportation journey. One of the

things we have to do is educate them around the current lead times for site design permitting construction, because that can take 12 months or more depending on the project and its complexity.

Caroline Choi, Southern California Edison and Edison International (00:14:17):

So, our strongest advice for customers and for any of you who are interested in working with us in our program in charge, ready, please engage us early. Talk to if you're a commercial customer, talk to your utility account manager regularly communicate. If you're looking at fleet electrification, because we want to make sure that we have the infrastructure in place and time for your vehicle delivery, that it is adequately sized for the planned fleet that you are anticipating for the charging times that you are looking at and for other operational news you may have. So that's definitely something that I would encourage, not just for those who want to work with Southern California Edison, but for any utility that they give a lot of ample notice to the utility and continue to engage with them regularly, as your plans come together. Another way that utilities support vehicle electrification is through our rates, and we offer a number of attractive rate options to make electric vehicle charging more affordable during times of the day, that's both beneficial to the customer as well as to the electric system.

Caroline Choi, Southern California Edison and Edison International (00:15:22):

And particularly for our commercial customers, our transportation electrification advisory services worked with them early in their journey to talk it to them about the rate options, charging strategies, overall cost of ownership, to help them understand and manage their total energy wallet. So, it's really critical that we continue to think about equity as we develop customer programs and we invest in clean energy programs and technologies and deploy the infrastructure to modernize and expand electric grid. One of the things that Edison does we work in partnership with representatives of our diverse communities and we wait toward helping our lower income and disadvantaged customers be part of the energy transition. We're really focused on making sure that all of our customers benefit as we move towards a clean energy economy. One of the things we learned in working with our customers is that we should offer a rebate program to support the purchase or lease of electric vehicles.

Caroline Choi, Southern California Edison and Edison International (00:16:19):

So, with state programs, targeting new vehicles, se SCE offers a rebate for the purchase or lease of a used vehicle. And we have a standard $1,000 rebate as well as a $4,000 rebate for certain income qualify customers. And we also heard about the cost of EVs from our commercial customers, particularly schools and transit customers who are looking at going electric with those buses. And those are particularly dependent on public grant funding. So, our transportation electrification advisory services, our TE advisory services now offer grant writing assistance and grant package review for customers who wish to apply for state and local funding. And so, while I'm proud of all that we've done here, we all know that there's more work to be done. And the pace of vehicle Excel adoption is accelerating. So, we're going to need to update our programs and policies to meet our customers' needs.

Caroline Choi, Southern California Edison and Edison International (00:17:13):

And that we certainly don't want to be the bottleneck to customer adoption of zero emission vehicles and success here is going to take continued partnership with policymakers, regulators, customers, and stakeholders like yourselves. And so that brings me to my last point. And that partnerships truly are key

here to the success of transforming the vehicle market and that cross sectoral support via partnerships and collaboration has been critical to arriving at the right solutions. And it will continue to be critical. Edison is a member of several organizations working to advance the rapid transition to zero mission transportation sector and as board chair and an active supporter, I'm just going to plug Velo here for a second. You know, we have a diverse board that represents various industry players. We also have an actively engaged public policy committee of government leaders. So, we think Velo is uniquely positioned to bring cross sector engagement and thought leadership to the space and through its programs and campaigns.

Caroline Choi, Southern California Edison and Edison International (00:18:13):

The lowest is leading the charge in customer education. Certainly, here in California, the summits and the webinar series, they provide an avenue to actively seek diverse perspectives and share inclusive ideas to achieve clean transportation while also creating a space for dialogue to address challenges bust myths and make connections and drive collaboration. The electric for all campaign that we have helps customer find incentives, the right car and the right home charger. And then finally our ad campaigns like kicking gas or the 40 million reasons to go electric or this upcoming Myths Busting Myths campaign reach broad audiences and help position the EV revolution within the mainstream public discourse. So, if you're not a member of Veloz, I hope you'll consider joining. So, in closing, it's a big ask to move the market and there's no individual company or sector region that can manage the clean to enable that affordable, reliable, just transition for one. And we are going to continue work on our commitment to harness the diverse wisdom and talent of our teammates, our partners, and communities to lead and align the clean energy transition. If you'd like to work with us, please don't hesitate to reach out. So, thank you. Thank you so much.

Munni Krishna, Veloz Strategic Partnerships Director (00:19:25):

Thank you so much, Caroline, for setting the stage for today's summit, your remarks are so appreciated about making the transition to electrification, be equitable for all. Hello, everyone. As Josh mentioned, my name is Munni Krishna. I'm the strategic partnerships director here at Veloz and your MC for today's event. I am thrilled to be with you to help introduce our spotlight, speakers, and panels. But first during the event today, we'll be doing two drawings for a $30 visa gift card, as a way to say, thank you for joining us. So, let's kick off this morning with a drawing name of all registered attendees have been added to the wheel of names, and we're going to spin that wheel to see who the lucky winner of the $30 visa gift card is. And there's more than 500 of you on today's webinar. So please excuse us. Those names look really tiny on that wheel.

Munni Krishna, Veloz (00:20:17):

Congratulations, Dominic, our team will reach out to you via email today after today's event, we're going to have another $30 visa drawing before our closing keynote. So please stick around up next. We have a spotlight talk from Cynthia Williams, the global director of sustainability and compliance at Ford Motor company. Cynthia's responsible for sustainable business plans and policies, environmental negotiations with regulatory bodies around the world, reporting on the company's environmental and social performance and engaging with non-governmental organizations and other external stakeholders. I say this to note how incredibly lucky we are to have Cynthia with her breadth of knowledge on the industry, both on velos board and in today's summit. Welcome Cynthia,

Cynthia Williams, Ford Motor Company Global Director, Sustainability, Homologation and Compliance (00:21:01):

Thank you, Munni. And thank you for having us here today. It's a really, really exciting time to be in the auto industry, and it's a pleasure to be here to represent Ford and to share a bit about how Ford's springing to electrify our fleets. I'll start with just a few weeks ago Bloomberg reported that the us sales passed 5% mark, and that's a critical Tempe point where you see technologies move from early adopters to more mainstream demand. And as usual, California is little ahead of the rest of the us and, and past the 5% mark about 2017. And they're now rocketing past 15% sales of electric vehicles. Very, very exciting for our industry and consumers and the sales success. It's not just personal use customers, businesses like those at the Dutton ranch love electric vehicles and what they have to offer the solutions provide both sustainable and lower cost solutions for customers. Our first year's production for our Eran electric vehicle sold out quickly and the vehicles are already on the road today doing the work that keeps America moving.

Cynthia Williams, Ford Motor Company (00:22:51):

And our four pro model is geared to provide an end-to-end solution for our commercial customers. That includes charging, that includes financing and also intelligent vehicle solutions for their entire fleet. The EV revolution is happening, and Ford intends to not only be part of it, but to lead our industry in creating ultra-efficient carbon neutral electric vehicle manufacturing systems that deliver electric vehicles to millions of people in California, across the us and globally. We understand the urgency of doing things to address climate change is now we're scaling up and have announced plans to, to be, to bring two massive environment and technologically advanced campuses in Tennessee and Kentucky that will provide the next generation electric F-Series trucks and batteries to power future Ford and Lincoln vehicles. We are putting our money, you know, where our mouth is. We're investing over 50 billion through 2026 to ensure that we can reach our aspirational targets on climate change.

Cynthia Williams, Ford Motor Company (00:24:38):

And let me expand a bit on that, just to give you some, some background grounded in science, we have established interim targets through the science-based target initiative to address the urgency of climate change. We're focusing on three areas globally that accounts for more than 95% of our CO2 emissions. That's our vehicle use our suppliers and our operations. We're going beyond tailpipe emissions, reducing vehicle emissions on a well to wheels basis. Again, our we're focusing on our supply chain, which is our initial approach is to we're targeting our select tier one suppliers and our operations. We're targeting both scope one and scope two emissions for manufacturing and non-manufacturing locations and building on strong demands from, for our electric vehicles from, from our consumers Ford recently announced a set of initiatives that for sourcing battery cap capacity and raw materials, that, that it sets a clear pathway to reach our aspirational targets, to reach 600,000 EVs by 2023, late 2023, and more than 2 million electric vehicles by 2026.

Cynthia Williams, Ford Motor Company (00:26:17):

And Ford creates a new EV supply chain that upholds not only our commitments to SA sustainability and human rights, but company continues to plan more than half of our electric vehicles will be our half of our vehicle fleet will be electric by 2030 and achieving again, our carbon neutrality goals no later than 2050, while we're excited about the momentum for electric vehicles, there is still lots of work to be done to

ensure that transition continues to accelerate a huge focus. And one of Ford's core values in our history is on accessibility and access to EVs and EV infrastructure and affordability are all focal to the just transition strategy that we've laid out. We support the transition to electrification. That's economically equitable. Ford is offering non-discriminatory financing for products to that, that serve that, that our, for our underserved communities and borrowers, we're driving investment in low income and disadvantaged communities where financing may also relate to installing charging infrastructure for individual consumers. We are also focused on our own workforce. We're investing more than 525 million in the us over the next five years to ensure that we can train auto technicians for electric vehicles and we're developing our employees that can develop and maintain skills that they need as well. Again, just transition is key to our progress.

Cynthia Williams, Ford Motor Company (00:28:46):

That's why I'm so happy to be working with organizations like VLO S who committed to overcoming barriers to electrification and to create a virtuous cycle of desire and demand for these vehicles. Demand side incentives are enabling factors for boosting EV demand. It's critical to continue the momentum to accelerate electric vehicle adoption customers need finance incentives to buy vehicles until you know, the, the cost of batteries continues to come down. Customers need to have infrastructure charging infrastructure in place to provide range confidence customers living in multifamily dwellings also need alternative solutions for charging. So continued work in, in, in the community to develop viable charging solutions is really, really key to continue this momentum soft incentives like free charging, free parking access to driving HOV lanes here in California and other areas continued education to just make sure that everyone's really, truly understands the benefits of electric vehicles and what they have to offer. And of course, OEMs like Ford will continue to provide alternative attractive electric vehicles, new models each year through our electrification strategy, connectivity, and sustainability aspirations. We are transitioning to a model that emphasizes services, relationships, human, and social capital, and also supports our purpose to help build a better world where every person is free to move and pursue their dreams. Thank you for having me here today.

Munni Krishna, Veloz (00:31:22):

Thank you so much, Cynthia. You can stay on camera since you're going to be the moderator for our next panel. And on that note, everyone, welcome to our next panel. Discussion the sprint to electrify let's now welcome Mike Maten the director of EV policy and regulatory affairs at GM. Tim Slattery the senior manager of government relations at Nissan and Mike Lord executive engineer at Toyota. Welcome. And Cynthia, I'll let you take it away.

Cynthia Williams, Ford Motor Company (00:31:51):

Awesome. Thanks, Munni. And as you just heard from me, the EV landscape is rapidly shifting with both exciting and challenging things. As we bring more and more vehicles to market, I'm joined by my fellow colleagues in the auto sector here today to expand on how improving manufacturing maneuvering around supply chain constraints and working closely with federal and state governments can continue to drive the switch to electric vehicles in light in the light duty sector. Welcome mikes and Mike and Tim,

Tim Slattery, Nissan Senior Manager, Government Relations (00:32:30):

Thank you.

Cynthia Williams, Ford Motor Company (00:32:33):

I'm going to start the panel. Okay. So, the state of the Zev market is vastly different today. It has been than it's been in, you know, just even a few years ago with rising consumer demand and federal and state government heavily signaling investments in the necessarily charging infrastructure to spur even more adoption. I would like to ask each of you, how has your organization adapted in the recent past to address this rapid change? Let's start with you Mike Maten from GM.

Mike Maten, General Motors Director of EV Policy and Regulatory Affairs (00:33:13):

Thanks, Cynthia. And thanks to Veloz for, for coordinating this panel really happy to be here. So, you're right, right. It's, it's true. As, as, as we and other automakers have re revealed more and more of our EV product strategy, we've seen demand for those products really increase. So, you know, current vehicles that we've rolled out like the Cadillac lyric, the Hummer EV they show what's possible with EV and that gets people excited. And then we go into as we shift into next year, we go into our high-volume products, the Silverado EV the blazer, EV the Equinox, EV you combine that with, with the fact that we've also as was mentioned earlier, we've lowered the price of our current bolt, EV and E EV by almost $6,000. There, there's just a lot of excitement around the EV space and, and, and around the products.

Mike Maten, General Motors (00:34:05):

And, and I think everybody would agree we're really just getting started. So, I would say, you know, the response is really just causing us to, to accelerate that, that development pace, and even on the infrastructure side, the federal government has indicated, right. Or, or, or passed the bipartisan infrastructure law to, with that 7.5 billion of, of, of infrastructure funding. But, but frankly, that's, that's really just a start too. We, we know more is needed. We're we at GM are, are doing our part just a few weeks ago. We announced an, an agreement with pilot flying J who install over 2000 chargers at their travel centers 500 travel centers across the country, including many in, in California. We're reaching out using our dealers as an asset with a dealer charging program to maybe reach some communities with, with charging that, that, that might, might have been left behind in the, in the, in this larger infrastructure rollout.

Mike Maten, General Motors (00:35:03):

So, we think dealers can be an especially the, the breadth of DM dealer's footprint can be a, a, a real asset on the consumer experience side, again, as consumers are, are more interested, they have more questions. So just this week, we, we launched an online platform called EV live and all new digital experience where you can ask EV questions and interact one on one with, with, with EV experts. We see as kind of the, the excitement grows the number of questions, the amount of the, the, the nature of the questions change. So, we've really just accelerated all our efforts in response. It's this very virtuous cycle of, of rolling out the product, seeing the demand, and then responding to that demand.

Cynthia Williams, Ford Motor Company (00:35:47):

Awesome, you know, attractive products, affordability all our key. And I couldn't agree with you more with that connection to the community, with the dealers. I agree with you that making that connection is, is just going to, you know, again, help to educate consumers and bring them along with us. Hey, Tim, what's your thoughts on this one?

Tim Slattery, Nissan (00:36:09):

So, Cynthia, thank you again for hosting this and Veloz Josh all, all the great work your organization does. You know, at Nissan, we've obviously been in the, the pure electric vehicle market approaching a decade now. So, we, we launched a leaf kind of the, the large mass market affordable EV and have, have taken the lessons learned from that as we've entered this period. I'm reporting here today from, from Tennessee where the belief is built just down the road. And I know a lot of those pictures, Cynthia shared she's become our, our new neighbor to the west and, and we appreciate heaven Ford with all their investment you know, coming to the state, but with the launch in California, we, you know, or nationwide, but California being the epicenter of where, you know, really the leaf really, really got its stakeholder in place.

Tim Slattery, Nissan (00:37:03):

You know, we we've continued to learn what our customers want. I think with this recent kind of last two, three years, going through the pandemic, going through kind of this rapid rise, INED demand, you know, within the last six to 12 months, you know, we've looked at what we've done in the past and honed it. In particular, the one point I'd raised beyond all the issues Mike talked about, which I agree completely is working with our dealers to say, hey, listen, we got a new customer base. That's very interest in electric vehicles, and you need to be able to answer the questions that they have for someone who's maybe never driven an EV or knows someone that's driven an EV. And so, we've been working with our customer, our dealer base to educate our customers. And, and on the customer side, we we've taken the step. We've all launched a new program. And this was kind of because of COVID, but other factors, you know, due to customer needs is Nissan at home so that customers can experience the car without maybe they don't have time to go to a dealer. And they're able to do it through their phone to get a simple request, to do an EV ride and drive. So that's, that's something we've done to kind of, to react to this, this, what we'll call a spike in EV demand in last 12 to 24 months.

Cynthia Williams, Ford Motor Company (00:38:18):

Awesome. Thanks, Tim. Yeah. Learning from your customers, I think is another critical point that you made there. And, and just learning from them, understanding what they want and what they need to get the job done. I think it's critically to move forward, but thanks for those comments. Let's turn to you now, Mike Lord from Toyota. Sure.

Mike Lord, Toyota Executive Engineer (00:38:40):

Right. Thanks, Cynthia. And I want to thank the those for inviting me and Toyota here to this panel today. Toyotas started its electrification efforts decades ago, and we've actually recently seen a much higher take rate on our hybrid electrified options recently. And these power trains now are making up about a quarter of our overall sales, at least. And now that there are a lot more interest in Z, we continue to by offering more options, such as plugin hybrid vehicles, skills, electric vehicle, and UHS as well. We think it's one of the key aspects going forward as we continue to electrify the fleet is to have this portfolio approach of vehicles to address the needs of many different types of consumers BS and fuel, and have, can meet different parts of the market. And we, we think that continuing to work on all three technologies is going to be key to meeting the needs, not just for our customers now, but as the market matures to the more mass market you know, lower cost vehicles.

Mike Lord, Toyota (00:39:55):

We also welcome the investment in infrastructure as it makes Zs more accessible for people, but we think we need to make sure that infrastructure is being placed where they may help those without home charging capabilities, for example, multi-unit housing. And, you know, one of you know, you know, either chargers in those areas where multi-unit dwells are, you know, apartment complexes are, or people are parking on the street or hydrogen refueling infrastructure. That's very helpful as well. There's a lot of people that drive vehicles currently that bill them without a problem. And hydrogen refueling is the same model as how people fill those vehicles right now in a zero-emission model. So, I think that's what I'd like to add through the discussion at this point.

Cynthia Williams, Ford Motor Company (00:40:48):

Thanks, Mike. And, and I couldn't agree with you more again, the, the multi-unit dwellings, that's one that we'll have to work together on working with the community to understand where we should place community-based solutions. So, there's alternatives for folks in multi-unit dwellings, as well as the hydrogen infrastructure barrier that you, you mentioned, or the challenge there. I think working not only across light duty, but that's a solution for your heavy-duty vehicles too, that we, we, again, we should work together on. So, moving into in talking about the state of the market, the opportunities, I believe they're just truly endless for, for, for electric vehicles. However, we need to be a bit realistic about the issues we are currently facing as manufacturers. So, we can develop strategies again to overcome them together. Mike Matt, a GM, we, we often hear about supply chain constraints affecting the auto manufacturers in general. Is there anything specific in the supply chain that, that most affects the production of electric vehicles? And also, do you have any methods to mitigate?

Mike Maten, General Motors (00:42:02):

Sure. It's a, it's, it's a great question. It's top of mind and it it's top of the, the, the discourse really in the auto industry, obviously for the last 12 months. So there, there's no question, you know, I think the entire industry is still experiencing disruptions from the chip shortage. We, all of our companies are, are, I would say reevaluating the supply chains, potentially trying to get more vertically integrated, have more transparency in those supply chains to make sure that this doesn't happen again. This is, this is, this is nobody's nobody likes to not make vehicles when there's demand out there or, or not have vehicles on dealer lots, but specifically to, to EVs at least from a GM perspective you know, the, the, the supply chain and, and, and everything still really starts around the battery.

Mike Maten, General Motors (00:42:52):

It's the highest cost most critical component of, of, of EVs and, and will be. So, so to that end, we we're, we're in the battery cell business with LG chem, we've announced four battery cell manufacturing plants here in the us about 140 gigawatt hours of cell production. That'll be online here by 2025, 1 opening in Lordstown, Ohio just this year that that capacity should allow us to, to source battery cells for over a million EVs by 2025. So, but more importantly, the material that makes those cells has to has to get to that plant, right? So, the lithium the nickel the manganese, the copper all of the, the, the, the electrolytes, all of that material. And, and again, so, so we face we're essentially, we, as automakers are, are, are really building in all new supply chain.

Mike Maten, General Motors (00:43:51):

This, this is a supply chain that, that, that frankly automakers haven't, haven't really dealt with in, in the past. And we're looking to directly source most of that to secure that supply, or frankly, for, for north America or, or around the world, wherever, wherever we, we make vehicles. And I think that everybody understands there's a, there's a global race for that, because the E the, the battery cell manufacturing is expected to increase somewhere around 19 to 20 times in the next 20 years. Just to give you an, a, a, a sense of, of, of, of the scale we're looking at. So, I think specifically to, to EVs, we're looking at supply agreements to secure those critical materials and, and more of a, a long term play I guess, short and long term is to nearshore onshore or nearshore. A lot of those materials as well as obviously getting the battery recycling business kick started here, which will get kick started as the battery plants come online. So, yeah, EV supply chain does create some unique challenges, but I would say, you know, we're fully aware of those challenges and just yesterday announced a few more supply agreements and highlighting that we do have enough materials secured for 2025 and our million units of EV capacity by then.

Cynthia Williams, Ford Motor Company (00:45:15):

Absolutely. I think we're all making some great strides there. And, and what you mentioned too about supply the chip shortage disruption. I think the federal support that for the chips act is definitely, definitely needed there. And some of the things we all should be working to, to progress that through, through our state legislators, also again, the, the battery divers battery cell diversification and, and, and the supply chain there, I think, again, that's critical Mike, as you mentioned and making sure that we bring some of that work here in north America to continue the jobs and, and, and others around EVs. But thank you, thank you for those comments. So, tell 'me one of the issues in the market demand versus supply of the vehicles themselves. How are automakers reacting to the recent increase in demand for EVs and what are the long-term plans to sustain a robust electric vehicle market?

Tim Slattery, Nissan (00:46:17):

So, excellent question. And I think, you know, we have a short term and a long-term strategy to kind of address these issues. I think Mike alluded to the, to the microchip issue, and I'll preface everything I say is I'm a government affair professional. I am not a manufacturing professional or an engineer or anything. So, if I, if I'm a bit wrong or I use the wrong lingo or the wrong acronym, please forgive me. You know, I think on the chips issue, just having set with many of our manufacturing leaders, you know, I think people on this call are saying, hey, I'm going into my dealer and I'm struggling to, to find a car. Or if I do find one that the markup's a bit higher than I want to pay. I think what we've heard or I've heard from, from our leaders is it's getting better the chip situation.

Tim Slattery, Nissan (00:47:06):

But it's still a major challenge and it's not just EVs it's across our lineup. I, I do think the, the question that a lot of people ask well, are EVs different. Do they require more chips than say an, an ice vehicle? And the answer I've heard is not really, it it's kind of the same situation. So, what we've done is, you know, prioritize product and, and our electric vehicles are priority for Nissan. So, when we allocate chips, we're always doing us most to meet our EV customer demand here in the short term. The second thing we're doing in the short term at Nissan, at least like a lot of others is, is more product. I think most of you heard, but I'll make sure I put my plug in the new aria. It's our new crossover that's coming out from Nissan.

Tim Slattery, Nissan (00:47:50):

That'll be hitting our dealerships later, this this fall. And so, I'll pull up a background of that. So, you can kind of take a look and, and do my marketing pitch here and long term, you know, we're, we're investing like, like everyone we've announced an ambition, 2030 plan. We're going to have 15 electric vehicles in the infinity and Nissan lineup by 2030 across the globe. We just announced earlier this year that we're going to be investing in, in here in the us at our Mississippi plant where we're going to be launching an infinity product and a Nissan product, both of which will be elect pure electric vehicle. So, we're, we're investing for the future, but we're also trying to meet short, short-term demand.

Cynthia Williams, Ford Motor Company (00:48:34):

Awesome. Lots of, lots of exciting products coming our way. No, that's, that's great. So, Mike Lord new makes and models are released each year. What is needed to address the market of all segments of the buying public?

Mike Lord, Toyota (00:48:55):

Thanks, Cynthia. I just wanted to know one issue on the, the supply chain. So, Toyota has had a little experience with that during the great Eastern Japan earthquake. What we learned from that is there are some components that and should be AMA to kind of hedge against issues in the supply chain. Fortunately, the supply chain issue has been going on and on, but we've learned a little bit from that in the past. And I think we're all also all the OEMs, you know, trying to figure out how to avoid with, with internal supply improvements, chain improvements, but back to the, the question itself. So, so it has been the market leader in electrified vehicles for 22 years. And we're well aware of the challenges in getting customers to adopt new technology, even when, you know, if we're talking, you know, hybrid vehicles where they're exactly the same use, people are resistant just because it's new technology.

Mike Lord, Toyota (00:49:58):

And you know, there are other issue, you know, things out there, for example, there's recent reporting and messaging that lead people to believe that be, are the only green vehicles out there and need to kind of make that, you know, work to keep that message broad Veloz is very supportive of that. And we really do appreciate the active that low is doing to push back on that messaging. You know, I, I think what I want to, you know, emphasize is, you know, as we're transitioning to Zev having the broad portfolio, we still think a little bit repetitive with an earlier question is, is important because we need to address all market segments and, you know, purchase decisions are really related on the individual lifestyle needs. And each customer is different. Currently we have six products out there. We have four plugin hybrids and two three plugin hybrids two BES and the one fuel cell vehicle both in the Toyota and the Lexus range. So, I think it's important to have customers understand and able to afford electric vehicles. And the understanding of blow is one of the key aspects and getting that understanding out there so customers can understand how them and adopt them. So, you know, we're really looking forward to kind of continuing to work that aspect, to get the public understanding broader and deeper.

Cynthia Williams, Ford Motor Company (00:51:36):

Absolutely. Thanks, Michael. Yeah, I, I totally agree with you. I think educating consumers is going to be key and getting them into the vehicles. Once you get them into the vehicles, they will love the El what

electrification can bring. I know I have the Mustang Mach-e and it's an awesome vehicle. One of the best vehicles I've ever, ever owned. So, thanks for that. Let's move now to an all-important issue of how auto makers and government work together to successfully bring vehicles to market and more drivers into EVs. So, Mike Lord, let's start with you on this one, in, in your opinion, what are some policies to help the market grow and flourish beyond just regulation? Do you have any specific examples that that could be replicated? I know you talked earlier about the experiences that you've had over the past decade love to hear from you.

Mike Lord, Toyota (00:52:37):

Thanks, with obviously supportive policies that send the right market signals are, are key. And, you know, one that comes to mind is the low carbon fuel standard. I think they they're different aspects, but in particular that policy is both supportive for both fueling and charging infrastructure and getting it out there with the incentives from the low carbon credits, although we need to work on figuring how to bring those credit values back up, particularly through the hydrogen refueling infrastructure and the fast-charging infrastructure credit. What's also key are incentives. And I think we all touched on these incentives that lower the barriers to adoption, and that really does help consumers make you know, move 'em along to make the right choices. So that is education to help give the customers good, you know, the ability to make inform, purchase decisions.

Mike Lord, Toyota (00:53:38):

There's one example that maybe I'd like to talk about as it relates to the Mariah fuel cell electric vehicle. We're in the second generation, excuse me, second generation currently. And we know the biggest barrier is fueling, sorry about that. So, we are trying to lower that barrier by providing fuel cards and tools that help new owners know where they can get hydrogen. So, there's been some challenges, but we are still seeing people taking the first step, and we're also having events and celebrations for those that made the decision through special owners' events and things like that, that kind of help, you know, you know, keep the good feeling going. So, activities like that I think are very helpful in addition to, you know, getting just be, you know, customers, potential customers into the vehicle for test drives.

Cynthia Williams, Ford Motor Company (00:54:32):

Absolutely. I couldn't agree with you more. We have the blue Ford charging network that connects our, our customers to over 70,000 plug and just, you know, having those tools and having that the, that availability to our customers just brings them along so much, so much easier. Thank, thanks, Mike. So, hey, Tim, knowing a critical barrier to adoption is charging the influx of federal and towards is bound to increase from how should this investment be used?

Tim Slattery, Nissan (00:55:09):

Important question. And I think, you know, the program that they're shaping the ne or what is it, the national electric vehicle infrastructure program funding is I think headed in the right direction and, and Nissan actually had history in California working. I think many of the, the folks on this chat have heard about drive the arc. And that was a program that went from Monterey California to lake Tahoe, where it was designed to provide customers, surety that, hey, if they wanted to travel that distance and maybe the temperatures weren't quite right for a battery and that they could have a reliable path to, to make that

journey. And I think some of the parameters that they've set in that program are going to be I think, a good template for future funding either by states utilities or otherwise. I mean, they, they have demanded reliability for those chargers, which I think looking back to the original kind of EV project from, from the early two, 2000 tens there's going to be a requirement that those, those chargers are up and running.

Tim Slattery, Nissan (00:56:14):

90% or it's 97%, I think, was the number they put in there. I think the other is, is fast charging. They have a focus on making sure that customers can, can get refueled quickly. And so those are going to be important things, all those things kind of help us at the point of sale because a customer knows, hey, how is this car going to impact my lifestyle? And if they know that they have a network of chargers that can let them get 200 5500 miles away, that they know that, hey, while they may not need them, they always, at that point of sale are thinking of this, the one trip that that's going to be difficult. And, and the investments by the state and federal government that are focusing to kind of meet those needs are going to further grow the market.

Cynthia Williams, Ford Motor Company (00:56:58):

I, I totally agree with you as well. Tim reliability, fast charging, I think are all key. Another one that comes to mind for me is plug and charge something that allows a seamless transition for our customers, but great, great points there. Thanks a lot. All right, Mike, from GM incentives for electric vehicles allow more drivers to get into cars faster. And is it it's important function of all state programs from your experience what's working voucher programs, incentives at the point of sale. Can you give us your thoughts on that?

Mike Maten, General Motors (00:57:38):

Yeah, sure. And, and, and just a, a follow up on a new program, agree with everything Tim said, and just want to highlight the importance. We don't know when we're going to get another 7.5 billion to do something this foundational, so it's really important to get it right. And, and frankly, to, to try as much as we can to future prove all of that work, that that's just a really important it's, it's, it's foundational to the EV industry. That's the word that I keep coming back? Absolutely. Absolutely. Anyway, sorry to get to incentives, I think there's, you know, as we look at the incentive programs across the country, even the federal incentive program, which we're, we're kind of disappointed that, that that, that, that doesn't look like it's going to make it through the, the federal process. There's several characteristics that we can say, what, what, what makes a good incentive program?

Mike Maten, General Motors (00:58:28):

I think, first of all, it, it has to be a meaningful amount of money. You know, we, we would say, you know, on the order of at least a thousand dollars any, anything less than that, it it's really tough to move the needle, especially with, with today's prices. More importantly, it has to be, it has to last, we've had state programs that have lasted literally a matter of weeks because they weren't funded enough. And when I say they, it lasted a matter of weeks, it wasn't even vehicles purchased in those weeks. It was people applying for vehicles they had already purchased. So, they, they have to be funded at a level that's sustainable for at least a year. And I know California's had, had its challenges with CV R P, but frankly, they, they've done a really nice job of, of looking at, at, at the fundings for CV, R P and, and trying to protect at least a level of, of spend for that something that makes it easy for customers and dealers to understand also the more rules

and regulations and, and contingencies, you put around an incentive program, the harder it is for both customers and dealers to understand it.

Mike Maten, General Motors (00:59:42):

If you make it a tax refund it becomes very difficult for the financing arms to work with state tax refund. So, we'd much rather see a, you know, point of sale is nice that the clean fuel rewards are point of sale. We, we love that the voucher program, I think again, in California, I think that's worked, that's worked fairly well. And I'll just reiterate something that Mike Lord said, LCFS presents a like clean fuel rewards. We'd love to see that rolled out to kind of more states those types of programs that can actually create the revenue to help continuously fund these efforts. We think that's a really nice mechanism that works well in the market.

Cynthia Williams, Ford Motor Company (01:00:29):

I couldn't agree with you more and, and, and the sustainable funding is, is key. And, you know, as states roll out their plans for EV adoption, those are some of the things that we think that they should spend a bit of time on working through the necessary barriers within their own construct to make sure that they're available as you roll it out and available for a point of time that's going to be critical and it's critical as we move in, in terms of equity, as we bring everyone along as well.

Mike Maten, General Motors (01:01:06):

And, and I said to you, I just don't, I don't want to forget used vehicle incentives is another one we should all be talking about. Yes, absolutely. And incentives for charging, particularly multifamily housing, all of that needs to look at in incentives because that's, that's the only way some of this is going to get done on the time scale that, that we all need it done.

Cynthia Williams, Ford Motor Company (01:01:25):

Absolutely. And it also provides you know, affordability price points for, you know, different you know, different levels of, of, of vehicles that, that are out there that, you know, what's available in terms of, you know, economic stability for some customers. The used vehicle solution is, is, could be a great option for some of our, some of our con consumers. And so definitely those programs should be evaluated as well. Couldn't agree with you more. And the new funding, again, like you said, is a one maybe once in a lifetime thing, but we got, we have to make sure we do it right the first time. So those are all, all great points, great points, an important topic in the ecosystem of electrification is equity. As I mentioned, it's critical that historically underserved communities and, and not far, are not further left behind in, in the transition to electric vehicles. And we know that auto makers like us have a key part of, of, of, of the equation to play. All of our organizations have public statements about organizational diversity. I'm curious to know, you know, how you build those principles into EV adoption efforts, Mike Adam from Jim, why don't we start with you?

Mike Maten, General Motors (01:02:55):

Thanks. So, you know, our, our CEO, Mary Barra I is a huge proponent of, of, of everything DEI and, and we have a, a, a slogan, everybody in, right in the EV transition our consumers, our workforce, our dealers E everybody. And so, we're, we're, we're proud of that, that kind of direction. It really goes into everything we talk about in terms of EVs. I think specifically for GM, we would say you know, reducing the price of that

bolt E U V to, to the 25, 20 $6,000 price point for a long-range EV you know, trying to make it really attractive for, for people shopping on, on the lower end of the market. Again, I think in the past GM would've said the used vehicle market is somebody else's problem. It's, it's we, we, we make new vehicles and then used vehicle, but, but you know what, as part of our, everybody in strategy, we know, again, those lower price points are going to be key to widespread EV adoption.

Mike Maten, General Motors (01:03:57):

So, looking for opportunities in, in the used market, I would say the other thing where we do is we launched a, a 50 million climate equity fund. And we've used that to fund, you know, different equity initiatives around EVs. One example I'll site is our funding of ecology actions, EV for everyone program that helps catalyze the electric vehicle transition and disadvantaged communities through, through the central coast there in, in California. That's just one example. We, we, we've done literally, you know dozens of, of these programs and it really is a part of, of all of our conversations, whether it's in product development, sales, and marketing public policy you know, you name it, our infrastructure the, these conversations are happening in our, in our in our company every day in terms of, Hey, let's make sure we, we, we have everybody included in that.

Cynthia Williams, Ford Motor Company (01:04:54):

That's awesome. Couldn't agree with you more. And that's one of the reasons why Ford chose to set the price point for the F-150 lightning at 39,974 to start making sure that we again can bring all of consumers along in terms of providing our truck that provides solutions and the customers being able to do the work.

Mike Maten, General Motors (01:05:19):

And I, I would just highlight, sorry, one more thing. I forgot, sorry. When, when you talk about disadvantaged communities, it's everybody can't think that all disadvantaged communities or EJ communities are not equal. There are inner cities, there's rural communities, and every one of them's different with different challenges. So, this isn't a one size fits all approach of do this and, and you know, and everybody is automatically happy. This is, this is literally kind of, you know initiative by initiative, rolling these things out, addressing the specific needs of these communities. So, I think that's an important kind of learning for, for everyone around it. It, it, isn't done when you just roll out one initiative, it's a series of, of action.

Cynthia Williams, Ford Motor Company (01:06:03):

Absolutely. Tim let's get your point of view.

Tim Slattery, Nissan (01:06:09):

Yeah. And I think not to reiterate all, all Mike's point, I think Nissan's model is very similar to GM and I'm sure Toyota that it's built into everything we do from a philanthropy side to a customer side, to, you know, a financial side everything, you know, we have a robust DEI organization that's integrated into nearly every function here at Nissan, I think from the EV side you know, Mike alluded to kind of the, the importance of affordability of EVs in, in all segments, in, in all areas. You know, I, I was pulling up a stat so 18 of the top 25 states. So those states that are kind of leaders in electric vehicle penetration, the Nissan leaf is the number

one used EV for those markets. And we think it's, it's an entry car for a lot of folks to say, hey, let me see if this can work for my lifestyle.

Tim Slattery, Nissan (01:07:04):

And we find that those customers come back to either buy another used or to you know, and in the other part of those used vehicle market is when we sell a news vehicle, we add the warranty to the vehicle because we want to make sure that they know that, that battery's going to last you know, for those critical years that they're using the vehicle. And then I think the other point is, is our, our leaf model itself, even the new model it's at a price point you know, under 30,000, we've also segmented by battery size to say, hey, listen, maybe the, the larger, battery's going to going to add $5,000 in cost to the new car. Let's give you the option. And, and we've found that customers don't want that. And, and it works great for Nissan. So, for a leaf, we have a 40-kilowatt version and we have a 60-kilowatt version. So those are the few things Nissan does to kind of ensure we're, we're reaching everybody with, with EVs.

Cynthia Williams, Ford Motor Company (01:08:04):

Awesome. I think the choices that you provide the customers is, is going to be critical as we move forward providing them with options again is, is, is, is something that, that they, they can use to make the, the choice that works best for them. Mike, Lord Toyota.

Mike Lord, Toyota (01:08:24):

Yes. Thanks, Cynthia. And I also want to emphasize the point on affordability is very important. Getting the cost of the vehicles where BZ four X Bev product we're, you know, we're getting there, the cost is coming down there. I think we all have some work to do. You know, I think is like Madden said that it's, you know, five 30,000 is very key segment of the market. That's key. I also, you know, it's probably important to note that, you know, that the plugin hybrid is a pretty good option for some folks, particularly that if it's the only vehicle in your fleet, the reduces some concern about public infrastructure usage which could be a little less built out currently in underserved communities. I, I want to note that our Toyota mobility foundation worked with and mobilize AI to study where charging stations could be installed talking just about electric charging at this point, electric vehicle charging, how we can get better equity across this important part of the infrastructure built out.

Mike Lord, Toyota (01:09:38):

And what I guess that study found is that the areas of highest need are places where off street charging is not readily available. This is back to the multifamily housing issue, and it's, you know, there's less stations in this less advantage section of the community and those overlap more multi-unit dwellings and less vanished community. So, the immediate recommendation from that study was to work on infrastructure charging infrastructure in those areas. Also, maybe would like to note that we, we have a project pilot project with valley can in the San Joaquin valley with 30 Mirai vehicles. There, there's an area where home charging is more difficult and there's long distance driving. And we're finding that that's a very good use case for a fuel cell electric vehicle where you know that type of driving is, is more you know, needed the long-distance driving. And as I mentioned, there's less opportunity for home charging. So, I think that gets to the point that, you know, not all less advantaged areas are the same and different solutions and provide different the needs of everyone.

Cynthia Williams, Ford Motor Company (01:10:56):

That's awesome. You Mike, in the, to electrify, we often are moving so fast and don't get a chance to highlight the incredible innovations that we are experiencing on a daily basis. Can each of you describe a key innovation, be it in manufacturing, technology, or business practices that has helped your organization tackle challenges of the current market? And let's start with GM Mike.

Mike Maten, General Motors (01:11:33):

Yeah, thanks Cynthia. So, this this might be a little selfish on my part because I was part of the group that helped plan it. But you know, our LTM battery system a modular vehicle platform that can support a wide variety of battery electric vehicles. You see it on the road today, they'll, they'll be more but a platform that can support, you know, anything from an Equinox all the way up to, to, to the large Hummer and, and, and a platform like that is a, is a massive innovation in, in the industry. It's something that, that we've talked about for a long time, but, but really an incredible amount of, of innovation went, went into that the ability to accept battery cells of different formats, the ability to adapt as battery chemistry and battery technology continues to improve.

Mike Maten, General Motors (01:12:28):

So, on the technology side, I think we're, we're really proud of that, that LTM battery package being able to even be used for things like stationary storage and those opportunities or, or crate applications, things like that on the business side, another one that, that we've, you know, we've seen, we saw the need to, to frankly create an entire organization. We call EV grow really dedicated to the, the unique challenges of, of expanding EV adoption in, in the us, we knew it, it was going to take led by, you know, again, a, a group vice president led by somebody that, that, that had the knowledge that had the power to really move things along in the GM system. We, we knew if business as usual moving all of this through our brands, through our normal channels, just, just, wasn't going to cut it. We knew we were going into a new world. So, in, in the business process world, I think creating that new organization, I think most companies have felt that way. We just, we really need to, to, to, to stimulate the, the, the growth of, of EVs with, with some I guess, new thinking about how we operate in, in those in those channels. So, I'd say those are the two that I point out from General Motors.

Cynthia Williams, Ford Motor Company (01:13:47):

Awesome. Thank you. Thank you, Mike. Hey, Tim, what's your thoughts?

Tim Slattery, Nissan (01:13:51):

So, so I'll add two. One's kind of been a near term and, and I alluded to it earlier was, was the Nissan at home program. And I think while it's not specifically an EV program, it it's, it's driven in large part by the EV market and the changing customer base. Who's demanding that a simplicity in sale, a simplicity and experience a vehicle that allows a customer to, to, to use their phone rather than, you know, maybe they don't want to go to a dealer. Maybe they want just to want a little more simplified paperwork to, to complete an EV transaction, to know that it's there and they can get it. And, and we think that's been tremendous. The second is a recent announcement by Nissan, that in the, in, by the end of the decade essentially, I think 20, 28 and remember, I'm not an engineer, but that we're moving towards an Allstate all

solid-state battery. And what that means for efficiency from, from an environmental perspective and, and the battery range is going to be critically important for Nissan.

Cynthia Williams, Ford Motor Company (01:14:49):

Awesome. Thank you, Tim. Mike Lord.

Mike Lord, Toyota (01:14:55):

Sure. Thanks, Cynthia. So, at Toyota, we have the Toyota production system, which has helped us not only in past, but as we transition to an all future. So, we're using this system not only for physical hardware design, but we're using that also in our approach to software. And as a matter of fact, the Toyota production system was one of the key GUID principles that move us out of the earthquake great Eastern Japan earthquake supply chain, and also guided us through this supply chain and has continuing to guide us through this supply chain issue to help keep our operations running as smoothly as possible. So, I'd like to note that for manufacturing, we have announced plans to vote our first battery plan in the us, which should be op will be operational in 2025. And this is aligned with our business direction to build where we sell and further help us with our supply chain needs.

Mike Lord, Toyota (01:15:55):

And we're also exploring how we might be able to reuse remanufacture, I think G and Nissan as well, all the other OEMs or recycle battery materials in our hybrid electric vehicles, as well as our you know, up and coming battery electric in other vehicles using electric battery batteries. This is a, a collaboration with Redwood materials who we worked with in the past. So that would include looking for end of light battery solutions you know, how to collect them, you know, how to test and evaluate, you know, ones that are good and bad for remanufacturing, how to recycle the battery material and, and improve production methodologies.

Cynthia Williams, Ford Motor Company (01:16:43):

Thanks, Mike, and, and I'll end with a few from Ford. And so, we have the, you know, that we have our F150 lightning with the bidirectional charging. You are able to power your, your, your site for, you know, with tools and things that, that, that you need to do your jobs on a day-to-day basis. You can power your home for up to three, three days and up to 10, if you rational on what you plug in. So key technologies like that is providing consumers with options, options that they need to get the job done options that they need to, to just live on a day-to-day basis. Our, our Ford pro I mentioned that before that whole solution for commercial vehicle customers, commercial vehicle customers that understand that total cost of ownership is lower. When you switch over to EV and these vehicles can provide them with the work that they need to be done, blew over charging.

Cynthia Williams, Ford Motor Company (01:17:43):

Again, another key tech technical solution we're providing to customers so that they can have consumer that they have charging confidence, not it's not a barrier we'll connect you to where you need to go. These are key solutions that we're providing consumers end to end solutions that will bring more and more folks into these vehicles. If we continue to work together, it's industry working with folks like velos to get the consumers in the vehicles. This is what we need in terms of partnerships, partnerships with governments on

select vehicle vehicles incentives, select vehicle infrastructure, again, that ne program that the folks I mentioned today, but those are key items that we need to make sure that we are accelerating to a zero emissions future. I thank all of you for participating in the panel today. You guys are awesome. Thank you so much. I'll turn it back over to you, Munni.

Munni Krishna, Veloz (01:18:44):

Thank you so much to all the speakers in this incredible round table for that meaningful dialogue. Thank you, Cynthia, for your fascinating spotlight remarks, and thank you all of you for being Veloz members. <Laugh> all right, folks, we're now going to take a short 10-minute break, and then we'll be back with our next spotlight speaker in the break. You're going to see be Oz's EV market report brought to you in collaboration with the California energy commission and California air resources board. Look out for an updated report from our team. Soon. Don't go too far. We'll be back at 1130.

Munni Krishna, Veloz (01:19:15):

Welcome back from the break. And thanks so much for joining us again. It is my pleasure to introduce you to our next spotlight speaker and velos public policy board member, Angelina Galiteva. Angelina was the first ever female chair of K IO. And is today the founder of renewables 100 and is on the board of governors for ally O as an expert in strategic issues related to renewable energy, the environment, new technologies, optimizing system efficiency, and overall sustainability policy programs. She's frequently sent as a us state department representative on renewable energy and grid issues. So, we are especially lucky to have her today. Welcome Angelina.

Angelina Galiteva, California ISO, Board of Governors Chair (01:19:54):

Thank you, so excited. All electric <laugh>. Can you hear me?

Munni Krishna, Veloz (01:20:12):

We sure can. And we're ready

Angelina Galiteva, California ISO (01:20:13):

Whenever you are. And can you see the slide presentation?

Munni Krishna, Veloz (01:20:16):

Absolutely can.

Angelina Galiteva, California ISO (01:20:18):

Okay. So here we go. Very happy and excited to be here. And thank you so much again, moon, and to here. And I'm going to focus on talking about the grid because I come from a grid perspective and also from a renewables 100% perspective transitioning to hundred percent renewables takes decarbonizing all sectors across the board. And of course, we know that transportation is the most important of all. So next slide we are dealing with several is at the same time, the coronavirus pandemic, which has exacerbated supply chain issues on next slide, we're also dealing with hurricanes and with climate change, that cannot be that is certainly giving us food for thought, in terms of fire, in terms of flooding, in terms of grid, operation, and operating a reliable and decarbonized grid, of course, is the foundation of electrifying everything. So, we've

got to make sure that we have a resilient, reliable, a hundred percent decarbonized grid that is dependent on local fuels, local generation to the extent possible, and that we can pull all the resources that we can from distributed resources, such as electric vehicles and distributed generation that's customer owned behind the grid at any time that we needed to support operations.

Angelina Galiteva, California ISO (01:21:39):

So next slide as if we didn't have enough problems with the coronavirus pandemic and climate change, we also have a war going on in Europe right now that has also pointed out the issue that having reliance and over reliance on fuels from other nations can be tricky. And certainly, being able to operate in grid again, the is resilient and reliable and independent of supply chain issues and resilient towards climate change and is also resilient towards sometimes conflict is, is a challenge that we all have to deal with as an international community. Next slide, fortunately for us though, renewables have become the cheapest resource on the grid that we can have because of public policy and because of sustained economic programs and investment in renewables. We now have seen a reduction in solar technologies of over 90% in the last decade batteries over 80% and wind has become also quite cheap and cost competitive with resources being dropping down over 80% as well.

Angelina Galiteva, California ISO (01:22:52):

Next slide. So, wind and power resources are now the lowest cost resources on the grid worldwide. And the one that we have to focus on globally in order to decarbonize is the transportation sector because we operate a grid, and we are very proud of having achieved a hundred percent of renewable energy on the grid in California. Actually, this year for the very first time, it was a tremendous milestone. We've done it for only 112 minutes. Now, the opportunity and the challenge are to do it for 24 hours, 365 days a year, every hour of every single day, but we are not alone here. There are many that are doing it. Certainly worldwide, next slide, we've achieved a hundred percent in California. Others are close to a hundred percent, oh, going towards a hundred percent renewable energy on the grid worldwide. And that is super exciting.

Angelina Galiteva, California ISO (01:23:43):

Next slide, going from the global to the local and the Western interconnect and how we are transitioning as the fifth largest economy in the world to a hundred percent renewable energy of all sectors and especially decarbonizing the grid that can then in turn decarbonize, everything else doesn't come without its challenges. We've got gas, storage challenges. We've got CCCA opportunities, regional collaboration that needs to be worked out a lot of retirements, transmission, and distribution system interface, which of course is critical for electric vehicles and all sorts of DG technologies as well, the hundred percent renewable energy goal and all the other existing goals that we have. Next slide, what we are also seeing is on a west wide basis that we have issues in terms of reliability, that all of us need to be cognizant of and risks that we need to keep in mind as we transition to decarbonizing California.

Angelina Galiteva, California ISO (01:24:40):

And of course, the west follows as well as well. We've got weak hydro situation because of the droughts. We've got wildfire risks that threatens the threats. The Western United States capacity is stretched to a limit. The Southwest power pool out from thermal generators may be reduced to river water levels because they have low water levels in the rivers and there's drought tree lighted heat events in Texas in other

places. So, what we're seeing in California certainly is not an isolated event. And because we are building an interconnected west wide grid and dependent on our neighbors for resources, we've got to be cognizant of the issues they're facing as well. Next slide, climate change is real and I'm, we see it every single day. The average annual maximum daily temperatures are increasing. Wildfires are increasing. And every time we have a wildfire, we also have a situation of having to, for public safety turn off power lines, which of course then affects customers as well.

Angelina Galiteva, California ISO (01:25:40):

Next slide. It's very, very important to have a regulatory framework. Some of the previous speakers pointed it out as well. And again, in California, we are extremely lucky to have a plethora of regulations that govern our transition to a hundred percent renewable energy goals. We've got the hundred percent renewable energy requirement for the grid. We also have a carbon reduction goal of reducing CO2 emissions to 80 levels below 1990, by 2050. This target pretty much means that the answer at the back of the book is decarbonize all sectors, including transportation fuels, big buildings, everything. And of course, we also have the requirement for no internal combustion engines and the programs that support electric vehicles. Next slide for California, and specifically with emissions to reduce our greenhouse gas. We need to decarbonize the transportation sector. As many of the speakers also pointed out previously 43% of our emissions come from the transportation sector.

Angelina Galiteva, California ISO (01:26:44):

And we are the ones that are investing most in electric vehicles. 90% of total us investment in clean transportation is in California. And of course, when I talk about electric vehicles, I also mean fuel cells because hydrogen and fuel cell cars are also electric cars. Next slide going carbon free doesn't necessarily mean that we can't be a leader and an economic leader. This is a slide that is extremely telling because as our GDP has grown and our population has grown our total greenhouse gas emissions and greenhouse gas emissions per capita, and GDP have fallen in California. So being green and going green can actually be beneficial and economically beneficial and of investing in renewable energy and clean technologies doesn't mean that you lose your economic leadership, the very opposite you maintain it. And you continue to lead the ISO, which is one of the largest great operators in the world.

Angelina Galiteva, California ISO (01:27:39):

Next slide supports California's clean energy goals, and we have been able to achieve massive decarbonization milestones this year and continue to reach them as well, both in CO2 reductions in achieving renewables. Now I should change my slide to a hundred percent <laugh>, which is the highest level served by renewables, which just happened a couple of months ago before it was 94.5. So super proud of that next slide, California, as a state mandates zero greenhouse gas emissions by electricity by 2045, which means we have massive amounts of new wind and new solar coming on the grid. And of course, that poses opportunities for electric vehicles and other technologies as well to have access to low-cost renewable resources in the middle of the day. And we need to ensure that's when the charging takes place. So, we are looking at 8,500 megawatts of new wind, 75,000 megawatts of new solar, 25,000 megawatts behind the meter solar and 55,000 megawatts of new storage.

Angelina Galiteva, California ISO (01:28:41):

And I have to say that in our interconnection queue, we have way about those amounts waiting to be interconnected. So, we do not have a, a, a, a shortage of resources. In fact, there plenty of renewable resources and storage resources waiting to be interconnected to California's grid. Next slide. And because we do need to look, look into a context of a Western mix. I thought it was important to also showcase, but what we are seeing west wide is a reduction in coral resources, possibly an increasing natural gas, a decreasing nuclear, massive increasing solar wind, and hydro technologies, and some increasing other which would include biomass as well as geothermal. So resource mix is certainly the largest growing mix, and we are expecting that happen west as well, which challenge depending in are so states to as well slide, we are all planning to retire, possible resources, whether it's the ones through cooling plants in California, or the coal plants west wide, those retirements are mostly fossil plants, which means that the renewable energy resources then of course, are highly reliable, but intermittent the sun doesn't shine 24 7 wind doesn't blow 24 7 have to make up for the reduction in 24, 7 fossil based resources of thermal resources.

Angelina Galiteva, California ISO (01:30:05):

Next slide. What we're also seeing is that we are going to have an own reliance and the overreliance in California and solar is going to continue. 60% of resources coming on. The grid is expected to be solar, which means we need more storage and we need to pull all resources that are able to balance solar short term and long term onto the grid as fast as possible. Next slide. So, the opportunities that we see on the grid that are extremely necessary for us, all of us know about the duck chart. We have OV production of resources in the middle of the day, and we need to have more resources towards the end of the day to meet that peak demand and that overall capacity demand for the grid in California. So, we're looking at these new resources coming online and experiencing some issues because of the supply chain.

Angelina Galiteva, California ISO (01:30:55):

Some of the storage resources have not been able to come online as fast. Some of the tariffs have slowed down solar programs as well, and we need to focus on how we ensure that we get past the supply chain issues and bring manufacturing back to the United States so that we don't become vulnerable to resources being stranded, either on ships or somewhere in another location. And we cannot get them where we need them installed and producing clean energy on schedule that we need next slide with over production. In the middle of the day, we have a very interesting opportunity because sometimes we have to curtail energy. That's clean energy because we just don't have enough capacity on the grid to take it. We have to give it to our other states for free. And in some instances, as embarrassing as a baby, we have to pay others to take our clean resources because we have such an over balance.

Angelina Galiteva, California ISO (01:31:48):

So having sinks in the middle of the day to be, to take at a lower cost, which mean charging in the middle of the day for, and time is extremely important for next slide. And then of course that ramp at the end of the day is very, very important because we have about 18,000 megawatts of fast ramping for our resources. And that is a storage and a fast-ramping capability. We need every single day for four hours at the end of the day. And that's where the grid is most vulnerable. The other challenge that doesn't happen as often, but can, is long term storage. So how do we come with a solution for long term storage, utility scale storage and multi-day storage. Certainly, electric vehicles may not be able to help with that, but they should be able to provide us as fast disrupting.

Angelina Galiteva, California ISO (01:32:39):

And of course, the four-hour storage and access to it. If we can compensate and figure out the scheme where they can play into that marketplace and provide the services that the grid needs, next slide and decarbonizing the fuels at the end of the day, this is our end of the day when the solar is going down and we need resources such as imports from out of states to come in and supply the power that we need for those four hours at the end of every single day, that is where we crank up the fossil resources that we have, and those need to be decarbonized by 2040. So, we need to collectively be looking and decarbonize fuels that are going to be able to provide a few that decarbonize that stack at the end of the day. And of course, decarbonize the imports that we have from out-of-state supporting the grid.

Angelina Galiteva, California ISO (01:33:28):

When the sun goes down and use starts going up at the end of the day, due to the duck curve. It's not it's a challenge, but it's also a tremendous opportunity for new technologies to come in and supply the mix that we need to operate a reliable resilient decarbonized spread. Next slide. So, what we've learned is that not one solution is, is, is the answer at the back of the book. We need a plethora of solutions. We need diversity in our resources. We need a lot of storage. We need demand response to be able to come in before used to be that load would follow. That generation would follow load because as low growth, so generation could be ramped up with traditional fossil resources. Now that we have resources that are more intermittent, it should be load following generation and turn it into 180 degrees.

Angelina Galiteva, California ISO (01:34:20):

And that's where demand response comes in and programs that allow the monetization of assets such as electric vehicles storage behind the meter, and other customer owned resources to participate in grid services. Time use rates are important to send the signal. Renewable portfolio. Diversity is key. We need wind energy. We need offshore wind. We need geothermal. We need to be able to have more variety and not be as solar dependent as we are. The Western energy I balance market expansion is key because that gives us access to wind resources from New Mexico and Wyoming, and of course, hydro resources. And we hope that we have a lot of them continue into the future from the Pacific Northwest. We need that regional coordination to have visibility into what the region needs as the whole region decarbonize and where the shortfall so that we can collectively ensure we are operating a reliable grid, but certainly interconnecting electric vehicles to supply those grid services on a west wide basis is going to be an interesting opportunity that we should be looking at.

Angelina Galiteva, California ISO (01:35:23):

And we need flexible resources that flexible ramping up and down in order to follow the generation of renewables is going to be extremely critical. So next slide, the future is digitized, decent, centralized, decarbonized, diversified, and, and highly democratized. It's decentralized with decentralized resources decarbonized, of course, because that's a band aid diversified. Hopefully we have a portfolio of local behind the meter resources, as well as large scale resources, interconnected with visibility west wide. We need to have vertical integration on a geographic basis and horizontal integration all the way behind the customer meter and highly democratized. Anybody can participate into the energy future and of course, bring in their resources and be compensated through programs that allow them to participate and determine their energy future. Next slide. And we have to do this because even though there are lots of

people who want to go to bars, we still haven't found the planet B that all of us can go to. So, we've got to save this one and think of our kids and everyone else that has to deal and live with the future that is livable on this planet. So, thank you very much, super excited to be here and discuss the opportunities for electric vehicles to ensure that happy, healthy, sustainable future for all of us.

Munni Krishna, Veloz (01:36:42):

Wonderful. Thank you so much, Angelina. You can stay on camera since you're going to be participating in the next round table panel discussion. So, let's now welcome the rest of our speakers for the next panel, the electric grid and electric vehicle. This session's going to be moderated by Nancy Sutley, senior assistant general manager, external and regulatory affairs, and chief sustainability officer at L E D WP. Please also welcome Aaron August, the vice president of business development and customer engagement at PG E Miguel Rome, the vice president of energy innovation for San Diego gas and electric and Obi IA. Barmy the manager of distributed energy strategy at the Sacramento municipal utility district. And finally, Diane Martinez the chair of east bay clean energy. Let's not forget Angelina Galiteva. Nancy, I'll let you take it away.

Nancy Sutley, Los Angeles Department of Water and Power Senior Assistant General Manager of External and Regulatory Affairs, Chief Sustainability Officer (01:37:31):

Thank you very much, many, and thank you everyone for being here. And thanks to Angelina for a great setup for this panel. We're very pleased to be here today to, with this great group of top EV stakeholders at our electric utilities and community choice aggregators throughout California, to discuss opportunities, transportation, electrification, pre presents for them key initiatives to advance electrification and how we can replicate successful models. We'll also talk about some exciting technology advances and, and how we're preparing for the future. So, let's get right into it. So, utilities in California have been at the forefront of advancing electrification in the form of Z education charging infrastructure and EV rates. This is a panel with a lot of knowledge. And so, we want to get on into some specific questions about projects to share learning and the models that we could replicate. So let me start with you Diane. Oh, there you are. Sorry, looking around my screen here from east bay clean energy and thanks for being here. So east bay clean energy offers customers, a residential rate for driver providing cost effective way they can charge at home. So, we're curious to know, have your customers responded to these programs and, and how can they be scalable in the future where everyone in your territory is an EV driver?

Dianne Martinez, East Bay Clean Energy Chair (01:39:13):

A great question. Thank you, Nancy. I just want to say I'm, I'm so happy to be here and really honored to be able to kick off this conversation in such esteemed company, but yeah, all of our base rate payers in our territory they they're getting a discount on rates otherwise available to them where we really think the impact is going to be made is hitting all of those folks who are in rental housing in multifamily housing in houses that they rent, which in where I live in Northern California in the east bay it's most of our electricity customers are in rentals or multifamily housing. And, you know, I, I, I was listening to some of the other forums earlier today and we folks were touching on equity and how do we move forward while including everyone in this green revolution, that's really at the core of how we're looking at our work at east bay community energy.

Dianne Martinez, East Bay Clean Energy (01:40:16):

We are looking to partner with cities specifically in providing DC fast charging that will impact those people and those neighborhoods that might have been left behind in the first wave of people who are purchasing EVs. We want to make sure that everyone has an opportunity to charge quickly, effectively, and cheaply. So that'll, I just want to touch on one other thing. You know, we're like I said, we're partnering with local cities, you know, cities and counties. They own a ton of parking lots. Why shouldn't those also be DC FA chargers at the same time, if that's how we're going to use the land, why don't we really put it to work for folks in a way that's going to help them make that choice about what vehicle that they're going to drive? But the other issue I wanted to bring up is marketing.

Dianne Martinez, East Bay Clean Energy (01:41:05):

How do we make sure that they know that they're not only doing right by the environment, but that they're getting a savings by that. And I think it's becoming clearer and clearer with world events and the price of fueling up and internal combustion engine people are, are getting a taste of that. But if we can get those signs up at our DCFA chargers that show the equivalent of what people would be getting for a full tank of gasoline versus a full charge on their EV I think that's when we're really going to start to break through with hearts and minds and get people on board, seeing that their friends and neighbors all have this opportunity to live better, faster, cheaper, greener and get all of those benefits of driving EV

Nancy Sutley, Los Angeles Department of Water and Power (01:42:00):

Well, thank you. And I think your point about cities and, and counties we've tried to do that here in LA with our streetlights and also some of our city facilities, including the LA zoo, which is a popular place to torture. And you can see some animals too, while you're at it. Okay, great. Well, thank you. Let me turn to you, Aaron and PG E I think a lot of utilities in California have incentive programs around installing EV charges. You know, PG E has its EV charge program well underway to help build out the public charging infrastructure. Can you, can you share some program successes, or any particular projects funded by this program? And is there a saturation point where utilities should stop investing in EV charging?

Aaron August, Pacific Gas and Electric Company Vice President of Business Development and Customer Engagement (01:42:52):

Thanks, man. Appreciate the time. I just want to check my, can you hear me okay, great. Awesome. Well, again, appreciate the time. It's a wonderful two-part question there. I maybe just do a quick flyover of our charge network program in general, which launched in 2018. It was focused on level two charging at multifamily housing sites and workplace. And so, the Diane Antonio comments you know, the MFH sector is a, a particularly sensitive and important target population. From a pure results standpoint, the program was certainly a success we had over 4,800 level two charging ports installed across 192 sites. And in fact, our last project finished last September, and we did all this while staying below our, our, our program of authorized budget, which again is another plus. And while those kind of back of the baseball card statistics are great.

Aaron August, Pacific Gas and Electric (01:43:45):

I think that the bigger wins are in two of the most critical places of the ed ecosystem. That we're all, all going to be a part of. The first one is around equitable access to DBS. So, of those 4,800 ports that I I've mentioned, 39% of them were located in disadvantaged communities. Again, the program goal of 15%. So again, you know, more than double what we were wanting to drive and it, and it is underscores the

importance of this sector. When you look deeper into the data, a hundred percent of the viable multi-family home sites in our disadvantaged communities who again are traditionally underserved back access to capital they need help. They requested the utility ownership option, which meant that PG E would own and install the behind the meter infrastructure and charger. And so, this offered a turnkey solution to this critical customer sector and really again, in support of increasing equitable EV charger deployment.

Aaron August, Pacific Gas and Electric (01:44:41):

So again, that's kind of when number one or success one, the second one I'd highlight of two is really the, the need and ability to think differently and creatively and how we build these projects to as low cost as possible. And so, a good example that we used within our program is the deployment of ALM or automated load management. So, a ALM for us helped produce the originally requested capacity for many of our projects by as much as 50%. And really what this means is, so when you look at an infrastructure project it would've been too costly and too expensive for a customer, whether it was in a disadvantaged community or, you know, a workplace that's seeking support wouldn't have been able to pencil out. And so, when you think about the transformer, the meter, the distribution panel, all the different elements that you might have to, to switch out in order to make that project go ALM helped really address some of those, I think, and again, that's Diane earlier comment on just more urban dense areas.

Aaron August, Pacific Gas and Electric (01:45:45):

There are some sites that would not been feasible at all without load management due to this, just the physical constraints of the site. So, they didn't have the space to how it's a larger transformer or distribution panel. And so again, ALM helped make projects reality in those different difficult locations and conditions. And so, I think for utility, it's really a two part-er of the success story it's enabling equity the adoption, and then really getting I'll say it curious and creative with how it is we build out building projects. And then the last comment I'll make here, just on your point of saturation. I think the transportation electrification market is seeing some encouraging signs of growth and investment. I think we've got a great turn up on today's call. You see that rising gas prices. I think the value proposition of EVs continues to grow and compound in a good way, day over day, but I also think that the market is still extremely nascent, and our state and climate goals are so important and ambitious. I think that the cute little girl there is no planet B. This is an all-hands-on deck moment for us. And so, I envision us being a part of this for quite some time. And so, I wouldn't say that we're at a point of saturation and, and my crystal wall is probably not clear enough to say when that that's going to happen, but we're excited about the role that we can play and what we're all going to do together.

Nancy Sutley, Los Angeles Department of Water and Power (01:47:03):

Great. Well thanks Aaron. That there's a lot there in terms of you know, how we use the assets we have and the assets that we need to ensure that everybody has access to electric transportation. Let me turn to you. ABIDA around residential charging. I know in Los Angeles; we still have many of our customers who are charging their EV at home and are the same is true for SMUD. Some studies estimate, 80% of drivers are charging at home. So, SMUD has their charge at home program that has a separate incentive for both the charger and the actual installation. Can you share why you went down that, that particular road and, and what are ways to increase adoption charging at home?

Obadiah Bartholomy, Sacramento Municipal Utility District Manager of Distributed Energy Strategy (01:47:55):

Sure. Thanks, Nancy. Absolutely. Yeah, I think we think charging at home can be the lowest cost way for us to get electric fuel into EVs. And, you know, as we surveyed our customers, we found that this was one of the biggest levers that we had on purchase decisions for EVs. We also found that this is a bit of a, a barrier, especially in the building electrification space, but also in the transport electrification space. It's a, it's somewhat of an unexpected cost as the customer sort of encounters the cost of installing a circuit or maybe upgrading a panel to facilitate charging at home. So that was really a key driver for us in thinking about expanding just a charger incentive to also encompass paying for customer circuit. We're also thinking about this as an opportunity for customers consider used DBS.

Obadiah Bartholomy, Sacramento Municipal Utility District (01:48:54):

We have a number of our participants who are purchasing used DBS, and that's, you know, certainly a, a better price point for someone in the low- and moderate-income space to be able to enjoy those fuel savings, but having the sticker shock of the install of the charger can be can be a surprise and maybe a negative first experience that could prevent them from promoting this to friends and neighbors. And then lastly, you know, we, we're seeing increasingly the use of power cords with vehicles that include two 40-volt chargers oftentimes coming with vehicles. And so, getting involved in that installation side is something that we saw as an opportunity to continue to maintain an influence point with the customer that allows us to have a conversation with them about charging levels, as well as opens the door for discussions around managed charging, which is something that we think is going to be really critical in the future as we get more and more EVs loading up residential transformers.

Nancy Sutley, Los Angeles Department of Water and Power (01:50:00):

Well, thank you lots of interesting ideas there and things. We can talk a little bit more when we get talked about technology as well. So let me turn to you, Miguel. I understand that SDG E hosted the world's largest Ze ride drive this year, that's very exciting and your program is as I think, considered a gold standard in EV education. Can you talk about in sort of how utilities can play a role in fundings of education who else should be in investing in Zev education and, and, you know, we all have to answer to someone about how we're spending money. So how do you all think about the return on investment from action?

Miguel Romero, San Diego Gas & Electric Vice President of Energy Innovation (01:50:53):

Yeah, thank you, Nancy. And, and look, we obviously all know that frequent communication with customers is critical to advancing EV adoption and, and, and creating this acceleration that we want. Right. I, I, we believe that, you know, our regulators, the public utilities commission was very visionary early on in us utilizing the utilities to further enable, right. I mean, obviously we know there's multiple interests, multiple stakeholders, and in the early stages, you know, we necessarily couldn't just bet on, on the vehicle OEMs to, to, to spread the word, right. Obviously, they had competing vehicles same with, with the local dealerships, right. I mean, obviously we all know the benefits of driving an EV is that there's low maintenance. So definitely we didn't want you know, communication to benefit one, one vehicle over another. So, you know, I think U utilizing the utilities early on what was critical because it is, it is a complex vehicle, right?

Miguel Romero, San Diego Gas & Electric (01:51:49):

I mean, obviously it's not just about whether I want electric, whether I want internal combustion, it's understanding the rate structure, the complexities of, of, of charging, right. And then all the different programs that we may have as a state you know, charging at night versus charging through a day. I think that that was very critical in the early days to making sure that a, that adoption existed. And, but clearly as we've advanced the adoption of EVs, we we've seen you know, a lot more engagement from multiple stakeholders. I mean, we see as far as education's concerned, our local governments and local stakeholders taking a larger role, which is great, you know, that has led to us collaborating further with, with these stakeholders. You know, we're very proud also of a collaborative here in our region called accelerate to zero where we're working with local government and local stakeholders to understand the gaps within our region to, to further deploy EVs and then also translate that into, into education to our customers.

Miguel Romero, San Diego Gas & Electric (01:52:42):

So, we can see that growth, right. We're now trying to move. I agree with Aaron, right? We're still in the early stages, but, but as we are still in the early stages with, with just regular users, we're also trying to move to, you know, for, to fleet adoption. And that's a lot more complex to multi-unit dwelling residents, which that's also a lot more complex. I mean, I still, I think there's a lot of anxiety from a lot of those residents to, to, to, to moving forward with EVs. Where am I going to charge, right? Is, is, is my multi going to have that capability, et cetera, et cetera, et cetera. So, we see an evolution with that education. I mean, I know the, our regulators are also spending time on, on who needs to do this going forward fully supportive of those efforts, you know, and at the same time, and I heard also Diane mentioned, right, we don't want to leave disadvantaged communities behind. Right. So, will that open up a, a key door for, for using, you know, folks such as utilities or others to promote that education? We'll definitely, you know, it'll, it will be a collaboration down the line.

Nancy Sutley, Los Angeles Department of Water and Power (01:53:42):

Oh, thank you, Miguel. Not in the script, I may ask you just a quick follow up on sort of how much do you see folks really wanting to understand what their, what it costs them to, to charge their vehicle?

Miguel Romero, San Diego Gas & Electric (01:54:00):

Yeah, I, I look, I, I think, you know, our, our specific campaign, we call it love electric, and, and as we also, we don't just do it and, and let it be right. I think we do a lot of follow up to see what the reaction has been from customers. And we've seen success, right? We track that through intent of adopting or adopting vehicles. And obviously part of that, that analysis also reflects on, you know, people are, are, are interested in, in, in the ultimate cost, right? A much better story to tell now because of the high gas prices, right. It's, it's easier to, to make that justification, but nevertheless, a lot of education still is needed.

Nancy Sutley, Los Angeles Department of Water and Power (01:54:36):

Thank you. Well, we're going to turn now to talk about technology and some and exciting technological advances as we March towards transportation electrification and, and what role the utilities are playing in bringing some of that technology. So, Angelina, you, you, you gave a very good presentation about sort of the state of the grid. And one of the more interesting and exciting opportunities is around the concept of the grid integration for both the utilities and the grid operators like the Kaiso. So how is California preparing for this future? And, and what, how will that result in benefits for consumers across the state?

Angelina Galiteva, California ISO (01:55:20):

Optimizing operations across the board is extremely important. So, ensuring that a customer has access to reliable charging as well as low-cost charging and benefiting the grid at the same time is what B two G does. I think that as we move into a future where we are trying as a system on a system basis to pull all resources that are behind the customer meter and allow them and enable them to provide much needed services to the grid on the local level, that then has a ripple effect. Of course, all the way to the transmission grid is extremely important. So, as I said, that vertical integration to where you have the transmission distribution system and the customer resources seamlessly interconnected, and able to go back and forth is extremely important. So a customer having a vehicle that can certainly utilize the resource in charge effectively during the day when we have an access amount of energy and have access to that low cost energy is of course extremely important, but then having that same customer then turn around and at the end of the day where we have the solar resources going down, because the sun is going down and we've got demand going out because everybody's switching on their lights or utilizing their appliances.

Angelina Galiteva, California ISO (01:56:38):

That's when you want to be able to pull power from those vehicles that are sitting probably plugged into a garage or somewhere else idle. I mean, we don't drive our vehicles every day. So being able to take advantage to charge at a low cost, but also discharge at a much higher price that the grid can pay and monetize the resource for the customer will enable that customer not only to have a low-cost car, but to maybe even make money with that asset, which they never were able to do that until now. So, we are working very hard and working with the DOE, as you know, with an MOU, the L a D WP is a part of, and of course also SDG and E. And I'd like to give a shoutout to SDG and E yesterday you launched a, one of the largest V2 G pilots, which school buses.

Angelina Galiteva, California ISO (01:57:23):

So, fleets are extremely important in this case because school buses are plugged in and idle at 4, 5, 6, 7, o'clock when we need them and can pull resources and, and power from those batteries to support the grid. And of course, provide resilience in reliability. Should we have an earthquake or some other event that puts the grid, the grid down, and that allows for the community to have access to additional resources. So, there are so many benefits with B2 G in terms of grid operations and optimizing that use is extremely critical in my personal opinion, unidirectional vehicles and unidirectional charges are going to become obsolete just because customers and the great needs and the optimization is going to require that flexibility. And I think we are working in that direction. We need to accelerate and work with utility partners, with distribution system partners, with technology, certainly the OEMs and the charging suppliers, the charges suppliers, because we do not have enough charges at this stage of the game capable of B2 G operation. And that hopefully will change in the near future as well. But again, I look at it as an opportunity. This is something that will unleash ingenuity and allow new technologies to provide resources to the grid from the electric transportation sector, which hasn't happened until now. It's going to be a very welcome opportunity.

Nancy Sutley, Los Angeles Department of Water and Power (01:58:46):

Thanks. Yeah, it's a very exciting time and an exciting opportunity and a, a couple of the utilities on this panel of have kind of dipped to, I guess, more than their toes into the waters of VD G both PG E and STP. So maybe since you set it up so nicely, Angelina, I'll start with Miguel. Talk a little bit about this school bus program and this pilot that you're doing with the Kajo valley union school district. You want to talk about what's

Miguel Romero, San Diego Gas & Electric (01:59:17):

Going on there? Absolutely. And thank you Angelina for those comments. Look, I'm very happy. Obviously, yesterday we did, we did have a little bit of a witnessing the, the launch of, of that key pilot. We had the opportunity also to, to ride in some of those buses, you know, very quiet, no films, unlike when I was riding a school bus back in the day. So quite the experience, but, but look, I think that the point is that it, it takes collaboration, right? This is, this is, this is complicated. And, you know, we're very obviously proud of, of having worked with our partners. We used it through, you know, we launched it through one of our initiatives that's tied to, to, to fleet deployment, right? Power, your drive, and, and it involved multiple entities, right? To us working with technology providers in this case, we, one of them local both bidirectional charges and, and the school buses, clearly the leadership of the, of the school district here in, in, in the El Cajon applaud them as far as trying to make that leap of faith.

Miguel Romero, San Diego Gas & Electric (02:00:13):

But obviously too, with the, the tremendous support of our, again, regulators at California agencies, right? This could not have been done without the funding of, of carb, CEC and EPA, all of them working together to make this a reality. And, and, you know, we're, we're trying to do more and we're having discussions with more right. Angel mentioned, right? School buses is a great prototype to test these things because their, their usage is very predictable, but obviously we have visions to, to rely on, on the ultimate fleets that are going to be going electric, right. A significant load that we can use in during emergencies. And we see also the support that's coming from the federal government with DOE I know a lot of us signed up for that V X initiative. And, you know, I know they're providing a lot of support because for us, it's not just about building that pilot and then going home, right. We are not now the funds starts and the most difficult part start, which is studying it, understanding, and how can we build upon it, right. We definitely have to also create the right market structures for V2 G obviously this is going to be participating in our emergency load reduction program, but, but more, more, more, more structure needs to be done. So, we can properly incentivize these fleet providers to, to discharge back to the grid. Right? So, a lot of collaboration, but very excited about the, about the future.

Nancy Sutley, Los Angeles Department of Water and Power (02:01:24):

We look forward to hearing what the results are and, and you know, when everyone across the state can learn about this and Aaron similarly, PG E has, has launched a number or had approved by the PUC, a number of vehicle-to-grid integration pilots. What can you tell us about these projects and how will they help our customers through providing some additional funding?

Aaron August, Pacific Gas and Electric (02:01:51):

Yeah. I am super excited about this topic and I would just say plus one plus one, plus one to a lot of what Miguel just said. I, I think we are really sitting at the beginning of the golden age of energy innovation mean

this, the, the value proposition of EV ownership is, gosh, I would say for the next decade is going to just off the charts criteria, yet we still have a huge mission and role to play here. But I think that growth is going to be happening through bidirectional technology and the understanding and evolution of that work. And so, these use cases that we've got as far as the three pilots are concerned with, the mission is approved. They're, they're going to be phased out really starting at the end of this year. The first one's focused on a VDA X space within the residential sector.

Aaron August, Pacific Gas and Electric (02:02:45):

And so that's the evaluation of light duty electric vehicles for, for grid services for backup power for bill management, for real-time energy participation. And, and then also looking at renewables integration and for customers that have solar, you know, we're fortunate enough to have so many customers that have solar you know, that there's this modular world of energy that we're about to tap into. And so that pilot, so VDX residential is going to be for about a thousand residential customers. The second is the commercial sector similar to residential. It's got backup power at nonresidential sites. How do you manage the load and bills in a commercial building? Real time energy with the added element of gathering distribution, upgrade deferral learnings. And so, again, back to my comments from how do you make sure that you're delivering power at the lowest possible cost?

Aaron August, Pacific Gas and Electric (02:03:38):

We see that there's some, some learnings to be had there. And so that'll be in the light, medium and heavy-duty space to about 200 nonresidential customer sites. And then the last one is a microgrid pilot to enable fleet EBS, to charge and discharge in our public safety, power shutoff form microgrids really around supporting community resiliency. And so, this is a focus on EVs. That's the energy aggregation point to support resiliency, especially during emergency events, climate driven events. But I would say the added benefit is this is also going to be huge GHG emission savings through the reduction of, of fossil fuel powered temporary generation, which is majority of how many microgrids function today that's being driven by a generator that's on fossil fuel. And so, to flip that out and really help participate in, in creating this clean energy future that we all need.

Aaron August, Pacific Gas and Electric (02:04:33):

And I think the last piece I I'd underscored here is maybe something that Miguel had said, the collaboration and partnerships across the entire EV value chain. This work is complicated and it is so nascent. And so, we see partnerships as being a, a big catalyst and amplifier of all of the thinking and how technology's going to evolve. Looking at that last panel, you know, PG need partnering with GM and board to enable some vehicle to home technology using OEM equipment. And so, we've got smaller pilots underway and that's really designed to evaluate the customer experience how quickly and seamlessly can we get them interconnected. And then how do we make sure that they know how to utilize these assets during again, climate driven events, its backup power becomes more and more important with climate change. So again, I, I could talk about this topic for hours. I know we're limited on time, but energy revolution, like we're, we're in the middle of it and we're shaping it as we

Nancy Sutley, Los Angeles Department of Water and Power (02:05:30):

Thanks. Obadiah, did you want to add something here? Sorry,

Obadiah Bartholomy, Sacramento Municipal Utility District (02:05:36):

Actually, a stray. Yeah. Aaron 10

Nancy Sutley, Los Angeles Department of Water and Power (02:05:38):

And Aaron

Obadiah Bartholomy, Sacramento Municipal Utility District (02:05:39):

Super excited about VG as well here. I'll just add that, you know, when we look out to our zero-carbon goals for 2030 VG and V1 G represent a huge amount of flexibility and virtual power plant potential for addressing that as a, a hugely moveable load and, and could play even in some of the long duration storage space, just based on the, the amount of flexibility we believe is there. Thanks.

Nancy Sutley, Los Angeles Department of Water and Power (02:06:05):

Great. Thank you. So, we're, we're unfortunately quickly approaching time before I get to sort of the last kind of Roundup question here, I mean, we've been talking about a lot about light duty, although we got a little bit into fleets and heavy duty talking about the school bus BDG pilot. But if anybody wants to kind of jump in on how utilities can prepare for the medium and heavy duty charging and you know, how can we leverage the investments we're making on a light duty side? I think this is a challenge. We're all trying to figure out with our fleets with transit and other fleets, as well as a lot of things that are coming delivery vans and things like that. So, I don't know, OB BDI looks like you want to jump in on this.

Obadiah Bartholomy, Sacramento Municipal Utility District (02:07:03):

Sure. Yeah. I'll offer up. I, I thought of two areas. I think there are an opportunity around one of those as, as combining investment and workplace charging, as well as fleets. I think there's an opportunity. There are certainly some challenges, but as you think about load management as Aaron called out and all the infrastructure implied planning those two together and, and making that joint investment represents an opportunity. The other one, I think we're, we're thinking about a lot is around the DC fast charging plazas and truck stops. And how can we bring in commercial fleets into those? I know there's a, at least one company, one EV that's doing some great work there, as well as the west coast, clean transit corridor initiative. That's doing some excellent planning that I, I think could help facilitate that sort of joint investment opportunity.

Nancy Sutley, Los Angeles Department of Water and Power (02:07:51):

Yeah. I think a real opportunity also for the utilities to kind of work together on some of these corridors. It's very exciting. So, Angelina, do you want to jump in on this question?

Angelina Galiteva, California ISO (02:08:01):

Yeah, very quickly. I think it is super exciting. What keeps us up at night though, is those fast chargers and everybody's zapping cars at the end of the day and stressing the grid even more so insulating that charging infrastructure I think is going to be very important and critical for all of us. As we optimize across the board and speaking of optimization school buses or delivery bonds, even postal fleets are extremely conducive to battery charging fleet operations, V2 G I would also like to point out though that long-term heavy-duty trucking shipping aviation, we need to be thinking about decarbonizing those sectors too. And coupling

that with the initiatives for decarbonizing fuels, whether it's electrolytic clean hydrogen, whether it's other fuels that we are going to need. And because we're going to make those fuels, hopefully with renewables powered electrolysis will be powered by renewable technologies that we are going to have another resource of fuel, which is a liquid fuel or a Gaius fuel, but in any case of fuel to diversify, not only generation, but also the transportation sector to utilize batteries, as well as fuel cell vehicles in order to be able to have that resiliency and reliability and also optimized the fuel decarbonization that I pointed out at the end of the day, where we are reliant on picking power plants right now, running on gas, let's figure out how we decarbonize those gas resources with a fuel that's carbon free and renewable space, and also benefit the heavy duty transportation sector.

Angelina Galiteva, California ISO (02:09:34):

So, I know we're all looking at it. I know they did that movie is also looking at decarbonizing their gas powerfully, starting with the operations in Utah, and hopefully as well in the, in basin power plants. And we should all work together to figure out how we make these connections as fast as possible and allow the decarbonization across the board of California as economy. And of course, of all Western economies as well as then the national economy because that's where we need to get and international, because we need to have a carbon free globe. And if we can show how, it's done here, that's, what's going to be this golden standard that everybody adopts. So, I'm very helpful and super excited.

Nancy Sutley, Los Angeles Department of Water and Power (02:10:15):

Yeah. Thanks. And I, you know, for here in Los Angeles, it, it will also give us the opportunity to finally conquer our smog problem if we heavy duty sector cleaned up. So, Aaron, a last thought on this and we'll move to the last question. Yeah. And I'll be

Aaron August, Pacific Gas and Electric (02:10:32):

Super brief. I'll just say that this is a little bit of skating to where we think the puck is going to be, and we've traditionally been reacting to where the puck is when you think about upgrades to substations and distribution infrastructure investments. And so, there's, there's some legacy thinking and I think some legacy policies that need to be changed that allow proactive upgrades to some of this infrastructure. That'll allow us to go from waiting for a project meter developed from a consumer or customer, and then build it to, we have it there and it's ready. And let's, let's turn this thing on. So just a, a short plug to say, I think proactive upgrades to how we think about infrastructure investments I think is going to be needed as well. Cause we're, we're going to have to, again, begin to skate to where we think the puck is going to be, not where it is. Cause it, this is fast moving ice we're on right now.

Nancy Sutley, Los Angeles Department of Water and Power (02:11:26):

Yeah. And, and a lot of the U the utility infrastructure in California is, you know, was built in the fifties and the sixties is California was growing very quickly. And we got to make sure it meets our future needs. Thank you. So, as we wrap up in the last few minutes and, you know, we want to, it's a, it's a big shift for all of us in the utility world as we try to prepare for this exciting future. So, we're going to ask all of you in just a minute or two to, to talk about what the, what you see as the most significant opportunity your organization when it comes to electrification and what you're most excited about that your organization's working start with you, Diane.

Dianne Martinez, East Bay Clean Energy (02:12:09):

Oh, thank you so much, Nancy. Great talk today by the way, everyone I'm, I'm just going to, we've got our hands and everything at east bay community energy, but I will pound home that we are focused right now on DC, fast charging. And I just want to acknowledge what Angelina had said about the, the, the demand going up after work hours, you know, that between four and nine and one way that we're looking at that is for these DC fast chargers, we could charge a premium for that time of use time. And I think that's, that's going to come naturally for those of us who are investing in, in that those type of public charging operations, because we do want to get people to mode shift and train themselves to, to charge during the day when the sun is in the sky.

Nancy Sutley, Los Angeles Department of Water and Power (02:12:55):

Thank you, Diane. How about you, Miguel?

Miguel Romero, San Diego Gas & Electric (02:12:59):

I think it's back to, to planning transmission and distribution investments for the future. I think there's just a great opportunity to figure out how to best leverage what we already have and how to best optimize what we already have. I mean, very analogous to what I see in the, I came from the supply side of the business, right? And we built a lot of transmission to support a lot of solar in the old days. Now we're building a lot of energy storage, which may fit in that same transmission that we have today as we change these resource adequacy rules. Again, a great example of how we're trying to leverage that. I see the same thing, you know, as we understand and see how electric vehicles behave a great opportunity to, to optimize the grid, right. So, we can make things more affordable, so excited for that

Aaron August, Pacific Gas and Electric (02:13:41):

Great

Nancy Sutley, Los Angeles Department of Water and Power (02:13:42):

OBA from SMUD.

Obadiah Bartholomy, Sacramento Municipal Utility District (02:13:46):

Sure. Thanks. Yeah. I think building off of that and the residential charging discussion we just had as we're seeing these Ford F one 50 S coming onto our system, I think there's a lot of focus on how managed charging can help keep those costs down, avoid transformer overloads. We're launching a pilot with O V G I P in about two weeks to do just that and manage multiple EVs on a transformer and make sure we can kind of feather those in during the low load hours. I think that's going to be tremendous for helping keep costs down, keep reliability up for our grid.

Nancy Sutley, Los Angeles Department of Water and Power (02:14:20):

Thank you. And Erin, we got, we got Erin and I'm going to give the last word to Angelina, but Erin. And then I see Moony as staring at me. So,

Aaron August, Pacific Gas and Electric (02:14:31):

So, I'll, I'll be quick. And I'll just say, I think instead of one, it's a one, two punch. I think we got to think about this in, in combination. So, one, and again, I feel like I'm following Miguel a couple of times now continuing to drive grid readiness and proactively building capacity to accommodate and inspire EV demand. And then I think the second one is really being tenacious and how we enable EV technology within industry innovators and those outside of, you know, the energy space to really partner and build a future that I think is, again, it's, it's one of the most game changing times in this industry that we, we will see. And so, it is a, it is an all of us moment. And so, I think partnering again to be tenacious and making it work for everyone is going to be critically important.

Nancy Sutley, Los Angeles Department of Water and Power (02:15:18):

I think the harnessing innovation across a bunch of different industries is going to, is a really interesting, exciting, and well, it should be a wild ride. So, I'll give you the last word, Angelina.

Angelina Galiteva, California ISO (02:15:30):

Yes, I, from a grid perspective, the way we look at everything is optimizing optionalities and making sure that we can optimize and bring in all the resources, recognizing that we've got horizontal integration, like I said, and coordinating between a vast geographic footprint throughout the west, through the energy balance market, but then going all the way down vertically into the distribution system, behind the customer resources and being able to pull those capabilities and ensure that they can be integrated and optimized to provide grid services because energy now is not just generated centrally at power plants. It's generated by a transportation sector is generated by the building sector; fuels are going to be electricity based. So, all optionalities and optimizing them is the name of the game. And that's what we're trying to anticipate what the need is. And we're

Nancy Sutley, Los Angeles Department of Water and Power (02:16:22):

Great. Thank you. And I hope for the, this gives you a little bit of a taste of, of what's going on across California. Thing all Californians have in common is somebody is serving them electricity. So, thank you all very much for a great panel and I'll turn it back over to Moony.

Munni Krishna, Veloz (02:16:41):

Wonderful. Thank you, Nancy. And thank you to all of our panelists to the audience. We're going to take another quick short break. Don't go too far. We're going to be back at 1235 on the dot. Thanks. See soon. Welcome back everybody. I hope you were able to get something to eat in the seven minutes that we gave you today. The next round table we have up is called shared transportation technology apps and charging. I'd like to welcome the speakers and moderator for this panel. Our moderator is Dr. Shelly Francis, the founder of EV Noire. We have on the panel, Adam grok, public policy manager of sustainability and environmental impact at Uber. John Walker, the sustainability manager at Lyft and Phil Pierce, senior manager of public policy and safety strategy at Zoox. Shelley, I'm passing it over to you.

Dr. Shelley Francis, EVNoire Founder (02:17:31):

All right. Thank you so much. It's so wonderful to be here with everyone this afternoon. And this has been a great program so far, so let's go ahead and dive into our ride, share electrification panel. So just to level set our conversation today because we're all coming from this from different backgrounds and experiences in

the past decade, the way people have transported and moved themselves around from point a to B has significantly changed what the advent of ride share. In fact, a 2019 study demonstrated that ride share services have added an estimated close to 6 billion miles and that's billion with a B folks of driving annually, accounting for miles traveled by TNCs. So, we are to electrify all transportation. And if we're moving in that direction, which all of us are committed to doing, we have convened, shared transportation, industry experts and leaders to discuss the state of electrification in the rideshare world, including adoption strategies, charging policies opportunities that will really help supercharge and move the growing rate of adoption.

Dr. Shelley Francis, EVNoire (02:18:42):

So, we're going to get right into our discussion today. So, let's start with our first question. So, each of your organizations have established a commitment to, you know, 100% electrification of your platforms, your, your ride share fleets and all of you of course are leading players in this space. I know that's why you're here today talking with us. So can you touch on how your efforts are going so far that where the pain points, where are some of the challenges and opportunities that you still took to this point and talk more about, you know, just exactly where are you in the process of moving towards this achieving this commitment. And are there any metrics that you can share with us as you all are moving through this journey? So, Adam, I would like to start with you for this first question and then we'll move on to John and then onto Phil.

Adam Gromis, Uber Public Policy Manager, Sustainability and Environmental Impact (02:19:34):

Thanks Dr. Francis. So good to be on with you and such a privilege to join. Both John and Phil. I can't imagine a better thing to compete over than racing towards shared electric transportation. Thanks very much to VO for having me. I'm Adam Gromis. I lead on sustainability policy for Uber globally. So how are we doing on electrification first? What are we trying to achieve? Dr. Francis Uber wants to be the cleanest platform on in the world and we think that's not just the right thing to do. We think that's what our consumers and the cities were. They enjoy our products and our investors in business need. And we've committed to, to fulfill that we've committed to becoming a zero emissions platform by 2030 in the us, Canada and Europe. And by 2040, everywhere, we operate more than 70 countries around the world.

Adam Gromis, Uber (02:20:27):

So that means helping every driver that uses our app get into a zero-emission vehicle. So how are we going to do that? We're focusing on three areas and this is where I'm going to give you the results. So first helping drivers make the transition. Second building, great products for consumers, push a button, get it in EV third transparency. We don't think people will just take our word for it. We got to show you where we are today or we're going tomorrow. So, what are the results across those three areas? First drivers as of the first quarter, this year, we're soon to release second quarter stats. So, hold your breath till about next week for that. But for the first quarter, this year, about 18,000 monthly active drivers are using zero emission vehicles on Uber, in the us, Canada and Europe, as far as we can tell, that's the largest collective of drivers offering commercial services in the in zero emission vehicles.

Adam Gromis, Uber (02:21:20):

And that's up three and half times from just a year ago in major cities. But so how, how much of that is the, is the Uber network you might ask? It's about one in every 60 miles in major cities in the us and Canada are in an Azure mission vehicle. And that's up from where it was about a year ago, which was like one in every 300 miles. So, we're very pleased by that still early days long way to go, but we're very pleased by it. We're also seeing faster uptake earlier in Europe where certain policies in European cities, including congestion charges, carbon charges have really promoted the move. And so, in Europe we're seeing it's more like one and every 12 miles in those zero-emission vehicle today. And that's up from about one in every 25, a year ago on the riders' side, Uber offers Uber green and our comfort electric product, which is push a button, get a ride in a premium EV those products combined are offered in more than a hundred Metro markets around the world.

Adam Gromis, Uber (02:22:21):

And we also offer car free options ride a scooter ride connect to public transportation, connect to a bike through partnerships in more than 170 markets around the world. And both of those are up a hundred percent to 200% over the last couple of years on transparency. We've produced two transparency reports on electrification and emissions from rides two in the last two years. And similar to some of the comments made by partners early on the call like Ford. We're also committed to the science-based targets initiative and should have an approved target hopefully very soon. That's where we're today.

Dr. Shelley Francis, EVNoire (02:22:59):

Right? Well, there's a lot happening since you made the announcement. So, thank you providing that, that robust update. So, John, I'd like to turn to you and hear more about what's happening in your organization around this conversation. Just, you know, what can you share today in terms of how your programs are going? What metrics are you able to share with us? Oh, John, you you're muted.

Jon Walker, Lyft Sustainability Manager (02:23:26):

Yeah. So, thank you. The rookie mistake. Thanks Dr. Francis and thanks Veloz for having me. So, we we're doing very well. I think it still is early days and you have to kind of kind of walk and, and, and before you can run and sprint, but we kind of think of it in two different ways. We have a, we have a rental program that's doing very well. We, we rent electric vehicles in several major markets in the United States. We have hundreds of electric vehicles for rent in Colorado and now California, as well as electric vehicles for rent in Washington state and now DC and Baltimore. In fact, I, I got my last trip to San Francisco. I got picked up in a, in a key and neuro electric vehicle from the airport, which is really exciting. So, we have electric vehicles for rent on our express drive program, and that program is growing rapidly.

Jon Walker, Lyft (02:24:18):

And so, we plan to electrify our entire rental fleet in the next several years. And so that's really exciting. And then we think about personal vehicles in the drivers on the platform and how can we make it as easy as possible for drivers to switch to an electric vehicle. And that comes with making the app the best app in the world for drivers to use electric vehicles. And that will come with features that make driving an EV the best EV experience. And that includes connection to charging infrastructure that includes potential for incentives. That includes a green mode feature where we're PI we're piloting that in the Pacific Northwest.

And we plan to roll that out in many other cities around the us and Canada soon. And then as far as metrics go, like I said, we have hundreds of EVs on the rental platform in the us similar to Uber.

Jon Walker, Lyft (02:25:15):

We've seen about a three to four times uptake in EVs over the last year or so, which is really, really exciting. So, we went from a very small percentage to a, a much higher percentage, but still fairly low in terms of mileage it's somewhere near what Adam quoted about one in every 50 or, or, or, or 60 miles in the us and Canada are EV miles, which is really exciting up from a much lower number where it was. And so, we're starting to see natural adoption paired with adoption. That's been influenced by some of the actions that our, our company has taken. So that's been really exciting. And then we've been working with electric utilities on other programs that have been subsidizing the cost of electric vehicles for drivers. And one such program is in Detroit where drivers can get $5,000 off the cost of an electric vehicle if they do a certain number of rides on the lift platform within a certain number of months.

Jon Walker, Lyft (02:26:18):

So that's a pilot program in Detroit, and if that's successful, we hope to roll that out with other electric utilities around the country. So that's just a little taste of what we're doing. We have grand plans, we've been building a lot of muscle at the company to really roll out, to get to that a hundred percent commitment. It's not going to be easy. And so, it's been great to see a lot of the folks on this webinar and what they're working on. And we're, it's going to take a big-time effort from the car companies, from the electric utilities, from the grid, from everybody to get to these, these big-time commitments

Dr. Shelley Francis, EVNoire (02:26:55):

Wonder, thank you for sharing that, John. So, from the, both what you and Adam shared, we had, there's obviously an influx of new drivers who are moving over to electric vehicles for a number of reasons, because you're both offering quite a number of pilots and programs to really make this transition much easier and more accessible to, to a diverse set of drivers. So now I want to turn to the newer player in this space. And so, Z it's a new newer organization you guys have been around maybe about 10, 10 or three ten-ish years now. And so, I would love to hear more just how you all are kind of taking the rideshare electrification space by storm and what you all have in the works. And if there's any metrics or up, up updates on your data or your implementation strategy that you can share with us today.

Phil Pierce, Zoox Senior Public Policy and Safety Strategy Manager (02:27:46):

Yeah, of course. Thanks Dr. Francis and good to be here with everybody. This is exciting, nice panel. So yeah, my name is Philip Pierce and I'm a senior public policy manager here at Zoox's. If you don't know about Zoox we, are you were close we're eight years old. We actually celebrate our eighth birthday on Friday, which is very exciting. And we are designing a fully autonomous all-electric rideshare vehicle. You can see it behind me in these beautiful zoom backgrounds. But what's exciting about this is that we are building a fleet of these vehicles. So not for personal ownership, and then we will operate like a ride share service, however with, with no driver, we will operate everything from the fleet to the driving system itself, the app and we also produce and design and build the vehicles all ourselves here in California.

Phil Pierce, Zoox (02:28:41):

So, in terms of sort of the electrification piece of it, you know, all the vehicles will be electric. I could, I could share more about that I think later but we also intend to charge with clean energy. So, we are right now, as we start to look at what markets we plan to launch in first we are working and talking to utility providers to figure out how we can get the cleanest mix and also what we can do to help them clean up their grid or find more access to it if we can be a partner in any way. And then when it comes to our actual vehicle and, and milestones, we actually are very excited. Just a couple weeks ago, we were able to announce that we are fully self-certified at the federal level for this vehicle, with the federal, federal motor vehicle safety standard.

Phil Pierce, Zoox (02:29:28):

Sorry, I always, I always mess that one up. That's a big deal. It's the, the first time any purpose-built ground up autonomous vehicle has been certified to those standards. We didn't ask for any exemptions through NSA and we're very excited to show improve all of the wonderful safety mechanisms that are built into the vehicle that include over a hundred safety innovations that make it, so it is a vehicle that all four seats will have a quote of a five-star safety rating. We have a really novel airbag design and a lot of great things that are built in to make it so we think it's going to be an awesome and safe experience for everyone that needs to get around cities.

Dr. Shelley Francis, EVNoire (02:30:09):

You know, Phil it's really exciting in terms of just thinking about when you think about access to different communities, mobility access for folks who may not be able to drive a car for a number of different reasons. So, this type of technology is really going to be quite impactful and critical to really making as we say you know, electrification accessible to all communities. So really fascinating work that you all are doing. I want to just stay with you for a moment and talk more about what your organization is envisioning in terms of that autonomous driving experience, which is very different from <inaudible> lift. And so can you bit about what's the most critical barrier that you see to overcome you know, just bringing vehicles to mark. So, for example, you know, obviously what's option of these and the technology, because it's obviously a frontier technology it's new to folks. It may be a little scary, but it's also very exciting at the same time. So, you know, what are the biggest challenges that you see or that you're currently facing to get these vehicles on the road?

Phil Pierce, Zoox (02:31:30):

Yeah. thanks for that question. So, you know I think it's a couple different things. So certainly, there's the regulatory environment. So, if we think about the fact that I just mentioned, we have the, the federal ability to drive on public roads in the us thanks to the self-certification process that is not the same for autonomous vehicles when it comes to states. In fact, it's a little bit of a patchwork and each state has a different system for how they move autonomous vehicles from the testing phase into deployment and into, into charging for rides. Some of those states have a really clear and thoughtful and, and, and good process, which is great. Some states have not quite gotten there yet, or, or haven't been spurred to do so. And so, there's a little bit of a, a, I think a challenge there, but also an opportunity to think about, you know, as these systems come online and get, and get built, how do we want them to operate?

Phil Pierce, Zoox (02:32:27):

How do we want them to show up in, in our cities and in our states and how can these things be seen as safe by other folks too, right? They, they think they want to know that there's some kind of process to go through that they say, oh, this new technology, this new fancy thing, but also, we know that it's gone through the, the proper steps and has, has proved itself to be, to be great. I think one other interesting thing to point out just in, in terms of charging infrastructure or about how these vehicles will operate. We're really excited that since we built this from the ground up, we built into it, the, the idea of thinking this should be able to do a full day's work a full cycle and, you know, whenever people think about electric vehicles, they often think about range, right?

Phil Pierce, Zoox (02:33:12):

That's a big metric that especially consumers think about. And we think about range anxiety. One thing that we're excited about, we, we don't talk about range. We talk about doing a full day cycle, and that, that could mean that some vehicles are charging while others are out when we have our peaks and our troughs. But it also means that it can do that whole cycle without having to come in multiple times during the day a lot of retrofit vehicles we estimate they would have to be charged multiple times a day. And that's in part, because there's so much compute on board that is like all the sensors that are perceiving the world, all the things that are planning for where the vehicle should go as well as actually the propulsion and moving forward. It's just so much more.

Phil Pierce, Zoox (02:33:54):

And so, it uses up a lot of that battery, just planning and figuring out how to drive. It's almost a 50, 50 split actually thinking and actually moving. And so, we have two huge batteries in our vehicle that make it so we can just, you know, charge when the time is right, but also have flexibility within our fleet that we're not constantly having to make these trips back to figure out when and how to charge. And, you know, we think that also could eventually decrease a lot of congestion that we might see in places too. So, we're very excited about that.

Dr. Shelley Francis, EVNoire (02:34:23):

That's very exciting. And I know one of the audience member questions is, is probably like, how can we engage with these vehicles? Where when can we see them and really kind of touch and experienced a technology?

Phil Pierce, Zoox (02:34:40):

Yes. The million-dollar question. Absolutely. So, you know I think we're hoping for, for some pretty exciting announcements soon in terms of how this vehicle is operating on the streets. I, I will say we are testing and driving our software in retrofit Toyota, a Highlander vehicle right now, currently in San Francisco, in Seattle, around the bay area and also in Las Vegas. So, the same actual self-driving ability is, is going on right now and it's happening across the us with, with more cities to come. But in terms of this, this novel vehicle it's sooner than you might think, but it's not tomorrow. So, so more soon,

Dr. Shelley Francis, EVNoire (02:35:21):

Okay, well, we'll be waiting patiently for that announcement and you may have to make sure you let us know first. So, thank you again for sharing all of that great information about just where you are in terms of

going market with the product. So, I want to touch on something that you raised a few minutes ago when you were talking about charging. And so that is one of, you know, usually when you start talking about electrification and clean transportation and buying EV or being an EV owner or enthusiast, when you talk to people, that's one of the first questions that they ask you about one is cost charging. And so, let's talk a little bit about charging infrastructure. And so, in thinking about overcoming charging as a barrier, what should we doing? So, Adam, I'll go to you first. So, in terms of just thinking about for ride share drivers, where is charging most media, like, where are they telling you that they need access to charging? Are there specific areas or markets where the charging infrastructure you know, what we call it, charging deserts. So, are there specific markets or areas where you think the public and the private sector need to invest more or collaborate more closely to really make sure that they're providing adequate charging infrastructure?

Adam Gromis, Uber (02:36:40):

Thanks Dr. Francis, and it's, it's such a good question. I when we, we did a survey last fall of 16,000 drivers who use our app in the us Canada in Europe, and we asked them what what's keeping you from getting into an EV because we got some big goals in mind. And the second greatest barrier, second, most frequently cited barrier was charging curiosity about charging. Where is the charging? What do I plug in? What do I use how much time will it take me to charge and how long will that keep me away from offering revenue, service, big concern for nearly half of drivers or so and second only to cost as, as the number one barrier. So, this is a big question. And we were really pleased earlier this year when Secretary Pete Buttigieg asked the same question and put it out to the market through an FHWA RFI.

Adam Gromis, Uber (02:37:31):

And they said, hey, does anybody have any ideas on how to spend these seven and a half billion dollars? And we raised our hand along with a number of other businesses and said, we we've got some ideas for you secretary budgie. So, if you care about emissions reduction and if you care about equity outcomes in our view, it's really important to keep commercial and high mileage drivers in mind, as you build out EV infrastructure. And that's not just ride hail drivers. That also includes taxi drivers. That includes fleet drivers. That includes low-income workers who drive longer distances to work. That group is a small but mighty segment of the overall driving population. And they, they represent an opportunity for outside benefits. And what do I mean by that? So just taking ride hail as an example, don't just take our word for it.

Adam Gromis, Uber (02:38:19):

If you look at research from UC Davis, from others when we help a ride hail driver switch to an EV from an ice vehicle three to four times the emissions benefits can be realized versus an average member of the driving public that's big deal. And that's, you know, because drive drivers who are driving a lot commercially trying to earn, earn money from it, tend to drive a little bit more. So, there's a bigger opportunity. They also drivers in this segment, not just ride hill, but all these other commercial and high mileage segments are overrepresented by lower income households by social and economic justice communities. So, there's a big opportunity if we can keep them in mind, as we put together these policies including EV charging. So, what does it take? What, what does it look like for, for instance, EV infrastructure that supports ride hail working ride hail drivers simply put, we need charging where drivers work and where they live.

Adam Gromis, Uber (02:39:14):

That means fast charging in downtown areas, urban areas, particularly high traffic, urban areas like multimodal centers, airports, big train stations, things like that. And it means slow or overnight charging solutions near in, in high density areas where lots of working people live, where there's more represent representation by renter populations and things like that. Cities are where VMT occurs. And I love the idea of a transcontinental coast to coast EV charge network. That's great, but while you're building it, don't forget where people live and where most miles and emissions happen and where they matter most in cities. And you might be thinking, okay, 5 billion for the Navy funds that's designed for highways, right? Well, for better, for worse in the last seven years, not every urban planner followed the guidance of, of a number of luminaries that said, you know, don't build freeways through cities and they're there.

Adam Gromis, Uber (02:40:12):

And if you, you look at where the alternative fuel corridors are, particularly in west coast cities and in a number of east coast cities, they're still running through urban areas and you got within a mile of that to spend that money. So, what we've started to do is, is leverage some of our data and we have new insight tools that convert miles that we see on our platform into prospective kilowatt hour demand in space and time. And we're sharing those insights with our EV charging partners. And we've started to open up access to government agencies who are going to spend unprecedented amounts of money on EV charging. We want to make sure that those dollars go to the highest and best use and where the miles will most be needed and must be converted into both emissions, benefits and equity benefits.

Dr. Shelley Francis, EVNoire (02:41:02):

Excellent. Thank, thank you so much for sharing that. I actually, I want to go back shortly to talk about what we can do to make sure that we're reaching diverse communities, particularly considering that 60% of the rides are starting and ending in and what we call communities of opportunity. And then there's a high proportion of drivers who represent BI pop communities. But I do want to pose the same question or a similar question to both John and to Phil, John, in terms of thinking about charging infrastructure, what's the right type of charging for drivers, you know, is it the fast chargers' charges in the Plaza, like a charging hub, or is it, you know, home charging? So, providing drivers access to charging at home, is there a specific ratio, a go to ratio per se, or just thinking about this from a policy standpoint, you know, if Lyft could guide the government to fund charging for the drivers, what would you do? Like what would you ask for, or what do you think is important to consider?

Jon Walker, Lyft (02:42:02):

Yeah, it's a great question. And, and I would start by just echoing what Adam said. So, I won't repeat what Adam said because I agree with almost everything he just said. So plus, one of that, and we are also aiding with data share and we've been creating a lot of heat maps of pickup drop off and driver locations. It's anonymized, its anonymized data, but it shows where drivers live to census track level and where they pick up and drop off to help site infrastructure. And so that's been, we're making that available to planners and to government agencies, so that can help incite it. And then on this question of what type of charging, so the fast charge has to be fast, you know, gone are the days of 50 KW. We need one 50. Plus, if we can start in, you know, the Wayne Greski analogy, right?

Jon Walker, Lyft (02:42:50):

Skate where the puck is going, we need to start installing super-fast chargers' things over 150 KW. It's not going to cut it if you put in less than 150 KW. So that that's the first thing. And then the other thing that we believe is that L two overnight charging is still a very viable option. And so, yeah, actually the ideal scenario would be to have programs where our drivers can get overnight charging in their homes and their multi-family dwellings, because then they wake up every day with a full tank and they don't pay gasoline prices. So that's actually the ideal scenario and you're still going to need fast charging in the wild for tactical purposes and for high mileage days and things like that. And people that just plain can't get home charging, but home charge programs are extremely interesting to us and, and try and, you know, we can't give up on the multifamily housing dwellings, particularly communities of opportunity. Like you mentioned, those have been pretty much overlooked because of the chicken and egg problems. People say, well in, in low-income communities or communities of color, there aren't very many EVs. So, we don't need to install charging infrastructure in multi-family dwellings. And then you get into a chicken and egg problem. I think we need to break through that and start installing multifamily dwelling level two charging.

Dr. Shelley Francis, EVNoire (02:44:16):

Yes, no thank you. That, and, and I, I understand that that analogy that people like to use around the chicken and egg and it's, it's really could be quite disastrous for certain communities because it really perpetuates the infusion of infrastructure only in like middle class and wealthier neighborhoods where the EV inventory already sits versus also, you know, making sure that we're thinking about inclusion and really making sure that we're intentional engaging those communities that can benefit the most from clean transportation BMTs and reducing emissions and pollution in those communities. But we have to be intentional about the education and outreach with which your organizations are, are really doing different from your peers. And while I know you don't have drivers per se, you definitely still need to charge your vehicles. Right. And so, I just want to know here a little bit more before we pivot to talking about how, what we can do to make this conversation much more inclusive to the drivers. I want to make sure we touch on that before we wrap today, but I do want to have a better understanding what the audience have a better understanding of how is envisioning charging on your routes and are there opportunities for charging for vehicles sharing as opposed to single occupancy vehicles? You know, what are your thoughts on that?

Phil Pierce, Zoox (02:45:50):

Yeah, it's a good question. And, and thanks for that. I know I touched on it a little bit in in the previous answer of talking about how, you know, before we get to charging, we think about the design of our vehicle and the fact that we want to have to charges and frequently as possible, both in terms of the fact that that means we, we can't charge for a ride if the vehicle's charging. But also, in terms of having less trips back to a facility where a vehicle needs to charge in less downtime, you know, in general. So, I think that's, that's a positive thing that sets us off on a good foot. You know, I think on top of that we going to need for vehicles and fleets of the size, you need a pretty substantial investment and you need to have a pretty considered effort to get power to those locations.

Phil Pierce, Zoox (02:46:39):

So, there's another conversation that can be had is as we're, as we're doing that. And we're thinking about, you know, fleets like our vehicles, but also like delivery and, and other things that are consider, you know, continuing to electrify is how do we leverage those expansions or those new power poles that were coming

to different parts of the city, where we could have big fleet charging to also have some ability to have public facing chargers at those as well. So, you know, can someone else that wants to have an electric vehicle utilize some of that same investment to charge their personal vehicle while we make those investments to make it so our fleets can charge in those cities or in a new place that hasn't even considered doing that. So, I think that's, that's one piece. Another piece that I think we all three of the companies electrifying adds to this is that, you know, it can be expensive to invest and buy a new personal vehicle and buy a new, personal electric vehicle for a lot of people.

Phil Pierce, Zoox (02:47:31):

And then on top of that, most vehicles sit unused, you know, 94 to 96% of the time when we have electric fleets like ours or as Uber and Lyft become those as those replace personal vehicle trips, that's electrifying all of these trips that used to be or could have been in a gas vehicle. So, I think it's really important to kind of consider that when we think about incentivizing electric fleets means essentially like putting an electric vehicle in a bunch of people's garages at a much less intense cost in terms of, you know, people's personal investment, but also the space in the time that's needed to make that happen. So, I think that's all you know, important context to think about when we consider what, what it means to electrify these fleets.

Dr. Shelley Francis, EVNoire (02:48:18):

Thank you. And that just goes to show that, you know, electrification is going to take all of us, all of our efforts, whether it is you're having a, you have a bike or scooter, or you have me heavy duty you know, vehicles, we really have to look at electrification and clean transportation from a multimodal lens and really meet people in communities where they are in this conversation. So, before we wrap for the day, I, we would be remiss. We didn't talk about what are the things and the strategies that we need to put into place to make sure that we're inclusive in thinking about ride, share electrification, both from the end user, but also from the driver perspective. And so just, let's go back to talking about the drivers for a moment. So, EV ownership, as we know, is disproportionately concentrated in higher income households and communities.

Dr. Shelley Francis, EVNoire (02:49:09):

And so, we touched on this a little while ago, and so that might not be surprising per se, but what we have seen is that data from the clean vehicle rebate program has shown that only about 6% of the California rebates for PS have been captured and utilized by communities that we would consider communities of opportunity. And so, we need to pivot and think about how we're engaging those communities and what can we do to get those numbers up. So, Adam, I want to start with you first, you know, what measures do I share companies take to ensure that the drivers with diversity in ethnicity ability, mobility, gender, race, et cetera, can drive electric. And how does your company's overall equity state really just relate to the work that you're doing in the electrification space?

Adam Gromis, Uber (02:50:00):

Well, first of all, Dr. Francis, I'm feeling a little shy to answer this in your presence, because I've learned a lot from you on this topic and, and you've built a business on an expertise in, in this region. Thank you for asking it and posing it's, it's a really important one. I want to zoom in first on the California data a little bit, because I'm going to come back to it in a second, but we had done some analysis to look at where, where

EV's registered in the state. And if you look at the, the 40% of zip codes that represent the lowest income households they only have about 20% of the state EVs. If you look at the other side, the, the top 40% of zip codes or the most income, they've got 60% of the EVs. So, and, and this is in a state where we've focused on environmental justice and equity and EVs for a while.

Adam Gromis, Uber (02:50:54):

This is a state that has hosted some of the birthplace of the environmental justice movement. So that's not good enough. We need to do better to your point that you made Dr. Francis and I'm, I'm proud to be on the board of velos and others that are working to try and turn that around, but we have work to do so. That's where we are today with sort of the, the, the average EV car ownership world. Now, what I'm so proud to be on this panel for is that we're talking about a new model, not, not to replace the old model, but to coexist with the, the old model of car ownership. The presumption of car ownership is the only way of getting from a to B and most EV policies and EVs and EV charging were created for, with the assumption that car ownership is the only way people get from a to B.

Adam Gromis, Uber (02:51:36):

This panel is talking about shared UCBs and that gives us a new opportunity. So how do we think about it? What do we think has to happen first? We, it can't fall on the drivers. We agree with the experts on this, the drivers particularly those who use our app or overrepresented by socio and economic communities of justice. That, that that's a problem. So, they, they can't be expected to bear the cost of that transition. That's one, two, it's the right thing to do, to do everything we can and to work with others, to support that change. So, what are we doing first? We're helping through our app second, we're helping by putting money on the table. And third we're working on great partnerships. So let me just cover those three areas. So, first in-app technology, this is a lot about information, information, exposure because many of the members of these communities have not seen EVs have not seen EV charging have not been focused on by, by public and industry campaigns for awareness.

Adam Gromis, Uber (02:52:31):

So, what we want to do is bring that information into the driver app. We announced two months ago that we have an EV hub now in the Uber driver app, you can push a button, go to a one stop shop for information about EBS connect to the incentives from Uber, from our partners, from local governments, from local utilities states and the federal government we partnered with ZPI ride, which is the same underlying creator of the tool that Veloz uses for its online calculators. And you can compare on through, through this tool that we built with Zappy, what is my current car today from my future EV tomorrow on a cost basis, we're also, we brought EV charging into the driver app. We, we announced it two months ago. It just entered the U.S. driver app a couple of weeks ago, really proud to see this.

Adam Gromis, Uber (02:53:17):

So that's step one in app tech and information. Step two is money. This is a lot about money. This transition is going to take some money. And most of the research and analysis would show that the cost parity is not going to happen for ride share drivers on a business-as-usual basis, until much later this decade, we got to change that. So, Uber's the only global platform that's committed to 800 million in total resources to help drivers hundreds, hundreds of thousands of drivers make that transition over the next couple of years. And

the us that takes the form of a dollar per trip, extra from Uber for every zero-emission vehicle driver that completes a trip, get an extra dollar from us. Third it's great partnerships. We can't do this by ourselves as Dar Lexus say climate's a team sport. So, we work with dozens of great EV industry players like many of members and those that you've heard from today, including EVgo, General Motors, Nissan and others.

Adam Gromis, Uber (02:54:12):

One of our latest partnerships is with Hertz to make 50,000 Teslas exclusively available to jar our app. This is the largest expansion of EVs on a platform in north America. One of the largest deals in the world on EVs. And I'm pleased to say that so far, 15,000 drivers have taken part of this program used Teslas that hurts locations, they've driven 40 million miles so far, that's 80 trips to the moon. And back I did the calculation Shelly because I know how much Elon wants to get to the moon. But we're really pleased to see drivers taking this up. So, the question is, can we audit it on the same basis as the state's distribution of EVs? We're about to share this data with the market. But what we found is that drivers representing those lower 40% of zip codes on an income basis represent our Tesla renters by 55%.

Adam Gromis, Uber (02:55:06):

That's exciting. Half of it, more than half the Teslas that are rented are coming from those zip codes, with the lower, lower incomes, 40 lower 40% of, of, of income zip codes in the state. If you look at the higher income zip codes, that's only about a quarter of renters. So, look, that's not an answer. It's not the end. We hope it's indicative of a good start. And we hope it's indicative of the world of shared UC EVs, which my fellow panelists are also here to talk about. And that that could be a future that has new opportunities and new models potentially needing more supportive policies to help make shared, use EVs more equitable in the future.

Dr. Shelley Francis, EVNoire (02:55:44):

Got it. Thank you. Thank you so much, Adam. So, it's what I heard you say is that you all are working to, you know, normalize EV adoption by really breaking down the barriers, the financial barriers specifically and making the vehicle and the technologies accessible while also doing the education, the outreach. So John, I want to pivot to you and toss the mic to you and just hear, you know, what additional measures do you think the rideshare companies should be taken to ensure that drivers specifically from communities of opportunity, community that are disproportionately overexposed to air pollution, particularly transportation, emissions related pollution, what should they be doing or what should communities and, and stakeholders be doing to measure? Sure. They may have the ability to drive electric as well and then feel I'll come back to you to close things out.

Jon Walker, Lyft (02:56:33):

Yeah. Thanks Dr. Francis. So, we're we think share mobility should be accessible by all. And so like, Adam, I won't pretend to be an equity expert. I'm a sustainability guy. And so, I'll just tell you what we're doing and, and it's a step in the right direction. And I think it's a step in the right direction, but it's certainly not the answer, but a couple of the things we're doing are making vehicles affordable to rent by our drivers. And as Adam mentioned, we have a similar demographic of renters. Most of our renters, about 70% come from communities of opportunity. And so, when these, when renters rent electric vehicles, they tend to be from low-income communities, communities of opportunity. And it's really exciting when they rent electric

vehicles. So, in San Francisco, for instance, we have hundreds of electric vehicles for rent and it's, it's a population that has had low exposure to electric vehicles.

Jon Walker, Lyft (02:57:35):

So, we've created a program to educate and introduce folks to electric vehicles, everything from what is an electric vehicle to, how do you charge it? How do you charge it on the network? Because we're partnered with electrify America and UV go. So, it shows them how to find the, the chargers on the network and how to utilize that. And then the really, really exciting thing. And what I'm most proud of is that renting an electric vehicle today in California is less expensive than renting the hybrid, the gasoline hybrid equivalent. And so, you not only save money at the pump, but you also save money on the rental price as well. We did that by partnering with an electric utility called peninsula clean energy. And they were able to subsidize the electric vehicles to make them lower cost than the, than their gasoline equivalent. So, this is a really great program for people and it's, it's not a long-term rental, it's a weekly rental.

Jon Walker, Lyft (02:58:27):

So, if for any reason, the people don't like the way they don't like anything about the vehicle or the program, they can just return the vehicle, no harm done. Most people have been keeping the vehicles for week over week, over week. They can keep the vehicle as long as they want. Some people keep it for over a year, maybe even years. And so, the program's been extremely successful. We're planning to really blow it up and flip the entire fleet of rental vehicles in California into electric vehicles. And it's a great way to avoid the skyrocketing gas prices and put more money into the pocket of drivers and make drivers extremely happy on the lift platform and to, and that's good for our bottom line because it keeps our best drivers. It keeps our drivers happy. It keeps our drivers doing rides, keeps our drivers, making a lot of money.

Jon Walker, Lyft (02:59:15):

So that's our model for rentals. And then we have another strategy with personal vehicles because not all vehicles of course are rentals. And I touched on this briefly, but we're doing this pilot in Detroit where folks who buy an electric vehicle and do a certain number of rides on the lift platform can get up to $5,000 off the vehicle. So, they get 2,500 upfront to help pay for the down payment or the first payments on the vehicle. And then another 2,500 after they complete a certain number of rides. And we're looking to expand that program both in Michigan and Detroit area and as well as in other places around the country. And that's a good way to in the near term, reduce the capital cost of the vehicles and allowed folks to recoup gas costs versus electricity cost. As battery costs come down and, and the vehicles reach cost parity at which we hope will be midday. Thank

Dr. Shelley Francis, EVNoire (03:00:16):

Excellent. Thank you. So, lots of great exciting pilots and programs happening they're being, they're obviously very successful cause people are taking up grabbing the opportunity to test drive the vehicles and see how they work for their lifestyles and their entrepreneurship. And then the also exciting things that it's also a walking billboard for their passengers, so that the drivers can tell them about the great experiences that they're having. And so just one other point we want to make sure that we can let Phil weigh in on this. So I know you're part of the equation of equities, where, and who you serve in terms of you know, serving your client and who your vehicles are servicing, but what are zoo's plans to get their vehicles

into priority communities and, you know, just how do you, how exactly do you plan to work with these different target communities to get rider from all backgrounds into your vehicles?

Phil Pierce, Zoox (03:01:14):

Yeah, it's, it's a great question. And I know we're running up on time here, so I'll, I'll, I'll be brief even though this is a really important topic. So, you know, I think a number of things for us, one is whenever people talk about autonomous vehicles, you talk about the operational design domain, the ODD. So, you officially usually get permitted for a certain type of a certain part of the city. So, you know, it's really important to focus those early pilots. And then also as you expand throughout the city to, to focus on priority communities, one in terms of just having them within the service envelope. But I think the other thing is like you mentioned doing outreach understanding what kind of, what, what things do people want, what are people interested and how can they get comfortable with this kind of technology and also what kind of trip needs could we better serve?

Phil Pierce, Zoox (03:02:01):

So, one additional point here is that we really want to compliment public transit. And so, as someone that used to work for a public transportation agency, I know there's a lot of challenges, especially in this post COVID world. So, I think one gray area to focus on is how do we partner with those agencies in order to provide some of that first mile first, last mile service. And how do we get you know, zero emissions trips going in all those communities and make it something that, you know, we can all we can all benefit from.

Dr. Shelley Francis, EVNoire (03:02:32):

Exciting. Well, thank you all so much for sharing your expertise and just where you all are in this space around electrification, ride sharing, really exciting things happening, and we're, can't wait to see and hear more from all of your organizations. So now I'm going to throw it back to you MUN and take it away.

Munni Krishna, Veloz (03:02:51):

Thank you so much, Shelly. And thank you to the panel up next. We have our final round table for the day called strategic investments in charging technology and networking. This session's going to be moderated by Orville Thomas, the California state policy director at CALSTART joining him is Carl Moczydlowsky, the vice president of software engineering and products at Powerflex, Mark Pastrone COO at summit connect, Matt Nelson director of government affairs at Electrify America. And finally, Paul Stith associate vice president global transportation initiatives of strategic growth at Black and Veatch. Paul kindly is stepping in at the last minute for Heather Donaldson today, who we will miss, but we are very lucky to have you Paul, welcome everyone and over to you Orville.

Orville Thomas, CALSTART California State Policy Director (03:03:36):

Thank you, Munni. Welcome everyone. And thanks for joining us, especially after lunch and participating via a screen all day, there are conferences on the topic of EV charging that can go on for multiple days, let alone a single panel that we are about to present. So, before we jump in, allow me to frame today's conversation with the massive influx of federal and state funding aimed at supporting EV charging and daily news about the private sector, investing more in EV charging companies. Today's discussion will be centered on how to invest funds strategically and equitably towards siding infrastructure, hardware, and

software solutions. We'll look at these issues from the lens of how to provide the highest value to drivers and the EV ecosystem at large, let's start with a fun question. I don't know if you're aware, but the lotto has hit over $1 billion. It has caused me to come down with a little bit of lotto fever and think about what I would do with my winnings, federal and California funding is something similar to the winning the EV infrastructure lottos, and so much new money is coming out and to be available now to our panelists.

Orville Thomas, CALSTART (03:04:51):

If I said you could guide every cent of the national electric vehicle infrastructure funding, what would you do? And we'll start with Paul.

Paul Stith, Black and Veatch Associate Vice President of Global Transportation Initiatives (03:05:04):

Hey, and thanks. And again, last minute, but happy to jump in and, and talk about, you know, this, this really this moment that we have right before us, don't, let's not mess it up. So, a few guiding principles that I would throw out there from, you know, just being in this for about a decade is getting infrastructure where it has a chance to be used. So, I, I love the, the panel and, and hearing from Adam and, and, you know, Uber and Lyft, and like, let's get these into some places where they're certainly going to get used. Now let's also get those beacons on the map that show that we can drive from point to point. I know there's some with the funding, we're looking at a certain cadence of, of having them, but let's get some thoughtful routes out there. If you, if you go back in the day and look in Japan, they built a DC fast charging network, 50 kilowatts in fact out to say, look, it's available. And, and having those beacons out there allow people to have some comfort to be able to drive. So, let's get things in the ground soon and let's keep them up and running, being disappointed as an early driver out in the wild is not something I want. My, the folks that follow behind the early doctors to find.

Orville Thomas, CALSTART (03:06:16):

Thanks, Paul. All right, Matt, your next step.

Matt Nelson, Electrify America Director of Government Affairs (03:06:21):

Well, first I think it's really important that we recognize that the levy, the, the new program, the national EV infrastructure program has been doing a really great job. Michael Nevy, Andrew Rogers, Andrew Wishnia, Rachel Neer, Alex Schroeder. They basically had this program dropped in their laps in November of last year, had to build an office, build a program and figure out how to do this well and wisely. And so far, they're way ahead of kind of the game. Their guidance is, is good. Their standards are thoughtful. So, there isn't a lot of direction I'm going to there. Isn't a lot. I'm going to say here that is inconsistent with what they're already doing. Our view is that for Nevy to succeed, it has to get three things, right? First it needs to concentrate investment on ultra-fast charging the average charging, and this was alluded to in the last panel, the average charging speed of new EV models is now 200 kilowatts.

Matt Nelson, Electrify America (03:07:22):

It's up fourfold in only six model years. And if we're thinking about the Wayne Gretzky analogy of where the puck is going, every, every automaker says the same thing, which is they're going up. And so, we need charging that matches the vehicles, not just today, but next year and the year following and the year following. It, it is, it is imperative that we meet customer expectations and deliver charging that is as fast as

the cars that they buy. It's also notable that this can be done in a cost-effective way. Atlas public policy research shows that it's actually cheaper to invest in 350 kilowatts charging than 150 kilowatts. And not by a little bit it's 33% cheaper saves the nation 13 billion. If we invest in 350 kilowatts, and finally it can completely be done. We've built more than 400 stations with 350-kilowatt charging.

Matt Nelson, Electrify America (03:08:24):

It does not require a grid upgrade in, in 97 to 98% of cases. We've been able to work with local utilities and build this infrastructure at existing retail without significant additional grid costs. Second, so that's first ultra-fast charging. The second thing is that customer ex customers expect charging stations to work. They've never thought on Saturday morning. I wonder if the gas station will work this weekend. They want reliability every time. And it's important for states to demand that of the network providers. They have to demand the capabilities to deliver much higher reliability than has been present in the past. And finally, they need to get interoperability, right? We, we see non-pro proprietary standards as the path to interoperability charging standards charging stations built on the CCS platform, which now all the auto makers have United around and built on the plugin charge standard ISO 15, 11, 8 will allow this to be a better, more convenient experience.

Matt Nelson, Electrify America (03:09:31):

So bottom line ultra-fast, reliable non-pro proprietary charging is absolutely everything. They get those three things, right? They'll succeed. If they fail on any of them, they probably won't succeed and everything else doesn't matter as much. Finally, just back where I started, the, the joint office understands this, they, their standards show this, their guidance shows this. They understand that these three things really matter. All we're asking is that they keep raising the bar. So, they've set the minimum floor at one 50. We think they've got to go to three 50. We they've set some, some standards, UN reliability. We think that they have to have higher expectations of capability. Thank you.

Orville Thomas, CALSTART (03:10:16):

All right. Thanks, Matt. I'm writing that down that Matt Nelson has said that join office understands this and, you know, we could, we could up, if don't next one up, I will toss to Mark.

Mark Pastrone, SemaConnect Chief Operating Officer (03:10:28):

Great. Thanks. Or can you hear me okay.

Orville Thomas, CALSTART (03:10:31):

You're loud and clear.

Mark Pastrone, SemaConnect (03:10:32):

All right. Fantastic. Well really appreciate the opportunity to be on this panel. So, thanks Orville and great to be on with Matt Paul and Carl. So yeah, of exciting times exciting to contemplate winning the lottery in this question. But one thing in terms of exciting times, because we've been at this summit, you know, we're summit connect, we're recently joined with blink and both companies have been at this for now over 10 years with this in the, you know, since the beginning of the industry. And so, we've all been in this early adopter phase for the last 10 plus years. And what's really exciting is I think, you know, we've truly hit the

inflection point. So, Paul, as you were saying, I think it's up to us now not to mess it up <laugh> as we as we go forward.

Mark Pastrone, SemaConnect (03:11:14):

Right. And one thing I'll, I'll just mention, as I thought was kind of an exciting sort of data point. There was a Bloomberg news article a couple weeks ago that said that the us EV sales have now hit 5%. So, 5% of new car sales are electric vehicles and what they were you know, what they were citing is other countries primarily in Europe about 18 countries that have hit that 5% point. They then really truly hit the inflection point where they've gone into, you know, fast growth and gone quickly to 25%. And so, this article was saying, when you, when you look at that here in the us, it could be as soon as the end of 2025, just about three years, that 25% of new car sales could be electric. So again, exciting times. And so, with that, in terms of the use of funding what I'll add on to Paul and Matt's comments is we'd really encourage you know, balance as we look at this new category of electric vehicles really see this as a paradigm shift in fueling vehicles.

Mark Pastrone, SemaConnect (03:12:23):

And part of that paradigm shift is now needing to fuel when the car is parked more like your cell phone in terms of charging your cell phone. So that's the, the need for chargers at home at work public retail. In addition to the fast chargers that Matt was talking about, which are very much needed, so would very much encourage you know, the funding to encourage that balanced approach for this new category of fueling. So that's number one. And then secondly, would really encourage the funding to support smart or networks charging, because really see that that's going to be a path to really help increase adoption of chargers and really solve the, the chicken and egg problem cause with the network, with the technology make it easier for drivers to find chargers number one then they can check availability for wherever they're looking to charge.

Mark Pastrone, SemaConnect (03:13:20):

But it also allows the site hosts that are installing the chargers to easily control access, charge fees, to make it easy for them to use this as an amenity. And then the, the third category, I think that's going to be very important for the network or smart technology is energy management. Cause this is really, you know, as they say the biggest thing that hit the grids since air conditioning is electric vehicles. <Laugh> right. And so, we're really going to want to smooth the impact on the grids, smooth you know, the impact for site host or installing these chargers to reduce the upfront costs as well as ongoing costs. So those are some of the I guess, win the lottery thoughts with that back you or

Orville Thomas, CALSTART (03:13:59):

Thanks mark. And I'll wrap up the win a lot of question with Carl, Carl, you are the last person to share in this ticket and winning numbers. What would you do with it? <Laugh>

Carl Moczydlowsky, Powerflex Vice President of Software Engineering and Product (03:14:10):

Yeah, thanks very much. Appreciate you having me on today. Really excellent program all day. It's been great, learned a lot happy to be here. Also super happy to be the last person to answer this question, because I get a steal a little bit from everybody that went before me and sort of twist on the, on the pieces I

liked, you know, I think the answer to the question is depends on what the goal of the program is, right, is the goal of the program to drive long term EV adoption or is the goal of the program to provide EV infrastructure that will really last into generations and continue to be used and, and be sort of you know, the, the backbone for how we actually charge these vehicles going forward. You know, I think Paul's statement around providing this beacon and providing a pathway so that people can see where they're going to charge, how they're going to get from point a to point B is really important.

Carl Moczydlowsky, Powerflex (03:15:00):

Particularly if you take the approach of the, you know, the first half of that, which is, hey, we're going to provide infrastructure, that's going to drive adoption. But if you start to look at some of the themes and Matt and Mark's statements, you know, like, you know, Matt was saying, look at how these vehicles are changing, look at how you're going to have to meet these vehicles where they're at. Well, one of the ways to meet the vehicles with that is sort of, is sort of consider what mark said is that the, the demands on the grid to meet those vehicles is going to actually require behavior changes and shifts and patterns in where people charge and how they charge. Right. We think that people are going to charge eventually at places where their cars are dwelling at for long periods of time. You know, the gas station model is really imperative to that, like fast EV adoption to get that inflection point to get that growth of adoption.

Carl Moczydlowsky, Powerflex (03:15:51):

But the reality is that when you look at overall marginal cost of charging and levelized cost of energy at those hosts or at the charging site, you have to take into like a take into consideration, a pretty significant behavior change. So, you know, my question is sort of like a, a long, my answer's a long rambling question answer to that question, but it's really about like, what's the goal? What are you after? Are you after adoption or are you after like long term infrastructure? And so, I think to the second degree, you know, I would look at what are those long-term dwell times, where are people actually going to be charging? Are they going to be at these UDS? Are they going to be at workplaces? Are they going to be at, at places where the cars are sitting or are they actually going to try to stop and charge like the gas station model? And, and that, you know, and I think the gas station model has sort of like limited behavior lifespan in the, in the EV market as we get broader adoption.

Orville Thomas, CALSTART (03:16:40):

Now, thanks Carl. You know, and I'm excited that we have heard from each one of y'all because it is going to provide the foundation for a very exciting kind of topic and panel that we have going on now that we've put our thinking caps on and we know our sound works. Let's get to some of the first questions early-stage investments in pilot or demonstration projects often allow us to achieve replicable successes. I think of it as seed money for startup. So as the federal and state government consider projects to fund, do you have any examples of pilot programs that you can and want to share and key metrics or how specifically the injection of funding would allow the project to come to fruition? And we'll switch it up a little bit. I'll go, Matt Paul, Carl mark.

Matt Nelson, Electrify America (03:17:33):

Well in electrify America, we see a tremendous opportunity to grow and reform and modernize the incentive regimes that, that exist out there today. When we think about the incentives that were put into

place for EV charging were pilots, they were small scale for a nascent industry and they really need to be modernized to meet this really exciting, unique moment. So, we can transition towards electrification on a widespread basis as, as was just noted. We're at 5% of the market. Now this is a growing space. As many of the folks on this call probably know about 80% of the projects in the California, California Cal E V I P program, just the primary incentive program in the state have never been built. And they, they they've, the, the program has awarded the funds, but the, the projects haven't come to fruition.

Matt Nelson, Electrify America (03:18:29):

And then there's also been a lot of dedication of that, those funds to projects that are not Ultrafast, don't rely on non-pro proprietary standards and have reliability issues. And we think that there are a lot of lessons that can be learned from this pilot, from this pilot period. The program has also been oversubscribed within minutes of each solicitation being opened. It gets oversubscribed and then closes out and the, the funds are per are committed at a very early develop stage in the development. What we call pre-development before a project has a permit in hand before it has a utility interconnect final design before it has been financed. And most importantly, often before the project has even established site control, which is a, a legal right to the real estate on which the, the project would be, would be built.

Matt Nelson, Electrify America (03:19:30):

We are super optimistic that California has recognized that this reform needs to happen. You're seeing really good things coming out of California energy commission and the center for sustainable energy, which is the program administrator that they understand these lessons learned and will reform the program in what they're calling 2.0 or Cali V I P 2.0, and that is a very positive sign that these lessons are being learned at that organization. Of course, Orville your organization. Cal start has similar work in in a, in the heavy duty and medium duty space that is similarly applying these lessons learned and getting these incentives to be aligned with where the industry is today. So, we're very optimistic. We're pushing really hard to see the, the push towards program design that is focused on ultra-fast, reliable non-pro proprietary charging. We think that can be accomplished in, in the near term here. We're looking forward to the process as we go into the second half of this year.

Orville Thomas, CALSTART (03:20:36):

All right, Paul.

Paul Stith, Black and Veatch (03:20:38):

So great, great input, Matt. I mean, it basically is we, we are excited about design engineering and deploying. We do a lot of upfront work but when you, when you look at the, the stats that, that we've deployed, something like two out of every five DC fast charging heads in north America for our clients such as such as Tesla, electrify America and others, we're, we're in do mode, right? Let's just get this job going. So I think that we get frustrated a little bit and I, as an EV driver on watching all of the pilots and then not getting rapid learnings in place in order to, to get that infrastructure into build mode, shovel, ready, don't grab the funds and stay it on 'em with, you know, multiple years in order to build and, you know, California west coast highways kind of getting there, but look at Oregon, look at Washington state and early on that basically those states took that initiative.

Paul Stith, Black and Veatch (03:21:31):

So, let's just get going and they did develop and build those. So, with that, I'll, I'll, I'll just kind of stop there and I'm going to go international. So, I had the pleasure of speaking and, and attending EVs 35 in Oslo, but on the way, I stopped in Stockholm. So now their adoption is not 70 odd percent where we see Oslo and, and, and Norway right now. But in, in Stockholm, they're, they're experiencing everything. And by the way, all of the room for what Carlos described about where those vehicles going to rest, the, the, the high-power mat that you're describing on the corridors they're in the middle of, of, of huge you know, upswell of, of uptake. And they're trying to get ahead of, of where they're going to continue to build, but I had the pleasure of visiting sites that are like hundreds, and there's one coming online, a thousand chargers in a garage for, you know, families where they live.

Paul Stith, Black and Veatch (03:22:22):

And I think that when we had a chance to engage with the Stockholm city leaders on EV, they, they express the same kind of frustrations that we exactly see here in the states. It's like, don't create a program that allows loopholes. Don't allow for folks to sit on those funds and not keep moving, and also encourage the best of the models that, that have some longevity and some sustainability into when of those things get up and running. So frankly, skin in the game for the private sector who come and look at, you know, the nodding mat of course, look at Electrify America is, is coming to the table where you're, you're going to be moving the needle forward faster because you've got skin in the game and you've got, you know, market share and, and you're ready to get going. So, I think we want to look not always here in states and not always in California, which I, I recently moved I'm up in Washington now for, for look at what's been happening in London, look at what's been happening in Stockholm, look, what's happening in Oslo for actual successful high adoption case geographies.

Paul Stith, Black and Veatch (03:23:27):

And, and then we can, you know, look and aspire to catch up.

Orville Thomas, CALSTART (03:23:33):

Thanks, Paul. Now, Carl.

Carl Moczydlowsky, Powerflex (03:23:35):

Yeah. I mean, I think the theme that you're going to hear sort of riding on this is let's focus on pilots where we actually get like cycles of learning and we get things done and we get stuff in the ground, right. Where we can actually have replicable sort of pilots that people can build off of and, and make investments around and say, and point to and say, yeah, this works, you know the pilots that, you know, we we've scooped up a bunch of those call V I P funds and we, some of them and some of 'em, we don't, I think we're just as guilty as everybody else, but, you know, I think some of the pilots were that have been more successful. If you look at like some of the projects that NRE has done where they're, you know, installing hundreds of chargers at their facility we're doing demand, charge management for them.

Carl Moczydlowsky, Powerflex (03:24:19):

We're doing you know some demand response programs for them across, you know, multiple chargers on bidirectional vehicle charging. I mean, there's a whole host of ways to, to really focus those, that funding

and those pilot projects after stuff that actually works that you can actually learn from. So, you know, I think I'd agree with the, the other with everyone else so far is that pilots are super important. They get you off the ground, they get you point in the right direction. Let's look at pilots that have worked. And let's, let's get a lot of input on designing pilot programs where those funds are actually going to, going to get us somewhere.

Orville Thomas, CALSTART (03:24:55):

All right. Thanks Carl. And now finally, we'll close out, mark.

Mark Pastrone, SemaConnect (03:24:59):

Thanks. Or sure. What, what I'll focus on is maybe two categories of pilots that we solve that, you know, have been helpful for summit connect and now the greater blink family. One is pilots around demand response. I think Carl mentioned demand response. It's part of energy management. We see that that's going to be a very important going forward as we have more and more, we're getting to that, you know, three years, 25% point of EVs on the road. So, one specific pilot that we saw that was quite helpful was actually through Pacific gas and electric demand response pilot, where they would send our network signals, stay in advance, and then we would adjust the power delivery the, the next day. And then with that part of that pilot was requiring standards in terms of the interface on demand response.

Mark Pastrone, SemaConnect (03:25:49):

And so, a key standard there is that open ADR 2.0 B. And so, in terms of government, you know involvement and guidance very much would endorse really requiring the use of standards as we go forward and really look to do more integration. So, one area is domain response, see a lot of, you know, kind of rich need for you know, developing that second is in the category of interoperability and integration. One specific there, you mentioned Cal E V I P we're just kicking off a program with the city of Watsonville, California through the C E V I P program funded by California energy commission. And part of that requirement is to integrate with fleet software. So, as we all know, the whole category of fleet now is also taking off. And what can be very important is that your, you know, smart charging solution can fit in with your legacy you know, fleet platform, right?

Mark Pastrone, SemaConnect (03:26:51):

And so, this program requires that it also requires the use of standards. And so, as we're all familiar you know, two key standards for network one for network to network, is that O C P I standard, and then charger to network is OCP P and that's, and that's required in, in in, as part of this project. So really you know, endorse, you know, both those categories of encouraging demand response as well as integration and interoperability and the use of standards. So, with that back to you, or,

Orville Thomas, CALSTART (03:27:26):

Yeah, thanks, mark. We're going to switch to hardware right now. And when we talk about EV infrastructure, we often have it referred as EV charging relating to light duty passenger vehicles but charging of medium heavy duty is another very important part of the equation. And I might be biased from my past work, but I'll say it's probably a more important part of the conversation and the, you know, infrastructure network. So, I'll, I'll toss this to Matt first, can any of the existing, you know, EA network or hardware be used towards

medium heavy-duty vehicles. And then is there opportunity to have chargers that can be used for light duty, medium duty and heavy duty considering what the government is trying to do with funding and manufacturing grants?

Matt Nelson, Electrify America (03:28:17):

So, first AB absolutely electrify America chargers are used for medium and heavy duty. We've, we've partnered with Yolo transit and SAC, RT, or SAC Sacramento, regional transit, and are the primary charger for charging supplier for their fleet of multiple different manufacturers of, of transit buses. And they operate in the, in the greater Sacramento area and are charged every night and along the route by electrify America stations. Last year we also announced the green city initiative in the port of LA and long beach. And it will focus on specifically building charging infrastructure for drainage trucks. We, we actually announced the first major project associated with that, which is a charging station for NFI industries, which is major trucking company, where we're going to actually build the largest charging station ever built in the, in the United States for drayage trucks with more than 30, 34 Ultrafast chargers solar canopies, battery storage on site very comprehensive project that we're doing, doing with NFI supporting their drainage vehicles and from a so, so we can do it big picture.

Matt Nelson, Electrify America (03:29:41):

What needs to happen is we need to, there's a, I'm very happy that on this, on this call, we seem to have consensus that we need non-pro proprietary standards across the industry. And this is a great example of where we need to keep working towards a non-pro proprietary standard. Electrify America is a big advocate of what's called MCs or the mega charging system, which actually goes up to four megawatts of power and is a global standard being developed and finalized now to, to support all a heavy duty and medium duty charging across, across the world. It's built upon the CCS standard. It's kind of an evolution of the CCS standard. So, it's a non-pro proprietary standard from jump and will allow us to avoid what has happened in the light duty space, where we've had competing standards for now a, a little more than a decade.

Matt Nelson, Electrify America (03:30:40):

Finally, it's, it's worth noting that until that MCs is kind of out in the wild and more importantly, there are vehicles that can use it. The CCS standard does go up to 500 kilowatts can support medium and heavy-duty vehicles for, for the foreseeable future and, and is doing so today. Finally, I, I, I should note that our vision is that our light duty stations are evolving to what we refer to as EV charging stations of the future. And these stations look a little bit more to the average person, like a gas station, and they have pull through capability and they have the ability to charge, not just light duty vehicles, but also heavy duty and medium duty vehicles much more effective, much more any charging station today can do it. It's a matter of whether it's a good customer experience and we are designing stations of the future. That will be a good customer experience, both for medium and heavy-duty vehicle drivers and light duty vehicle drivers in the same location and facility.

Orville Thomas, CALSTART (03:31:49):

All right, thanks so much, Matt. And the next question on hardware Paul Black and Veatch, obviously a leader in the construction of the heavy-duty charging depots. Is there any value?

Paul Stith, Black and Veatch (03:32:04):

Yeah, so let's talk about that. First off, I, I did spend the last four years of my life, pretty much every Wednesday morning on the turn megawatt charging system, standard group. So super excited that that's coming ready for action. There is one of those in north America. There's been pictures of it circulating, so bring your truck with your port on that. And it happens to be a little bit close to Portland. So, you got to talk about safety. You got to talk about the design of those sites. If you go to that char megawatts site, you're going to see black and beach did the templates for this, laying that out. We're talking about 53-foot odd trucks. We're talking about ones that are much wider. There's a video of the first truck stop for medium heavy duty in north America that we built here in Portland commissioned it last year.

Paul Stith, Black and Veatch (03:32:57):

Those aisles are huge. There's a Chevy bolt behind Nate Nate's shoulder, it's half of the width of a semi-truck, basically. So, you've got to look at the space requirements, both in the width and the length. You also got to look at important things as the power levels go up, the cable length. We worked diligently to pick a spot on every large, medium, heavy-duty truck going forward where that charge, port's going to be, imagine wrangling 3000 amps into a cable that's cooled and weighs a few pounds every meter or so you really have to focus on that. So, I think that there's a lot of aspirations. There's a lot of deal making going on. We are working on sites that are going to be 5, 10 25 megawatts. And by the way, we are on jets Z as well. We happen to be doing the Schneider national portion of that project that was awarded.

Paul Stith, Black and Veatch (03:33:50):

So, you know, we're right there. We've been doing high power charging for trucks since 2017 and a baby charger on that project for Daimler innovation, by the way, was 150 kilowatts. So, you kind of want to look at the size of these batteries and where things are going and get an appreciation of that. So can you share, maybe you can share truck charging with light duty vehicles safely, hopefully in a, in operations, look at that taking light duty charging and having trucks pull in is a disaster. And there, there are a number of those things where the truck takes up all of the spaces in a location, look at Tesla goes and pulls their semi. They have to take the trailer off and then scooch it over into, and then plug into a few of those charging ports. So, you got to look at the, the realities of it. I'm a big fan of power sharing. If we're going to have multi megawatt sites, we're going to co-locate storage. Maybe we have acreage in a rural location or large logistics provider that can fit you know, five megawatts on their roof because the roof is that large. Then we should be looking for power sharing, not necessarily the same physical space, but rather chargers that have pedestals that utilize the back the big business as far as switch gear and, and grid access.

Orville Thomas, CALSTART (03:35:13):

All right. Thanks, Paul. And now we're going from hardware to software mark for you what is the most valuable for your customers as station owners and drivers when it comes to your software suite? And then is there a place for government to fund the development of software or is that the role exclusively to the company?

Mark Pastrone, SemaConnect (03:35:35):

No, thanks for that. Or, well I would put it into maybe three categories and is where we see drivers finding a lot of value. I should say, drivers and site hosts that are installing charges as well value in the in the

software. One for the drivers is the ability to find chargers, you know, to use the apps that are available in the industry to easily find where public charging is available. And then to get up to date, current information on pricing and availability, and then to be able to easily start and pay for a session all on the, all on the app, so that really endorses is very useful for the drivers, for the site host. What we're finding there is kind of the two of the key requirements. There is the ability to control access and then to charge prices for the use of the chargers.

Mark Pastrone, SemaConnect (03:36:24):

In terms of the ability to control access you know, typical example, there would be a workplace that may want employees to use these chargers. And, and so they are controlling access to the group of employees. They may provide it for free as a, an employee benefit, but they want to control access. And then the other is the ability to easily charge fees. Cause again, this is a new amenity whether this could be you know, multifamily and apartment location could be a, you know, office location could be a shopping center. So, you want to make it easy, easy for the site host to, to charge fees. So those are two of the categories, a third category though, that would really, again encourage as important for the future is energy management load management.

Mark Pastrone, SemaConnect (03:37:10):

And so that's where I, I see that the, the government can really motivate to requirements the use of software in protocols that really enable smart, you know, energy management, you know, an example that we're going to start to see at a, at an application like multifamily is many apartments today are installing these chargers for shared use. What we're going to start seeing more and more of is dedicated chargers for tenants. And as, as then, these apartments are going from the five to 10 chargers to 30 to, you know, 40 chargers in a two 50 unit of apartment building. They're going to need a means of, of really easily managing that power. You know, as, as Paul was talking about power share on the high-power CFC, we see it's also going to be important for routine charging, both managing peak power for the site, you know, for, at panel level, circuit level, but also sharing that power.

Mark Pastrone, SemaConnect (03:38:10):

So now you have 30 tenants in an apartment building, and that example, you need a smart way of sharing that power. That's going to give the drivers at the, you know, in the morning when they leave and go to work, that they feel happy that they're fully charged that their neighbor didn't take there you know, take their charging session. So really endorse requirements that again, require smart network charging that require the use of load management as part of the of, of the program. And then the other category that I would mention in terms of encouraging smart charging software is fleet to really enable these fleet customers you know, these large managers of fleet vehicles to be able to easily deploy the charging infrastructure needed. You're going to need also very smart software that will do things like provide alerts to the fleet manager because now you're requiring on these chargers for the mission of the vehicle the next day, right?

Mark Pastrone, SemaConnect (03:39:13):

And so, if the driver comes home at the end of the shift maybe a single-family home, or maybe back to the Depot it's, it's critical that that driver plugs in, right. And it doesn't just park and, and, and leave. And so that

there's got to be some smart software there to confirm that yeah, that was plugged in. And then in the morning when the driver unplugs its confirmation, that that vehicle is fully charged and it's ready to do the mission the next day. So those are two categories in particular that I see that are very robust areas for growing this industry is energy management. And then the fleet software is that whole category takes off. So back to you, our thank you.

Orville Thomas, CALSTART (03:39:50):

Yeah. Thanks mark. And we'll wrap our panel with Carl. Same question, Carl, is there a place for government to fund software solutions? And if there is, what do you think they are?

Carl Moczydlowsky, Powerflex (03:40:00):

Yeah, I feel like Mark teed that one out for me, because all of those categories that he mentioned is exactly what power X does today. So, from a software perspective and the value perspective were hyper focused on the energy management we're, we're focused on the impending doomed to the distribution grid when we get to that 20, 30, 40% EV adoption. And everybody's trying to plug in, in charge at once and there's not you know, there's not capacity at a facility or a capacity at a distribution grid or, or at a residential transformer to manage all those vehicles trying to charge at once. So that's what power X does. We you know, we think we've solved those problems on, on all those levels on workplace charging on me DS on you know, even on like just transformer sharing from a residential standpoint.

Carl Moczydlowsky, Powerflex (03:40:54):

And so, to answer the second part of that question you know, what is the government role in that? I, I think government funding software projects is a little rough, but I think government funding pilots and funding demonstration projects where you can actually show how that software works. You can get some cycles of learning around that software and you can deploy it for everybody to sort of you know, build off of Fort. You know, as you know, in the, in the patent sense on prior art and to, to really advance the, the whole level of industry I think is, is where government's role in that is. I also agree that, you know, requiring non-pro proprietary standards, 15, 11, 8 all those things that have been talked about for a while on this panel. You know, I, I think those are important pieces that the government can play as well. Right. And sort of pushing along those standards while funding, you know, demonstration for those software projects.

Orville Thomas, CALSTART (03:41:50):

All right. Well, thanks Carl. And thank you to all the other panelists. This has been great. Like we said, we could probably do a week on this topic alone but this last, you know, 40 to 45 minutes really flew by and I want to thank velos for giving me the opportunity to moderate the panel and with that I'll toss back to moon.

Munni Krishna, Veloz (03:42:08):

Awesome. Thanks Orville. And thank you to the panel. I have to say only a group of industry nerds like us will think about lottery money in the context of how to advance charging and not how to advance ourselves to boa Bora. We're going to take one last, very short break here today before our closing keynote from chair, from the chair of the California air resources board, Leanne Randolph, right before that, we'll do our final $30 visa giveaway. So be back at 2 0 5 and we'll see you then thanks so much. Welcome back

everyone for the final segment today, before we jump into our final keynote and closing remarks from our executive director, Josh Boone, we want to go ahead and spend the wheel one more time to give away a $30 visa gift card. So, Jay let's spin that wheel. Congratulations, Aaron August, who is actually a board member of Veloz and also one of our speakers. So, we'll probably spin that wheel again and reach out to one of you later today, via EAL and let you know <laugh> Alex. Congratulations. All right, everyone to close out today's summit. We are incredibly lucky to have Leanne Randolph chair of the California air resources board since 2020 and a member of Velo public policy board. We ask chair Randolph to share with us the key policies, driving transportation, electrification, how ACC two will spur adoption in California and her thoughts on the state of the industry. Please welcome, please welcome us and enjoy a recording. Clean keynote from chair Randolph.

Liane Randolph, California Air Resources Board Chair (03:43:51):

Good afternoon. It's great to be here to close out today's summit and thank you for having me. This is a really big year for carb and for California in our work to address pollution and the climate crisis, the policies and regulations we are developing this year are going to set the stage for the next two decades. As we transition our society and economy definitively away from combustion decarbonizing. Our transportation system is central to this work and light duty vehicles will be one of the first sectors to complete the transformation with Governor Newsome's 2035 goal of 100% new zero emission vehicle sales. Just 13 years away. Carb will be drawing on our tried-and-true policy strategies to realize this vision strong enforceable regulations that send clear market signals to manufacturers alongside strategic investments, that support technology development and deployment and ensure an equitable transition to zero emission vehicles advanced clean cars.

Liane Randolph, California Air Resources Board (03:44:55):

Two, the next generation of carbs light duty vehicle standards is the regulatory piece of this strategy. The past three decades of regulation at carb catalyzed, the development of the clean car market motivating manufacturers to both make internal combustion engines cleaner and to develop zero emission technology. The first hybrid car and plug-in hybrids were introduced in the years following the passage of car's first zero emission vehicle standard in 1990 in 2012, the first iteration of our advanced clean cars, regulation, spurred development of news E technology, and laid out a path to our 2025 Z sales target, which as you know, we have already met and exceeded several years ahead of schedule with ZEVs and plug-in hybrids making up 16% of sales in the first quarter of this year, the early 2010s also marked the founding of the plugin electric vehicle collaborative the predecessor of Veloz, which set the tone for an institution that welcomed all players involved in moving cars to zero remission.

Liane Randolph, California Air Resources Board (03:46:03):

California's history of market driven. Z regulations has also transformed the, this date into an incubator for the development of Zev technology and manufacturer alongside our regulatory requirements actions by many partners here today from innovative developments in Zev technology to bold target setting by manufacturers to dedicated work by our public and private partners on expanding charging and fuel systems to velos public awareness campaigns have all combined to accelerate the electrification of California's light duty fleet. The industry has responded rapidly to this confluence of market pressures, consumer demands and regulatory requirements leading auto makers have now announced electrification

plans far beyond what many of us would've imagined even a few years ago. Now we are on the cusp of going all the way to zero ACC. Two will build on this legacy by setting the course to 100%, zero emission vehicle sales. While ensuring that emissions from remaining internal combustion engines are rigorously controlled.

Liane Randolph, California Air Resources Board (03:47:11):

ACC two is designed to ensure that customers can successfully replace their traditional combustion vehicles with new or used ZEVs and plugin hybrids, and that all customers have access to zero emission vehicles that both meet their transportation needs and protect the emission benefits of the program. ACC two lays out step by step path to the goal of 100%, zero emission vehicle sales by 2035, by requiring a steadily increasing percentage of zero emission vehicles to be sold in California from 2026 onwards, the proposed percentages will keep automakers on an achievable path to the 100% requirement while providing appropriate flexibilities along the way over the multi-year development process for the proposed regulation staff have in fact increased the percentage requirements for Zev sales from their initial proposal due to latest automaker projections, automakers representing the majority of California's vehicle markets have made significant commitments to electrification, which we applaud with targets ranging from 50% to a hundred percent, zero emission vehicle sales.

Liane Randolph, California Air Resources Board (03:48:21):

As soon as the 2028 model year, these bold targets bolster the state's efforts to achieve electrification as fast as possible. In addition to setting out year by year Zev sales requirements, ACC two is designed to ensure that the ZEVs being sold are robust and well-engineered to provide customers with the features and the confidence to replace their combustion vehicles. The proposed regulation includes provisions to ensure that Z's meet customer's needs, including a minimum 150 mile range for new vehicles to ensure that even lower cost Zs can fulfill the daily driving needs of a typical driver warranty requirements to ensure durable batteries for a decade or more and transparency requirements to allow consumers to evaluate the health of the vehicle and the battery, as well as charging capability requirements that give the customers the ability to charge at whatever type of charging infrastructure that they have access to consumers in low income and underserved communities where used vehicle sales are significant stand to especially benefit from these insurance assurance measures meant to ensure better range and better serviceability throughout the vehicle's life.

Liane Randolph, California Air Resources Board (03:49:38):

And that leads me to another important element of our program that sets California apart from other jurisdictions. And that's the work we're doing on integrating equity into our move to zero. We know mobile sources are the greatest contributor of emissions of criteria pollutants and greenhouse gases in California today. And cleaning up these emissions is essential to protecting the health of both of our communities and our climate. Particularly along heavily travels, transportation corridors, the clean transportation future. We are building needs to be shared by all Californians. And it must address the disproportionate pollution burdens experienced by our frontline communities, ACC two, therefore aims to embed equity and environmental justice in the regulation more deeply than before, and to establish new tools, to improve access to zero emission vehicles for low-income households and communities most impacted by pollution. The regulation includes provisions to continue emissions reductions in conventional vehicles, establish Zev

technology requirements that will help drive down vehicle costs and make ZEVs more usable for all communities and encourage automakers to place EVs in community car share services, retain use Zs in the California market for equity programs and sell lower priced vehicles.

Liane Randolph, California Air Resources Board (03:51:01):

And we're proposing to strengthen these provisions even more in ongoing amendments released this month, but a manufacturer's regulation cannot carry the burden of ensuring that all California communities have access to ZEVs. Our regulatory actions need to work in concert with our other strategies. We are targeting billions of dollars in incentives in ways that benefit the most impacted communities to ensure financial support for lower income residents, to purchase vehicles, working with our sister agencies and private sector partners to provide infrastructure access to all communities and continuing to provide financial support for programs that expand our focus from zero emission vehicles to mobility as a whole, all of these strategies are necessary to bring zero emission vehicles and sustainable mobility to all communities. Importantly, our regulations set the ZEV standard, not just in California, but for all of the states that adopt our clean car regulations and electrification commitments.

Liane Randolph, California Air Resources Board (03:52:05):

There are now 17 other states that have adopted or can have committed to adopt our light duty regulations together, California. And these section 1 77 states represent nearly 40% of the us new vehicle markets and ACC two will thus accelerate electrification across the country. It's critical that all of these states adopt ACC two and take steps to support the transition to zero emission vehicles. And we hope this ambitious action by California and our state partners will also continue to drive strong federal action. Adopting ACC two will make California one of the first and largest vehicle markets to require 100% electric vehicle sales, not just in the us, but anywhere in the world. Many jurisdictions have set ambitious targets to phase out the sale of Eter internal combustion cars. But it's one thing to state your ambition and a more difficult endeavor to show just how you will achieve it.

Liane Randolph, California Air Resources Board (03:53:09):

With ACC two, we will be one of only a handful of jurisdictions to set out a legally binding roadmap with annual requirements. That show exactly how we will get to zero year by year. Even as we advance our decarbonization agenda here at home with our partner states and the federal government, we must build partnerships around the globe to develop comprehensive solutions to air pollution and climate challenges. California is proud to help lead the global E-transition by chairing the transportation decarbonization Alliance, a unique coalition sanctioned by the UN of countries, cities, regions, and companies working to advance real world solutions to clean up transportation around the globe. Alliance members support one another in setting ambitious goals and collectively advocate for ZEV policies in key international forums members also share valuable on the ground experience with one another, from strategies for decarbonizing freight and deploying charging infrastructure to models for innovative transit and active mobility to plans for corporate sustainability and zero emission technology development.

Liane Randolph, California Air Resources Board (03:54:25):

TDA recently welcomed the city of Los Angeles at its, as its newest member. And we're looking forward to their participation as they share lessons learned, overcome barriers with real world knowledge and

accelerate the transition to clean zero emission, transportation and mobility, both globally and here at home. Public private partnerships will be central to achieving a fully electrified transportation sector and organizations like the lows are critical to building those partnerships. Carb and our sister agencies are issuing the regulations and making the investments to drive the electrification automakers and EVs E providers are developing the vehicles and charging infrastructure, but we need consumers on board to bring those efforts to fruition. Veloz has been a leader in raising consumer awareness and building enthusiasm for zero emission vehicles. And it'll be important for velos and its members to continue to engage in these efforts. We're counting on you to help spread the word about the cost savings, durability and other advantages of EV ownership and to allay consumer concerns about range or charging availability by communicating all the work we're doing and the incredible success we've had.

Liane Randolph, California Air Resources Board (03:55:44):

And the, and also communicating the provisions of ACC two that will build these strategies into actually legally enforceable requirements. The cardboard held its first hearing on ACC two in June, and we are slated to adopt the final regulation in August. We released a 15-day amendment package a few weeks ago, and the deadline for comments on that package is tomorrow. So, if you have feedback, you'd like to share with us, please get that in. As soon as possible, I look forward to continuing to work with all of you as we build a clean transportation future together. Thank you for all of the work that you all do on behalf of communities and the climate. Thank you.

Josh D. Boone, Veloz (03:56:33):

Thank you so much chair Randolph for providing the closing keynote for us today. We know you're extra busy these days and appreciate your time and engagement. Before we close out the summit, allow me to share a few key short takeaways from what we learned from our speakers. One, all parts of the EV ecosystem, automakers utilities, rideshare providers and charging companies are primed to take the next step forward to mass adoption of EVs. The tipping point has arrived. Two, the opportunities to collaborate together in acting policy, delivering programs and leveraging investments, including those investments in charging infrastructure that we talked about earlier will only further spur consumer adoption. Third consumer education is a critical piece of the puzzle that requires investments by the public and private sectors on that note stay tuned for OSA's electric for all campaign coming up in the fall and fourth ensuring equity in the electrification revolution means that all parts of the industry have to thoughtfully serve all communities.

Josh D. Boone, Veloz (03:57:34):

Finally, in listening to the sheer wealth of knowledge that our speaker shared today, it strikes me that every single speaker was from a Velo member organization and we are honored to have them in our electric for all movement and in the industry. They each brought world class expertise to our summit today and our, our EV superheroes. I want to thank all of you in the audience for joining us today. I know it was a long day. Many of us on today's zoom line have been working towards transportation electrification for many years, and we are thrilled to be partners with you in this exciting industry. Thank you also to the entire Velo staff, a special call out to Moony Krishna for managing and MCing today's summit. Didn't she do a great job and our logistics partners at social enterprises for all of your efforts to deliver a successful summit shortly, we will share a survey with all of you as soon as soon as the zoom closes. Please be sure to complete that with

your feedback about today, so we can continue to offer you the most meaningful summits in the future and stay tuned because we will be launching the dates for our next summit very soon. Thanks again. And I hope you have a wonderful afternoon.