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CALIFORNIA ENERGY COMMISSION

COMMISSIONER WORKSHOP

In the Matter of:	)	Docket No. 20-IEPR-02
	)	
	)	
2020 Integrated Energy	)	REMOTE ACCESS WORKSHOP
RE:		
Policy Report Update	)	Heavy-Duty Zero-Emission
(2020 IEPR Update)	)	Vehicle Market Trends
	)	
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PORTS AND OFF-ROAD EQUIPMENT

REMOTE HEARING

WEDNESDAY, MAY 20, 2020

9:30 A.M.

Reported by:

Martha Nelson

APPEARANCES

COMMISSIONERS

Patricia Monahan, Lead Commissioner

David Hochschild, California Energy Commission (CEC) Chair

Janea Scott, CEC Vice Chair

Karen Douglas, CEC Commissioner

Andrew McAllister, CEC Commissioner

Fran Inman, Commissioner, California Transportation Commission

CEC STAFF

Heather Raitt, Assistant Executive Director, Policy Development

Lindsey Buckley, Communications and Internal Affairs

Harrison Reynolds

MODERATOR

Jeffrey Lu, CEC

PANEL 1

Román Partida-López, Greenlining Institute

Morgan Caswell, Port of Long Beach

Amanda Marruffo, BNSF Railway

Gary Dannar, DANNAR

Dawn Fenton, Volvo Group North America

Niki Okuk, CALSTART

APPEARANCES

PUBLIC COMMENT

Tim Sasseen, Ballard Power Systems

Jaimie Levin, Center for Transportation and the Environment

Eileen Tutt, California Electric Transportation Coalition

Meredith Alexander, CALSTART

AGENDA

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P R O C E E D I N G S

9:30 A.M.

WEDNESDAY, MAY 20, 2020

MS. RAITT: I'm Heather Raitt, the Program Manager for the IEPR, for today's 2019 IEPR Commission -- excuse me, 2020 IEPR Update Commission Workshop on Heavy-Duty Zero-Emission Vehicle Market Trends.

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

Today's workshop is being held remotely, consistent with the Executive Orders N-25-20 and N-29-20, and the recommendations from the California Department of Public Health, to encourage physical distancing to spare the spread of COVID-19. Instructions for attending or participating in the meeting were provided in the notice and include both internet and call-in options. The notice is available on the Energy Commission's webpage.

Instead of our normal full-day IEPR workshop, we've broken this topic into three segments over two days. It's something new we're trying in an attempt to lessen the technology fatigue and encourage participation.

So this morning, we will have a presentation and panel on ports and off-road equipment. This afternoon, our second session, will cover medium- and

heavy-duty ZEVs for moving goods, and that session will begin at 2:00 p.m. And, lastly, tomorrow is our third session which is on heavy-duty ZEVs focusing on moving people, and that will start at 1:30 in the afternoon. Please note that there are separate Zoom logins for each session, so you'll want to refer to the notice to make sure you have the login for that session.

Also, please be aware that the meeting is being recorded. We'll post a recording and written transcript on our website. And the presentations are already posted on the website.

So there are several ways to comment that I'll go over briefly. At the end of the session today, we will open the floor for public comments. You can use your raise-hand function if you're on Zoom to let us know that you have a comment. And before you start -- we'll open up your lines. And before you speak, please, identify yourselves and spell your name for the court reporter. You can also use the Q&A function on Zoom and we will read your comment. And, finally, if you're on the telephone, you can press star nine to rai CERTIFICATE OF REPORTER

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 certified electronic court reporter and 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 23rd day of June, 2020.

MARTHA L. NELSON, CERT**367

se your hand and let us know that you wanted to comment.

Alternatively, written comments, after the workshop, are welcome and they are due on June 11th. And the notice provides all the information you need for submitting comments.

And, finally, I'd just like to say this is our first all-remote IEPR workshop. This is the first time we've used Zoom, so please be patient with us if we have

a few bumps, and I look forward to a great workshop.

And with that, I'll turn it over to the Commissioners for opening remarks.

Thank you.

COMMISSIONER MONAHAN: Good morning everybody. Sorry, I'm losing my voice. This is Commissioner Monahan. And I want to just thank everybody for joining this conversation.

As Heather was saying, this is our first ever IEPR workshop using Zoom, so we're learning, and we've excited to be able to use this technology to continue a conversation on how do we clean up transportation and do it in a way that helps everyone.

And I want to just, first, thank our panelists, thank Heather and the IEPR team for pulling this together, and thank everybody who's joining this webinar.

So when we planned to do a Transportation IEPR it was in a pre-COVID world. And it's clear that transportation, I would say, is our biggest challenge when it comes to meeting our goals for climate and clean energy, and our biggest opportunity, arguably. We're seeing a lot of exciting changes in the world of transportation like we've never seen before. I didn't think five years ago that we could electrify a semi and we are.

So the question that we pose to our panelists and to the participants is how do we continue to make progress on clean transportation, even as we are facing a world of -- you know, where job loss and economic impacts are tremendous from COVID-19? So we are using this IEPR process to also explore, what do we need to do in the near term as the State of California in the policy landscape to continue to make progress, and to create jobs, and to help the economy recover? So we want to do it all.

And this is just the first of a number of workshops to explore this topic. We have a great set of panelists.

We actually have a great set of folks on the dais. I want to thank my fellow Commissioners, and Commissioner Inman from California Transportation Commission, about how we can continue to, you know, work together across different agencies to make progress on clean transportation.

So I open it up to fellow participants on the dais. And you can raise your hand and I will call on you or try to as I navigate this system.

So would any Commissioners like to make comments?

CHAIR HOCHSCHILD: Yeah.

COMMISSIONER MONAHAN: Oh, and I like the actual raising of the hand, Chair.

CHAIR HOCHSCHILD: The actual raising of the hand.

Hey, I just wanted to say thank you to Commissioner Monahan for putting this terrific agenda together, and welcome to Commissioner Inman. Thank you for joining us, and thanks to all the staff and stakeholders.

This is a really, really critical decade. This 2020 to 2030, I really view it as the decade in which we make this transition to clean transportation technologies. This is building on a lot of momentum we've seen over the past years, investing in new innovation. It's bringing the cost down and making these technologies more affordable and better than ever. And, really, this, for me as Chair, is my top priority to work on to support Commissioner Monahan and all of our fellow agencies in advancing this goal. It's our number one emission problem in the state.

It is inextricably connected to the economic recovery. And the infrastructure that we need to build to support clean transportation, in addition to improving air quality, is also an essential part of what we need to do to put the state back to work.

So I really see it through those lenses and I look forward to the discussion. Thanks for pulling this together.

VICE CHAIR SCOTT: So good morning. This is Vice Chair Janea Scott. And I am also delighted to join you all today.

And congratulations, Commissioner Monahan, on having the 2020 IEPR. This is a great way to start a really detailed and robust workshop that I'm very much looking forward to.

I have worked with the Energy Commission and a set of ports across the state, so I'm really looking forward to hearing some more on this topic. We've worked closely with the Port of Oakland, Port of Stockton, Port of Hueneme, Port of Long Beach, Port of L.A., and Port of San Diego over the last five years or so to really test out zero-emission technologies. So we have electrified all different types of port equipment to see how it works. Folks have had a chance to drive it, really, actually, kick the tires on it, see that it makes the duty cycles and it can perform in just the same way that internal combustion engines were working at the ports.

The ports have been fantastic partners for us. They've been pragmatic and practical. They're willing to try out new things and really work with us on the cutting

edge, and not just in testing out the vehicles but in also testing out the infrastructure and thinking through, where do you put a charger for a set of drayage trucks that may be moving around a port, or on a terminal where the shape and size of the terminal and what's coming in and out changes quite often? So where do you put charging equipment in a way that really matches up the duty cycles of what you need to accomplish with the charging cycles?

And looking into hydrogen fuel cells, where that fits in, where hydrogen can fit into the technology and where you would do the fueling as well?

And then also looking at some of the standardization that we're going to need in terms of what does the plug look like; right? You don't want a bunch of different vehicles and every single one has a different plug.

So a lot of really pragmatic things to help us think through and have real practical on-the-ground experience for what it's going to look like to bring these zero-emission vehicles in the infrastructure to support them to ports.

So I just wanted to take a quick minute to highlight that work that's going on. And I hope that information from that will be included into the chapter

because it's some really interesting real-world experience and I know that we'll be talking about that some during the workshop as well.

So thank you so much. I'm glad to see all of the panelists and our participants and looking forward to the day.

COMMISSIONER MONAHAN: Commissioner Inman, would you like to say anything?

COMMISSIONER INMAN: I would. I am delighted to be here today. And I think the timing is just absolutely amazing. During this extraordinary shelter-in-place, safe-at-home, whatever label your area put on it, I have the opportunity to really get to feel like I can help in some small way by working with the supply chain. And that sector was deemed essential. And so those of us, whether it was our port partners, our rail partners, our trucking partners, our warehouse, you know, rolled up our sleeves to make sure that we could keep goods flowing to make sure that we can identify the challenges, whether it was with medical supplies, kind of use some of the technology that our port partners had used but expand that into our medical partners.

So I think the timing is amazing because we've all had a timeout but we've kept moving. And I think for all us to listen and learn together and to think about

how best to do this because, with the economic recovery, we know that infrastructure has a proven track record of being a good investment, short-term and longer term. So to the extent that we can identify what it is we're going to need in the infrastructure for our new next norm, or whatever we're calling the future, I think it's great for all of us to be having these discussions today.

I think we've all learned through this to be better listeners, I hope, as we've been on this journey. We've all had a lot of time at home.

And that we've used with technology. I mean, I'm thankful for Zoom. And I laughed and said that I've gotten Zoom-itis from so many Zoom meetings. But we really have figured out that we can be very effective and connect.

So I'm excited to listen and learn today. Thank you for having me.

COMMISSIONER MONAHAN: Great. Well, thank you so much for joining us.

So let's start off with our first speaker, Román Partida-López from the Greenlining Institute.

Román, you are on.

MR. PARTIDA-LOPEZ: Can you hear me now?

COMMISSIONER MONAHAN: Yes, we can.

MR. PARTIDA-LOPEZ: Okay. All right. I called

in, taking a different approach to this call, and so I was having call myself from Zoom, so I'm trying to figure that out. So you can still learn something new, even though I think we've all used Zoom for several weeks now. There's always a new component that you're unaware of.

COMMISSIONER MONAHAN: It's all about learning, Román, all about the learning.

MR. PARTIDA-LOPEZ: Well, I learned my one thing for the day, so I'm just going to call it a day, pack it up, and stay home.

And so good morning everyone, Chair, Vice Chair, and Commissioners. Thank you so much for this opportunity to speak with you all this morning. And I want to thank you all for your opening remarks because I think what you all talked to or mentioned I think really sets the framework for the discussion we're about to have over the next 20 minutes or so, plus for the rest of the day and tomorrow. What you all mentioned was really in line with what we're thinking at Greenlining and how do we advance a market, like the medium- and heavy-duty market, while ensuring that benefits are felt by all?

So over the next 20 minutes or so, you know, I want to set a foundation for our discussion and talk to how we advance policies and programs that center equities and environmental justice while advancing the adoption

and deployment of zero-emission medium- and heavy-duty trucks and buses and equipment.

Next slide. Oh, now I have my video. Okay, there we go. Now you all can see me.

So for those who are unfamiliar with Greenlining, we are a racial and economic equity advocacy research and leadership development organization, focused on redressing the impacts of redlining on low-income communities of color. I'm Legal Counsel with the Environmental Equity Team and I've been with the team for about two years. And we work to reduce poverty and pollution in our most impacted years. Over the last two years, Greenlining has been engaged at the intersection of electric vehicles, transportation electrification, mobility, and equity.

And we really appreciate the opportunity to come and share with you all today what we're thinking and how do we assure, again, that we move in a direction, especially in the times that we're in, that create multiple benefits and that we're not only cleaning our air but that we're also providing opportunities for economic growth and wealth building for our most impacted communities.

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So the purpose of my presentation today will

be, again, to level set and conceptualize the importance of making equity real in policies and programs that will help advance a market that can provide multiple benefits for low-income communities of color, especially those who reside next to ports, warehouses, highly-transited freeways, who we know face the brunt of these economic -- face the brunt of both socioeconomic and environmental burdens.

First, though, I do want to spend a couple minutes talking through the current situation that we're in and how this pandemic has exacerbated the impacts on low-income communities of color and why this work is so important right now, both short term, medium term, and long term.

Next I want to share with you all a set of principles that Greenlining, along with other organizations, have spent some time thinking through and that we hope that, as part of this discussion, it's something that you all think through and, hopefully, in the discussions that you all have in the following workshops, keep in mind. But, hopefully, our concept is enough to get you all thinking about how we're centering equity in the work. These principles and standards that I'm talking about we feel can provide the guidance needed to ensure we are centering and addressing equity.

And last, I want to share our most recent experience as part of the San Diego Port Demonstration and Equity Project and share with you all a set of recommendations that we feel center equity and the community needs and provide benefits for those communities.

Next slide. Thank you.

Right now, you all have already seen or heard of the impacts that this pandemic is having on low-income communities of color. Even though this pandemic has impacted us all, the impacts are uneven and have been felt by -- felt the most by Black and brown communities, from rising unemployment, housing inequalities, lack of adequate broadband access. This pandemic has only really magnified existing economic equalities.

Additionally, we've seen actions taken by federal and some state regulators to ease or eliminate environmental protections, protections that are designed to help the most vulnerable. This attack was already underway prior to the pandemic, so this situation has only exacerbated conditions. Low-income communities of color who already have faced the brunt of these actions or inactions, they are now additionally exposed to higher levels of pollution and socioeconomic impacts by easing or stopping some of these regulations.

Lastly, when we think about moving people, transit access needs to be prioritized. We've seen and read how, because of the pandemic, there's been a decrease in transit accessibility. And that is really impacting or low-income essential workers who rely on transit as their way of transportation, yet we continue to see these cuts, even though we continue to state that they are essential workers. And we're not providing the adequate resources to ensure that they are being uplifted and centered in the work that's happening.

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So I wanted to share this visual here that a colleague of mine put together. And by now, I think a lot of us have heard, also, or seen pictures, right, of the change in air quality because people are not driving as much, either working from home, or staying home, and so there's been a reduction in air pollution. However, these air quality benefits, again, are not being felt by all, especially low-income communities of color.

With more people home there's also been an increase in demand for goods and delivery services, which means hubs, such as ports, warehouses, those corridors of highly-transited corridors, have seen an increase in activity which, again, impact low-income communities of color. And we know that most of those vehicles and

equipment that's operating isn't yet zero-emission and, therefore, continuing to increase the level of air pollution in -- the level of air pollution and, therefore, increasing additional exposures to our community.

And so this image here, as, hopefully, you can kind of see how -- you can see it, basically takes three maps. It takes the redlining map of Oakland in the late 1930s, CalEnviroScreen map, and then the most recent map put together by the Alameda County Health. And as you can see, all three of these maps highlight in the same general area. Redline areas in the 1940s are pretty much the same when we look at CalEnviroScreen. And when you look at COVID and its impacts, those bright orange there also seem to overlap with the other two maps.

And so, again, this is just a different way of visualizing the fact that our most impacted communities continue to take the brunt of, whether it be air pollution, pandemics, or injustices.

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So because of this, we offer the following guidelines, the following guiding principles and standards for an equitable -- as an equitable framework for any funding or regulatory proposal that is meant to address the fallout and recovery of this pandemic. These

principles and standards we feel provide the best opportunity to embrace systematic transformation and meaningful address the needs and concerns of priority communities as we begin to recover from COVID and simultaneously prepare for climate-related impacts.

So any recovery effort must deliver targeted, race-conscious investments. Investments must be targeted to these priority populations and significantly address the needs of those who are most impacted by pollution, the pandemic, and climate change, particularly Latinx communities, Black, API, and indigenous communities.

And if we're going to center equity, we must uplift the communities -- we must uplift community-driven solutions. Investments must facilitate and require community leadership, decision making power, and robust community engagement. There must be intentional benefits that avoid burdens. Investments must not harm priority communities who are already experiencing significant socioeconomic, environmental, and health burdens.

And to achieve this transformation, investments must comprehensively deliver public health outcomes, environmental and economic opportunities as well.

And, lastly, investment monies must include funds for capacity building and technical assistance to support communities with the least resources and help

ensure that they have access to program and funding opportunities.

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So with this in mind, I want to share our experience through this work that we did with the San Diego Port Tenant Association and its partners. I want to share the analysis and the recommendations that we developed as part of this work.

Greenlining was tasked with analyzing several state, local government, and port policies to better understand how equity was being addressed and built that -- we built out recommendations for policies that center equity, engage, listen, and hear community needs, and ensure both direct and co-benefits to these types of investments.

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So utilizing our making equity real framework, we analyzed how policies and programs focused on transitioning medium- and heavy-duty trucks and buses and equipment to that technology, center equity in its goals, vision, and values, in its process development, in its implementation process, and in its evaluation. And what we found was a set of mixed outcomes in providing benefits to surrounding port communities in the transition of freight equipment from diesel to zero-

emission.

Beyond technology and air quality improvements, these policies were not explicit on how surrounding port communities would see direct, meaningful, and measurable benefits because of the implementation of these policies and investments.

For the California goods movement sector, to succeed in their efforts to address climate change and improve the quality of life of all Californians, they need to clearly define how to properly deliver opportunities and benefits to improve air quality, link job opportunities, and improve community relations with surrounding port communities. And based on Greenlining's analysis, the report that we put together provides a set of recommendations that can strengthen social equity outcomes from port and goods movement activities and increase the benefits of transportation electrification.

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So incorporating equity into a policy, plan, program or project at its inception makes it more likely that we're going to be prioritizing equity in the procedural and implementation efforts. The project's goals, visions, and values should explicitly state the equity goals it attempts to achieve and specify the communities it intends to benefit. Having clear equity

goals and clear identification of priority communities at the outset of a policy, plan or project helps improve transparency and accountability for the project.

By now we understand that investments need to go to disadvantaged communities or AB 1550 low-income communities. But because we have now defined that for several years now, there is this opportunity to take that a step further and really identify what communities are going to benefit beyond just having a broad definition.

The policy and project should also clearly articulate the disproportionate impacts that the goods movements has had on that impacted port community, how structural and institutional inequalities play a role, and how government and the private sector have an obligation to leverage the efforts at hand to combat environmental and economic injustices.

Additionally, the project goals and guiding principles should include an equity goal that it will address the disproportionate impacts of port pollution on poor communities by directly -- by directing and prioritizing benefits to these communities.

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So as I mentioned earlier, community buy-in and community engagement is critical. Often, vulnerable communities are only informed that a project is happening

rather than being fully engaged and empowered in all stages of a project. Communities engagement in projects and policies should be -- should not be just an add-on benefit just to check the box. It should really help drive the project's direction. If the communities of color hardest hit by port pollution and port-related environmental degradation are not brought into the proposed effort to become zero-emission, we are missing an opportunity to address equity, center equity and, especially, the needs of the communities. And having that community buy-in will help move those projects along and, hopefully create that momentum needed to transition to zero-emission.

We need to promote community-driven solutions that address community-identified needs and share meaningful community partnerships and engagement in planning and decision making, and advance community power that promote community ownership of projects to the maximum extent possible.

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So the benefits of this work are only as good as the implementation, so equity must be at the center of this. We need to prioritize deployment of clean technologies, promote an inclusive workforce, hiring and training opportunities for low-income communities of

color and be explicit about that.

And especially how this works in its implementation phase is also going to benefit individuals with barriers to employment, so more inclusive contracting practices for goods and for services to ensure diverse-owned businesses, minority owned that run businesses, have access to these economic benefits and are also able to participate from the benefits that are part of the project or policy, and ensure that jobs are accessible and high quality with livable wages and benefits.

Next slide. Great.

In general, climate and clean energy-related efforts do not adequately measure and evaluate equity outcomes. Greenlining strongly believes that for policies and programs to succeed they should measure and analyze the equity goals and outcomes that's been established. If we set that standard from the beginning where we are identifying as our goal, vision, and values what the equity goals are, it would be much easier to then go back and analyze how we're doing on those equity goals that we have set out.

So we recommend that any effort to become zero-emissions clearly define those equity goals and develop evaluation mechanisms to measure progress and to promote

transparency and accountability. The evaluation should analyze the policy, it should indicate what strength and areas for improvements it needs in order to meet the equity goals and be used to inform the direction of the effort moving forward. Having some accountability will be important.

Next slide. I've got one minute. Almost there.

So I just want to end by stating that, you know, well, first off, thank you for your time. And I really just want to express my gratitude for allowing me to speak to you all this morning and reiterate that we have an opportunity to really uplift and provide benefits to our most impacted communities if we are able to really center equity in every phase of the work that we're doing.

In order to do that, though, we just can't go back to normal since back when things were normal we had severe economic inequalities. And as my colleague said recently in a blog, our goal for recovering from this pandemic and the economic crisis shouldn't just be going back to normal. Normal is a big part of the problem. Our goal must be to make this world a better place for everyone and the opportunity is now, because if it's not now, then when?

So with that, I want to thank you for your time and I look forward to your questions.

COMMISSIONER MONAHAN: Well, Román, thank you so much. That was really, really informative.

And just -- so we have about ten minutes for questions from the dais, and I'd like to start.

So, you know, we have been, at the Energy Commission, measuring the amount of money that's spent in disadvantaged communities as one metric for equity. And it's kind of become, I would say, the central way that we've evaluated equity. And we know that it's deeply imperfect and we are struggling with trying to find a better way to measure equity.

And I really was listening closely to what you were saying about engaging communities and defining the outcomes that you want and measuring progress against those outcomes. And we're challenged in this way with electric transportation because, you know, so when you replace one truck and you make it electric, it's pretty expensive. And it's pretty expensive to put the infrastructure in to either charge or refuel it with hydrogen. And, yet, we know, you know, that to get to the clean air future that we want and a largely electrified transportation system, we need to make those initial costly investments.

And so that's just one of the challenges we have. And I wonder if you have any advice for us about what we can do, you know, to get to this place where we are accounting for equity with -- you know, in terms that we can measure, while recognizing that there's also going to be some metrics that we'll use that just aren't numerical?

MR. PARTIDA-LOPEZ: Um-hmm. Um-hmm. Yeah. No. I think that's a great question; right? And, you know, just want to share quickly the experience that we've had in even developing metrics as well; right? It's not easy. It's definitely a process. And I don't want to say that Greenlining has the answers of what the metrics should look like. I think that's why we point to community and having the community engage in the process.

I think from the experience I had on this San Diego Port project, you know, I think developing a process where we're engaging community, and not just really to inform, as I mentioned, but to really hear what they have to say, right, and how we then take that information to prioritize the type of projects that we want to see; right? If what they want to see is, you know, that we electrify this particular sector, how can we then have -- make -- ensure that those investments are prioritized and are happening in that particular port

community.

But based on those discussions, we also start thinking through what those metrics should be, right, whether, you know, they just want to track if it's -- or just tracking what the level of investment is, or you know, the type of jobs that are being created because of that opportunity, or how many times they've actually been engaged, right, and whether that engagement and their feedback has actually led to particular changes in the way that the ports -- or the policy is being implemented.

And I'll just say, too, that I also sit on the AB 617 Advisory Committee here in San Diego. And through that process, I've learned a lot; right? I have now -- engaging both with industry and using the experience I had from this work in that space is how there is sometimes that tension between how do you move this forward in a way that gives you those -- the air quality benefits but also ensuring that we are meeting the needs of the communities that they're requesting.

And recently, we saw that kind of unfold in a way that, you know, both industry and community kind of came together in a decision of how we proceed on some of these projects so that we are prioritizing zero-emission technology because the community is the ones who live there and are experiencing this. But then, also, how do

we move some of these other projects that may not be focused on zero-emissions? By having conversations with folks about -- and with industry folks about what it would take to take that next step to transition some of that over to zero-emission?

But I just -- I'll close by saying, engaging community at every point possible, right, obviously doing it without overburdening them with meetings, but doing it in a manner where you can then ensure that their input is being brought in, and then being able to showcase that their feedback is being incorporated and having an influence in how decisions are made.

COMMISSIONER MONAHAN: Thank you.

Any other questions from the dais? And you could do it -- I mean, you could just, I guess, raise your hand or talk. You can also, if you click on the participant tab, you'll see the opportunity to raise your hand virtually, so that would be another way to let me know you want to ask a question.

All right, Commissioner Inman, I like the actual raising of hands. Let's just --

COMMISSIONER INMAN: Hey, I was covering all my bases. I've got the little blue diamond up there, the blue rectangle, and then the old-fashioned raise the hand.

But, anyway, thank you so much, Román. And, you know, just taking notes, and I think about this time we've all been through, and we all like to have our voices heard. And I don't know about you all, but I've been on hold, calling my communication provider or whatever. And so it's just, it's a reminder to me that we need to listen and we need to, I think, engage. And I look at, really, our communities, and I think for each of us the sense of place in the community, and to think how collectively we can all be better together. And, you know, when I think about it, too, clearly the education, and we're all learning energy and transportation and those opportunities, but then the jobs.

So, for me, I think really looking at what are the skills we're going to need, what are the jobs that are going to be available, and so at the end of the day, I mean, that was my takeaway, so thank you.

MR. PARTIDA-LOPEZ: Yeah. And if I can just react to that, yeah, that's a core component; right? And how do we, through this process of community engagement, really then also uplift job opportunities by informing folks of what the potential jobs could be at ports or, you know, or at some of these other places of goods movement.

There is that tension, obviously, between

community and industry, and so we have to also account for that. But how do we build -- how do we start building that trust, right, with the communities and the community organizations who are in that space so that we can get to a place where we can have those conversations of, okay, there is this, but how can we also then create job opportunities in a way that is responsive to what's happening in the community and addressing the concerns of the community while also being able to create jobs, and especially jobs for those who have those additional barriers to entry?

VICE CHAIR SCOTT: Patty, this is -- Commissioner Monahan, this is Janea. I will jump in also.

Thank you, Román, for your excellent presentation. I think just, you know, just sitting and thinking through, also, what you have talked about and how we have tried to incorporate more meaningful engagement with communities, even into the solicitations, right, so that it's part of what the folks who win the dollars to do the solicitation are -- they have to have that forefront of mind, right, when they go and start putting projects together.

And it is tricky to think about what those metrics should be. And we have had -- so I used to be on

the transportation side and now I'm the research side -- some fits and starts in places where folks started communicating with communities and then the grant money was gone and then everything just dropped off.

And so something else that I think about is how do we develop relationships that last longer than the particular Energy Commission grant; right? And that's a big ask; right? That's more of a macro kind of question. But that's the type of thing that, also, I think would really help as we are trying to develop a meaningful engagement. How do we encourage people to keep doing that whether they have a grant from the Energy Commission or Air Resources Board or whomever or not; right? Because that's such an important part of making sure that we're all moving together in a smart and thoughtful way that's meaningful for people in the communities where these projects are.

MR. PARTIDA-LOPEZ: Um-hmm. Yeah. No. And I think that's a great point; right? Because, yeah, community and community groups are already at capacity or stretched thin with the funding that they have.

VICE CHAIR SCOTT: Um-hmm.

MR. PARTIDA-LOPEZ: And, you know, we've been thinking about that, and just kind of through the work that we're doing and the committees that we're on, of how

can we be somewhat forward thinking in how we're applying for grants? And how we then setting up our communities to have the capacity to engage post that particular grant; right? And at times what that means is applying for one grant and then knowing that you have two years for implementation but halfway through that thinking through, how can you extend that by applying for another; right?

And that's just one example of how you start building those blocks to maintain that progress and that momentum that you're building around that particular work, and having that funding needed, right, to move that forward?

But it is a challenging one, right, and one that, probably, you know, I think needs a much broader discussion of how do we get there? But kind of leveraging some of the existing funding opportunities that are there.

And then, when we think about who's applying, how those who are applying or who have access to some of those funds, because they are, you know, constant applicants, how are they then bringing those same partners along to move them forward together, right, in building that -- building those relationships and that trust to continue the work to create a lower-emission

future where we all benefit from.

Thank you.

MS. RAITT: Great. Thank you. This is Heather Raitt. Thank you, Román.

Unless we have more burning questions, Commissioner, we'll move on to the panel. Okay. Great.

COMMISSIONER MONAHAN: Oh, great.

Thanks Román.

MS. RAITT: Thank you.

MR. PARTIDA-LOPEZ: Thank you.

CHAIR RUH: so we'll move on to the panel discussion on ports and off-road equipment. And it's moderated by Jeffrey Lu from the Energy Commission. So there will be a series of short presentations and then time for questions from the dais and discussion among the panelists.

So, Jeffrey, please go ahead and start your panel.

MR. LU: Yeah. Thank you, Heather.

And thank you, Román, for that presentation.

Good morning everyone. My name is Jeffrey Lu. I'm an Air Pollution Specialist at the Fuels and Transportation Division here at the California Energy Commission. I think the next 90 minutes or so we're going to be focusing ZEVs within the ports and off-road

sector. And to do that, we have five panelists who have set aside some time to join us remotely this morning.

With us today we have Morgan Caswell, who is the Manager of Air Quality Practices at the Port of Long Beach, Amanda Marruffo, Manager of Environmental Operations at the BNSF Railway, Gary Dannar, Founder and CEO of DANNAR, Dawn Fenton, Vice President of Government Relations and Public Affairs at Volvo Group North America, and finally, Niki Okuk, Program Manager at CALSTART.

As Heather mentioned, each of the panelists has a brief five-minute presentation which they'd like to share. After all of the introductory presentations are complete, we'll open it up to questions from the Commissioners. And following that, we'll jump into the actual panel discussion. We will kick it off with Morgan Caswell from the Port of Long Beach.

So, Morgan, whenever you're ready, please go ahead with your presentation.

MS. CASWELL: Can you hear me?

MR. LU: Yes, we can.

MS. CASWELL: Okay. Okay. Do you need the video on, as well, or are we going to keep that off?

MR. LU: You can keep that off for now but I'll probably turn it on for the panel discussion later.

MS. CASWELL: Sure. Makes sense. Okay.

Well, good morning. Thank you so much to the Chair, Vice Chair, and Commissioners, as well as the staff at the CEC for inviting the Port of Long Beach to participate in this workshop. We really appreciate the opportunity.

I want to briefly provide some background on who the Port of Long Beach is and what our clean air goals are. And my hope is we'll dive into some of the specifics related to the projects, and opportunities and challenges we're experiencing in this space, a little bit later in the discussion.

Jeffrey, if you wouldn't mind changing to the next slide? Great.

So we'll start from the beginning.

In 1911, California granted Long Beach the charter to build a port to promote trade, further economic development, and create jobs. Thus, the Harbor Department for the City of Long Beach was born.

We are governed by a board of five Harbor Commissioners who are appointed by the mayor to set policies for the Port. Although we are a public agency. Port operations are not supported by tax dollars. Instead, our revenues come from leasing terminals to our tenants.

As a landlord port, we do not own or operate any of the equipment. And this becomes particularly important when you're talking about our zero-emission project and transitioning the equipment to zero-emissions.

Next slide.

The Port of Long Beach is an economic engine. We are the second busiest container port in the United States. And $194 billion worth of trade goes through our port each year. Trade, construction, and tourism at the Port of Long Beach is connected to 1-in-20 jobs across Southern California, providing $30.9 billion in income. The port supports about 2.6 million jobs in the United States, providing $126.8 billion in income.

Next slide.

This economic success does not come without a cost to our air quality and local community health. In 2006, the Ports of Los Angeles and Long Beach jointly released the first Clean Air Action Plan, known as the CAAP, which focused on reducing health risk and criteria air pollutants across all source categories. Since its adoption, we have reduced diesel particulate matter by 88 percent, nitrogen oxides by 56 percent, sulfur oxides by 97 percent, and greenhouse gases by 16 percent at the Port of Long Beach.

In 2017, we updated our CAAP with new strategies and included our most aggressive clean air goals yet. By 2030, all cargo handling equipment in our terminals will be zero-emission equipment. And by 2035, all heavy-duty trucks entering and exiting the ports will be zero-emission.

Next slide.

In order to advance our zero-emission goals, we've worked with our partners to secure over $73 million in mostly state and some federal grants to demonstrate zero-emissions equipment, hybrid equipment, clean harbor craft technologies, zero-emission heavy-duty trucks, and other cleaner technologies. The majority of our grant funding comes from the CEC and the California Air Resources Board. And we are incredibly grateful for their support and their partnership.

These demonstrations are starting to take place now at most of our container terminals, with some equipment set to come online in 2021.

Next slide.

So with that, thank you again for allowing me the brief introduction. Looking forward to the follow-up discussion where we'll get into some of the details related to the impacts we're seeing with COVID-19, as well as some of the opportunities and challenges

associated with heavy-duty equipment and the transition.

Thank you.

MR. LU: Great. Thank you, Morgan, for that.

Amanda from BNSF.

MS. MARRUFFO: Hi. Good morning. Can you hear me?

MR. LU: Yes, we can.

MS. MARRUFFO: Perfect. Okay. Well, I don't have slides this morning, so I thought you guys would actually appreciate having a short break from slides, so I'll just speak on the content.

So I am with BNSF Railway. And, first of all, thank you for having me here. I definitely appreciate being invited and happy to speak on our experience.

In 2018, BNSF started a battery-electric initiative. And this was to see if we could leverage zero-emission and hybrid technologies in order to improve efficiencies, reduce costs, and lower our environmental impact. So some of the electrical equipment that we're looking at, we're demonstrating an all-electric drayage truck an all-electric yard hostlers, multiple, two hybrid rubber tire gantry cranes, and an all-electric side loader. And sort of the star of the show, that we affectionately refer it to, we are going to be partnering with Wabtec, formerly GE Transportation, which is a

company that has made the majority of our diesel locomotives, which we refer to them, really, as the technical experts in the locomotive space. But we're going to be demonstrating a 100 percent battery-electric locomotive that will work in concert with multiple diesel line haul locomotives to form what we refer to as a hybrid content.

So, typically, you will see a line haul train that has three to four diesel locomotives on the front end of it. What we're doing is we're adding a battery locomotive where the battery power is then going to offset the fuel consumption of the other diesel locomotives. So the specific route that we're looking at is a Stockton to Barstow route. And based on this and our assumptions, we're estimating about a 10 to 15 percent reduction in fuel consumption.

So what are some of the opportunities in California?

You know, the biggest opportunity comes with the incentive programs. California has a very impressive suite of incentive programs, from the Utility Infrastructure Program, LCFS, CARB's Low Carbon Transportation Program, and now we're seeing CEC's Clean Transportation Incentives. And these are working and these need to continue for heavy-duty and off-road

applications because without these incentives, heavy-duty electric equipment is not cost competitive with diesel.

So these incentives are helping us demonstrate hybrid and zero-emission equipment and help us understand these operational differences, as they're compared to their diesel counterparts, we're able to test reliability, maintain ability, productivity of this new technology under 24/7 operations. And BNSF is a 365-24/7 type operation. And all of these specific datapoints are then needed for our company leadership to then get comfortable with the concept of electric.

So looking ahead into 2021, you know, incentive funding programs are going to be needed more than ever by companies who are seeing reduced revenue impacts from COVID. And then, also, likely what we're going to see coincide is drastic state budget cuts to these very programs.

So one of -- some of the barriers that we see in California, there's three main barriers that I see, number one being the supply of electricity. It has to be reliable. It has to be resilient in the face of natural disaster. You know, there are serious concerns, as we face the prospect of another big fire season and possible power blackouts, so we really need that reliability that is going to be 24/7.

The second being interagency coordination has to improve. These groups have to align their policy agendas and really ensure that the utilities can and will execute on these proposed regulatory timelines.

And then, lastly, the price of electricity, this is a big one. You know, BNSF operates in 28 states, so we see what other states are doing. And, typically, it's two to three times lower in terms of electricity rates outside of California.

So just to wrap it up, we are -- we have three sites in California that we're piloting, currently piloting all-electric equipment, and that is San Bernardino, L.A., and Stockton. And we will have our battery-electric locomotives in Q1 of next year.

And that's all I have. Thank you.

MR. LU: Great. Thank you, Amanda.

And a correction to what I said earlier. If you are -- for the panelists, when you begin presenting, please go ahead and start your video.

Thanks again, Amanda, for that presentation.

Gary from DANNAR, you're up next.

MR. DANNAR: Good morning, Jeffrey. I assume you can hear me?

MR. LU: I can hear you fine. Thank you.

MR. DANNAR: Oh, very good. It seems like

every presentation now starts with a sound check, so thank you.

Good morning everybody. And I appreciate this opportunity to share our information with you.

And what you're looking at is a true off-road working machine, off-road vehicle. We're an Indiana company that has locations in San Clemente and in Stockton, California. We started this project and the company about nine years ago, in 2011. And the objective, of course, with that concept vehicle was to have an all-electric off-road vehicle that had not compromise with performance and so forth.

And eight years later, what you're looking at, to give you some size perspective, that's the size of a large pickup truck, a large Suburban, if you will, but inside is 500 kilowatt hours of batteries. And we chose a partnership with BMW car batteries. And we buy directly and have worked directly with BMW out of Germany. We're using the i3 car battery. Inside is 12 of those and so it's able to package enough electric power to work all day long and work any kind of attachment.

You can kind of see the design is very disruptive. It's purposely been talked about for decades, quite honestly, of coming up with a platform that is very

symmetrical, where it's all-wheel drive, all-wheel steer. It's identical on either end, so you have attachments working on either end.

So because it is electric, it is about mobile grid storage, being able to have grid storage delivered and placed where you want it or collect energy and share it.

It is a charger, a mobile charger, being able to charge up Level 2 cars or Level 3. So it's able to export AC and DC. But it's primarily about work, as well, so that that vehicle can always perform work and emergency response.

The next slide kind of gives you a perspective of what you were looking at was 500 kilowatt hours and now you're looking at 250. So below the decks is 250 kilowatt hours of BMW i3 batteries. And it frees up those surfaces to receive cabs and scissor lifts and dump beds and work apparatuses. And, of course, each end is available to work anybody's attachment, and we're talking third-party attachment from Caterpillar and Deer and so forth. So it's -- we call it attachment agnostic, meaning we're able to receive anybody's working attachment and, therefore, it has a work application available to anybody.

And if you go to the next slide, you'll get a

perspective of that configuration of the platform. Now a fleet manager for work machinery has the ability to configure the platform, perhaps for an operator station, or the lower right you see there, there's an operator cab that is a climate-controlled cab. It has arms.

But every vehicle also has with it the ability to control it remotely, wirelessly. You'll see in the lower left, and that's a very comfortable user interface, even though that is military grid encrypted for one mile of range. But you can see the eight-year-old boy from Munsey Robotics Team there beside Jake, running the machine. That's by design because emergency response volunteers, we want to make sure that they can feel comfortable either getting on the machine in a cab or grabbing hold of the controller and working it and responding it.

The next slide shows a collection of off-road work machinery that you might find in an agriculture setting or a campus or a zoo, any kind of urban or even suburban area that has construction equipment that is collected. This shows that it is a machine that can be configured to have priorities towards storing energy and sharing it or priorities of work, like the lower left there, and charging up other electric vehicles.

So the big challenge for the off-road industry

right now, it's a very different thing. We were able to take a lot of cues from the transportation industry and the great progress that's made. The technology is becoming very mature after 12, 15 years, electric buses and so forth. A lot of the undercarriages and components and systems that work well in transportation can be packaged uniquely, like we are doing, so that it can now be moved to the field, moved to construction areas and so forth.

The difference is the charging infrastructure, the management of energy. Most off-road fleets have always had their own, by necessity, energy strategy. Whether they would be storing fuel on site or be moving fuel by trucks, receiving fuel, they would always do a calculation of just how much energy in fuel do we need every month. And then they had their own strategies that they've used for, you know, decades and decades and decades.

The equivalent fleets are anxious and motivated to move to electric vehicles. So the real challenge for us now is how to help them manage their energy.

And that next slide is my last slide. And I appreciate the opportunity to share that with you and look forward to what next steps may be.

Thanks, Jeffrey.

MR. LU: Thank you, Gary.

Next up we have Dawn from Volvo.

MS. FENTON: Okay. Let's see. I don't know if my -- I assume you can hear me and --

MR. LU: We can hear you, Dawn.

MS. FENTON: -- but I haven't seen my video.

MR. LU: Yes.

MS. FENTON: Okay. Great. And I don't know, is the video working, too, or no?

MR. LU: The video is also working.

MS. FENTON: Okay. Great. Great. Well, thanks so much to everyone for inviting me to be here today. It's really an exciting time to be talking about the advent of electric heavy-duty vehicles. And Volvo Group is doing a lot of work in this space. As I'm sure many of you know, we are selling all-electric trucks and buses and construction equipment in Europe right now, and now moving to make those available here in the United States as well. We've learned much and we're really excited to share what we've learned to help contribute to the success of this emergence here in the U.S.

Can you go to the next slide?

Probably the most well-known project that we're working on right now, at least here in the U.S., is the Volva LIGHTS Project. I'm not going to get into a lot of

detail about this because there's more information available at a website that's listed there, lightsproject.com. And we've also done a lot to communicate about this project.

But just quickly, on this slide, you can see the map there which shows where the project was operating, going between the Ports of L.A. and Long Beach to the Inland Empire. Across the bottom there you can see the different components of the project that include bringing 23 all-electric heavy-duty trucks, freight handling equipment, renewable energy, charging equipment to the project. And then on the left side you see the list of the partners. There are actually 15 different partners who are involved in this project and it's quite a diverse group of folks all working together to show that electric -- battery-electric trucks can work for goods movement.

Can you go to the next slide?

So in addition to the LIGHTS Project, though, there's other vehicles and equipment that we're working on. Certainly, in our subsidiary, Mack Trucks, we have launched an all-electric refuse truck that is being demonstrated now with the Department of Sanitation in New York City. And we're aiming for commercial production after that and one or two commercial pilots are

concluded.

And, also, we're working in the area of construction equipment. And you'll see here a press release that was issued last month between South Coast Air Quality Management District and Volvo Construction Equipment where we're testing an all-electric urban excavator and wheel loader in California. And that, also, will conclude at the end of that project with having a commercial offer here in California and in the U.S. more broadly.

Can you go on to the next slide which, I believe, is my last slide?

So -- and, obviously, California is really in the lead in this market. The state has dedicated hundreds of millions of dollars to try and accelerate the adoption of ZEVs. And there's regulatory activities going on with the Advanced Clean Truck Regulation. And Volvo supports this movement and this transition that California is looking to accelerate. We find it to be good for the environment. Certainly, it's good for communities as it helps air quality and noise reduction. It's good for our customers and for their workers who operate these vehicles. And it's good for us, as a company, because we manufacture these products, and so it's good for business.

So we want to support this transition as much as we can but we are concerned that the transition may not go well, especially if things unfold, as they seem -- it seems that they might, as of right now, in California. And we don't want to see California undermined -- or the success that they're on the cusp of reaching be undermined. And so we see four -- I've captured just four points here that I think really clarify some of the biggest concerns we have.

First, just to highlight that this is a real paradigm shift. It's much different than when we added particulate matter -- I mean diesel particulate filters or some of the other technology advances that we've added in past years. I mean, this is the first time that you're forcing interdependence among a number of new stakeholders in this process.

And we really feel that the single largest obstacle that we have to having these introduced successfully is the lack of heavy-duty charging infrastructure. And I know Amanda had mentioned this as well. And, obviously, these vehicles can't operate without the charging infrastructure. And right now I think the state is woefully unprepared in terms of the amount of money that's going to be available and underestimating the amount of time it's going to take to

get some of these -- this infrastructure in place.

This was the situation that was really difficult before the COVID-19 pandemic. And it's only gotten worse since then. As we see, the State of California is having to reduce budgets. Companies, fleets, are going to have to reduce budgets. OEMs are going to have reduce budgets. So it's certainly only gotten more difficult.

And then, finally, one thing that we think that could be done to help alleviate some of this is to have better coordination in the state to -- for those incentive dollars for either -- for purchase of the vehicles, as well as for the infrastructure, to make it easier for customers to be willing to take on this risk at a very risky time in their -- as they're facing in the economy. So we don't want to discourage them with a bad experience and have them walk away from this market as it's just beginning.

So with that, I'll conclude. And happy to engage in conversation.

MR. LU: Thank you very much, Dawn.

And, finally, we have Niki Okuk from CALSTART.

Niki, are you on? Niki, you're on mute right now.

MS. OKUK: All right. How's that?

MR. LU: All right. Yeah. We can hear you now.

MS. OKUK: Okay. So I will try to go quickly in consideration for everyone's time today.

The CORE Voucher Incentive Program is for clean off-road equipment. This funding cycle was dedicated strictly to freight-enabling and freight equipment, so it includes things like real car movers, RTG cranes, four power capable systems, transportation refrigeration units, et cetera. But I'd like to start, rather, with more of a level set of what is the Voucher Incentive Program and why is it important?

So unlike some other funding options, the Voucher Incentive Program is really intended to buy down the incremental costs between your traditional internal combustion engine equipment and your new zero-emission advanced technology equipment. So what that means is that we spend quite a bit of time sort of gathering information on the cost of this equipment and try to bring it down so that it's comparable with what these end users would have traditionally bought. In doing that, we hope to accelerate the market and then, over time, reduce related components costs and allow these types of technology to reach a cost parity.

So the way that the program works is that a

manufacturer, like DANNAR, for example, on the line with us here today, or Volvo, would submit their equipment in order to be qualified by CARB. The Air Resources Board will evaluate that equipment. And then it is added to sort of a catalog of approved equipment which is available on the website.

Then those dealers can go out and begin marketing this equipment to end users, like our esteemed panelist from BNSF today, and those end users can conduct a purchase without having to complete a competitive application. They would pay only the purchase price of the equipment with the voucher to reduction sort of discount taken right off the value of the vehicle. And then the dealer delivers that equipment to them and receives a check directly from CALSTART or ARB. The CORE Project then pays the difference to the dealer.

So the reason, I think, that I go to the trouble of explaining all of this is because voucher incentive programs really are the very easiest way to deliver dollars to manufacturers, dealers, and end users in order to make it really simple to make this transition.

So the CORE Project and sort of it's analogous sister project, which is HVIP for on-road vehicles, works really well in doing this because it is so simple,

because everybody can understand how to use the program and how to participate in the program.

Go to the next slide please.

And so the reason we believe that this is such an important step in sort of a longer term goal is because we believe that transferrable technologies will begin to reduce in cost over time and, therefore, bring us into sort of the heavier-duty applications. And I think that this has been, actually, proven out to be true, right, with the advancement from light duty and transit into shuttle bus and now delivery, and now moving into heavy-duty type technology.

And the same has been true in parallel in off-road, being that forklifts have been available for quite a bit of time. And now yard trucks are becoming available. And, as some of our other panelists mentioned, now there are pilots and demonstrations for heavy-duty container handling equipment, construction equipment, and then we'll be moving into heavier-duty applications as battery technology advances and costs come down.

This is made exceptionally apparent by the fact that when we launched CORE just a few months ago, within about 45 minutes, all of the funding for yard trucks was expended. And that shows to us, that demonstrates to us,

right, that that particular market, that application is advancing well, while others have taken more time and a little bit more nurturing to begin participating in the program and deploying equipment.

Next slide please.

So, sorry, this got a little bit difficult to read here. But, really, what I wanted to say is that, you know, this program was allotted $40 million. And as I mentioned, very quickly, within the first couple of days, more than half of it was used. We've gone to speak with all of our stakeholders, our potential manufacturers, our end users, dealers, and even stakeholders, right, like ports, who don't necessarily own equipment but are essential in deploying this equipment, to sort of understand, what is going to be the growing demand for all of this? And what we've found, after speaking with all of them, really is that there is a projected demand of more than twice what was originally allotted this program pre-COVID funding.

So with that being said, I just, I guess I want to reiterate the point that the technology is here, the technology is ready, and the technology is driving the next steps. And we only need to assist them by buying down the cost, which voucher incentive programs do incredibly effectively. However, the demand is

definitely going to outstrip what we project will be available in the next days.

And so in response to some of our other stakeholders on the panel today, the one-stop shopping, the coordinated concerted efforts, right, bringing together all of these funding options and making them readily available and easily accessible is really going to make all of the difference in being able to deploy this type of equipment, right, the type of equipment that is going to drive the market forward, generally, and actually bring incredible reductions in emissions to the communities that are most overburdened by our freight.

Thank you.

MR. LU: Great. Thank you so much, Niki. And just a heads-up, I don't think your video is working, at least for me, so if you want to double check that?

At this time, thank you to all the panelists for your presentations. That was a great introduction.

I'd like to open it up to the Commissioners, if they have any follow-up questions for any of the panelists or any specific things they have talked about.

And, Niki, yes, I can see you now.

Commissioners, do you have questions?

COMMISSIONER MONAHAN: Yes. This is Commissioner Monahan. Thanks to all the panelists. That

was really, really informative.

I have a question. I mean, the Energy Commission is the lead agency on the infrastructure when it comes to hydrogen and battery-electric vehicles. And, you know, I hear the concern that, actually, that one of the biggest barriers is just getting the fuel, whether it be -- I'm assuming, whether it be electricity or hydrogen, we're focusing a little more on electricity in this panel, but hydrogen is also a zero-emission opportunity in the heavy-duty sector.

And we know for the vehicle grid integration, it's critical to providing a benefit to all electricity users, especially heavy-duty vehicles are charged at times, at peak times, that can make it more difficult for us to reach our goals for clean power and clean transportation. And so we are striving to have more of a thoughtful integration of charging with the grid and to establish the right policies to set the market signals so charging happens at the right time of day or, if it doesn't happen at the right time of day, you're paying more for it.

And I wonder if any of the panelists can respond to that question? I mean, that is an increased barrier, I would say, on the electrification side. But it's also an opportunity that we could even have negative

pricing for electricity at certain times of the day.

Does anyone on the panel have a response to this question of whether vehicle grid integration is something that you are spending some time thinking about and what your perspective is on that?

MR. DANNAR: I'm doing it the old-fashioned way. This is Gary Dannar and I appreciate your question.

The one slide I shared shows that if electric equipment, fleet of equipment, not all of it, goes out and works every day but the equipment that's left behind at a port, an airport, wherever, if it could be charging in those off-peak times, obviously, as long as it can export that and charge up the vehicles later, that's one way. That's the first opportunity to manage that, to use what grid power is available to charge those equipments, store it, and then export it and share it with other pieces of equipment.

In addition, the agricultural communities could use solar to help support that as well.

And so we are, all of us, focusing on trying to figure out that right strategy for the large fleets.

MS. FENTON: Yeah. Yes. Just to respond, as well, certainly, we're thinking about it. And potential customers are thinking about it as well.

Part of the problem is that, you know, as I

mentioned, this is such a shift in the way that businesses are going to have to operate that, you know, we hear frequently about how important it is and how it would be great if fleets, you know, they can charge overnight and when the cost is less. And there are, certainly, certain fleets that can do that and take advantage of that and can be really flexible with their charging.

But there are also many that just can't. I mean, they slip seat their trucks that they, you know, are going out and running a shorter run, then they're running a longer run, and they're used to being able to just fuel in 15 minutes and go back out again. And so -- and if they are not able to do that, it really changes their whole business model. And they have to even consider whether they can use electric trucks for certain applications or certain routes.

So it's a key question and it's one that we're still trying to figure out.

MS. MARRUFFO: This is Amanda with BNSF. I'll just reiterate what Dawn just said. And from BNSF's perspective, we're in that boat of we simply don't have the flexibility in our charging strategies -- or in our charging structure in that we have to rely on opportunity charging because we are a 24/7 operation, that's three

shifts a day, seven days a week.

MS. CASWELL: So I would just reiterate that that's a similar setup that we have at the Port of Long Beach. We have very few opportunity charging hours. So, typically, we would have an opportunity at lunchtime or between a shift, but those shifts are an agreement between the terminal operators and the unions. So those are set times that they're performing work on the terminal.

There is opportunity overnight. It's about four hours for charging. That's the best opportunity that we have.

Some of the things we're looking into is maybe you can phase charging. So while operators may all plug in at the same time, maybe you can save the actual charging of the equipment so that there's not just an instant spike in demand.

So we're absolutely looking at those things. And we're hoping to wrap those kinds of issues into a larger infrastructure plan on a terminal basis to really look at how do we best manage our energy use during peak operations?

COMMISSIONER MONAHAN: That's great. Well, thank you all for that answer.

We're in the process, at the Energy Commission,

of publishing a Vehicle Grid Integration Roadmap, which will be coming out in draft pretty soon. And it's something that we're working closely with the Public Utilities Commission and the CAISO because curtailment of renewables is such a major issue. And the opportunity, as Chair Hochschild likes to say, we want -- we need an EV happy hour where we're plugging in those electric vehicles at a time when we have a lot of generation from renewable energy that is currently being curtailed. So that's an opportunity we're increasingly thinking about, like how do we capitalize on that opportunity so we can integrate more renewables and have extremely low pricing for the electricity that's being used to charge vehicles at those optimal times of the day.

Do any of the other Commissioners have questions?

I actually am not seeing -- oh, there we go. Now I'm seeing everyone.

So you can, I guess, physically raise -- well, I think I'm the only Commissioner on the dais.

VICE CHAIR SCOTT: Commissioner Monahan --

COMMISSIONER MONAHAN: -- at least not on video.

VICE CHAIR SCOTT: -- this is Janea.

COMMISSIONER MONAHAN: Oh, there we go. Okay.

VICE CHAIR SCOTT: Hi. So --

COMMISSIONER MONAHAN: Sorry, Janea.

VICE CHAIR SCOTT: -- I would love to jump in with a question. I think it goes along on the infrastructure side, I think, and a question I have.

I know we've worked closely with the ports to think about where to put infrastructure. One of the ports was joking with me about if you put something out there, someone will certainly run it over within a day. And so just really making sure in the off-road equipment in the port setting that we have good places where we can put the infrastructure.

And then a question I have is a question for you all about scale. So as we go from maybe 5 vehicles or 10 vehicles to 50 vehicles or 100 vehicles, what does that look like? And are you planning for the infrastructure in that side?

And I'd love to know what folks are thinking about hydrogen and hydrogen fuel cells; right? So in some of the instances where you're saying you've only got 15 minutes to fuel up, hydrogen does fit that and it still is zero-emission. And I know that that technology is a little bit, in some instances, behind where the chargers are for the plugins. But I'd love to just get

your thoughts on that. That's kind of for all of you, whoever wants to take that on.

MS. MARRUFFO: So this is Amanda with BNSF. I can address the question about scaling.

So, you know, right now we're in the pilot stage. And we've got three facilities where we're piloting a rather small number of electric equipment. But really, when we think about scaling out, it comes down to two main issues, and those are, one, reliability of the electricity supply. Nobody wants to scale out to 100 percent electric, having all of the equipment be electric, when there's a chance that there's going to be power blackouts and that supply of fuel is not reliable. So that's number one.

Number two, stable utility rates. We need stable rates that will allow a sustained cost advantage over diesel. And right now we're seeing, at least from our perspective, because we operate in so many other states, unfortunately, California being, you know, two to three times higher than most other states that we operate in.

VICE CHAIR SCOTT: Um-hmm.

MS. CASWELL: Well, I'll jump in on that one.

I would just add, you know, it's going to look different on a terminal-by-terminal basis. For the

ports, you're not going to see the same terminal repeated across the San Pedro Bay.

A major next step for the Port of Long Beach is to do some of that infrastructure planning. And we're calling these Zero-Emissions Infrastructure Master Plans. And these master plans really describe the infrastructure needs for terminals to support a zero-emissions fleet, including the charging and fueling needs. And it will be a design and engineering document that really looks at what does the future layout need to be to accommodate some of the larger charging stations that need to go in? How do we need to shift the way that we operate so that it's more efficient as a result? What are the safety requirements and the clearance requirements of these different pieces of equipment? What are the magnitude of the costs? And what is the schedule to deploy the infrastructure, as well as to insure the equipment? And, again, how can do some of that energy management to ensure, you know, that the demand isn't overwhelming the grid when all of the pieces of equipment plug in?

So for us, this is our next opportunity to really address how we scale up. We have a lot of pilot demonstrations that we're looking to, to provide really meaningful input, not only for the port, but to the terminal operators, who are seeing and learning and

kicking the tires on the equipment. So those have been incredibly helpful and informative and they will continue to be as we continue to roll out more equipment.

But for us, in order to really scale, we need those master plans to cost effectively and strategically deploy infrastructure. And it's absolutely a partnership with our utility and making sure there's enough power down at the ports to support that. And we do have operators who have interests in hydrogen fuel cell.

So we are, you know, agnostic. We do not have a preference for the zero-emissions types of vehicles that they select. But there is a strong push for electric. But we absolutely have folks interested in hydrogen.

MS. FENTON: I'll just jump in quickly here.

In terms of building and resiliency and scaling up, I mean, this is something that our customers are going to be looking at. Quite honestly, we're still in such early stages right now that, I mean, we will be encouraging our customers, as they are purchasing. You know, most fleets are going to purchase. There are just a couple likely to purchase just a few vehicles at first so that they can test them and make sure that they're comfortable using them. But then as they scale up more, obviously, the needs are going to go up.

And the smart thing to do is to try and future proof and to make sure that it's resilient and they can take -- have sufficient power when they do want to purchase more vehicles. But it's hard for them to envision what that means.

And that's really hard is that, you know, every fleet is different. They're looking at their own charging infrastructure. But as far as like grid stability and things, that's kind of on a geographical basis, it's on a regional basis, and fleets really don't have the access to that.

And so this is where it's helpful, I think, for the utilities or the Commission or, you know, has to play that role in terms making sure that there is a good stability and that plans are being looked at holistically.

And which is why, actually, that public charging stations are so important. I think that they can really contribute significantly if located in key areas. Now, obviously, a fleet is never going to purchase vehicles and only rely on public charging, like they do on gas stations today, or fueling stations. But it's essential to get past that, you know, smaller number of vehicles and really scaling up, if they know that there are other places along the way they can fuel up and

not have to just go back to their home base.

Oh, and by the way, just on the hydrogen side, I'm sorry, I didn't mean -- I forgot about that, I mean, this is something that Volvo is interested in, that we're looking at. We recently announced a joint venture with Daimler in this area. But we definitely see that as a longer-term option. We see the battery-electric trucks coming to market much more quickly.

VICE CHAIR SCOTT: Great. Thank you all so much.

MR. LU: Great. This is Jeffrey.

Commissioner Inman, did you -- you have your hand raised. Did you have a question you wanted to squeeze in?

COMMISSIONER INMAN: Yes. Yeah, I do. And I just want to circle back.

And looking at -- Amanda, I think, brought up reliability, the wildfires, the public service power shutoffs that we've done. And I think we all collectively really have to put our heads together. I've given it a lot of thought. The fact that migrating from partners that have had fueling choices and going to a single provider, so to speak, is a much different operation. And it's also, you know, we haven't been deemed essential when it comes to our ports and goods

movement sector in terms of a Tier 1 when there's a power shutoff. But, yet, clearly through the CV-19, we've all been working and we've been deemed essential.

So I think collectively -- I know Vice Chair Scott and I have had some discussions about what -- you know, on the scale side and how do we collectively kind of look at -- some of the things we're patching together were designed under different times and rules and guidance and everything. So I think for all of us, we really have to look and make sure that we do have the ability.

And when Commissioner Monahan talks about negative pricing, I think that might solve some of Amanda's concerns about the price of electricity as well.

So I think collectively we all need to just really sit around the table and see what might be.

MR. LU: Great.

Any other Commissioners have any kind of question before we move into the panel discussion? Okay. Great.

I want to spend the remaining time diving deeper into some of these topics that we just touched on and, of course, the challenges associated with zero-emissions vehicles in the off-road sector.

For this discussion, I'm going to be directing some of the questions at individual panelists. But, of course, any of the panelists, you're free to chime in if you feel like it's appropriate.

But first, actually, I want to start off with a question for all of you that I'd like to hear your responses on. How has COVID-19 impacted your operations, both for your company but, I think more importantly for this discussion, your adoption of ZEVs as your fleet, or if you're an OEM, your manufacturing, you know, deployment of ZEVs?

Morgan, can we start with you?

MS. CASWELL: Sure. I'll give you just kind of a high-level impact that we're seeing at the Port of Long Beach, and then I'll dive into some of the demonstration projects.

The Port of Long Beach, our container movement is actually down 17.3 percent as of April of this year, compared to April of 2019. We've seen imports drop by 20.2 perception, while exports dropped 17.2 percent. So we're seeing significant impacts in our trade at a higher level.

In terms of our technology advancement projects, we've seen a mix of things. So some projects are moving on successfully and meeting their timeline,

while others are significantly feeling the impact. For example, we're seeing delays in equipment production, equipment delivery, testing of the systems. There's a lot of travel restrictions, so folks can't go out to the terminals and start testing the equipment at the terminal.

Some of the demonstrations have actually been delayed. Their start dates have been delayed, whether it's due to shifted priorities of really needing to focus in on sanitizing and ensuring that labor, you know, is maintaining social distancing, or whether or not there is reduced volume through their operations and, thus, their revenue has dropped significantly, so they may not want to start with a demonstration. They may opt to pause any insurance requirements on those new vehicles, so there's some cost implications associated with our demonstrations.

And then infrastructure installations. We've seen some delays in infrastructure installations as well.

MR. LU: Yeah. And, Amanda, since BNSF, I imagine, would closely mirror this since you also work with freight. Can you talk a bit about the COVID impacts for you and your --

MS. MARRUFFO: Yeah. Yeah. Absolutely. You know, freight rail is, really, we consider ourselves the

backbone of the economy. And we move goods that make up the nation's supply chain.

So in the rail industry, we've seen a huge decrease in volumes, which has an impact on our budgets and our expenditures. And this makes it that much more difficult for us to push through an electrification project, and that much more vital for us to get a lower total cost of ownership when we're comparing a diesel to electric project. We really want to see, you know, our company leadership at this point, when we're seeing these budget cuts, wants to see cost savings. So if that total cost of ownership comparison of diesel to electric doesn't show a lower or favorable for electric, then it's going to be very difficult for us to get projects pushed through at this time.

And we've also -- you know, the current pilot projects that we're working on right now, our partners are service partners who actually are the ones who operate and will eventually own those pieces of equipment. And, you know, we've seen some hesitation and some nervousness with going forward and actually executing the purchase of those equipment because of what's happening right now with revenue.

And I think, you know, with COVID-19, right now, what's going on, it's almost like a worst-case

scenario case study showing, you know, what do we not -- what is the worst thing to happen in this early worst-case scenario, which is disruptions in the supply chain. That's what we don't need at this critical time.

So this is really just demonstrating, and I'll probably sound like a broken record, but this is demonstrating why reliable and resilient electricity service are so important in the goods movement because disruptions in the supply chain, we're seeing right now play out in front of us, that they have very vast and cascading impacts.

MR. LU: And, Gary, as an OEM, can we get your thoughts on outlook for -- your outlook for electrification of ZEVs based on the recent events with COVID?

MR. DANNAR: So, yes, we did have the impact to the assembly process. We've been idle in that area for about six weeks, although we're back to work now. The supply chain has not been impacted for us that much because we're using high-volume components and big suppliers globally. It's too early to really be confident about that.

I will say the one thing that has been noted is the travel. It's the onsite pilot projects that we have and the demonstration projects that have been interrupted

because of travel.

And a quick plug for CORE that CALSTART mentioned earlier. We've been very fortunate to have earlier participation on some of our orders with CORE. And the reason that has been positive is some of these governmental fleets are quite concerned about their budgets and how they've been decimated due to COVID. And so purchasing equipment, replacement equipment, a lot of that has put some constraint on that.

On the other hand, emergency response, grid storage, it seems to emphasize the importance of, you know, our product being used as part of a microgrid or part of grid storage and emergency response, so not much impact there.

But the supply chain, we're concerned about that. Long term will probably be the concern.

MR. LU: Thank you.

And, Dawn, I know you had touched on this in your introductory presentation, but I'd like to hear your thoughts on this as well.

MS. FENTON: Well, sure. We've been affected as a company. And, obviously, the whole industry has been affected.

In terms of Volvo specifically, I mean, we had to shut down production globally for several weeks.

We're actually in the process of starting to get back up again but it's at a reduced level, you know, a 25 percent kind of level, so that affects production of all our vehicles, so you know, not just the ZEVs but everything.

We've had to reduce consultants that are working with us. We've cut back our own time. Budgets in the company have been -- are cut. And so we have to -- we've had to terminate certain projects or put certain projects off for a bit.

You know, that said, as a company, we are maintaining our commitment to move forward with our ZEV vehicles. It is a high-priority item. And so despite the cuts, significant cuts we're having to make internally, we're not looking to reduce in that area.

But that said, though, it may mean that certain applications, certain extensions to other applications might get slowed down. I mean, it's really too early to know. But we still have that strong commitment.

The real concern for us comes in what it means for our customers because, obviously, they are experiencing the downturn as well. And as, I believe, Amanda said, it makes it all that more important to have the incentives in place, both for the vehicle purchases and for the charging infrastructure, because it's that much more difficult for them to take on significant

purchases, and especially what's considered a risky purchase.

MR. LU: Absolutely. And that's actually a really good transition into Niki's comments on this.

Niki, since you worked with CORE and (indiscernible), you're probably hearing a lot from customers and working with them, who are going through this incentive process. What are your thoughts on how COVID has impacted all of it?

MS. OKUK: You know, when we originally surveyed our participants to find out what their demand was going to be for the rest of this year, most of them were actually quite optimistic and positive and bullish and saying that they were going to execute, sort of, on their capital investment plans for the year.

However, I would caution that, you know, everybody's going to be reassessing that at the close of the fiscal year when they start doing their planning for next year. And for that reason, I think it's just really important that incentive programs like this don't send start and stop signals, right, so they can allow end users and purchasers and manufacturers to do that longer-term planning.

I mean, if you run a trucking company, like I've run a trucking company, every data is a crisis. And

you simply do not have the time in your day between dispatching and maintenance and everything else to hunt and peck for funding and different resources. It's like, if you have a plan and you have a commitment to move towards alternative fuel technology, you really need to know that the funding is going to be available and accessible right -- like all throughout the calendar, whenever you get ready to do your purchase.

And so I just, I'm really working on trying to make sure that everybody is trained and understands how to access the funding, and making sure that it's available, and the technology that they need is there when they need it.

MR. LU: Yeah. Actually, I'd like to bounce back to Dawn to follow-up the discussion on that.

Dawn, I know you've said many times that we need a one-stop-shop for customers and that there's some inadequacies in existing funding programs. Can you talk a bit more about your experiences with that?

MS. FENTON: Well, in terms of the one-stop-shop, I mean, that's something that I think we see as a need. I mean, there's -- I can't say that we have any experience with that because it doesn't exist quite now.

But what I can say is from the case of, say, our Volvo LIGHTS Project, I mean, that is -- and it's

amazing how much we've learned on so many levels from that project and we're not even halfway through it yet. But, you know, I mean, just to pull that all together, to get the charging infrastructure in place, to combine different funding sources for that, it's very difficult.

And when I think about how, you know -- and in this case, you know, Volvo is doing a lot of the work to coordinate on behalf of the fleets. I mean, the fleets aren't having to take it on themselves.

And so it really indicates to me that when a fleet is not part of one of these major demonstration projects and just wants to do it on their own, it's going to be a bear trying to figure out, you know, do I go to HVIP or someplace to get charging vehicle incentives? Do I go to CEC to get charging incentives or is through the PUC? Do I have to combine them? How do they work? Are they timed the same so that the charging infrastructure is going to be in when my vehicles come?

I mean, when everybody's going to different sources and there's different timelines, you know, it's hard to make sure that everything is going to operate right at the same time and it's going to be very fluid.

And it hasn't been -- it's generally been good with the Volvo LIGHTS Project, but there's a lot of people working really hard to make sure that that

happens. And it's going to be very different when you just have a fleet who's just trying to run their business. This is, you know, extra work on their behalf to try and make it all come together.

So that's why I think it's so important for some kind of one-stop-shop so that a fleet can say, okay, I want to buy my first five electric trucks, and so I go to, you know, X department and I want to put in for my vehicle incentives and I want to put in for the charging infrastructure incentives and, you know, see what that's going to -- how that's going to help bring down the cost, and to make sure that it's all going to flow so I'm not going to get delivery of my vehicles and then have them sit there for, you know, six months or eight months before I can actually use them. And the timeline, advance timeline for trucks and for charging infrastructure, is very different or I anticipate that it will be very different going forward.

MR. LU: Yeah. To Morgan, I'm wondering if you have anything to follow up on this? Because you had mentioned, you know, the Port of Long Beach doesn't operate any of the cargo handling equipment. But one area where the Port of Long Beach does have a huge influence when it comes to ZEVs is refueling infrastructure, both for hydrogen and to -- and for

electricity. And you had mentioned earlier about those infrastructure plans.

So can you talk about the planning that goes into the infrastructure for the Port of Long Beach and how incentives may or may not factor into that?

MS. CASWELL: Sure. So it's probably important to clarify the relationship that we have with the tenants and how we install infrastructure.

So typically the way that it works, and this is how it works for shore power, when the first berth regulation came out we, essentially as a service to our tenants, installed the infrastructure. And then we had an agreement through our lease with the tenants to recoup that investment. So that's typically the way that we do it.

On the grant projects, we don't look to recoup any grant funding, but it does work similarly.

So in terms of when we go to do infrastructure, we have a design-bid-build process, and that's standard for any public agency, and it's long. So it can take quite a while to get through infrastructure deployment if the Port of Long Beach is doing that infrastructure on behalf of the tenant.

There are some advantages. We know our infrastructure. We know our terminals. And it's

something we're happy to do. But that's where we feel like we really ought to look at this a little more wholesomely and take a look at the entire terminal so that we aren't unnecessarily spending more than we need to in these piecemeal infrastructure projects.

So that's why we are taking this approach with the Zero-Emission Infrastructure Master Plan. And the pilot projects, which for the most part have been led by the Port of Long Beach for the infrastructure, they've been incredibly valuable for our engineering group to really learn the challenges associated with putting that infrastructure in.

In contrast, some of our tenants have actually opted to utilize the Charge Ready Program, which has been, you know, incredibly helpful in terms of funding. And it's been, also, a little bit of a lessons learned with SCE who, you know, hadn't done this kind of work for us before.

So we're all continuing to learn on the infrastructure side. We're happy to put in that infrastructure on behalf of the tenant. But funding is absolutely critical, you know, not just for us but for them, long term as they look to recoup their investment in infrastructure.

MS. FENTON: Jeffrey, you're on mute.

MR. LU: Sorry about that. Thank you.

Gary, I wanted to turn this to you because I know this is probably different for you and your customers who may be perfectly off the grid, who aren't even working with the utility to bring out extra make-ready.

So what goes into infrastructure planning, both in terms of, you know, electrical readiness for -- I believe you also have customers who look into hydrogen fuel cell as well?

MR. DANNAR: That's right, Jeffrey. We did have an off-road. This situation is much different than, perhaps, what we're hearing today where fleets of equipment are 24/7, and they're urban in nature, where a grid is the cornerstone of the infrastructure.

When you do consider off-road equipment that's used at a zoo, at an amusement park, at a resort, at a commercial office park, there's a lot of equipment out there in agriculture that don't even have a grid. And they have relied on diesel generators to run diesel water pumps and wells and so forth.

And Commissioner Scott brought this up earlier with a question about scaling up. And, you know, we're working with some agriculture producers and processors that -- agriculturally, and they're wanting to scale up

into the hundreds of units. But they recognize they'll have to have an infrastructure that is unique to them.

And I think that's the takeaway is we're not going to have off-road infrastructure, charging infrastructure, that works as easily as transportation. Transportation was very simple, Level 2, Level 3, and location, location, location, coming off the grid. Now the solution will be some grid, some microgrid, some battery storage onsite, some solar, maybe wind, a biodigester, you know, onsite, producing electricity. We're having to understand that technology across all that and figure out what works best for the customers that want to scale up. In a sense, they create their own energy or they're managing their own energy, if that's -- if you follow that.

MR. LU: Yeah. Absolutely. Yeah. Completely different approach when the grid isn't necessarily available.

Continuing that light of charging, Amanda, I'm wondering, I know BNSF already has several demonstration projects with plugin electrified cargo handling equipment. Have you run into any problems when it comes to interoperability when -- like especially with charging or charge ports?

MS. MARRUFFO: Yeah. Absolutely, we have.

And, you know, funny enough it was with -- under the same OEM. So even with one OEM, you come across issues where maybe they upgraded to a new model of vehicle and now that existing charging infrastructure or charging station that you installed is no longer compatible with that new vehicle model. So basically what you did as an early adapter, you're sort of now being hurt for those early decisions.

And I think Gary had used this term earlier, and I don't know if I'm going to use the term correctly, but he said, attachment agnostic. So, to me, that means, you know, any attachment, any connection can work. You have this interoperability. And that's what we need between the OEMs, both for the chargers and the vehicles. Because what we're seeing is we're going in a direction of having smart chargers, which usually the vehicle OEMs, that's not their expertise, that's not their realm of -- they don't necessarily know the charging technology. So we're seeing a divergence in having a different OEM for the charger and now a different OEM for the vehicle.

So I think that interoperability is going to become even more of an issue as we see more OEMs come into the field.

MS. OKUK: You're muted, Jeffrey.

MR. LU: Sorry. My space bar doesn't seem to

be working.

Dawn, as an OEM, did you have any thoughts on that sort of interoperability of working with you creating the vehicle but also ensuring that charger manufacturers are able to support that vehicle?

MS. FENTON: Well, yes. I mean, there's a lot going on in the space right now. I mean, I was, you know, nodding to Amanda. It is a different world in the sense that, you know, we're a vehicle OEM. We're not into the charging infrastructure and so we have to count on, you know, EVSEs and others to manufacture those goods and to incorporate to work together with them to figure out a good solution.

In terms of, you know, common -- the OEMs, the truck OEMs are working together. And there is work going on now in terms of having standards in place, looking to make sure that charging ports are all located in the same place. There are different charging standards that exist right now. It's just a function of the fact that we're at the very beginnings of this transition. It's just the nature of going through something so new. And we're learning from all this. I mean, there are different chargers, different speeds of charging. And what's right for one customer may not be right for another customer.

And so in these early days, you have to have

different options available so that you have the experience to learn what works best. And then, obviously, after you've had several of these experiences, and I don't mean just Volvo or just a certain fleet but I mean across the industry, then you can try and hone down and get it to the point that it makes the most sense once you get past those early adopters and you get to me more massive scale.

But, yeah, it's a time of learning and transition and -- but we will get there. We will get there.

MR. LU: Indeed, we will.

You know, we've had this discussion about some of the background, logistical charging, how do you incorporate that into it? I mean, but I kind of want to hear about what operators of these vehicles in these pilot demonstration projects have been saying. Because, ultimately, these are the folks who will be using the vehicles. We need to know their thoughts as well.

Niki, I'm sure you've gotten a lot of feedback through HVIP and CORE recipients. What have you been hearing from people who have adapted some of these ZEVs into their fleets?

MS. OKUK: Yeah. I think -- I don't want to sound like a broken record, but the one-stop-shopping is

important, right, this ability to purchase a vehicle and the truck at the same time. But the thing that I think I've learned and is interesting is that you have to flexibility in that relationship. Because the person who owns the vehicle is not always the person who owns the charger. And this is definitely true in off-road applications; right? You have terminals and ports and rail yards. And you have third-party operators that are using real estate that's owned by someone else.

It's definitely true in the on-road applications; right? You have fleets that lease these properties. And the chargers, you know, go like hand-in-hand with the equipment, but then, at some point in their life, maybe be separated from the equipment.

And I think being -- sort of being flexible to understanding those relationships has been a learning curve. Very often, you know, funding will have, you know, a rule attached to it, like you can install a charger if you can show that you're purchasing a vehicle, or something like that. Well, if they're -- but if they're not being purchased by the same parties, they're not going to be owned by the same parties. They may eventually be used in other different future applications.

So while it's important to have funding

available and accessible and simple and in one place, it's also important for it to be flexible, adaptable, and sort of understanding to the fact pilots and demos are very often executed in sort of the perfect scenario, right, where you have all the stakeholders onboard; right? Dawn was giving this perfect example of Volvo LIGHTS. You've got all these entities that are coordinating. But when we move past, when we go to scale, when we're past pilots and demos and we're commercializing this technology, there will very rarely be those perfect scenarios. Every single one will be different.

MR. LU: Um-hmm. Morgan, I'd like to enlist you as well. You know, you have plenty of demonstration projects at the Port of Long Beach. How are these operators or these drivers feeling about these vehicles? And how do they share their learnings with each other, you know, with all the other tenants at the port?

MS. CASWELL: Sure. Yeah. So the feedback we've gotten thus far is predominantly positive from the folks that are actually driving the equipment. They like that it's quieter. They like that it's brand-new. Everyone wants to be in the brand-new piece of equipment.

So as long as this, you know, meeting the duty cycle that it needs to meet, the reaction is, generally,

positive. For the actual operators of the terminal the same is true.

On the flip side, if it doesn't go well or the relationship with that developer or the OEM or the technology developer, you know, isn't solid, that information is shared across terminals. So they do actively speak to one another. And for many of our projects, they're going well, and that has translated to other terminals. And they start to have interest in pieces of equipment or charging solutions that maybe they hadn't considered before but because it worked at a different terminal, they're really intrigued and they want to be part of it as well. So they do talk to one another.

The port, also, jointly with the Port of Los Angeles, pulled regular, what we call our cap implementation meeting or cap stakeholder meetings, where we get -- all of our stakeholders are invited to come to the port -- and in the future we'll probably be virtually come to the port -- and discuss, you know, some of the lessons learned of the technology projects. And we try to inform them on what we're seeing. And we're absolutely looking for them to speak to one another and to engage with us on what their experience has been. So we try to create a more regular platform for folks to

interact with one another but also to interact with the ports and to hear how our demonstration projects are going.

MR. LU: Yeah. Do any of the other panelists want to chime in on this topic, sort of scaling beyond demonstration into regular ZEV adoption?

MS. FENTON: Yeah. Just to build on a couple of things that Morgan said, yes, I think that getting back to the operation of the vehicles, I mean, you know, generally speaking, people love driving these vehicles. I mean, they're so cool and easy to operate. I mean, I drove one of the all-electric, the new all-electric Class A trucks. And it is just so much easier. And I've heard from people who operate these regularly, what a difference it makes in terms of the sound, and little things I wouldn't even think of.

I mean, we did a video for one of the -- on the Volvo LIGHTS Project and somebody was saying that it makes it cooler because they're not sitting -- this is for the freight handling equipment, not trucks, but they're not sitting on top of a hot engine and so it's actually cooler as well. So there's a lot of benefits to that.

And as you know, not just in this world but in every realm, I mean, news travels fast. And that goes

whether it's good news or whether it's bad news. And so it's great from the good news standpoint when things go well.

But this is why -- and this is why, with the Volvo LIGHTS Project, we're working very hard to try and get information out about this, about the positives of the project, and also the challenges to avoid others having to engage or maybe minimize the challenges that they have. Because the worst thing that can happen is that if, you know, people get a bad first experience and then they're not coming back.

And that's one of the things that we're concerned about, especially when it comes to fleets adopting, you know, their first few trucks. I mean, if it's not a relatively painless endeavor, they're not going to go forward with more. And they're going to -- the word is going to spread and then others are not going to take it on either.

So that's why it's so important to make it easy for those initial fleets to get access to the funding and the infrastructure that they need and have a good positive experience.

MS. MARRUFFO: This is Amanda. I just have one thing to chime in, if I could?

So BNSF had a very different experience in

terms of when we first rolled out our electric vehicles operated by our service partner. They did not like operation of the electric vehicles for many different factors, many different reasons. But I would say it took about a year-and-a-half of working hand in hand with them to get them comfortable, you know, also the OEM working very closely with us in making modifications to the vehicles. Because one of the things that we noticed is the more different that the electric vehicle is from its diesel counterpart the longer that adoption period is probably going to be because people are creatures of habit. They have to get used to something that's different. And for some folks, it's just, it takes longer than others.

So I just wanted to say that our experience was a little bit different but we eventually got there.

MR. DANNAR: So, Jeffrey, I might add just a couple of points that haven't been brought up regarding the user experience in the fleet to managers is maintenance and autonomy.

Everybody has stated exactly the same cases, we, as far as operators, liking the extra performance and liking how quiet it is and so forth, but noticeably different on off-road work machinery, backhoes, trenchers. And, you know, all this working equipment is

about one-tenth the maintenance. That increases productivity. And it's noticeable that the equipment can be safer and more productive for the fleets.

But the autonomy and semi-autonomous, the large global OEM manufacturers are not investing a lot of autonomy into diesel equipment. But with electric equipment, now you can start assisting the operator. And the operator has an easier time of operating the equipment when there's some assistance, some intelligence onboard that is, perhaps, adding not only safety but more productivity, more performance.

So we've seen very eager adoption of work machinery that is doing something unique with the semi-autonomous operation and in the lower maintenance.

MR. LU: Great points. Thank you all for chiming in on that.

We have four minutes left of this presentation -- excuse me, panel discussion.

I wanted to actually circle back to Román's presentation earlier, his being on equity.

Niki, this one's for you. I want to know your thoughts on how CALSTART is considering -- well, I guess CALSTART is in administering (indiscernible), how we're considering equity and quality of life in terms of for our communities which are disproportionately impacted by

pollution? How can we build that into electrifying fleets and switching over to ZEVs?

And, Niki, you're on mute right now.

MS. OKUK: Of course. The program was designed to have and create a voucher incentive for equipment that are deployed in overburdened communities. So for the CORE Project, about a ten percent additional funding for vehicles that are operating in designated DACs and low-income communities, as defined by CalEnviroScreen.

Now all of that said, it also follows, though, that most of the vouchers are deployed in those communities because those communities are where our freight hubs are. So we find that two-thirds of the funding ends up being spent in operations in those designated areas just sort of naturally. But definitely, you know, going out of our way to make sure that our outreach efforts, our educational efforts, our coordination efforts are really focused on the areas that are experiencing the highest rates of, especially, particulate pollution, now more than ever; right? Because we have now a sort of combined public health crisis that's only exacerbated by sort of long-term exposure to these types of pollution.

So we've been working really hard on that but we also, you know, understand that it is more and more

difficult to access sort of the more equity portion of the project as far as delivering the dollars into the hands of minority-owned and diverse-owned businesses; right?

We do find that the businesses come back again and again once they've used the voucher program. I look back over the ten years of, say, an HVIP project, and the same company, if they, you know, they bought a bus or bought a truck a few years ago will come back and purchase again using the system, so once they learn it. But, you know, larger companies with greater resources and staff that are dedicated to these types of things can access this funding a lot easier.

And so it really is imperative for us to go the extra mile to make sure that we can find those small businesses, those owner/operators, the smaller fleets, so that they can have access to this funding as well.

MR. LU: Um-hmm. Did any of the other panelists want to chime in on building equity into these projects before we transition into ZEVs?

MS. CASWELL: Sure. I'll jump in.

I think what Niki described is absolutely true. And, you know, making sure that you're targeting investments in those communities most burdened by freight operations is absolutely critical.

I think there is quite a few opportunities that Román had discussed. And one major opportunity is, you know, ensuring you have equity goals built into some of these projects.

So, for example, we have an explicit equity goal for our microgrid project, and it's CEC funded. And through that project the port will work with the International Brotherhood of Electrical Workers to ensure 20 percent of all journeymen hours related to installation of the microgrid will be matched with appropriate apprentices who are sourced from the local dispatch facility. So making sure that these opportunities are maintained in the port area where the communities are most impacted.

We can also do other things, like invest in curriculum development or training or do a better job of linking job opportunities in freight and goods movement, where we expect to see expansion, with the local community. And that's something our Communications Division has been pretty focused on.

MR. LU: Great. Thank you so much.

We are at 11:40, so I want to take a moment just to thank all the panelists for taking the time and joining us today to discuss these topics.

Unless anybody else has some point they're just

dying to make, I think I'm going to hand it off to Heather for the next section of this workshop. Any last points? All right. Great. Thank you to all of you.

MS. RAITT: All right. This is Heather, Heather Raitt.

Thank you, Jeffrey, and thank you to our panelists. That was a really great discussion. I appreciate you giving your time here today to share your expertise on these important topics.

Now it's time to turn to the public comments. And so we are allowing one person per organization to make comments please. And we're going to limit comments to three minutes per speaker.

If you're using the Zoom platform, use the raise-hand feature to let us know you'd like to comment. And if you change your mind, you can also just use that to un-raise your hand. We'll call on you and open up your line to make comments at the right time.

We also have folks on the line that aren't on the Zoom platform. And you can just press star nine to raise your hand and we will read out the last three digits of your phone number at the appropriate time.

And, finally, we have a lot of comments on Q&A. And we, unfortunately, won't be able to go through them all but we will read some of them.

And, panelists, some of them are questions to things that you spoke on. So if you would like to respond, you may, or we can just read them for the record and that's fine too.

So Lindsey Buckley, the Director of Communications and External Affairs at the Energy Commission, is going to conduct the public comments for us for this session.

Thank you, Lindsey, if you want to take it?

MS. BUCKLEY: Thank you, Heather.

Okay, so I'm going to first call on folks that are using the raise-hand feature on Zoom, so please state your name and affiliation for the record, and also spell your first and last name after you're un-muted and before commenting. Folks are going to be limited to three minutes, so please be watchful of the clock or we will go ahead and help you out with that.

So the first person I'm going to call on is Tim Sasseen.

And, actually, Harrison, it looks like you might need to un-mute on your own because I'm not seeing the un-mute option on my end as the co-host.

MR. SASSEEN: Hi. This is Tim Sasseen. Am I coming through?

MS. BUCKLEY: Oh, Tim, you are coming through,

yes. So your line is open. And please just state your name and affiliation and spell it for us also.

MR. SASSEEN: All right. Technological success. My name is Tim Sasseen. I'm the Market Development Manager for California for Ballard Power Systems.

I'd like to thank the California Energy Commission for putting on these panels over the next couple of days. This is really important work and really informative.

I have a question, I guess, for the Port of Long Beach, moreover, talking about the balance that's been spoken about between battery-electric vehicles and hydrogen-electric vehicles. Battery-electric vehicles are, obviously, very well suited for applications that require noncontinuous duty and that have flexible charging schedules. We know there's going to be great applications at the port for those. Hydrogen fuel cell vehicles are going to do well for vehicles requiring continuous duty and that require rapid refueling.

The question then comes down to how to balance those out and how to prepare for infrastructure? Because we're looking at infrastructure here that's going to be decades in utilization and cost trajectories that are changing rapidly for both technologies.

So how do you address that balance between the two technologies when you have to do so much preparation for infrastructure, knowing the difficulties and bringing in new interconnections through the L.A. Basin and the tens of megawatts for grid charging, as opposed to moving fuel back and forth?

So that's my question, and how do you consider that balance between the two different vehicle technologies?

MS. CASWELL: Sure. I can go ahead and answer that quickly.

It absolutely will be a balance and it will -- we are absolutely supportive of both technologies. We have had fuel cell demonstration projects and those have been critical to advancing some of the lessons learned associated with how do you fuel, you know, the equipment, given we don't have the infrastructure for it today? A lot of them are bringing in, you know, the mobile refuelers.

But long term, looking at it, you know, that's going to be a conversation that the port has with each tenant on our own to identify what makes most sense for their operations. And through that master planning process the hope is that we would identify specifically the equipment that needs to go in and then the associated

infrastructure and what that heavy lift is going to look like.

From the port's perspective, we also need to take a step back and say if we've got multiple terminals with interest in using the fuel cell technology, which that may be the case, how do we prepare for that as a port? So that's a balance we're going to continue to try to strike. And we're actively working on that on a terminal-by-terminal basis.

MR. SASSEEN: Thank you.

MS. BUCKLEY: Okay. Thank you.

Next up we have a participant who is named CTE11.

Participant CTE11, we are un-muting your line. You may need to un-mute on your end. If you could please state your name and affiliation for the record, and also spell your first and last name?

MR. LEVIN: Sure. This is Jaimie Levin, spelled J-A-I-M-I-E, Levin, L-E-V-I-N, with the Center for Transportation and the Environment. And, also, I would like to thank the Commission for putting on this, I think, really valuable workshop.

Several speakers and Commissioners raised the challenges of how we are going to afford this transition

to zero-emission, which we all recognize is critical to our long-range state goals. And in making that transition with really scarce dollars that we have, as much money as the State of California has raised, we are looking at scarce dollars impacted by COVID and the like, it's going to be so important that we evaluate solutions from a performance-based standpoint.

And I thought it was very interesting. Román, in his presentation about equity, many of the -- especially we see this in the drayage operation, many of the end users, the fleet operators, are independent truckers who require applications that will meet a number of different duty cycles that, therefore, are based on performance evaluation criteria.

So I wanted to throw this out to the panel, how -- essentially asking the question and asking you to comment on the importance of understanding the business aspect of operating our ports, operating off-road vehicles, and of course, this bridges over to on-road vehicles as well, in order to utilize our dollars effectively on both vehicles and infrastructure?

Thank you.

MS. BUCKLEY: Thank you very much for that comment.

If any of the panelists want to respond, please

jump in. Otherwise, we will move to the next public comment.

Again, just a reminder, this is a public comment period. If you are intending to submit written comments, you can do so. Please raise your hand to submit your three minutes of public comment in the meantime.

So we're going to go to our next commenter with the raised-hand feature.

Eileen Tutt, we are un-muting your line. You may also need to un-mute on your end. If you could please state your name and affiliation for the record, and also spell? Eileen?

MS. TUTT: Hi. This is Eileen Tutt, E-I-L-E-E-N T-U-T-T. And I'm with the California Electric Transportation Coalition.

And I heard throughout this conversation, which was fabulous, by the way, really. I want to thank your group again. And, Jeffrey, great job moderating. And a really good presentation by Greenlining.

We heard a lot of issues about infrastructure challenges. And, in fact, Volvo went as far as to say -- Dawn, you said that infrastructure is the single largest challenge in this sector. I don't know that I agree with that because I think one of the other single largest

challenges that came up is we don't have adequate or reliable funding for these incentive programs. And right now, with the governor's budget that was -- if the May revise is passed, then these programs will all go on hold. So we really -- that is a huge challenge in my mind and one that is absolutely immediate and critical.

But I do want to just say that, you know, at the California Electric Transportation Coalition, we have -- our members include every single utility in the state for the most part. And I do think that this is a uniquely daunting challenge, and also an incredible opportunity. So, you know, we can create -- we can install this infrastructure in the time needed and we can do it at costs that are reasonable. And we've done a lot of analysis around this so we know this is true.

But we do need a more coordinated public-private effort. And we have called for the creation of some kind of task force or implementation team, call it what you like, but we believe we need cross-agency coordination, but also public-private coordination. So we need a public-private partnership to really make this happen effectively and to address the many challenges that infrastructure presents, and embrace and make sure we recognize and grab the many opportunities that this infrastructure build-out provides, not just economic

opportunities and the opportunity to really go all in for zero-emission transportation, but also jobs opportunities, and jobs opportunities that are in communities that are most deserving of those jobs and most in need of those jobs.

So just wanted to put that out here. And anybody who can help, we've got to get this thing up and running and this kind of task force, or whatever you want to call it, group, public-private partnership created so we can get on this challenge and make sure that we meet it in a very equitable way.

So thank you.

MS. BUCKLEY: Thank you, Eileen.

Next up for public comment is Meredith Alexander.

Meredith, we are un-muting your line. You may need to un-mute on your end. Again, please state your name and spell it for the record. Meredith?

MS. ALEXANDER: Hi. Can you hear me?

MS. BUCKLEY: Yes. Thank you.

MS. ALEXANDER: Okay. Great. My name is spelled M-E-R-E-D-I-T-H, Alexander, A-L-E-X-A-N-D-E-R. And I am with CALSTART. I am our Policy Director. And just wanted to make a few statements.

I very much appreciate Niki's presentation and so glad that she could participate. And thank you for including CALSTART in this morning's workshop.

I, following Eileen, have less to say than I may have before. But I did just want to highlight for the Commissioners and other participants that, you know, we just launched this wonderful program, CORE, a few months ago and it's been so popular, as Niki highlighted. But funding for this program going forward is now incredibly uncertain, as well as for the types of projects that BNSF so helpfully highlighted.

You know, we're making just incredible technological progress and we're really poised at what we think is a tipping point for these technologies. Manufacturers are bringing new products to market. You know, we're really seeing all these technologies become real that we have been trying to, you know, create over the past five to ten years. And, unfortunately, now we're at the point where technology is available in this space and, yet, the state is not indicating that there will be incentive funding going forward.

And so we really think all this progress is just really at risk. And, obviously, the Energy Commission has such an important role to play with its Clean Transportation Program. And you all have been

focused on the infrastructure piece, you know, to date for off-road and developing new incentive programs for medium- and heavy-duty. So we just wanted to highlight that it may be that the GGRF is such an unreliable source of funding for these technologies that the Clean Transportation Program, you know, needs to, perhaps, step back into the, you know, pilot and demonstration role for these off-road technologies, as well as potentially considering equipment or, you know, vehicle incentives if GGRF is not going to be able to fund programs like CORE moving forward or fund pilot and demonstration projects in the off-road sector.

Thank you very much for your time. And thank you again for having this workshop, Commissioners.

MS. BUCKLEY: Thank you, Meredith.

That takes us through all of the raised hands that we're seeing on Zoom.

And so at this point I'm going to read off several of the comments that came through on the Q&A box.

So one comment from H.E. Christian, Chris Peoples (phonetic), is,

"The charging infrastructure issue is solved by going to hydrogen-electric heavy-duty vehicles. You have the

different problem of hydrogen stations. But I submit that this is a simpler problem than charging stations run by utilities with geographic monopolies."

The next comment that we have through the Q&A box, Antonio has submitted a comment.

"I appreciate the valuable discussion here today. I believe that zero-emission goals, while highly focused on battery-electric vehicles, will also be achieved with the diverse option of technologies where these can work well together and complement each other. Unfortunately, most of this coordinated approach seems to be absent throughout the ZEV dialogue.

"Today I heard the representative from Volvo noting SCEV (phonetic) as a longer-term alternative for Volvo. It is important to recognize that other OEMs have been engaged and are investing in the development and near-term deployment of SCEVs.

"Significant progress has been made in the last few years through collaborative efforts among industry, as well as in close coordination with governments. I'd like to learn about CEC and government incentives and policy tools that will aim to bring a balanced and equal market opportunity for both the ZEV technology options."

And the next comment that I'm going to read is

from a Dee Lisa (phonetic) who is targeting this comment at Niki, one of our panelists. And they say,

> "In addition, hydrogen stationary fuel cells provide resilient backup power to support telecommunication sites. Currently, the South Coast Air Quality Management District is using and H2FC backup generator to provide tenth prime power to an air quality monitoring project, complete story to be released soon by the South Coast Air Quality Management District."

And that is it in terms of the comments that were submitted through the Q&A box.

And with no more hands raised or comments in the Q&A box, we'll just remind folks again, you do have the option to submit written comments today. The instructions should be on the screen here for you.

And with that, I'm going to hand things back to Heather.

MS. RAITT: Thanks, Lindsey.

This is Heather. And I don't have anything more to add, so Commissioner Monahan, if you wanted to make any further remarks? Thanks.

COMMISSIONER MONAHAN: No. I just want to thank everybody. Thanks to the team, again, the IEPR Team for pulling together, and the whole Transportation

Division for setting up the agenda, all our panelists. We really appreciate it. Again, this is our first time ever using Zoom for an IEPR meeting. And I think, I mean, it went pretty well, all things considered. We were chatting a lot in the background. You all couldn't see that but there was a lot of chats about what to do. And I feel like we learned a lot. We're going to keep using this platform. We're going to keep getting better at this platform. And just thanks, everybody, for participating and hope you rejoin us for the afternoon.

MS. RAITT: Thanks. We'll close out and see you this afternoon. Bye everybody.

(The workshop concluded at 11:59 a.m.)

CERTIFICATE OF REPORTER

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 certified electronic court reporter and 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 23rd day of June, 2020.

MARTHA L. NELSON, CERT**367

CERTIFICATE OF TRANSCRIBER

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 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.

I certify that the foregoing is a correct transcript, to the best of my ability, from the electronic sound recording of the proceedings in the above-entitled matter.

June 22, 2020

MARTHA L. NELSON, CERT**367