DOCKETED	
Docket Number:	20-IEPR-02
Project Title:	Transportation
TN #:	234186
Document Title:	Transcript 06-11-20 re IEPR Commissioner Workshop on Transportation Trends - Session 1
Description:	N/A
Filer:	Patty Paul
Organization:	California Energy Commission
Submitter Role:	Commission Staff
Submission Date:	8/3/2020 3:08:38 PM
Docketed Date:	8/3/2020

BEFORE THE

CALIFORNIA ENERGY COMMISSION

In the matter of,	)
	) Docket No. 20-IEPR-02
2020 Integrated Energy Policy	) REMOTE ACCESS WORKSHOP
Report Update(2020 IEPR Update)	)

IEPR COMMISSIONER WORKSHOP ON TRANSPORTATION

TRENDS AND LIGHT-DUTY ZERO-EMISSION VEHICLE

MARKET UPDATE

REMOTE ACCESS WORKSHOP

Session 1 – Light-Duty ZEV Update and Trends in Larger Vehicles

THURSDAY, JUNE 11, 2020

10:00 A.M.

Reported By:
Jacqueline Denlinger

APPEARANCES

Commissioners Present

Patricia Monahan, 2020 IEPR Update Lead Commissioner

David Hochschild, Chair

Karen Douglas, Commissioner

Staff Present

Heather Raitt, IEPR Program Manager

Dorothy Murimi, Public Advisor's Office

Panel One

Nick Albanese, Bloomberg New Energy Finance

Panel Two

Jim McKinney, CEC

Jesse Gage, CEC

Cynthia Williams, Ford

Leonardo Paoli, International Energy Agency

Alfred Artis, Consumer Reports

Lisa Macumber, California Air Resources Board

APPEARANCES (CONT.)

Public Comment

Wayne Leighty, Shell

David Park, California Fuel Cell Partnership

Glen Choe, Toyota Motors, North America

Diane Moss, California Hydrogen Business Counsel

INDEX

P R O C E E D I N G S

JUNE 11, 2020 10:00 A.M.

MS. RAITT: So I think we can go ahead and get started.

Program manager for the IEPR, the Integrated Energy Policy Report.

Welcome to today's 2020 IEPR Update Commissioner workshop on Transportation Trends and Light-Duty ZEV Market Update or Zero Emission Vehicle Market Update.

I'll quickly go over some housekeeping items before we begin.

Excuse me. Today's workshop is being held remotely consistent with the Executive Orders N-25-20 and N-29-20 as a recommendation from the California Department of Public Health to encourage physical distancing to slow the spread of COVID-19.

Directions for attending or participating in the workshop were provided in the notice and include both Internet and call-in options. The notice is available on the Energy Commission's website.

Please be aware that this meeting is being recorded. We will post the recording and the written transcript on our website. Also, today's presentations have been posted on our website.

This is our second remote IEPR workshop, we've broken

it into three sessions over two days. This morning we have a presentation and panel on light-duty ZEV updates and trends in larger vehicles. This afternoon our second session will cover ZEV affordability and equitable access and market perspectives on the ZEV 2030 goal. This afternoon will begin at 2 p.m.

Tomorrow morning is the third and last session and it will be discussing vehicle miles traveled starting at 10 a.m. And please note that there are separate Zoom logins for each session so you'll need the Zoom login for this afternoon if you'd like to join then as well.

As in this new remote access approach, we are trying new things to make the IEPR workshops more engaging. So for example, today we'll be using the Q&A function in Zoom with the capability to vote on questions posed on others. So if you'd like to, you can -- an attendee may type a question for the panelist by clicking the Q&A icon at the bottom of your screen. And if you see a question that somebody else typed that you're interested, you can like it or you can click on the thumbs up to let us know that you like that question.

And we will at the end of the panel session be taking some of the questions that are raised, some of the questions for discussion. We probably won't be able to get all of them because of time restrictions but we will do our best to respond to questions.

Another new feature we are trying is polling to get feedback from you, the workshop attendees. And our aim is to get input as we explore how to best conduct these online workshops since this is all new to us. And next I'll go over how to provide comments on the materials for today's workshop.

There will be an opportunity for public comment at the end of the workshop. In your Zoom, you -- if you're in Zoom, you can click the hand icon, the raise hand icon at the bottom of your screen to let us know that you'd like to make a comment. And if you change your mind, you can click on it again just to raise -- to lower your hand. For those on the phone not using Zoom, just press star 9 and that will raise your hand to let us know that you wanted to comment.

Alternatively, written comments after the workshop are welcome and due the close of business on July 3rd. And again, the meeting notice gives all this information about how to submit written comments.

And so finally, thanks for your patience as we try new things and try to make these workshops more engaging and effective. And we're definitely learning as we go.

And with that, I turn it over to Commissioner Monahan for opening remarks.

Thanks so much.

COMMISSIONER MONAHAN: Thanks, Heather.

And good morning, everybody. As Heather said, this is our second in a series of workshops for the -- our 2020 IEPR on Transportation.

And we're really trying -- in addition to trying new things with Zoom and Q&A and hand raising, I hope you all participate because we really are, as Heather said, trying to use technology to make these workshops more engaging. And we know it can be hard to sit in front of your computer for three hours at a time just listening to people. We want it to be more participatory with the folks that are listening in.

For this morning, we're discussing trends and light-duty zero emission vehicles as well as consumer preferences for larger passenger vehicles which was a big trend before COVID and I'm assuming as we recover economically from the impacts of COVID, we'll see that trend continuing.

And this afternoon we're going to be talking more about equity and access. Tomorrow about vehicle miles traveled. And I'm excited that we are tackling these topics that we really historically haven't tackled very much in the IEPR. They're a little bit out of the sweet spot of the Energy Commission, but they're really important trends as we evaluate how do we meet state goals for carbon reduction and also for transportation electrification.

So I'm going to keep my remarks short because we want

to dive in to this great set of discussions and panelists. But I just want to highlight a few things which is that, you know, we are very focused in the state on meeting our carbon reduction goals but also in doing it in a way that benefits all communities.

And I can't emphasize this enough that we have to make sure that this is a transition that especially benefits disadvantaged communities and benefits them in multiple ways, lower fuel prices if they're able to afford electrical vehicle or a shared vehicle but also cleaner air as we electrify heavy-duty transportation.

So really looking forward to discussion. We have a few other Commissioners who are going to be joining me on this virtual dais, but they'll be popping in and out, they may not have their video on but three of my fellow commissioners are going to be participating, Chair Hochschild, Commissioner McAllister, and Commissioner Douglas. So don't be surprised if you see other folks chiming in throughout the question and answer period.

So I'm going to turn it back over to Heather. Or Heather, should I introduce Nick? What's your preference?

MR. RAITT: So, yeah, you should introduce Nick.

COMMISSIONER MONAHAN: So we're going to have Nick Albanese from Bloomberg New Energy Finance. And I want to say quickly, Bloomberg New Energy Finance has been putting

out data on light-duty zero emission vehicles for many years. And at first when I would read these I would think, oh, my gosh, they're being way too bullish, way too optimistic. And actually the answer came, you know, to be that no, they were -- they were actually the ones that were most on target. Even I would say not as ambitious as they could have been in terms of the price drop of battery electric vehicles.

So happy to welcome Nick. Happy to hear the latest perspective from Bloomberg New Energy Finance on where we're going on light-duty zero emission vehicles.

So, Nick, I'll turn it over to you.

MR. ALBANESE: Excellent. Thank you, Commissioner Monahan, really appreciate that kind introduction.

And thank you everyone else who's involved in organizing, it's absolutely a pleasure to be presenting today.

Again, my name is Nick Albanese and I'm the head of BloombergNEF or BNEF, intelligent mobility research practice based out of New York City.

Let's go to the next slide.

For those who are potentially unfamiliar with BloombergNEF or BNEF, we are the primary research and data arm of Bloomberg LP. We're a team of roughly 250 data scientists and research analysts for 17 offices around the world.

And going to the next slide.

Our mission is to provide primary research and data on the policies, technologies, and corporate strategies that are powering the decarbonization of key sectors of the economy. So everything from commodities and electricity to buildings and industry, agriculture, and of course advanced transportation. So on that advanced transport team on which is for reading about (indiscernible) everything from the electrification of passenger vehicles, commercial vehicles, municipal buses, and even two and three wheelers to the new technologies and business models that are also evolving road transportation. So primarily autonomous vehicles and shared mobility services.

So with that, for today's presentation, I'm really excited to have the opportunity to present where we see the EV market today.

Going to the next slide.

And then talk a little bit about what we think the three main drivers of growth will be going forward. And then finally have an opportunity to talk about how quickly we see the global electric vehicle market as well as the U.S. EV market evolving through 2040.

So just to go to the next slide.

I think it's important to take note just how quickly passenger EV sales have taken off over the past five years.

If you go back to 2015, you can see that global sales, battery electric, and plug-in electric hybrids were just under 500,000 units. By 2017, that number has doubled to 1 million. By the end of 2019, it had doubled again to 2 million. And what you notice from this chart is that this is an increasingly global story. So we'll try to accounts for about 50 percent of the annual EV market due to the strong quality incentives in place that I'll speak to shortly. We've in fact also seen robust growth in markets like Europe and North America as well as in solar auto markets but of course auto manufacturing hubs like Japan and South Korea.

Now moving to the next slide.

If you look at the breakdown of passenger EV sales on a drive train basis, you'll find that in fact battery electric vehicles have accounted for the vast majority of passenger EVs sold today both globally and within the United States. And there are really two key reasons for that. The first is that regulators around the world stopped to incentivize automakers to produce and sell more battery electric vehicles. They have, of course, better environmental benefits and has.

The second reason is that we've seen actually strong organic consumer demands for the long-range battery electric vehicles. Really Tesla is the best example of that.

So going to the next slide.

Somewhat unsurprisingly with this rapid growth in sales, of course the passenger EV fleet has grown quickly as well so that at the end of 2019, we estimate there about 7 million passenger EVs on the world's roads. We can see here that again, China is about 50 percent of that fleet, but U.S. is not too far behind with over 1 million EVs on the road at the end of last year.

Now we estimate that about 50 percent of the EVs were sold in California. But interestingly enough, we've seen a slight uptick in sales in other states across the United States really in the past two years. So this is starting to become not only a global trend but more of a statewide trend within the United States.

Now to put that in context, we can go to the next slide.

You can see that, you know, despite this rapid increase in growth, passenger EV sales still account for just 2 to 5 percent of annual vehicle sales in most major auto markets. And while you'll see here that there's been a slight increase in the penetration of EV sales, if you look at these lines, you'll see there's still a good amount of regional diversity. So in a country like Japan where the government has historically sought to subsidize traditional hybrids, think of the success of the Toyota Prius globally. We had an EV still accounting for under 1 percent of new car

sales.

But in markets like the United States and South Korea which generates upfront subsidies, we see EVs in the 2 percent range. And in markets with both subsidies and ambitious top line national mandates like China and European Union were already in the 5 percent of new car sales range.

Now going to the next slide.

Great. You'll see that some counties and some companies are much further ahead in fact on their electrification journey. So if you look at the chart on the left, you can see that there are a number of global automakers for which EVs already account for 6 plus percent of their total vehicle sales.

Now of course there are a handful of companies like Tesla and Neo which already see EVs accounting for 100 percent of their sales. But what's notable here is that some of the major internal combustion engines vehicle incumbents have pivoted quite quickly in electrification. And that's the story that we expect to continue going forward.

And a similar story at the country level. Of course California is a leader in the United States. It has seen EVs exceed 10 percent of new car sales on a quarterly basis on a few occasions over the past two years. But notably countries like Sweden, the Netherlands, Iceland, and Norway has seen that on an annualized basis into a much greater extent. So

there are some reasons why Norway is an outlier in terms of GDP per capita and educational level. But it's a really illustrative example to consider because if the market in which you already have up on price parities between electric vehicles. This happens to be the case that upfront price parity happened in Norway much earlier because the government has a very high tax on the internal combustion engine vehicle which rates itself as between an EV and an ICE car.

Now looking forward, if you go two slides ahead.

There are really three key reasons why we expect most companies and countries to catch up with Norway despite not having the policies in place. And the main driver of electrification at least through the medium term will continue to be policy. So either they're somewhere expensive on an upfront basis in most markets and most vehicle segments, the EV subsidies will continue to be important. But as well as to get phased out due to the cost of maintaining those programs, it'll be vehicle fuel efficiency standards on ICE vehicle vans that will play the biggest role on the quality front.

Looking past 2025, it's going to be rising from automakers and charging infrastructure suppliers as well as battery manufacturers which are going to rapidly decrease the cost of the lithium ion batteries looking forward.

So to look at policies first on the next slide,

you'll see that the United States is a bit of an outlier on this front. So looking at the chart on the left, you'll see that Tesla and General Motors have both quickly exceeded the 200,000 electric vehicles that they can sell with the full $7,500 federal tax credit. That's important to keep note of because despite the fact that several have not hit that target. Actually, Tesla and General Motors account for about 75 percent of the EV market on a quarterly basis in the United States. So now most consumers in the United States do not have access to the federal tax credit.

With that said, there has been some notable activity at the state level. In terms of subsidy, New Jersey recently introduced the $5,000 upfront purchase subsidy for battery electric vehicles. But you'll notice that all the subsidies are below that $7500 value that was originally offered by the federal government for all automakers.

And of course you also have a good amount of uncertainty around the future of fuel efficiency standards here in United States.

Now if you'll go to the next slide, you'll see that it's absolutely a different story in China and the European Union. So China really took an example from California's Zero Emission Vehicle Mandate Program and adopted that policy at the national level. So now they have a requirement that automakers must generate 12 percent new energy vehicle

credits, they call them, in line with the vehicles that they're either producing or importing. They want to increase that to 20 -- or excuse me, to 18 percent by 2023. And then China also has ambitious city-level instructions on ICE vehicles in most major cities.

It's a similar story in the European Union as a result of the ambitious fuel efficiency centers adopted there which call for the CO_2 emission intensity of vehicles sold to decrease by 15 percent by 2025 and nearly 40 percent by 2030. You can see that these are as to how many EVs would have to be sold to comply with those programs. So very strong policy support from China and the EU.

Going to the next slide.

Great. You'll see that automakers are not sitting on the sidelines in light of these new policies. We spend a lot of time tracking corporate strategy announcements at BloombergNEF. What we've found is that the number of passenger EV models available at the global level will increase by 100 units by 2022 alone. That number will continue to grow through 2030.

What's interesting here is that battery electric vehicles will account for the majority of those models available, whereas you can see that automakers are only planning to launch a handful of fuel cell passenger vehicles. That's one reason why we see the fuel cell market growing

much more -- much more slowly than the electric vehicle market going forward.

Now going to the next slide.

It's important to also make note that the EV models are increasingly better and better. So in 2008 if you were to purchase an EV in the United States, it might have 400 kilometers of range. This year if you're purchasing one, it'll have over 650 kilometers of range. So really one of the key barriers of EV option that we've heard about range anxiety is being addressed by the automakers. And in addition to that is also barriers being addressed by charting infrastructure players.

If you can go to the next slide.

You can see here that we're also tracking the public stock of charging infrastructure. It rose by about 50 percent in 2019. You can see that there are now about 72,000 publicly available charging sectors in the United States. This -- these numbers will continue to grow going forward, but there are really two key challenges that will have to be addressed.

And if you go to the next slide.

You can see that one of those challenges is the density. So in the United States, about a third of public available chargers are in California. That's great for California consumers, it's a challenge for folks living in

other states that want to purchase EVs.

Another challenge is the speed and power outset of those charges. You can see that most chargers available in the United States today are really in that Level 2 range. They're good for top off charging but not necessarily sufficient to enable road trips and things like that. So more fast charging will be needed in the United States itself.

Now going forward, if you'll go to the next slide.

Really the main driver of electrification going forward will be the volume with lithium ion battery crisis. So again, this is something that we try to track quite closely at the NEF. Each year we sign on disclosure agreements with upwards of 90 battery manufacturers in key markets of vehicle segments around the world. We've got a real-world data on the price of the batteries that they're producing. What we've found is that that numbers have dropped by 90 percent in the past ten years. And that's a trend to continue going forward.

If you go to the next slide.

The first reason for that is that we're -- we've already seen a significant ramp up in the lithium ion battery manufacturing capacity. Based on plants that have been announced, that manufacturing base will quadruple by 2025. A good portion of that will come on-line within the United

States. This will provide our economies with scale automakers.

If you go to the next slide.

You'll see that these batteries are also improving in terms of their the core output. So actually the energy density of batteries has improved quite quickly over the past ten years and that will continue going forward. That means you'll need fewer kilowatt hours battery capacity to deliver a similar range to a consumer.

So going forward, we take this data that we have on historical lithium ion battery type crisis and our knowledge of the supply chain as well as the technology trends.

If you go to the next slide.

And you'll see that based on that data, we actually expect this trend to continue going forward. So by 2024, the lithium ion battery pack prices will be under $100 on a volume weighted basis and could fall to as low as $60 per kilowatt hour by 2030.

That 2024 number is really important because if you go to the next slide, that's really the level around which you start to see EVs being cheaper on an upfront basis than comparable internal combustion engine cars without subsidies.

And if you look at that column on the left, you'll see that this price parity crossover is coming quite quickly in the United States. So the illustrative years, of course,

some automakers will reach price parity before others, some might lag these years by -- by two to three in some cases. But regardless, on average, we are seeing upfront price parity come in the mid-2020s and really every vehicle segment in all of the world's major auto markets. And this is a trend that will continue despite uncertainty about U.S. federal government's stance on electric vehicles.

So going to the next slide.

Each year we take all this data that we have on where the market is today and what's happening with key drivers that I just outlined above and we come up with a long-term forecast for everything from vehicle electrification to share mobility services and autonomous vehicles, down to the country level for eight major auto markets. And that's our long-term EV outlook.

So this year, of course, that analysis is complicated by the impact of COVID-19. So when you're thinking about long-term EV adoption, you absolutely have to consider what's going to happen in short-term as a result of COVID.

As you can see in this chart here, what's actually quite surprising is that in the first quarter of 2020, passenger EV sales held up much better than passenger internal combustion engine vehicle sales in nearly every auto market. And this is a trend that we expect to continue throughout 2020 in every region listed here except for the

United States where we do not have strong policy support for EVs or any indication of a green stimulus at this time.

So going to the next slide.

You can see, you know, it's not just vehicle sales that have been impacted by COVID-19. Of course vehicle kilometers traveled have also been hit hard. We're expecting this to drop by about 15 percent in 2020 on a global basis, slightly more than that in the United States alone. We expect this sort of demands return to 2019 levels by 2022 to 2023 on average.

Now looking at the next slide.

It's absolutely important to recognize that even if you're not in the business of forecasting pandemics, so we came up with three scenarios this year that would outline how short-term EV sales might evolve under various macroeconomic trend.

Essentially the base case that we assumed for our EV outlook which I'll outline shortly is that we will see a multi-wave pandemic during which economic growth will not return for the second quarter of 2021. So if you're more or less pessimistic about this, of course the outlook for EV sales is different. I'm happy to speak to that in Q&A.

And then going to the next slide.

You can see that this is our base case forecast. We're expecting about a 34 percent drop in EV sales in the

United States this year but a relatively quick rebound. You can see we think EVs will hit 4 percent market share by 2023.

And going to the next slide.

You can see our more long-term view. So we're expecting EVs to account for 20 percent of new car sales in 2030 and a high 60 percent new car sales in 2040. You can see that our outlook for fuel cell vehicles by contrast is much more pessimistic.

Now if you go to the next slide.

You can see our view on the fully penetration of electric vehicles. You can see here that we think about 40 percent of the fleet will be electric. In 2030, we're expecting about 17 million EVs on the -- on the U.S. roads. And in terms of vehicle kilometers traveled, we're actually expecting a slightly higher market share for EVs.

If you go to the next slide.

Predicting upwards of 45 percent of the cases traveled to be done in electric vehicles. And that's primarily because of our view on the rise of shared mobility services in autonomous vehicles.

If you go to the next slide.

You can see that we expect these to claim increasingly important role in the United States. And our core assumption for these services is that all will be

serviced by electric vehicles.

So just to conclude. Going to the next slide.

You can see this is our outlook for the global EV market. You can see that we expect the U.S. to be the third largest passenger EV market and for topline sales to approach 55 million in 2040.

Now going to the next slide, finally just very quickly.

You can see this is how we think that level of electrification will impact the grid as well as the climate. So in the United States, the takeaway is that EVs are actually a benefit to utilities. We see them essentially keeping electricity demands flat. Without them, we would see electricity demands declining.

And there's also somewhat good news on the climate front. So we actually see road transport greenhouse gas emissions declining by about 35 percent between 2018 to 2040 in the United States. That's not the case in China, the rest of the world, or India. We might expect to see more stringent policies supporting electrification put into place in those markets going forward.

And with that, I believe I'm at time. So just to go to the next slide.

Again, thank you, Commissioner Monahan, and everyone else involved in organizing this presentation. I'd be happy

to take questions. And if you have additional interest in looking at this report, the Public Executive Summary is available at about.bnef.com.

Thank you.

COMMISSIONER MONAHAN: Nick, that was great. Thank you so much.

I actually lost my Internet in the middle but luckily you were so clear when you were talking. I stayed on audio so I think I caught a lot of it.

MR. ALBANESE: Oh, good.

COMMISSIONER MONAHAN: So just so I understand, Heather, we have -- we have until 10:40 for Q&A; is that correct?

MS. RAITT: That's right.

COMMISSIONER MONAHAN: And I -- so folks want to start asking questions in the Q&A, that would be great. I don't -- the only question I see right now is will these slides be made available.

So, Nick, I don't have a question for you from a California perspective and I apologize if you talked about this and I just was in my Wi-Fi nightmare.

But, you know, we lumped California in with the United States or BNEF does, everybody does, right. And you talk about California as having its own, you know, sort of piece of proceed, that's how we like to think of it. But I'm

wondering in terms of California's ability to exercise its authority. You know, we if survive the fight to keep ours ZEV mandates and I think we will win in court. I mean, we have 23 other states that are on our side. We have a long history of being able to pass our own vehicle standards as a result of our horrible air quality.

And, you know, California is committed to a clean transportation future that's primarily electric. And so I'm just curious about your assessment of, you know, California going ahead with the next round of zero emission vehicle standards past 2025, and how that would sort of change your assessment of the U.S. being able to move forward more aggressively on electrification.

We're already half of the EV market in the country. If we were -- as you pointed out if we were a country, we would be up there with some of the best in the world.

MR. ALBANESE: Uh-huh.

COMMISSIONER MONAHAN: There is an argument to like separate California from the rest of the United States because it is so, so very different.

So if you could just speak to California and the opportunity to electrify here?

MR. ALBANESE: Certainly. And I absolutely agree with everything you said. I think that that first chart that I showed where you see annual EV sales starting at 2015. If

you go back further, of course California was the early pioneer in electric vehicles in the passenger vehicle segment and was really a leader very early on in a critical role in jumpstarting the market. It continues to play a very critical role in the United States.

If I understand correctly, I think your question is regarding what might happen if California were to adopt a more aggressive policy stance or if we were to see a change at the federal level. And absolutely that would increase our topline forecast. So I think if you were to see the reintroduction of the Obama era fuel economy standards, for example, or the expansion of those mandate to a more significant number of states, we would probably expect sales in the United States to be more in power with those in European Union. So I think it's hard to see the U.S. catching up with China in the next five years but it could be possible to sort of tie with European Union in second place on a global basis.

I think what's really important to keep in mind is that we do see price parity happening relatively quickly in the United States really regardless of what's happened on the policy front. And that will be a big enabler of adoption within the United States.

So I think just to conclude, probably the biggest opportunities of the policy front now are offering subsidies

for low-income buyers who may not see that price parity point right now as well as investing in charging infrastructure to sort of further reduce concerns about range anxiety.

COMMISSIONER MONAHAN: Great. Thank.

We are getting questions from the folks that are participating. And remember, if you like the questions, say that you like it because then it will prioritize the question in the list of ones that we address.

So this one I'm also very interested in this. So what's driving the fact that large vehicles and SUVs get price parities either early or then smaller vehicles in the U.S. It seems counterintuitive.

And that does seem counterintuitive. Can you talk about that?

MR. ALBANESE: Absolutely. It does seem counterintuitive. Really, the reason for that is that consumers in the United States tend to pay more for an SUV or a large sedan. So the average MRSP as a vehicle for those two segments is significantly higher than it is for a smaller and medium sized sedan. So as a result, the level to which you have to reduce your cost on the battery front are much lower.

Now that would depend on your assumptions for the range of an EV. If you think that a consumer is comfortable purchasing that 50-kilometer -- excuse me, 50-mile small

sedan, that price parity is going come much sooner. Really the core assumption that we make is that a small sedan has to have 200 miles of range, medium sedan has to have 250 miles of range, and then SUVs and large sedans have to have a 300 mile. We think those are sort of the minimum levels that consumers would want to see the (indiscernible) between an ICE car and an EV.

COMMISSIONER MONAHAN: So -- wow, the Q&As are live its live. It's really moving around.

So let's see. Can you talk about why you see such a small role for fuel cell vehicle? And especially since they sell the range, charging times, at-home charging problems that you kind of risk with batteries.

MR. ALBANESE: Yeah, I think -- I think there are a few reasons. One is that we've seen relatively limited investment and commitment from the world's major automakers. I'm not sure if we saw the slide available but I think it was 513. If you look at all of the models that have been announced by the world's automakers, there will just be a handful of passenger fuel cell vehicles available in the market even as soon as 2022. So there aren't going to be many available.

Model availability is really important if you want to do -- expand the market. And then we also see significant constraints around refueling. So there's the NIMBYism

problem, people do not necessarily want a hydrogen refueling station in their backyard, so to speak. And the cost of building a hydrogen refueling station is essentially an order of magnitude higher than that of building, you know, a Level 2 or even a fast charging station for electrical vehicles. And of course EVs can be charged at home.

So I think what's also important to point out is that even in a country like China where the upfront subsidies for fuel cell vehicles has been as generous as they've been for battery electric vehicles. We've seen automakers primarily invest in EVs for the past review segment.

So we do have a separate forecast for commercial vehicles as well as municipal buses. And we absolutely see hydrogen powertrain playing a role in those segments. Primarily in Asian markets but to a lesser extent in the United State and European markets as well.

COMMISSIONER MONAHAN: All right. Thank you.

And then there -- do you have any assumptions about a transition to Next-Gen battery technology? So --

MR. ALBANESE: We do.

COMMISSIONER MONAHAN: Working there is one but there's many others. What's your -- what's your prognostication on that?

MR. ALBANESE: Yeah, so our core case on that is existing lithium ion technologies are here to stay. If you

look at the hundreds of model cells that are set to be announced -- or launched in the coming few years, all of those will use the similar lithium ion technologies. Regulators around the world are comfortable with these. And we've also seen significant investments being put into building up the supply chain.

So we think lithium ion batteries are really here to stay at least through 2025. In the cost curve that I showed previously where we see prices potentially going to as low as $60 per kilowatt hour. We do absolutely recognize that to get to a price that low, we probably do need a significant technology change. Either on the chemistry front or sort of a switch (indiscernible) something like that.

So there probably is a role for Next-Gen Technologies to play but it would be at least 10 to 15 years out in our view.

COMMISSIONER MONAHAN: Thank you. And do you -- we've talked about this previously but this idea of having EV specific numbers for California. Is it possible that in future iterations of this PowerPoint, you can break California out of its own nation state?

MR. ALBANESE: Yeah. So we do not at this time have a California specific EV outlook. I think it's going to be network considering doing potential in the next iteration of that. But we do have some data on state level EV sales

within California and other states. We're simply in the process of updating those right now. There's been a delay in the reporting, presumably due to COVID-19.

COMMISSIONER MONAHAN: All right. Then there's a series of questions around fuel cells.

One question is for your evaluation of automaker commitments, are you talking directly with automakers or are you more looking at what they are saying in the marketplace in terms of your models?

MR. ALBANESE: Absolutely. So we actually work directly with 9 out of 10 the world's largest automakers Pre-Covid I regularly in Detroit and (indiscernible) with our clients there so we primarily work with corporate strategists in these teams, so absolutely do have open dialogs with them. We're also in regular conversation with most of the regulatory bodies that are work with electrification in that major develop the economy.

COMMISSIONER MONAHAN: Thank you. And then what -- what trends do you see in terms of hydrogen vehicle and fueling cost performance improvements? Do you see the potential that they could also scale like batteries?

Maybe this is a comment. You're saying the medium and heavy-duty stations where you've thought about this more. But what's your sense in the ability of the hydrogen scale, hydrogen fuel cell to scale?

MR. ALBANESE: Yes, we have a separate forecast for that. I am not the best person to speak to that. It is available to BNEF clients. I will flag, there will certainly be economies of scale achieved hydrogen fueling infrastructure. And it is -- it is quite different to finding out that they are not directly comparable to electric vehicle charging station.

With that said, we've spent a long time looking at the economics of fuel cell vehicles and have tracked where governments are directing their incentive programs not just nationally but down in fact to the city level. We also have regular conversations with automakers. So that's where our view on the outlook for fuel cell vehicles for passenger vehicles comes from.

COMMISSIONER MONAHAN: Can you talk about -- about vans and the role of it? I mean, you've listed them as one of the primary reasons why there's going to be greater investment interest, (indiscernible) education.

Can you talk about what you're seeing across the globe on that?

MR. ALBANESE: Certainly. And I guess one thing to point out first is that we do not date these into our forecast. To be clear, most of these announced ICE vehicle vans have target implementation years of 2030 plus; 2040 in most cases. And a few of them are currently backed by firm

legislation. There are a few examples, Canada appears to be quite committed with ICE phase out targets.

But internationally, if you look outside of China, I'm excluding that because there are a number of important city-level policies in place there. We estimate there are 13 national economies that have ICE vehicle vans announced to date and another 30 major municipalities in regions that are also committing to that.

The reason why that's interesting is that those numbers have gone up from, you know, just a handful three years ago. So there's a growing wave of interest. Not just in Europe but increasingly across Asia and adopting some sort of ICE vehicle vans whether for sale or actually rehabilitation.

COMMISSIONER MONAHAN: And can you talk about -- this may be our last question, I think we only have about a minute or so left. How the parity base shift within a much longer-range requirement? Say like 350 to 400 miles of range.

MR. ALBANESE: Yeah. So again, our assumptions for SUVs and sedans is that the range would be at least 300 miles. If you bump that up to 350 or 400, depending on what year you're talking about if it is, you know, there's a $100 per kilowatt hour, multiply that by like $50 (indiscernible) additional cost to the vehicle. So I'd probably push back price parity by one to two years.

COMMISSIONER MONAHAN: Great. Well, Nick, thank you so much. This has been a really fascinating conversation. And really look forward to the next written outlook having California standalone. I think it's worth being standalone. I'm not just saying that because I'm from California but also the size of the market, the influence in the market. And as you stated, I mean, part of the reason why we kind of have this zero-emission vehicle mandate is because it's California.

So thanks for the presentation and I think we're going to turn -- turn this over now to our next -- the next section on trends and larger vehicles.

So Jim McKinney, my colleague is going to be facilitating this.

So Jim, do you want to --

MR. MCKINNEY: Hi. Let me get --

MS. RAITT: If I could jump in for one moment.

Before we move on to our next panel, thank you Commissioner and thank you, Nick, that was very a great exchange. If we could just indulge in taking a We're going to do a poll. So this is our first poll. And we wanted to do just a quick check in on what people are planning in terms of attending other workshop sessions. Sessions for the first two workshops.

So just give me a few seconds here to respond and --

this is part of our effort to get input from you all make this more engaged and find out more about your interests.

So it looks like a few folks are responding. If you'll go ahead and click on one of those, we'll close the poll in a few seconds.

All right. We'll go ahead and close it.

Great. I hope we all can see the results. It looks like most folks are deciding to come to upcoming sessions which is great. And a few aren't sure, but most of them are going to be joining at least one of the sessions. And (indiscernible).

So thank you for that. And now we can just go ahead and move on to Jim McKinney, our panel on trends and larger vehicles.

Thank you, Jim, go ahead and take it away.

MR. MCKINNEY: Okay. Good morning, everybody. Can you see me and hear me okay?

MS. RAITT: Yes.

MR. MCKINNEY: Good. Okay.

Yeah, thank you, Heather. Good morning.

My name is Jim McKinney and I'm your moderator for our panel today on trends towards larger vehicles. I just want to say thank you and good morning to Commissioner Monahan and to Nick for a great presentation. Good kickoff to the day.

Consumer preferences have been shifting the larger SUV and pickup style vehicles. Basic physics says larger vehicles are going to need more energy and have higher emission rates than smaller vehicles. So we want to find some time today investigating this trend in consumer preferences for larger vehicles and better understand the energy environmental consequences.

As Commission Monahan said, the Energy Commission does not have jurisdiction or authority over vehicle sizes, shapes, or compulsion systems. In California, those abilities are with the Air Resources Board and our Regional Air Districts. Our engagement is to a work charger refunding program and the electrification of larger vehicles like school and transit buses and freight transport vehicles.

As with other parts of IEPR investigations and transportation, we want to learn from our panelists how COVID-19 is affecting consumers, industry, and government and what implications are for equitable access to modern and convenient transportation option.

Another issue to explore today is the role of electrification with batteries or fuel cells. With larger would electrifying larger for SUVs and pickups, they eliminate concerns over fuel consumption or emissions and what level of market share would be needed to mitigate energy or emissions issues.

So we have five panelists today from government industry and not for profit sectors to explore these trends.

Leading us off will be Jesse Gage, lead data scientist for analysis at the DMV Vehicle Registration database with our Energy Assessments Division here at the Energy Commission.

Next we have Ms. Cynthia Williams, global director for sustainability, homologation, and compliance with the Ford Motor Company in Dearborn, Michigan.

After her, we have Leonardo Paoli, an analyst with the Energy Information Agency in Paris. But I think Leonardo gets the prize for best office view because as we were finishing up our discussion with him, he turned his camera around to show us the Eiffel Tower. So for people stuck in our homes, that was beautiful. Thank you.

Alfred Artis is a policy analyst for Consumer Reports in San Francisco.

And then Lisa Macumber is the manager for the Innovative Light-Duty Strategy section at the Air Resources Board. Lisa's responsibilities include the Clean Vehicle Rebate Program and the Clean Transportation Funding Program.

So welcome to you all. I'm really looking forward to our discussion today.

And Jesse, you're our lead speaker. So I'm going to ask you to turn on your camera and I'll turn this over to

you.

MR. GAGE: Great. Thank you, Jim.

You can hear him, I take it?

MR. MCKINNEY: Yes, we can.

MR. GAGE: Okay. Thank you.

Again, this is Jesse Gage. I work with the Energy Assessments Division looking at the DMV's vehicle registration database which for our perspective is basically a quarterly dump of all vehicles in the state of California for which we can get -- kind of get new vehicle sales as well as existing stock.

Can we go to the first slide?

Take a look at basically where the market has been for the last decade. The first half of the decade was pretty much about the fairly steady between in terms of sales share by vehicle type. All of these, by the way, are going to be California specific.

But starting around twenty -- 2015 or so, the SUV started to make a push change to the car sector. And you can see there's been quite a lot more SUVs in sales shares at the expense of cars. So what has this done to vehicle rates?

If we go to the next slide.

You can see on the left that yes, you know, average per week vehicle per new vehicles has gone up about 200 pounds. And that's not because the cars themselves have been

getting larger, well the vehicles themselves. SUVS, vans, and trucks, as you can see on the right has decreased slightly but largely remained the same. And cars have increased just a little but certainly not enough to account for the difference in way that you can see on the left. But shift in SUVs has been the main driver from increasing the average weight of new vehicles in California.

So as Jim said, we say this might have effect on miles per gallon.

And if we can go to the next slide.

We can see that, well, you might have had an impact, but we're still making gains in average fuel economy. This is the harmonic mean of miles per gallon for the tire sales weighted fleet for California. And fuel efficiency gains have really been across all types of vehicles, cars, SUVs, vans, and trucks, all made increases in fuel economy which have offset the increase in weight as as we switch over from cars to SUVs.

And that's essentially what I have, if you have any questions.

MR. MCKINNEY: Great. Thank you, Jesse.

I think we're going to hold questions until after all the presentations. So thank you very much.

And with that, can we turn to Cynthia Williams.

MS. WILLIAMS: Good morning, good afternoon.

I'm Cynthia Williams with Ford Motor Company. I just want to say Ford Motor Company, we're committed to reducing the CO2 footprint of our fleet and that includes building exciting zero electric vehicles.

We have conducted research with regards to consumer preference and we'd like to share some of that data with you. This is U.S. data, just to clarify.

If you can go to the next slide, please.

So taking a look at consumer preference by retail customers. Customers want exciting and capable fully electric vehicles. We plan to build -- bring customers exciting products. It's that got to have it new experiences that we're looking to bring. We're going to bring conductivity with update new useable faces within vehicles and some vehicles exportable power.

Our strategic approach here is to build on a foundation that creates long-term success. And with that, we plan to build on our strengths. And our strengths are pickup, vans, and performance vehicles. We plan to build iconic brands amplified attributes and you'll see that later this year with the Mach-E) hits the market. We're going to leverage skill to help reduce cost. And provided there's no technology for consumers.

We believe ZEV adoptions will increase as barriers decrease. And that -- and those barriers include EV costs

much come down. The EV offering will increase and those must increase. There's a supplier presentation from Bloomberg show we're expecting over 100 different models in the future in 2020.

Infrastructure also needs to increase as well as educating consumers on the benefits of the product. And with that all coupled together, EV adoption will increase. But thus incentives must remain in place until there's cost parity between internal combustion engines in new vehicles and battery electric vehicles.

Charging infrastructures. It's increasing and also the speeds are increasing. And as part of the Ford Motor Company's strategy to address consumer's anxiety, we're tying that that to a Ford path, accept a Ford path and with that consumers will having a charging network of over 13,500 charging stations in North America.

With that, we believe we can provide retail customers exciting and capable products.

Moving to the next slide, we'll talk a bit about fleet customers.

So fleet customers. Fleet customers and fleet managers, their number one goal, number one goal is cost of ownership. It's business. It's simply business. Fleets focus on vehicles that provide capabilities and are cheap to operate, increasing their productivity.

Fleet needs are very -- they vary from fleet to fleet, it's not a one size fit all. We believe the near term increase adoption is expected where you have consistent routes per fleet as well as access to charging. That's very important. And also yield a three- to five-year payback. And that's regardless of how long the fleet will have that vehicle.

Again, the primary focus for the fleet owner is to get the job done. And if they can't get the job done, they cannot feed their families. So it's very important that vehicles are designed for their needs.

Batteries, electric vehicles need to fulfill about 95th percentile day of a fleet in order for them to consider a purchase. Similar to the retail side of business, instead of a critical interstate in order to provide that cost parity for internal combustion engine.

And with that, I'll turn it over to see if there's any questions or move to the next speaker.

MR. MCKINNEY: Forgot to hit the unmute. Okay.

Thank you very much, Cynthia. And I think we're going to stick with original plan to hold questions till after all the presentations.

So next up we have Leonardo Paoli with the International Energy Agency in Paris.

MR. PAOLI: Good morning, everyone. Thank you, Jim,

for the introduction.

So just again, I'm working in the Energy Stability Policy Division here within the International Energy Agency. And the work of our team focuses on developments in electric mobility and fuel economy.

Here at the IEA we've been analyzing the trends that show this rapid increase in average people size for a few years. Mostly due to its implication on global energy demands and on zero emissions.

We've analyzed this topic from a global perspective in a number of publications. And today I'd like to share with you some of the insights of our analysis.

We can go to the next slide.

First of all, I would like to draw your attention to the fact that this trend in larger and larger vehicles is actual a global one. In 2019, SUVs accounted for 30 to 50 percent of new passenger light duty vehicles in most regions across the world. And while some of the highest market shares are observed in North America, the speeds of this trend that's being most rapid in markets that have traditionally more vehicles such as China, India, and Europe.

In the 2010, less than 1 in 10 vehicles in Europe was an SUV. In 2019, that number became 35 percent of new sales. And one in the U.S., the same trend went from about 1 in 3 in 2010 to 1 in 2 in 2019. So there was a slower but constant

increase.

What this meant is that we estimated that 60 percent of the new car fleet expansion over the past nine years was made up by SUVs. So while the rise of SUVs has many impacts on mobility and just being so there are many issues that are discussed from pedestrian safety to parked in urban areas, we focus on energy and emissions. In fact, SUVs that have 25 percent higher fuel prior consumption than standard cars when normalizing the bodies of the global level.

If you look at the next slide.

We can see some details on fuel consumption. And so in this graph, you see on the Y axis the fuel consumption, so this is the universal miles per gallon, the higher volume means more energy consumed for units of distance. On the X axis, you can see the weight of the vehicle.

And of course as mentioned before, the larger, the heavier the vehicle, the higher different assumption as mentioned in the introduction. And this is the case mostly for conventional powertrain.

When looking at electric powertrains, we see that there's still a proportionality between weights and fuel consumption. However, this is not as strong as for conventional vehicles, mostly due to regeneratitve braking.

This does not mean that electrifying larger vehicle is necessarily better despite a larger let's say balance in

fuel consumption since larger electric vehicle still have larger energy and material footprint compared to smaller ones.

If we look at the next slide.

Here we -- so after the sales, what has been the impact of the trends of more and more SUVs in the market. And we estimated that since 2010, the impact of SUV has been to increase emissions by 500 megatons and that this is roughly equivalent to California's emissions in a year. And this is a staggering amount considering that this being the second largest source of additional zero emissions above other important methods such as the heavy industry.

If we look at the next slide.

Just going to mention a few -- sort of a few examples of how countries disincentivize larger vehicles when that is in their policy objectives. In a few instances, such as in Norway and the Netherlands, there are -- there's taxation either on registration of the vehicle or during -- for the ownership of the vehicle that is directly proportional to the weight.

In other cases, there are -- in other cases, more common cases, there are CO_2 based taxation, either again on registration owner during ownership. And this is also tends to disincentivize larger vehicles because they tend to emit higher CO2 emissions.

Another that's even more indirect form of disincentive is through taxation that is based on engine power or engine displacement since larger vehicles tend to have requirements for bigger engines in order to deliver the same performance asked on their cars.

And yes, this is all for me. Happy to take more into the Q&A session.

MR. MCKINNLEY: Thank you very much, Leonardo.

Next up, we have Alfred Artis with Consumer Reports in San Francisco.

Alfred, are you ready?

MR. ARTIS: I am. Hello.

MR. MCKINNLEY: Take it away.

MR. ARTIS: Thank you for the introduction, Jim. And thank you, staff, for organizing this. Commissioner Monahan and other Commissioners, thank you for having me.

Hello. As mentioned, my name is Alfred Artis and I'm a policy analyst at Consumers Reports on our sustainability team. And I'm here to discuss consumer preference for large vehicles. In particular, I'd like to address the rise of the crossover.

Now it's conventional wisdom that consumers want larger vehicles. Much is made of the trend towards pickups and SUVs. And this shift in preferences for large vehicles is real, but it's not the SUVs and the pickups that our

consumers are buying, it's the crossover. Now let's dig into the data.

Next slide, please.

Let me direct your attention to the green portion of this graph indicated by the large arrow. Crossovers have grown from 4 percent of market share in the year 2000 to 40 percent of market share in 2019. Relative to pickups, crossovers had exploded. At the top of the graph in the red, you'll see that the pickup market remains stable with a slight decline over 20 years, that's only increased slightly over the last two years. The crossover is clearly it.

Now, what is a crossover? Well Ward's Auto defines a crossover as a vehicle with a black and body with unibody construction, front or all-wheel drive with passenger vehicle qualities being the dominant characteristic, along with some limited off-road capacity. What that really means is, it's a big car. It's a souped-up hatchback. It's a -- it's a big kid station wagon. Crossovers provide a more carlike driving experience with greater efficiency than most SUVs, but they provide higher seating position that consumers like along with more room.

There's also a fuel economy advantage. The average crossover gets 26 miles per gallon, while the average SUV only gets 19 miles per gallon. The same goes for sedans. Top selling crossovers, like the CRV and the RAV4, only get

10 percent less in fuel economy compared to similar priced sedans, the Camry and the Accord. But the crossover has 1.5 times as much cargo space. One that consumers like.

Next slide, please.

I want to direct your attention to a few facts in this graph. The sedan market share has declined by 16 percent over the last five years from 2014 to 2109. Over 70 percent of those buyers bought compact or subcompact crossovers. Full-size vehicles accounted for only about 14 percent of declining sedan sales. Only about 2 percent increase in market share. So while consumers are buying larger vehicles, they typically transition from a sedan to a crossover.

Next slide, please.

Crossovers have entered the electric market and they can impact California's goals for electrifying. Here we have two highly rated EVs. The County EV is a crossover. The Tesla is a sporty sedan. Knowing that consumers prefer crossovers, automakers would do well to make more full-size electric crossovers beyond the handful of models that are coming on to the market.

It's clear that the crossover is a massive share of the market and offering electrified versions of these vehicles will drive adoption. As the policymakers, especially at the Air Resources Board, we recommend ensuring

consumers have choices. That means a strong ZEV mandate so that these vehicles are more widely available.

Additionally, California plays a role in driving down the cost of larger EVs. From our perspective, that means scaling the Clean Vehicle Rebate Program to the size of a vehicle's battery. Or, spreading its eligibility requirements by large and small vehicles, allowing for a higher MRSP cap for vehicles that drive over 200 miles on a single charge.

Now with all this said, there certainly are downsides to larger vehicles as they necessarily use more energy to move a larger frame. And that does have a draining effect on the grid. Their heft also poses risks to drivers and pedestrians outside the vehicles during accidents. That being said, California has a chance to meet the market and help drive adoption of electric vehicles by helping consumers transition to the vehicles they love, and those vehicles are clearly the crossover. Also, again, automakers would be wise to make more electric crossovers.

So with that, thank you for your time.

MR. MCKINNEY: Thank you very much, Alfred. That was great.

Okay. And our final panelist for today will be Lisa Macumber from the Air Resources Board. Are you ready, Lisa?

MS. MACUMBER: Sure am. Thank you, Jim.

MR. MCKINNEY: Okay. All yours.

MS. MACUMBER: Great. Thanks, Jim. Thanks Commissioner Monahan and staff for having me today for the presentation.

I'll be talking today about the incentive projects that we do offer at CARB. Specifically CVRP and HVIP. Both referenced a little bit throughout presentations this morning.

So move on to Slide 1.

Give a little bit of background on CVRP. So Clean Vehicle Rebate Project, or CVRP, is one of our two flagships programs that is -- has been around for ten years now and providing rebates for the purchase of plug-in hydrogenized vehicles and EVs. As you can see from the table on the slide, the majority of vehicles that have received rebates have gone towards kind of the mid-size category of vehicles. And that's only because that is the bulk of vehicle offerings that have been out there so far to date. Small SUVs began entering in 2013 but there are still are very few offerings available to consumers.

This project also over the years has gone through a number of changes that has affected the types of vehicles that are eligible in the program. As well as the eligibility for consumers. So CVRP is an income-based program. Now

there is an income cap on the program. There's also an increased rebate for lower income consumers to really help make up kind of this increased incremental costs for the vehicles and push them into the vehicle with more incentives. There are -- there is an MSRP cap now on the program which does impact quite a few vehicles. And there is an -- a limit for all electric range at 35 miles for -- for electric range using the UDDF test cycle.

What that means essentially is that this last year when we adopted those changes, we lost a lot of vehicles because the vehicles that have come into the market, especially the plug-in hybrids, it had lower range and they've been at a higher price point. So we -- we went from a pretty large list to a much smaller list this last year. But we are encouraged by manufacturers sharing, you know, that there were more offerings to come in the future and hopefully they will fall within the caps that are set.

So again, the -- the all-electric range cap for plug-in hybrids is set at 35 miles per electric range for -- I'm sorry, using the UVVF cycle, and the MSRP cap is set at $60,000 for all vehicles.

Now for HVIP, on the next slide, HVIP has been around just as long as CVRP. And -- and kind of contrary, the majority of vouchers that have been offered through HVIP have been offered for the larger vehicles. Typically in the

Class 7 to 8 range for both near zero emission vehicles and for zero emission vehicles, things like buses and -- and freight vehicles. The middle classes ranges 4 through 6, where we tend to see a lot of delivery-type trucks. In recent years in particular have started to pick up and ramp up pretty well there. But the smaller classes that kind of cross over a bit is what we cover within CVRP has seen a lot less vouchers in that area.

Next slide.

So upcoming for the year, we have a few changes that will actually affect the programs based off of vehicle size. So for HVIP, HVIP has currently been closed since November 1 because we have run out of funding in that area. Both of these projects have a huge funding demand on them but with the market as -- as great as it's been in growth the last couple of years, we haven't been able to keep up with the funds needed for the projects.

So for HVIP this next upcoming year we do plan to kind of focus more on those larger commercial vehicles and shift support of the lighter vehicles over to CVRP. CVRP does have about $100 million dollars remaining in the program. And depending upon how the market really does pick back up as we come out of this kind of COVID time that we're in now. We've done no projections yet but we're kind of watching to see what happens.

That funding could last just a little while or it could go quickly. But we do propose to make up that shortfall from HVIP and pull vehicles with a -- with a rate rating up to 10,000 into CVRP. Right now that's capped at 8500 so we would up -- increase that to 10,000. And by doing that, we would really capture the trucks like Rivian that we expect to come to market, and other trucks kind of in that -- the 8500 range that are already used for consumer purposes.

Last note to make is for CVRP. We've talked about for a number of years now bifurcating things like the MSRP cap and the HVIP have all-electric range and based on vehicle -- on vehicle size. Again, recognizing that some of the panelists before me have said that the cost tends to be a little bit higher. We really want to make sure that we are maintaining as much consumer choice as possible for the program.

And that's all for -- for me.

MR. MCKINNEY: Great. Thank you very much, Lisa.

Now we are going to turn the discussion over to Commissioner Monahan to lead off with her questions. And then after that, I also have a series of questions for panel discussion.

So, Commissioner.

COMMISSIONER MONAHAN: You know, Jim, I think it'd be better if we just turn it right over to you and

to -- because I'm loving this idea of having the -- the participants actually add their questions to the mix. So let's -- I'll, I'll chime in maybe later in the Q&A if my questions haven't been answered --

MR. MCKINNEY: Okay.

COMMISSIONER MONAHAN: -- by the panel, by the audience asking them.

MR. MCKINNEY: Okay, that sounds like a plan.

And let me ask our IEPR team in the background here, do we want to start incorporating the -- the Q&A questions or should we do those after we go to the questions that I have prepared?

MS. RAITT: Sure, sounds like -- this is Heather. Sounds like if we can incorporate some of the Q&A questions, that would be great.

MR. MCKINNEY: Great. Okay, so Quentin. Yeah, so Quentin I'll look to you to chime in with questions as appropriate.

MR. GAGE: Sure. Yeah. And I'm reviewing the questions and as I see ones that pertain to follow-up or adding onto what you have, we can go forward with that. And then if -- if there are additional questions afterward -- you're done with your section, I can bring those in.

MR. MCKINNEY: Super. Okay. Great.

So the first question I have, so this deals with

COVID-19 and its effect on consumer preferences and the auto industry. So as we saw from Nick's presentation, Bloomberg found a 13 percent decrease in light-duty vehicle sales through Q1 2020 and a 5 percent uptick in PEV sales. It was a short-term PEV sales. UC Davis Institute for Transportation Studies recent data showed a significant drop in fossil fuel light-duty vehicle sales, but a more modest drop in PEV sales. Car and driver reports at sales of pickups surpass passenger vehicles in April 2020. And then SUV and pickup sales fell less than sells of sedans so they're more resilient. And Tesla seems to be holding its own with steady or even increased sales.

So Jesse, I'd like to ask you first, in your review of the DMV data, do you see anything in Quarters 2 or 3 that would indicate how California's going on these trends?

MR. GAGE: Hi, Jim. Unfortunately, I don't have data for Quarters 2 or 3 yet. We get our next file pass in -- we had our last -- last file pass was in April, the next one will be in July. And the April file pass since the deals with the registration so there's a couple weeks of lag between when the DMV gets the paperwork and when it gets in the database. It's -- the data starts becoming unreliable after about say March 15, which just happens to be when the worst effects of COVID veered her head.

MR. MCKINNEY: Right.

MR. GAGE: So I'm expecting next quarter, next -- around the end of next month, I should have better data. It's going to take a bit of thought to be able to compare this to previous quarters simply because not only will we be looking at the effects of COVID, but since this is a vehicle registrations and -- you know, vehicle registrations would be down because people just aren't reregistering their vehicles due to, you know, not being able to make it to the DMV office. That's going to be an -- also an impact.

So I'll -- basically I'll have more information for you next quarter.

MR. MCKINNEY: Okay. Great. We will look forward to that and other parts of the IEPRs as we move through the year here.

And Leonardo and/or Cynthia, let me ask this. How could current economic conditions affect the LEM capacity to continue developing and building new models of fossil fuel and battery electric vehicles?

MS. WILLIAMS: Well, just from a Ford standpoint, the COVID, you know, it slowed us down a bit, but our plans are unchanged. As I mentioned when I spoke, we still plan to produce the Mach-E, introduce it to market later this year.

Okay, Jim.

MR. MCKINNEY: Okay. Leonardo, would you like to add anything to that?

MR. PAOLI: No, I would like to echo what was said with reports from manufacturers that's coming through, I'll say that plans should be going forward as -- as expected. So we don't see any major -- major challenge on that.

MR. MCKINNEY: So is it fair to say, Cynthia, that companies like yours have sufficient capital reserves or access to capital to maintain technology development?

MS. WILLIAMS: Yes. Absolutely. We're continuing our plan.

MR. MCKINNEY: Okay, super.

And then Alfred, I wanted to ask you, could these recent decreases in VMT and household trips affect consumer perceptions about how necessary or useful a larger vehicle is for day-to-day consumer purposes?

MR. ARTIS: Yes. We do know that consumers are researching vehicles more, but they are not necessarily clicking through to purchase that, which is interesting to know. We do know also that there are possible effects on how it affects consumer perception for larger vehicles when consumers think about not commuting. When they think about working from home, it does affect how -- what kind of vehicle they're thinking about purchasing.

But the thing about large vehicles is they are roomy and helpful for families to have and they also are helpful for recreation as well. And when consumers start

thinking about vehicles outside of the terms of commuting, they think about other ways of using the vehicle, such as for getting groceries, picking up kids, and recreating. And for those reasons, the large vehicle is unlikely to lose any luster.

MR. MCKINNEY: Okay. Thank you. So in our pre-COVID world, what primary factors were driving the trends towards larger vehicles?

And I'm really kind of curious about, was this a -- this a consumer-driven demand side shift or is this possibly more on the supply side? And how might these factors change, you know, now we're in COVID, and then after as we come out of that?

Leonardo, can I start with you on that one?

MR. PAOLI: Yes. So on this topic, I think so of course our analysis show that the -- the cost considerations are not important when it comes to SUV choice. We've seen in our analysis that -- I'm going to mention two elements from our analysis. One is that we have observed substantial sort of the fact that advertising from manufacturers is quite strong on these -- on these types of vehicles and that's considered to be one of the -- of the reasons for the popularity.

And then I wanted to add another sort of element to this. Maybe from a -- from a global perspective on one of

the reasons for SUV and larger vehicle attractiveness in certain parts of the world is the -- the fact that they represent status and in other less developed countries the fact that given road quality. Larger vehicles tend to also give, should I say, poor road quality. Larger vehicles give better, sort of higher sort of sense of safety, and this will push their -- their money share forward, in our opinion.

MR. MCKINNEY: Jesse, would you like to add anything to this?

MR. GAGE: No. I think I'm good. Thank you.

MR. MCKINNEY: Okay. Thank you.

Lisa, would you like to weigh in on this question?

MS. MACUMBER: I don't have much more to add. From the unfunded perspective again we, you know, what we've seen primarily has been what the -- what the offerings are that are available to consumers. And starting out really early with the program, for CVRP in particular, you know, we do -- we see that trend moving a little bit. But it all just depends on what -- what ends up being offered I think in the long run.

MR. MCKINNEY: Okay. Thank you.

I see from our chat that Commissioner McAllister has joined us. Good morning, Commissioner, and welcome.

Would you like to say anything or shall we keep going here? Sorry to put you on the spot.

COMMISSIONER MCALLISTER: Sorry, Jim, no worries. I'm -- can you hear me now?

MR. MCKINNEY: Perfectly.

COMMISSIONER MCALLISTER: Great. All right. Yeah, I've been enjoying the conversation and, you know, you guys are the experts, not me, so I'm biding my time because I don't think I'm going to add a whole ton to the conversation. So thanks for being here and certainly appreciate Commissioner Monahan's leadership and -- and all the staff putting it together. So thanks a lot.

MR. MCKINNEY: Okay. Thanks, Commissioner.

Let's see. Another question I had. So with this shift towards larger vehicles, what impacts do carbon emissions and California's carbon reduction policies can be expected from this trend? And are these -- do we think that the current policies and regulations we have in place are sufficient to stay the course?

And I think this gets to Commissioner Monahan's question about protecting California's authority, vis-a-vis the federal administration right now.

Lisa, can I put you on the spot for this? And I know you're not representing the regulatory side of the Air Board, but if you did have any thoughts on this question, I'd appreciate it.

MS. MACUMBER: Yeah. You know, we've -- you know,

I think what I can say is that we feel strongly that the regs support our efforts in making sure that we continue to drive down the emissions from the automobile side. And that right now, we've got a lot going on. We've got regulations that we continue to evaluate, and we just -- we did an update in May. There'll be future conversations coming along that side as well.

We're -- we're watching very closely what's happening nationwide but feel strongly that it's important for us to keep moving ahead and continue to push on the regulatory side.

MR. MCKINNEY: Okay. Thank you.

Would any other panelists like to weigh-in on this question?

MS. WILLIAMS: Hi, this is Cynthia. I'll just say that we're one of the only American Ford-line automotive manufacturers that -- that aligns with California and their goals. We plan to, you know, maintain. Again, like I said, we plan to reduce the CO_2 footprint of our fleet. And we're committed -- we're committed to that -- that goal and we think that's the right balance. The current regs of the California agreement that we've made with them. We get there by -- at the right balance for the report.

Thank you.

MR. MCKINNEY: Okay. Thank you.

COMMISSIONER MCALLISTER: Jim, this is Commissioner McAllister. Can I ask a question after all?

MR. MCKINNEY: Please.

COMMISSIONER MCALLISTER: And this rose from Ms. Williams. It occurred that Nick actually might have had some perspective on this, and I know Commissioner Monahan is interested in this grid issue.

So I want to ask, in particular from the Ford perspective and -- well, so vehicles are obviously key to decarbonizing the transportation sector, right. We have to get rid of tailpipe emissions, but they're also potentially a very strong motivator or contributor, enabler to decarbonize the electric grid itself. In terms of, you know, organizing and -- and coordinating how we -- when and how and where we actually -- with what energy we charge those EVs. And so I guess I'm wondering if for -- well, really if you could describe Ford's work with electric utilities on the communications and the infrastructure that's going to enable the vehicles to contribute as a decarbonizing force on the electric grid in terms of when they get charged and discharged.

MS. WILLIAMS: Absolutely. We definitely, as I mentioned when I spoke, one of the adoption barriers is infrastructure. And in order to get that down, we're working with utilities, we work with government, we're working with,

you know, local municipalities just to, you know, have them bring down on the -- or also make the -- the grid green as well. We think moving towards renewable energy is only going to help, you know, move the adoption and actually not, you know, when you're looking at the emissions piece of it, you've got to have both. You can't have EV vehicles without a green grid. So we have to have both in order to meet our goals for the future, as well as California.

So I think that's one of the things that we -- we pride ourselves on is working with partners to help make that a success. We think California has a right, you know, a good balance of this formula and we think that should be used as a best practice as we go across to the other northeast states that are actually adopting their regulation.

So, thank you.

COMMISSIONER MONAHAN: Jim, can I chime in too? This is Commissioner Monahan and I'm going to continue to ask Cynthia some questions about --

MR. MCKINNEY: Great.

COMMISSIONER MONAHAN: -- what to expect on electrification.

And first I want to say, you know, thank you to Ford for aligning with California, for supporting standards, for recognizing that it's really important that we decarbonize the transportation sector and provide vehicles

that people want to drive. So just, you know, thank you to Ford.

And I -- I've got a very specific question around electrifying trucks. So Ford had invested in Rivian, which I got to say, I went to the LA auto show a couple years ago and saw the Rivian vehicle, and I was like, what is this? It's so beautiful. I don't drive a truck, but I want to because that vehicle is beautiful.

And I know Ford has, you know, talked about electrifying its fleet of trucks. I'm just wondering what -- what's going on now in this world of COVID where there has been some, you know, strategic moves by Ford and other auto companies to continue to survive economically, even after we face a near turndown threatening the economy and auto sales. But what's your -- what's your vision on trucks and on Ford's commitment to electrifying trucks?

MS. WILLIAMS: Again, our commitment is unchanged. You may have seen on TMZ and NBC last night as Jim Farley as noted that we will bringing up Ford F150 truck to market in the 2022 timeframe, as well as the transit vehicle as well. We think both customers are, again, both customers, the fleet customers actually that will use those type of vehicles, they can see the benefits, the benefits to cost of ownership. And as we can bring our vehicles to market, we see that they can be utilized there.

We see coming out of COVID, actually, there's going to be a strong sense or a move towards specific, the way goods are delivered. And we think our leadership in trucks and leadership in vans can help in that space. So stay tuned, vehicles are coming.

COMMISSIONER MONAHAN: Let's first see that F150 electric, an electric version.

MR. MCKINNEY: That actually kind of aligns well with one of the questions from the audience right now.

You mentioned kind of these fleet aspects of it. Are these the particular segments of trucks that you see as favorable or unfavor -- or favorable for an EV transition? Are there any other segments that you think would be well aligned for EV?

MS. WILLIAMS: Well definitely we see the fleet customers, again, as a huge transition. Because, again, the fleets focus on cost of ownership again. And if they see a benefit to their business, that's where they're going to -- they're going to populate to. So definitely. And if we can make the vehicles that align, that will keep us consistent with their needs, we think that's the way to go.

MR. MCKINNEY: Commissioner Monahan.

MS. WILLIAMS: Again, the whole education piece about educating consumers on the benefits, I think we can utilize complete examples and also use that to teach some of

the consumers that buy the retail side of business. Educate them on the benefits as well because again, coming out of COVID, as we can see, you know, less driving, less pollution, cleaner air. We think folks will have a sense of health and environment coming out of COVID. So opportunities. We see opportunities even for the passenger side of our fleet.

MR. MCKINNEY: Commissioner Monahan, did you want to continue with your -- your queries here?

COMMISSIONER MONAHAN: Well I -- I'm not sure if Cynthia actually would know the reason why Ford originally had invested in Rivian and pulled back. Do you have any insights into that decision making?

MS. WILLIAMS: No, I don't have any insight for that. But that's something we can, you know, look into and get back to you.

COMMISSIONER MONAHAN: Okay. Thank you.

MS. WILLIAMS: And again, I would say to that is we definitely we're not, and that may be I think it's just a delay. Because you may have saw, also, after we announced that we were coming out of Rivian, we also added a Ford member, family member to the board. So I think -- I think the partnership is still there, it just may be delayed a bit. So we still have a strong commitment to them.

MR. MCKINNEY: Great. Thank you for that.

I would like to -- to recognize, introduce

Commissioner Douglas who's joined the conversation.

And Commissioner, I don't want to put you on the spot, but do you want to say anything or just listen in to the conversation?

Okay, I think we'll continue with the conversation.

Yeah, Cynthia, if actually we could stick with you a little bit. So I confess to being a car head and in my youth, I was the only guy with a Chevy Camaro and not a Ford Mustang so I'm still getting over that one. So what I think of in a Ford Mustang I don't think has much to do with the Mach-E Mustang. And could you talk a little bit more about that and what some of the consumer response is. It seems to be pretty exciting and how consumers are looking at this car.

MS. WILLIAMS: Right. Yeah. Consumers I think what they wanted -- what they all looked at is they looked at the performance aspects of it and that's something we're trying to bring to the Mach-E. They're looking at what are the technology piece that we can add to the vehicle that makes their lives simpler. So that's some of the things that we're looking to do. So make the vehicle fun, exciting, something the consumer wants to drive and is attracted to. So we're trying to reach out to fulfill customer needs and I think that's something that we'll see with the Mach-E.

MR. MCKINNEY: Yeah. Okay. And I really enjoyed Ford versus Ferrari. It's too bad Carroll Shelby's not still

around to help you with the Mach-E.

MS. WILLIAMS: Yeah.

MR. MCKINNEY: Okay. I'd like to turn the line of questioning now kind of back towards Lisa and CVRP and HVIP, which I think as we know are sister programs to the original AB 118 and AB 8 program that we run at the Commission.

Can you talk a little bit more about the way you're going to shift some of the classifications there to accommodate some of these larger vehicles that are coming into the market?

MS. MACUMBER: Yeah, absolutely, Jim. Thanks.

So, you know, as I mentioned, demands on both programs is significant right now, which is great. We have a lot more need than we can accommodate at an extensive level and within the scope of eligibility that I think we'd all like to be able to offer.

But given where we're at with HVIP, the need has grown so much, primarily on the larger vehicle side. Trucks such as larger delivery, kind of those middle classes as well. And so we're -- in order to kind of be able to focus funding in that area, we're going to -- we have been talking kind of publicly about bringing the board the option to shift some of those. So the smaller of the weight classes that are currently allowed within HVIP, and that would be basically up to the 10,000 pounds GVWR. We would shift those out of,

graduate them out of HVIP and pull them into CVRP. This will allow the increase on CVRP the GVWR weight limit from 8500 to 10,000 pounds.

And, you know, I know we recognize that there's impacts to that a few different ways. You know, first, we do envision, and our understanding is the majority of the vehicles that kind of come under that 10,000 weight class -- 10,000 pound weight class, primarily are used by consumers. At least, that's what we've seen is their use is more for personal use than it is for the larger fleet use than we -- that we typically get on the HVIP side. And so it's a -- it's kind of a, you know, we see that as a natural progression for those vehicle classes.

And on CVRP, we do still support kind of the business and the fleet side. We've got public fleet incentives and for public fleets that are domiciled within the age disadvantaged communities, it can get a larger rebate for their vehicles. And then businesses can still participate in the program as well. There is a limit to how many rebates they can get but there are still options for them to participate on the CVRP side.

We also think that for those particular vehicle classes, the incentive amount that are aligned with what we offer within CVRP versus kind of those -- those larger amounts that really get at the larger incremental costs that

are associated with trucks and buses and larger delivery vehicles of the sort.

So we'll be, we're going to be bringing that. We still have some process to go. We see our board in -- right now we're planned for October. Some of that will depend upon where -- when a budget is passed and what we see for the upcoming year. But we are right now planning to go to the board in October and bring them that particular change among some other, kind of just programmatic changes too.

MR. MCKINNEY: Great. Thanks. And I'd like to follow up with a couple questions and then I think Quentin is going to add some. You know, another issue that several speakers have brought up, and think Alfred in particular, was the notion of, you know, the budget. The COVID-19 impacts to the state budget, and specifically to your funding. And I'm remembering when all of us started this work many years ago, that we had our curves about early adopters, and the big middle, and all that stuff. And a lot of concern was discussed over the early adopters need a boost, a financial boost to try these.

But when we really hit the regular market for consumers, we're probably going to need a lot more money shaped in different ways but to really keep pushing the EV market in California. What does it look like from your perspective?

MS. MACUMBER: You know, that's a really great point. I think, you know, we put out a long-term plan every couple of years. It's updated every year, but we take a real fresh look at it. We just put out an updated plan last year that -- that continues to highlight that we do think that incentives need to continue until we get to a point where the market is about 15, 16 percent or so. And that just -- that's based off of using a technology theory for technology growth.

And we are still a ways from getting there. I think absent -- with or without COVID, we're still a ways from getting there. And, you know, as we talk about what's in our plan, the amount of the incentives over time should come down as those volume needs come up. But it doesn't -- but that still, with the volume needs going up, still does mean that there is a need for significant funding. So we've, you know, we've noted that, and we've done some -- we've done projections in prior plans that show what we think the needs are or what we think kind of base amount for incentives to carry us through reaching the 5 million ZEV goal by 2030.

And we kind of plotted some of that out. Now how that's -- it's going to be impacted by the current health and economic crisis we're in, it's really, really hard to say.

MR. MCKINNEY: Uh-huh.

MS. MACUMBER: It's too early for us to -- you

know, we don't want to make guesses because we don't want to be wrong. We want to be able to support the market as best as we can. You know, they noted on the slides, CVRP does still have about $100 million dollars available. And the burn rate is a lot lower right now than it's been.

So we do expect that once folks are back at work and moving around the state again, those numbers will go up. We, you know, kind of in contrast to that in some of our smaller vehicle purchase incentive contracts, like our Financing Assistance Program that's ran statewide, that program is really aimed at helping provide financing for consumers. Lowering the consumers that have a hard time getting good financing and being able to afford these types of vehicles still.

It also provides an incentive that is offered at the dealership level to bring their initial purchase price of that car down. That program is still seeing a steady influx of folks coming in. They have not had a huge impact yet from this. Granted, we don't do -- we keep our outreach at a -- at a minimal right now because of what we're going through because we want to make sure that we can handle and be there to support lower income consumers one on one if they come into those types of programs. But again we are still seeing some steady activity, which is great.

Now on the HVIP side with, you know, again, we've

been out of money since November 1st in that program. And so, you know, having funding in the budget to support that is -- would be fantastic. It would allow us to get more of the vehicles out there and really support the businesses that want to make transformative change.

But we are, you know, we are waiting to see the support, the priorities that the governor's put out for funding this year and we're just anxious to see what the legislature does and how they act.

MR. MCKINNEY: Great. Thank you very much, Lisa. Yeah, Lisa. Sorry.

Let's see, I think Quentin, you've got some questions from Q&A that you're going to share.

MR. GEE: Yeah. I'm going to get to a couple of these briefly. Just to introduce myself quickly, my name's Quentin. I'm with the -- with the IEPR staff. I'm the IEPR staff for the CEC.

We had a quick question to move -- switch over to Leonardo and Alfred. You both had slides discussing the -- the proportion of vehicles that are SUVs, but it looks like there might be a slight tension there.

I think, Leonardo, your slide was showing about 50 percent. And Alfred, including your slide, if we add SUVs and crossovers, it looks like, just eyeballing it, it looks like only about 40 percent.

Leonardo, are you including trucks in your SUV categorization or are those separate?

MR. PAOLI: So, yes. In our categorization we've had to sort of do these across the classification because it has to be able to compare vehicles from across the world. We do not include pickup trucks, but we do include vehicles that are listed as trucks in the United States. But sort of half shapes of passenger vehicles. So those would be included. I don't know if this would explain the difference, but that could be -- that could be the case.

MR. GEE: Okay. Great. One other question that we have for Leonardo again.

Are -- you're noticing that there's this trend in SUV uptick, but you mentioned electrification is one option. One attendee asks if you think that there is a policy that could be used to discourage SUV purchases. Is that anything that IEA has been taking a look at?

MR. PAOLI: We have not looked at that specifically, but I can quote a few examples from -- from European countries. I think that, to the best of my knowledge, the country that has the strongest disincentive for larger vehicles is Norway. To give an idea, they have a weight registration pack. So on purchase of a vehicle, a vehicle that has a weight of about 1.2 metric tons would pay a tax of roughly -- of roughly, let's say $1,800. And if a

vehicle has a weight of two tons, that rate would become $15,000. So it's a very, very steep tax based on -- on vehicle weights. And that serves as a disincentive. Probably the strongest that we've heard of.

MR. GEE: Okay. One final question for Jesse. This might be a little technical. But when you're looking at the increase of vehicle weight and the shift to SUVs, are you -- do you know if electrification is contributing to that as batteries have a very -- batteries are quite heavy. Are you noticing any impact from increased EVs in this trend?

MR. GAGE: Thank you, Quentin. The short answer is very little at this time. You do have a point in that yes, especially looking at the Model X as the primary example. You know, the curb weight of the Model X is much heavier even in the SUV market. But it's also only 1 percent of the market in terms of sales in 2018 and 2019. So as uptake increases, yes, we will start seeing the curve weights for SUVs increase because of the battery size. But right now, it's just -- it's a small pond. Or a small duck in a big pond.

MR.GEE: Great. With that, are we running low on time or do we have time for some more?

Heather, are you -- do we need to move to public comment?

MS. RAITT: All right. Well, we have more time.

MR. GEE: Oh. Okay, great. Here -- here's an option maybe for the whole panel to consider in terms of Q&A from the public that may be targeted towards the Ford issue but may be more broadly on just heavier vehicles overall.

Someone asks, the Ford F-Series is the highest selling vehicle in California and has a fairly low fuel economy. Would Ford or would automakers, or are there thoughts on folks supporting a tax, maybe similar to what Leonardo mentioned to help offset the cost of EVs. Is that something that seems feasible to folks? Maybe Alfred or Leonardo. Larger vehicle taxes.

MR. ARTIS: We definitely prefer incentives making it easier for folks to purchase electric vehicles. We also believe in a strong mandate. Strong ZEV mandate in order to make sure that these vehicles are widely available in the market. So that's where Consumer Reports falls on that issue for now.

MR. GEE: Great.

MR. PAOLI: I would just say it depends on the -- on the political will to tackle this policy objective. If there's a strong political will, this has shown to work. But it's a, yeah, it's a political decision.

MR. GEE: Great. Thank you.

One question, again, for Leonardo. Just, this might be a bit of a technical question. But you presented a

slide showing the increase in emissions per unit of vehicle weight. So it's sort of showing an exponential trend. One person asks why you chose to use an exponential trend as opposed to a linear trend and what might be the implications to that?

MR. PAOLI: So that slide is not used for any modeling purpose. It's just -- it's just to show, I want to highlight the difference between the two trends so that -- it has no implications. It was just used to try to show the difference between the different powertrains.

MR. GEE: Okay. Okay.

So one question maybe for Jesse. When you state that fleet fuel economy is increasing despite increased sales of SUVs and trucks, is that due to the increase of fuel economy in those vehicles or is it due to EVs replacing some of the ICEs?

MR. GAGE: I think this harkens back to the previous question about the sales bidding. EVs are, you know, they're about what, 5, maybe coming up on 7 percent or so of the light-duty vehicle sales market. So you are going to start seeing the impact of NPGs, but it's still, you know, right now in the market, gas is king when it comes to the light-duty market. So it's going to be increases in the average fuel economy and the gasoline market is going to drive it.

MR. GEE: Okay. This is a question for Cynthia Williams. Is Ford looking at a fuel cell electric vehicle as an option for, maybe for fleets or just as a consumer availability?

MS. WILLIAMS: I think long-term, yes, we're looking at all options and then fuel cell is one of those options that we're looking at. Near-term we're looking at electrifying our fleet. But if you look at the BEM adoption, I think fuel cell adoptions have some of the similar barriers to entry. So again, the cost is a concern. Infrastructure availability as well. So I think as, again, if we work together as a -- as a group government industry partners, other partners to -- to help bring some of these technologies on.

There's no silver bullet. Again, we're looking at what the customer needs are and how best to make sure the customer can have an affordable solution.

MR. GEE: Great. And related to that, do you have a sense of what customer insights are? I mean, do you -- you presented a little bit about customer preferences, but do you -- someone asks here, if you have more granular EV specific infrastructure needs. What customer preference for that? You mentioned sort of the range anxiety issue, but is there anything more that you have on that front?

MS. WILLIAMS: Right. Well one thing I will add is

we believe consumers -- well, you know, for the majority of consumers, about 85 percent of those, those folks will either charge at home or charge at work. So we think that gets to 85 percent of the folks. And with the Mach-E, we wished -- we will sell the Level 2 type charger with that package as well. And we just went out and had, we're working with Amazon on installation there.

Again, we think that will get to your 85 percent of your customers. And with the Mach-E, you'll be able to charge within ten minutes, 47 miles. So, again, we think that gets to the majority of the -- of the customers.

But I'll give you a personal example. I live in Michigan. I also have a home in Florida. So when I look for a vehicle -- and that's a 17-hour drive for us. And we have, you know, I have extended family that we take with us, for holiday gatherings. And so I have a family of four, you bring my mother-in-law, we bring a great aunt, that's a family of six. So that's, you know, if you talk about why people migrate to larger vehicles. That's one reason because we have extended family. We have to take them with us and we take care of them.

But and when I look at driving from my home to Florida in a -- in a electric vehicle, and that's 17 hours. We drive straight through. We typically don't -- we will stop for gas, so the ten minutes works for me, and me as a

customer. But if it's a lot longer than that, it really, you know, it gets to be a long journey for us.

But that's that recreational piece. But going back and forth to work, I think about 85 percent of what we're doing in terms of the infrastructure providing options for customers to purchase at the time of vehicle is what we're looking at there.

MR. GEE: Okay. Thanks. It looks like, I think Commissioner Monahan has one more question and we're coming up on time here, so we'll hand it off to Commissioner Monahan.

COMMISSIONER MONAHAN: I did have a question, but you answered it. You actually asked it Quentin so thanks for doing that.

MR. GEE: Okay.

COMMISSIONER MONAHAN: One comment came up like three count electric vehicles that we're looking at both fuel cell electric and battery electric, plug-in hybrid electric. And the answer is yes, like electric vehicles mean anything, any vehicle that uses electricity. Fuel cell electricity is just a different, different mechanism than battery electricity vehicle.

So -- so we want to clarify that from a California perspective, when we talk about EVs, we're talking about, you know, all zero emission vehicles that -- that use electricity

as their powertrain.

So I'm done. Turn it back over to you, Quentin.

I think Jim had a final question as well.

MR. MCKINNEY. Yeah, I did have one more. I'll just rely on Heather for our -- to keep us on time here.

The last question I had I wanted to put out to all the panelists. And it's what role could Energy Commission programs, like our charger funding program, the money we have for school buses, technology development for larger vehicles, Class 6, 7, and 8. What recommendations might you have for how we could use these authorities and funding pools to alleviate some of these issues we've been talking today and to kind of accelerate or support the electrification of larger vehicles?

MS. WILLIAMS: I guess I'll start from my perspective. I think the charger funding could actually help deploy more chargers throughout a community. Also rates. Rates which electricity, you know, peak -- peak rates and things of that sort. I think you can help in that arena to provide and educate consumers about how much does it cost to actually charge a vehicle at a specific rate at a specific time versus gasoline.

So I think there's some things that we can do in terms of public education. We can partner together and educate folks on, you know, about -- you do actually have a

cost savings when you can switch over, as well as a better environment.

I think that's all I have.

MR. MCKINNEY: Thank you. Anybody else on the -- on the panel there want to take a shot at this question?

MR. GAGE: This is Jesse. I'll admit to being more of a clock than a policy person. I usually defer to you guys when it comes to policy. But my boss does have some thoughts about it. Maybe encourage charging to happen during the middle of the day when solar affordable uptake is producing electricity in order to reduce emissions associated with charging. You know, especially if it's somewhere in like Sacramento where we're literally like the sunniest city on the planet for two months out of the year. You know, energy consumption will stay the same, but the charging occurs when we're better equipped to take advantage of renewals.

MR. MCKINNEY: And thank you, Jesse.

Any last opportunities because we're going to wrap it up here pretty soon.

MR. ARTIS: Yeah. Alfred from Consumer Reports. I just wanted to chime in and say that yes, increasing the amount of charging infrastructure will be instrumental in driving adoption for these, that tell me consumers are concerned about and it's something that they certainly think

that were alleviated in both public and at home charging were available. That would be excellent and would help consumers get over their range anxiety, which is something that is a small burden, but exists.

MR. MCKINNEY: All right. Thank you for that.

Commissioners and Heather, I -- I think that does it for the questions I had prepared for this. I'm going to turn it back over to you. And it looks like we're going to move to public comment.

I want to thank very, very much all of our panelists today. Cynthia, Jesse, Lisa, Alfred, and Leonardo. And I'm going to have to figure out how to get to the Eiffel Tower at some point here. So thanks to all of you very much.

MR. PAOLI: Thank you, Jim.

MS. RAITT: Thank you, Jim.

Yes, thank you to our panelists, that was a great discussion and presentations. We really appreciate it.

So we are going to move on to public comments. This is Heather Raitt. Again, I'm not sure that I identified myself. We are doing public comments with three minutes per comment. And we are asking the folks limit comments to one person per organization.

And if you're in a Zoom class one, you can raise your hand with your raised hand feature to let us know that you'd like to comment. And you can also just click that

again if you change your mind or if hit it by accident.

And for those on the phone who are not on Zoom, you can just push star 9 and that will raise your hand to let us know you'd like to comment. And then you can also press star 6 to mute and unmute your line.

And with that, I will ask Dorothy Murimi from the Public Adviser's Office with the Energy Commission if she can go ahead and lead this part of the session. Thank you, Dorothy.

MS. MURIMI: Thank you, Heather and good morning, everyone. We still have a few minutes in the morning.

I'll first call on participants with the raise hand feature. And if you would, please don't use the speaker phone feature. We won't be able to hear you clearly. So let's begin with Tim Olson.

And Tim, your -- once your line is open, you may need to unmute on your end. Please state your name and affiliation for the record.

MR. OLSON: I don't have a question. It was answered in the Q&A.

MS. MURIMI: Okay. Thank you, Tim. We'll move on to Acosa, Acosa Calza. Acosha? Seem to be having technical difficulties there.

Let's move on to Wayne Leighty. Wayne Leighty.

MR. LEIGHTY: Hello.

MS. MURIMI: And please state your name. Please spell and state your name. Hello, we can hear you, Wayne.

MR. LEIGHTY: Great. Thank you.

Thank you, Commissioner Monahan for such a great workshop.

I'm Wayne Leighty, hydrogen business development manager at Shell. Four quick points from our perspective building, I think, on a lot what was said, as we develop the full range of new fuels at Shell. It seems that scale and pace are shared objectives. It helps us tap into virtual cycles and it helps to mitigate the atmospheric concentration of the greenhouse gases that we're worried about. I would just say beware of any haste that caused this dislocation, stranded assets, and dead weight loss in the California economy. I would note the pace of progress in cost and performance in hydrogen mobility is tremendous. Very similar to early years of solar and batteries. I encourage you to look at the applications to GFO 19602 as some evidence and encourage us all to stay on those trends.

The second point, California policy seems to call for nothing less than tipping points, headed toward mass market adoption of zero emission vehicles and private sector investment at very large scale. So I would encourage, as was mentioned today, to really listen closely to the needs and wants of customers and really focus on improving the business

case for zero emission vehicles in California.

As a retailer of fuels, we're focused on serving customers with reliable, convenient access to fueling for their mobility needs. And in our customer research, we see clear market segments for both charging and hydrogen fueling in light, medium, and heavy-duty segments.

For a fast charge level of service, hydrogen is already cost competitive with DC fast charging and offers about ten times the rate of charge or the level of service as we think about it. And the importance in hydrogen mobility of the light, medium, and heavy-duty segments for cost reduction in the vehicles and the infrastructure and supply of hydrogen. It's important as well for the choice aspect needed to get to that mass market adoption.

The third point, importance of a decarbonized molecular energy carrier. I know we're talking about transportation and vehicles today. From our perspective as an energy company, for California's energy system to be reliable, resilient, affordable, and equitable, simply put we need wires and pipes. We need charging and fueling.

And my fourth point, the real importance of your policy signals for our investments to further the state goals clean air, climate change mitigation. And maybe as we come out of COVID, infrastructure stimulus, the stability of policy in California and market-based mechanisms become

investable. That's key for all of our success. The policy goals in California and the importance of California policy in leading other jurisdictions, essentially means I think California can't really wait for others. And there have been some great successes and pivots in policy that complement industry. The capacity crediting mechanism and the low carbon fuel standard and the multiyear approach in the GFO.

As a global company, my proposals on hydrogen to invest in California compete with other regions around the world. In some cases jurisdictions with stronger policy, longer term vision. But those policy signals can be very effective.

My closing example --

MS. MURIMI: All right. Your time is up. Would you like to close out your comments?

MR. LEITY: Sorry. Thank you. Closing example is as a result of the capacity crediting and the low carbon fuel standard, Shell is now selling 100 percent renewable hydrogen in California today.

Thank you very much.

MS. MURIMI: Thank you, Wayne.

Moving on to Glen, I think it's Choe. If you wouldn't mind -- if you wouldn't mind, once you're unmuted, stating and spelling your first and last name, and giving your affiliation as well.

And just a reminder to folks on the line, please use star 9, or dial star 9 to raise your hand. And folks, if you're using Zoom, please do not use the speak -- the speaker phone feature. Thank you.

Glen. Go ahead, Glen. Again, comment from Glen Choe. Can you hear us? We seem to be having technical difficulties there. We'll come back to Glen.

At this time, there are no raised hands from the phone. I'll take a moment to wait again for folks on the line. For folks on the line, on your phone, please dial star 9 to raise your hand. For folks on Zoom, you can use the raise hand feature.

We have David Park. David Park, go ahead.

MR. PARK: Hi, good morning. David Park; D-A-V-I-D, P-A-R-K with the California Fuel Cell Partnership. To follow up with Mr. Leighty's comments, there are two activities that are notable in California. And that first is -- is renewable hydrogen is a great interest and activity within our membership. And we see a significant amount of investment in that space on the part of the hydrogen producers.

And then secondly, on the retail side, we see a move towards higher capacity and multiple fueling position hydrogen stations. And that is -- these two factors combined improve the carbon footprint of hydrogen fuel cell electric

vehicles. And the convenience and with the convenience and affordability of hydrogen as a fuel for the consumer market.

Thank you.

MR. GEE: We're going to go ahead and go to the phone line now. Phone number ending in 078, you're unmuted.

Please state your name and affiliation.

MR. CHOE: Hello. Can you hear me? This is Glen Choe, from Toyota Motors, North America. Last name's spelled C-H-O-E. Unfortunately, I can't use Zoom, so I'm using my phone. Hopefully, you can hear me.

I'd like to first of all say thank you to the CEC staff for offering today's session. Toyota would like to comment on the consumer perspective that was offered today. We just want to say that U.S. consumers are fickle and seek predictable markets. Predictable market to mean (indiscernible) expecting product conformance with no tradeoff, as well as wide selection of features, body styles, and colors offered to consumers. And also relative price performance -- price points, and guide propositions within vehicle segments.

And lastly, convenience in (indiscernible). As OEMs, we are trying our best to move beyond early adopted markets and increase towards mass market. That includes continuous improvements in product performance, range, cost, and also available features. However, from a consumer

officer's perspective, we are recognizing that as it was mentioned today, there are some market barriers, such as infrastructure.

Infrastructure needs to be more predictable and also provide certainty to consumers to access, just as gas stations use today. We believe that there needs to be continuous investment in infrastructure, both hydrogen stations, as well as DC fast chargers for the public because there is no singular, or single silver bullet solution to -- for consumers for adopting ZEV technologies.

We do believe they will take time and also continuous investment to capture the hearts and minds of today's and tomorrow's consumers towards that product.

Thank you.

MS. MURIMI: Thank you. Next, we have Diane Moss. Diane, if you could make sure your line is unmuted on your end. Please spell and state your name and give your affiliation. Thank you.

MS. MOSS: Diane Moss; D-I-A-N-E. Last name M, like Mary, O, S, like Sam, S, like Sam. And I'm with the California Hydrogen Business Counsel.

And I just wanted to briefly thank Commissioner Monahan, all of the staff and panelists for this hard work and this interesting discussion. And the California Hydrogen Business Counsel very much appreciates the broad and

inclusive definition of electric vehicles. Thank you so much, Commissioner Monahan.

And wanted to just point out there was an interesting discussion about the trend towards SUVs and heavier vehicles. And we've been seeing studies like from McKenzie, Hydrogen Counsel with McKenzie in Europe and the European Commission, Deloitte China. All of who are planning to, the fact that different electric vehicles are going to be more cost effective in total cost of ownership in different weight and use classes. And incentive programs and policies will also be impactful. But they've been noticing a trend, or they've been forecasting a trend that by approximately 2030 in the SUV class of passenger vehicle, the heavier vehicles like that, that hydrogen fuel cell electric vehicles will be cost competitive compared to other types of electric vehicles.

So I just wanted to point that out, reference those studies. Happy to share them if you haven't seen them already. And I look forward to the next panel. Thanks so much.

MS. MURIMI: Thank you, Diane.

We have no more raised hands either on the phone line or on Zoom. We'll take another moment, wait for a raised hand.

Seeing none, I'd like to hand the mic over to

Commissioner Monahan. We are done with public comment at this time.

COMMISSIONER MONAHAN: Great. Well, thank you, Dorothy.

Thanks to the IEPR team. Thanks to all the panelists. It's been really a great discussion. Appreciate everybody's forbearance as we learn the limits of Zoom. We really are trying to make these more interactive and really thank you for participating. I hope folks continue to ask questions. And also very helpful if your questions being asked by somebody else, if you just like could say, like that question because that way it will get bumped up. Otherwise we get a lot of questions that are kind of similar that we're trying to sort through.

So but just thanks to everybody for participating. Look forward to the afternoon, and we're closing it out now.

Heather, any final things that we're -- or do we just.

MS. RAITT: I think that's it. Thank you, everybody, and we'll be back with a second session at 2:00 with a different login so just make sure you get that login from the notice.

Thank you.

REPORTER'S CERTIFICATE

I do hereby certify that the testimony in the foregoing hearing was taken at the time and place therein stated; that the testimony of said witnesses were reported by me, a disinterested person, and was under my supervision thereafter transcribed into typewriting.

And I further certify that I am not of counsel or attorney for either or any of the parties to said hearing nor in any way interested in the outcome of the cause named in said caption.

IN WITNESS WHEREOF, I have hereunto set my hand this 24th day of July,2020.

_____

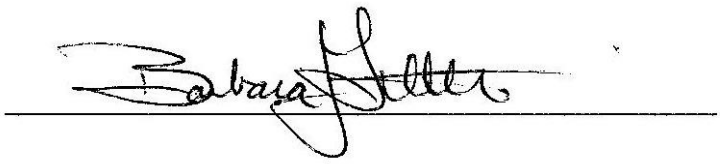
Jacqueline Denlinger
AAERT CERT # 747

TRANSCRIBER'S CERTIFICATE

I do hereby certify that the testimony in the foregoing hearing was taken at the time and place therein stated; that the testimony of said witnesses were transcribed by me, a certified transcriber.

And I further certify that I am not of counsel or attorney for either or any of the parties to said hearing nor in any way interested in the outcome of the cause named in said caption.

IN WITNESS WHEREOF, I have hereunto set my hand this 24th day of July, 2020.



Barbara Little
Certified Transcriber
AAERT No. CET**D-520